PB ASSOCIATES

ECONOMIC REGULATION OF TRANSMISSION SERVICES UNDERTAKEN BY DNSPS

An independent review

Prepared for

EnergyAustralia

***PB Associates** Quality System:*

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EXECUTIVE SUMMARY

Energy Australia ("EA") owns a significant number of assets that, on the basis of the definitions in the National Electricity Rules ("the Rules"), form part of the transmission system. These assets represent a small proportion (around 12%) of Energy Australia's total regulated asset base.

EA is of the view that this transmission function is incidental to the provision of distribution services and for, all intents and purposes, the assets are managed and operated as a single integrated network business. However, the Rules, as currently drafted, require two separate regulatory reviews to be undertaken, under two distinct and separate regulatory regimes. EA proposes a change to the existing Rules that would allow a single regulatory process for its entire network, with separate pricing of the transmission and distribution networks following the calculation of the revenue requirement.

PB has undertaken an independent review of current regulatory practice and has assessed whether the benefits of moving to a single determination for EA's entire network outweigh any adverse market or customer effects. It is intended that this review will support EA in its rule change proposal submission to the Australian Energy Markets Commission (AEMC).

In pursuit of the project objective, PB has undertaken the following tasks:

- conducted an independent review of EA's existing processes associated with transmission and distribution price determinations;
- identified the potential process efficiency gains which might be realised through the removal of duplication and/or process redundancies in the event of the proposed Rule change being adopted by the AEMC; and
- explored the new processes associated with developing transmission and distribution prices in the context of a single network regulatory review process.

Through this process PB has developed an independent view on the likely impact of the proposed changes on both transmission and distribution customer prices and on regulated revenues.

The PB conclusions are as follows:

- the introduction of a single regulatory review would increase process efficiency and reduce costs – both for the regulator and the network business;
- the opportunities for rationalisation of the price setting processes are limited and any changes to pricing may result in significant customer price disturbances;
- EA should continue with its current principles of revenue allocation to avoid customer price disturbance;
- there will be no impact on customer prices, nor on the financial position of EA, as a direct result of the proposed single review process, other than the potential effects of a change in WACC;
- the impact of applying a distribution WACC to EA's transmission assets is likely to be negligible and could anyway be easily corrected if required; and
- the potential change in WACC should be weighed against the potential change of the parameters other than debt margin, market benefits from the simplification of regulatory processes, impacts from movement in capex incentive arrangements and impact from movement in incentive arrangements for service standards.

1. INTRODUCTION

In this section we set out the background to the PB review, the objectives of the works and the scope of our engagement. We also include a description of the PB approach to the project.

1.1 BACKGROUND TO THE REVIEW

Energy Australia ("EA") owns a significant number of assets that, on the basis of the definitions in the National Electricity Rules ("the Rules"), form part of the transmission system. These assets represent a small proportion (around 12%) of Energy Australia's total regulated asset base.

PB understands that EA is of the view that this transmission function is incidental to the provision of distribution services and for, all intents and purposes, the assets are managed and operated as a single integrated network business. However, the Rules, as currently drafted, require two separate regulatory reviews to be undertaken, under two distinct and separate regulatory regimes.

In both the 1999 and 2004, EA was subjected to separate regulatory determinations for its transmission and distribution networks. The Australian Competition and Consumer Commission (ACCC) undertook the regulatory review of the EA assets deemed to be *transmission* and the Independent Pricing and Regulatory and Tribunal (IPART) reviewed the EA *distribution* assets. EA has advised that a significant level of duplication and redundancy was evident in the undertaking of two concurrent reviews. EA believes that this problem will be exacerbated when responsibility for the regulation of both networks rests with the same regulator – the Australian Energy Regulator (AER)[1].

For these reasons, EA proposes a change to the existing Rules that would allow a single regulatory process for its entire network, with separate pricing of the transmission and distribution networks following the calculation of the revenue requirement. Separate pricing would enable a continuation of the established frameworks for the development of prices and the associated continued close management of end customer price disturbance.

1.2 OBJECTIVE AND SCOPE OF WORK

The overall aim of this assignment by PB has been to undertake an independent review of current regulatory practice and to assess whether the benefits of moving to a single determination for EA's entire network outweigh any adverse market or customer effects. EA intends to use this independent report to support a rule change proposal submission to the Australian Energy Markets Commission (AEMC).

1.3 PB APPROACH TO THE REVIEW

In meeting the project objectives, PB has undertaken the following tasks:

- conducted an independent review of EA's existing processes associated with transmission and distribution price determinations;
- identified the potential process efficiency gains which might be realised through the removal of duplication and/or process redundancies in the event of the proposed Rule change being adopted by the AEMC;

[1] The AER is part of the Australian Competition and Consumer Commission (ACCC).

- explored the new processes associated with developing transmission and distribution prices in the context of a single network regulatory review process; and
- formed an independent view on the likely impact of the proposed changes on both transmission and distribution customer prices and on regulated revenues.

PB has used these project tasks in order to develop an independent view on answers to the following questions with regard to the change proposals:

- does the proposed new process achieve the desired outcome – for both the DNSP and the regulatory authorities?
- do the proposed changes deliver any market benefits?
- do the proposed changes deliver any other efficiency gains (e.g. organisational, procedural)?
- what is the potential impact on customer prices?
- are there any other issues or options that the new process introduces? For example:
  - allocation of costs between transmission and distribution (options)
  - potential windfall gains and losses for EA.

Structure of this report

In Section 2 of this report we provide an outline description of the existing processes associated with the economic regulation (and price setting) of both EA's transmission and distribution networks. In Section 3 we describe how the new (proposed) process might work and highlight any issues or potential challenges which may arise. Section 4 reports on our analysis on the potential impact of the new regime on ends user (customer) prices. The PB conclusions are set out in Section 5.

Appendix A provides details of the current revenue determination and cost allocation processes for transmission and distribution services.

Appendix B provides details of current price setting processes for transmission and distribution services.

2. REVIEW OF EXISTING PROCESSES

This section of the report describes the existing processes associated with the economic regulation of EA's transmission and distribution assets. This includes an overview description of the regulatory review processes and the mechanisms associated with determining allowed revenues and allocated costs.

As part of this process, PB has reviewed the relevant documentation and has held discussions with specialist EA staff. In this section we also report on any identified duplication and/or process redundancies which may be potentially avoidable in the event that the proposed Rule change is made.

2.1 REGULATORY REVIEW

The revenues associated with EA's electricity assets (both transmission and distribution) are, by virtue of their (natural) monopolistic characteristics, subject to economic regulation. Although the way in which the allowed revenue is described varies slightly between transmission and distribution electricity assets, in both cases the regulator (effectively) prescribes the amount which the business is permitted to charge for provision of its network services.

Under the current regulatory framework EA is required to undergo two distinct, and separate, regulatory review processes. From first inspection it would seem that this arrangement may result in significant duplication and redundancy. Given that the regulation of both the transmission and distribution networks will be undertaken by a single regulator in the future, many of these processes are unnecessary and redundant.

Figure 2-1 shows the two separate regulatory review processes for transmission and distribution. Under the present arrangements EA's network assets are categorised as either *transmission* or *distribution* before the review process can proceed. Projected capital expenditure (capex) and operational expenditure (opex) also needs to be categorised at the start of the process.

Presently, under the definitions in the Rules, a transmission network is defined as being a network which operates at a nominal voltage of 220kV and above plus any part of a network which operates in parallel and provide support to a higher voltage transmission network – including networks operating at voltages between 66kV and 220kV[2].

The classification of assets can change

This definition can mean that some assets move between classifications in accordance with operational conditions.

Also, the status of assets is 'as commissioned' and this can only be re-classified at the end of the regulatory period. For example, an asset might be commissioned at a distribution voltage (and hence classified as distribution) but the operating voltage may be increased at a later time – this may be, for example, once a new line is subsequently built and commissioned. Additionally, changes to the transmission network can move assets owned by EA into and out of the transmission category (depending on augmentation or reconfiguring of the transmission network).

2 National Electricity Rules, Version 12, Chapter 10 (Glossary). The definition also provides for any part of a network, operating at a nominal voltage of between 66kV and 220kV, to be deemed part of the *transmission network* by the AER.

2.1.1 Transmission

The Australian Energy Regulator (AER) performs economic regulation of the electricity transmission networks operating in the National Electricity Market (NEM). This includes the economic regulation of those assets which are owned and operated by EA and which are deemed to be transmission by virtue of the definitions contained within the Rules ("the EA transmission assets"). The AER assumed this responsibility from the Australian Competition and Consumer Commission (ACCC) on 1 July 2005.

The current determination period associated with the EA transmission assets runs from 1 July 2004 to 30 June 2009. The ACCC set transmission revenues at the beginning of this regulatory period based on its consideration of the required levels of network investment (and operating costs) during the period. The ACCC published its draft determination on the network revenue cap for the EA transmission assets in April 2004.

At this time, the intention was for the ACCC to undertake a review of *actual* capital expenditure at the end of the period and for adjustments to be made in accordance with the ACCC's view of the prudency and efficiency with which investments, during the period, have been made. A so called '*ex-post'* capex regime.

The regulatory framework for transmission was revised in 2005

In 2005, the ACCC moved away from an *ex-post* capex regime to an *ex-ante* capex regime. In an *ex-ante* regime, a greater emphasis is placed on conducting a rigorous review of forecast investment before that investment is undertaken. An investment cap is set at the beginning of the regulatory period; there is little or no emphasis placed on *actual* expenditure and, therefore, no *ex-post* review.

It was considered that this approach delivered a number of advantages – including the provision of greater certainty for stakeholders; improving the assessment framework for capital investments and generally represents a move towards a more light-handed regulatory regime.

As part of the transition to the *ex-ante* investment regime, a further assessment the EA forward capex was undertaken. In April 2005, the ACCC published its final determination, taking account of its re-assessment of the forward capex allowance required under the ex-ante framework.

The present regulatory regime (for transmission) uses a post-tax nominal WACC

Under the 'new' regulatory regime for transmission, the rate of return on assets is calculated on a post-tax basis. In addition, returns are calculated on a *nominal* basis (rather than on a *real* basis). The result is a *post-tax nominal* Weighted Average Cost of Capital (WACC)[3].

Under the 'post tax' framework, the business's tax liabilities are treated as a separate expenditure item and, as such, appear as a separate term in the building block equation.

[3] A detailed discussion on the implications or moving from a WACC based on pre-tax real returns to a post-tax nominal WACC, is beyond the scope of this review. A more detailed discussion can be found in the ACCC Draft Statement of Principals for the Regulatory of Transmission Services, 27 May 1999 (http://www.aer.gov.au/content/item.phtml?itemId=660464&nodeId=cf271e3ac6ead62ea894bf6d429066bc&fn=A2-%20Draft%20SRP.pdf)

2.1.2 Distribution

The economic regulation of the NSW electricity distribution networks is presently the responsibility of IPART. In January 2008 this responsibility is scheduled to transfer to the AER. The AER will assume responsibility for the economic regulation of all of the distribution networks in the NEM at this time.

The current determination period associated with the EA distribution assets runs from 1 July 2004 to 30 June 2009. IPART set distribution business revenues at the beginning of this regulatory period based on its consideration of the required levels of network investment (and business operating costs) during the period. IPART published its final draft determination on the network revenue cap for the EA distribution business in June 2004.

To date, IPART has applied an *ex-post* regime in its assessment of investment in the distribution network. This process relies heavily on a review of *actual* capital expenditure at the end of the period and for adjustments to be made in accordance with IPART's view of the prudency and efficiency with which investments, during the period, have been made.

The present regulatory regime (for distribution) uses a pre-tax real WACC

Under the existing arrangements for the economic regulation of distribution, the rate of return on assets is calculated on a pre-tax basis. In addition, returns are calculated on a *real* basis (rather than on a *nominal* basis). The result is a *pre-tax real* Weighted Average Cost of Capital (WACC). Under this regime tax is already provided for in the pre-tax return and does not, therefore, appear as a separate term in the building block equation.

2.1.3 The price reset review process

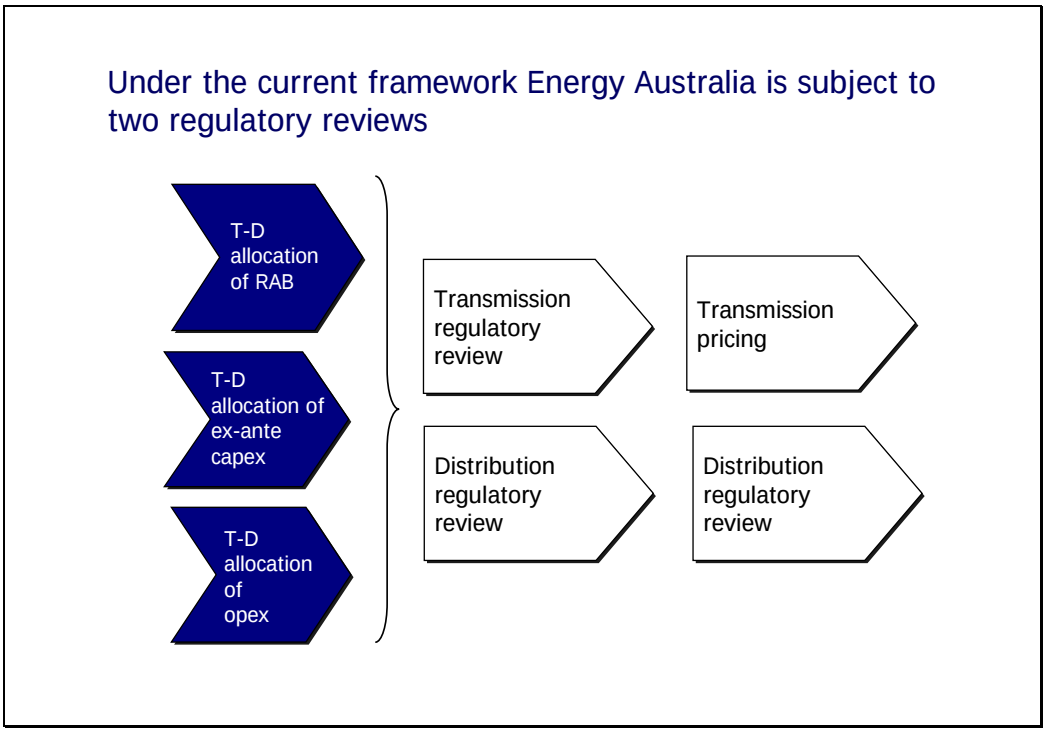
At a summary level, the process for undertaking a regulatory review of monopoly network businesses, both transmission and distribution, for the purposes of establishing allowed revenues, is as follows:

1. business submissions are received by the regulator
2. regulator's consultant is engaged and begins review of submission
3. consultant produces detailed (final) draft report on technical review
4. businesses comment on draft report
5. regulator makes draft determination
6. responses and submissions (from all interested parties) on draft decision and consultant's report
7. regulator's final determination is published.

It is not unusual for the time period to complete steps 1 to 7 above to be 9-10 months. Under the present arrangements all of these review steps are carried out separately for both EA's distribution business and for those assets owned and operated by EA which are deemed to be *transmission*.

In order to begin the regulatory review process set out above, EA needs to undertake an allocation exercise associated with the existing asset base, forecast (*ex-ante*) investment and opex for both transmission and distribution. Figure 2-1 illustrates this duplication.

Figure 2-1 – Overview of regulatory process applicable for Energy Australia



2.2 DUPLICATIONS AND REDUNDANCIES IN THE EXISTING PROCESSES

The differences in the regulatory frameworks for the determination of annual revenue requirements for distribution and transmission services, are minor. Moreover, the differences in these frameworks are expected to diminish, or even potentially cease to exist, as the economic regulation of electricity distribution transfers to the AER and the efforts are made to improve the integrity and consistency of regulatory processes[4].

Nevertheless, distribution service providers having assets deemed to be *transmission* under the Rules (which are incidental to the provision of distribution services) are still required to undergo two distinct and separate regulatory reviews.

Two separate and distinct regulatory reviews would seem to lead to the duplication of a number of regulatory process elements. This include, but are not limited to, the following:

- regulatory submissions by the businesses;
- information requests and financial models;
- the regulator's own analysis;
- regulator's consultant reports;
- publication of discussion papers;
- public forums and third party submissions; and
- reviews of costs and public submissions.

The introduction of a single regulatory review process for distribution businesses having some assets also deemed *transmission* by virtue of the Rules definition, would result in

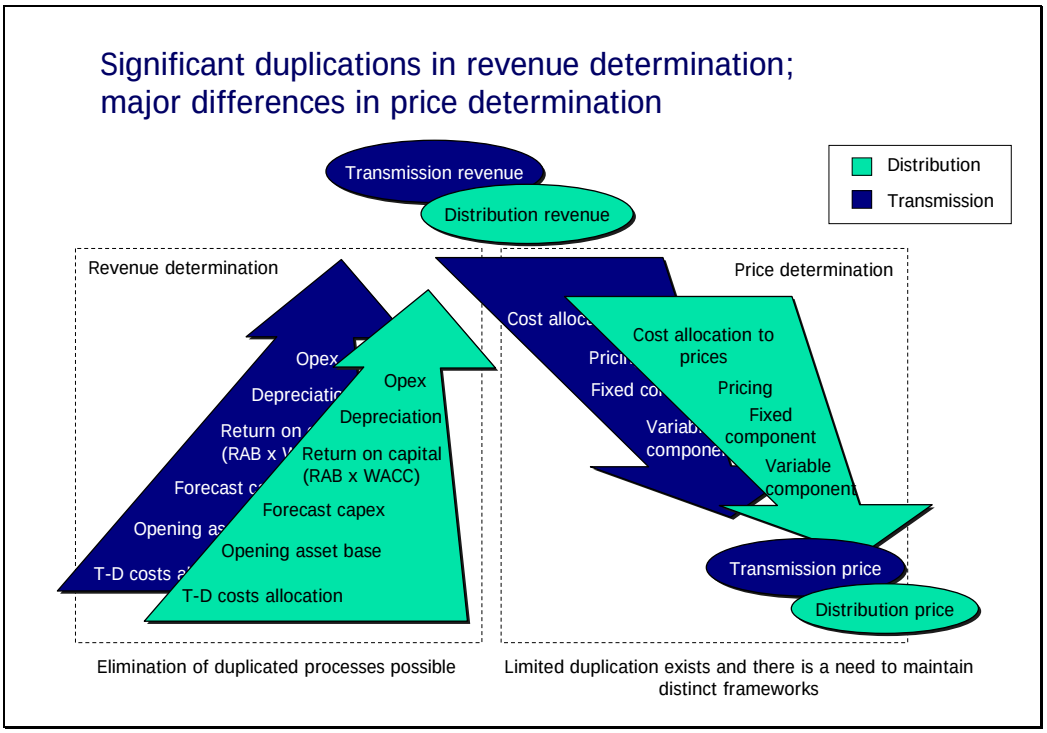
4 Indeed, PB can see no reason why a pre-tax real, ex-post, framework (with regulatory depreciation) and a post-tax nominal, ex-ante, framework (with accounting depreciation) should coexist under a single national regulator.

elimination of these duplications and would lead to significant simplification of the processes. This, in turn, would increase process efficiency and lower costs – for both the businesses and for the regulator.

Whilst the processes associated with the determination of the overall allowed revenue for transmission and distribution are very similar, the subsequent process for determining prices is distinctly different. Price incentives for typical transmission and distribution customers are very different. This is also reflected in a difference in both cost allocation principles and final price structures. The opportunities for rationalisation, and hence simplification, of the price setting processes are, therefore, somewhat limited. Moreover, any changes in pricing processes could lead to unacceptably high customer price disturbances.

The high level revenue and price determination processes, and the identified key areas of duplication, are illustrated in Figure 2-2.

Figure 2-2 – Revenue and price determination processes for distribution and transmission



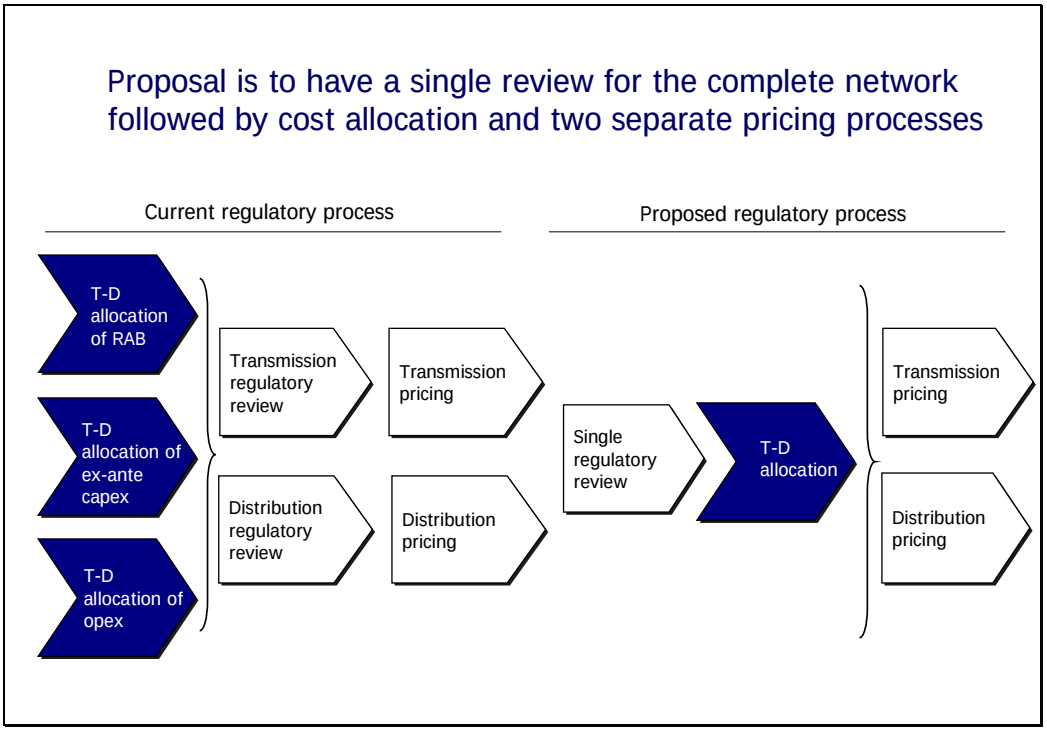
3. TRANSMISSION AND DISTRIBUTION PRICING UNDER A SINGLE REVIEW PROCESS

In order to simplify the regulatory process and to ensure the integrity of regulatory framework, PB understands that EA is seeking a single regulatory determination for its entire network business.

Under this proposal, all of the EA network, including both transmission and distribution assets, would be the subject of a single regulatory review. With the vast majority of the EA assets being associated with the distribution network, and with EA essentially being a distribution network business, it would seem appropriate for the single, rationalised, regulatory review process to be based on that currently applied to the distribution business.

Under the EA proposals, the single regulatory review for EA would be followed by an allocation of allowed revenues (based on a number of alternative methodologies) and then a separate process for the development of distribution and transmission prices – based on existing methodologies. A comparison of the current and proposed regulatory processes is illustrated in Figure 3-1.

Figure 3-1 – Comparison of current and proposed regulatory processes



3.1 SINGLE REGULATORY REVIEW FOR EA'S NETWORK

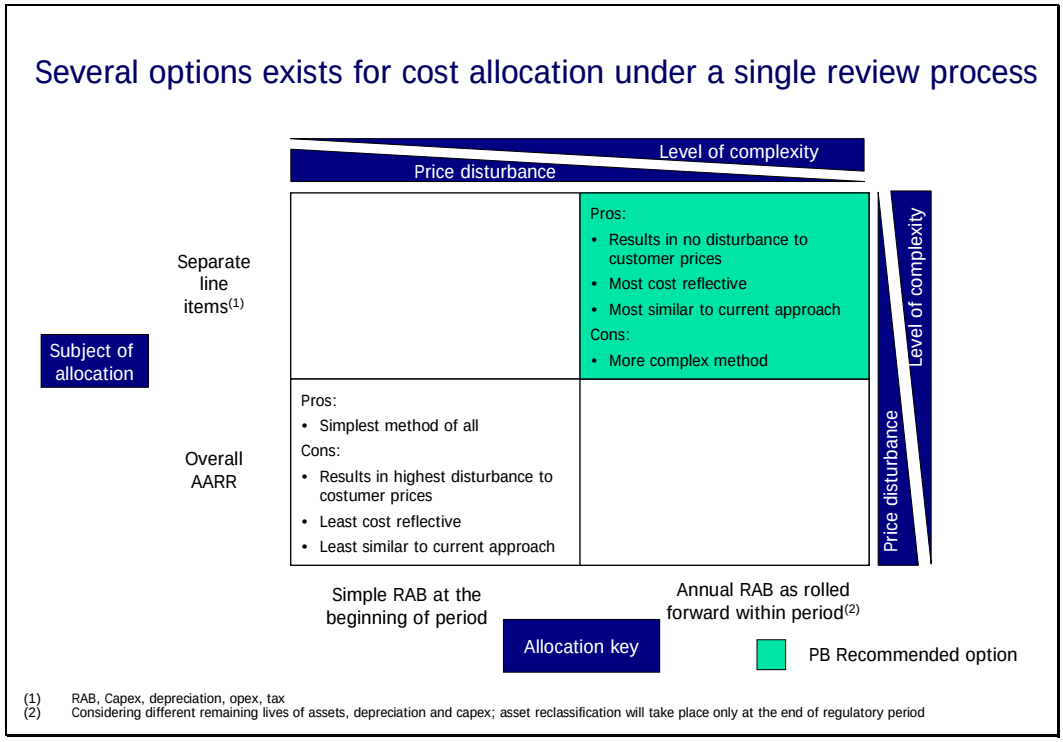
Under a single regulatory review, the AARR would be based on the same building block approach as currently used in both transmission and distribution price reviews. The AARR would be the sum of return on RAB, depreciation, efficient operating costs and tax (in the case of a post-tax framework).

3.2 ALLOCATION OF AARR TO DISTRIBUTION AND TRANSMISSION SERVICES

Once a single AARR is established for the transmission and distribution assets, there is a requirement to apportion, or allocate, the revenue across the two businesses so as to yield an amount which can be used as the basis for setting prices.

There are several options for this cost allocation process ranging from simple allocation of AARR based on RAB value at the beginning of regulatory period to a more complex allocation methodology which examines each individual terms in the building block equation considering different cost allocation keys. An overview of some potential allocation methods is illustrated in Figure 3-2.

Figure 3-2 – Overview of cost allocation options under single review process



Under the current regulatory frameworks, the allocation of costs between transmission and distribution is at a building block level. Specifically:

- the transmission and distribution asset bases[5] are treated separately;
- depreciation is assigned in accordance with asset identification in existing accounting systems;
- operating costs are either directly associated with transmission or distribution functions, or are allocated according to more detailed (engineering) assessment of cost centres; and
- tax is recovered either pre-tax (distribution) or post-tax (transmission) and the WACC adjusted accordingly.

This relatively complex process is required in order to ensure that resulting prices are cost reflective.

5 Including ex-post and ex-ante review of capital expenditures.

PB has reviewed the potential options and has considered the expected impact on distribution and transmission customer prices[6]. Alternative methodologies result in different allocation of the AARR between transmission and distribution and, therefore, potential changes in customer prices. However, the expectation is that the allocation process would be simplified only to the extent that it would not result in material reallocation of cost between the transmission and distribution businesses (compared to the status-quo).

PB has selected the allocation of opex as an example to illustrate the effects of different allocation approaches. Opex can be allocated according to detailed (engineering) assessment of cost centres (as is presently the case), but as an alternative, opex could be allocated in based on RAB value at the beginning of the period. In making this comparison we have used data from the most recent regulatory reviews for transmission and distribution. This is shown in Table 3-1.

Table 3-1 – Allowed operating expenditures and RAB for current regulatory period

	Opex[7]		RAB[8]		Opex/RAB
	$m	% of total	$m	% of total	%
Transmission	121.9	7.3%	635.5	13.4%	19.2%
Distribution	1,548.0	92.7%	4,116.0	86.6%	37.6%
Total network	1,669.9	100.0%	4,751.5	100.0%	35.1%

Table 3-1 shows that the allocation of opex based on the current methodology[9] results in a significantly different allocation in current regulatory period than would be the case if the allocation was based on RAB value at the beginning of the current period. If RAB at the beginning of the current period would have been selected for the allocation of opex; PB estimates that the AARR for the distribution business would have been (approximately) $20m (6.6%) per annum lower, while the transmission AARR would have been increased by the same amount.

Therefore, in order to maintain the cost reflective characteristics of prices and to avoid considerable price disturbance, PB recommends that EA continues with the allocation of costs between transmission and distribution at a building block level.

3.3 TRANSMISSION AND DISTRIBUTION PRICING

Transmission and distribution pricing, including the allocation of costs to customer prices, will remain unchanged under the proposed framework.

Due to significant differences in transmission and distribution pricing principles any changes in these processes would lead to unacceptably high customer price disturbances.

6 Selection of the allocation methodology has no impact on overall regulated revenues of the integrated transmission and distribution business.

7 Aggregate opex for the current regulatory period (July 2004 to 30 June 2009).

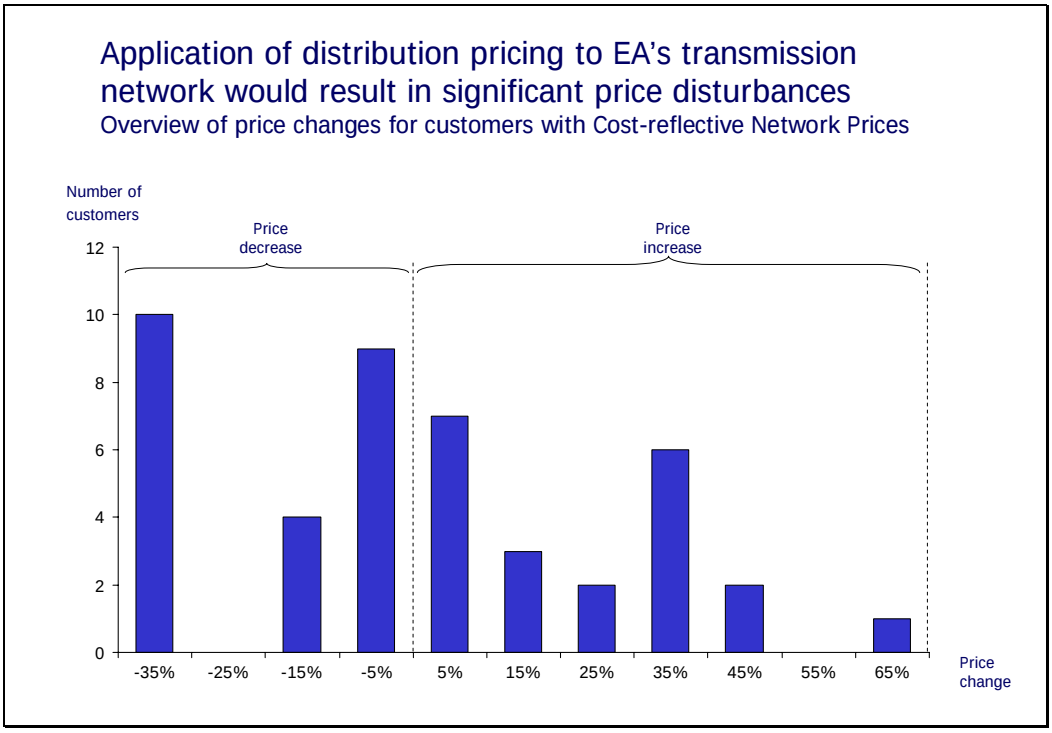
8 Initial RAB at the beginning of current regulatory period.

9 Based on engineering assessment of each cost centre.

- EA's 132kV parallel network[10] is currently modelled by Transgrid as part of the full transmission network supplying the entire state of NSW. As a result 50% of the allowed transmission revenues for shared assets are retrieved using a postage stamp price while 50% are apportioned on a locational basis.
- On its subtransmission network EA uses the transmission cost allocation method. However for the sub-transmission network EA uses a 100% locational apportioning.

EA has modelled the price impact resulting from the potential application of distribution cost allocation principles[11] to its transmission network. The results of this analysis are shown on Figure 3-3.

Figure 3-3 – Overview of potential price changes



Currently because of the cross flows of electricity passing between EA's and Transgrid's networks, about $20m of EA's transmission revenues are received from other DNSPs. The application of distribution pricing to EA's transmission network would mean that the $20m previously retrieved from other DNSPs would be retrieved from EA tariff customers. Therefore the application of distribution pricing to EA's transmission network would lead to circa 0.5% P_0 price increase for tariff customers.

10 Transmission network

11 100% locational apportioning

4. ANALYSIS OF IMPACT ON END-USER PRICES

This section explores the possible impact on regulated revenues (and customer prices) – for both transmission and distribution – of establishing a single regulatory process.

4.1 IMPACT ON REGULATED REVENUES OF THE INTEGRATED BUSINESS

Under a single regulatory review, the (total) AARR would be based on the same building block approach as is currently used in both transmission and distribution regulatory reviews. The AARR would be determined as the sum of return on RAB, depreciation, efficient operating costs and tax[12].

In order to estimate the potential impact of the proposed change on the regulated revenues of the entire EA business, PB has analysed the differences between (i) determining the building-block elements under current transmission and expected distribution revenue framework; and (ii) under the proposed single regulatory framework for the network.

- under the proposed approach there are no differences in depreciation and efficient operating expenses;
- expected tax is a function of all the other building block elements, i.e. tax remains unchanged unless there is a change in the sum of all the other building block elements;
- with regard to the asset base, the transmission regulatory framework allows for inclusion of contingent projects into the RAB. Conversely, neither the current nor the expected distribution regulatory framework (formally) recognises the concept of contingent projects[13].
- the process of calculating the WACC is expected to be practically identical for transmission and distribution price determination. However. there appears to be some differences in the determination/quantification of some input parameters into WACC calculation. Recognising the potential for impact on regulated revenues, PB has undertaken some high-level analysis of potential changes in WACC inputs with a view to establishing the likely materiality. Our analysis is set out below.

4.1.1 Calculation of WACC for the transmission business

The Section 6A.6.2 of National Electricity Rules defines the calculation methodology of WACC for transmission businesses and also provides some of the values of the input parameters for the calculation. The parameters predefined in the Rules are as follows.

- equity beta: 1;
- market risk premium: 6.0%;
- gearing: 60%;
- nominal risk free rate: indicative mid rates of annualised yield on Commonwealth Government bonds with a maturity of 10 years as published by Reserve Bank of Australia; and

12 Assuming post-tax WACC also for distribution.

13 It is, however, expected that an equivalent to this will need to be established for distribution businesses in order to provide for any material changes, for example, those related to asset condition or unexpected load requirements.

- debt risk premium: margin between 10 year commonwealth annualised bond rate and the observed annualised Australian benchmark corporate bond rate for corporate bonds which have BBB+ credit rating from Standard and Poors and a maturity of 10 years.

4.1.2 Calculation of WACC for distribution business

WACC for the distribution business is expected to be calculated based on the same formula as for the transmission business. The formula is illustrated in Figure 4-2. Both methodologies assume a *post-tax nominal* WACC. The key difference is that for distribution services, the current Rules do not specifically set any of the parameters. These are expected to be determined during the distribution price determination process.

The WACC parameters for transmission and distribution businesses in NSW, as determined by the ACCC and IPART respectively, for the most recent price determination are given in Table 4-1.

Table 4-1 – Comparison of input parameters for WACC calculation

Parameters	Transmission	Distribution
Nominal risk free rate	5.98%	5.90%
Market risk premium	6.00%	5.00-6.00%
Debt margin	0.90%	0.9-1.1%
Gearing (debt to assets)	60%	60%
Tax rate	30%	30%
Equity beta	1.00	0.78-1.11
post-tax nominal WACC	11.98%	9.8 – 12.6%

The regulator applying the Rules for distribution services has discretion to choose a rate of return within the WACC range which achieves in its view, an appropriate balance between the Rules objectives. There is no requirement for the input parameters for distribution WACC to be equal to the input parameters for the transmission WACC calculation. On the contrary, it can be expected that some parameters would be different, which theoretically could result in very different rates of return for transmission and distribution businesses.

Although it is understood that input parameters may differ, to allow quantification of the potential impact of a single regulatory review on regulated revenues, PB has made the following assumptions:

- The input parameters for the calculation of transmission and distribution WACC will be equal with the exception of the debt margin.
- As financial markets perceive higher credit risks associated with distribution companies than with transmission businesses, the yield of corporate bonds for distribution businesses needs to be higher to attract investors. Therefore, as the debt margin is directly related to the difference between the yields of corporate and government bonds, it is reasonable to expect that a higher debt margin will be used in the calculation of WACC for distribution business.

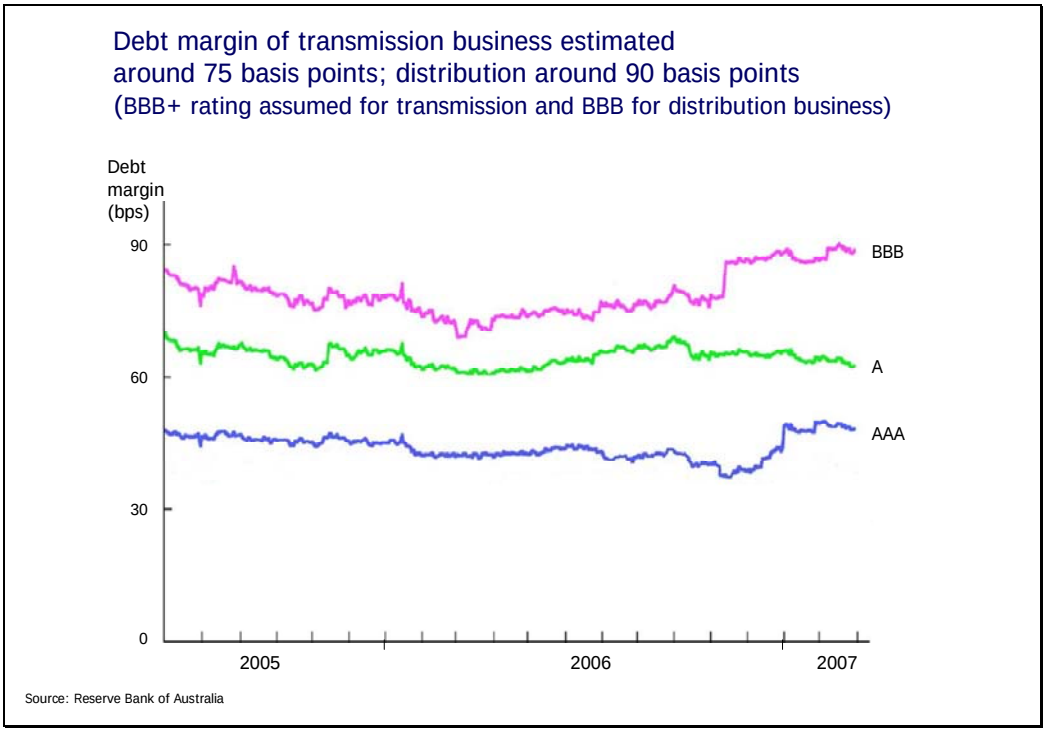
- For the estimation of the debt margin for a distribution business, PB has assumed a credit risk of 'BBB' as rated by Standard and Poors.

4.1.3 Impact of WACC on regulated revenues

We have assumed that a single regulatory review process for a company which is predominantly a distribution company (as in the case of EA) would use of a distribution business WACC for all network assets (distribution plus transmission). In this section of the report we attempt to quantify the potential change in regulated revenues resulting from the application of a single (distribution) WACC.

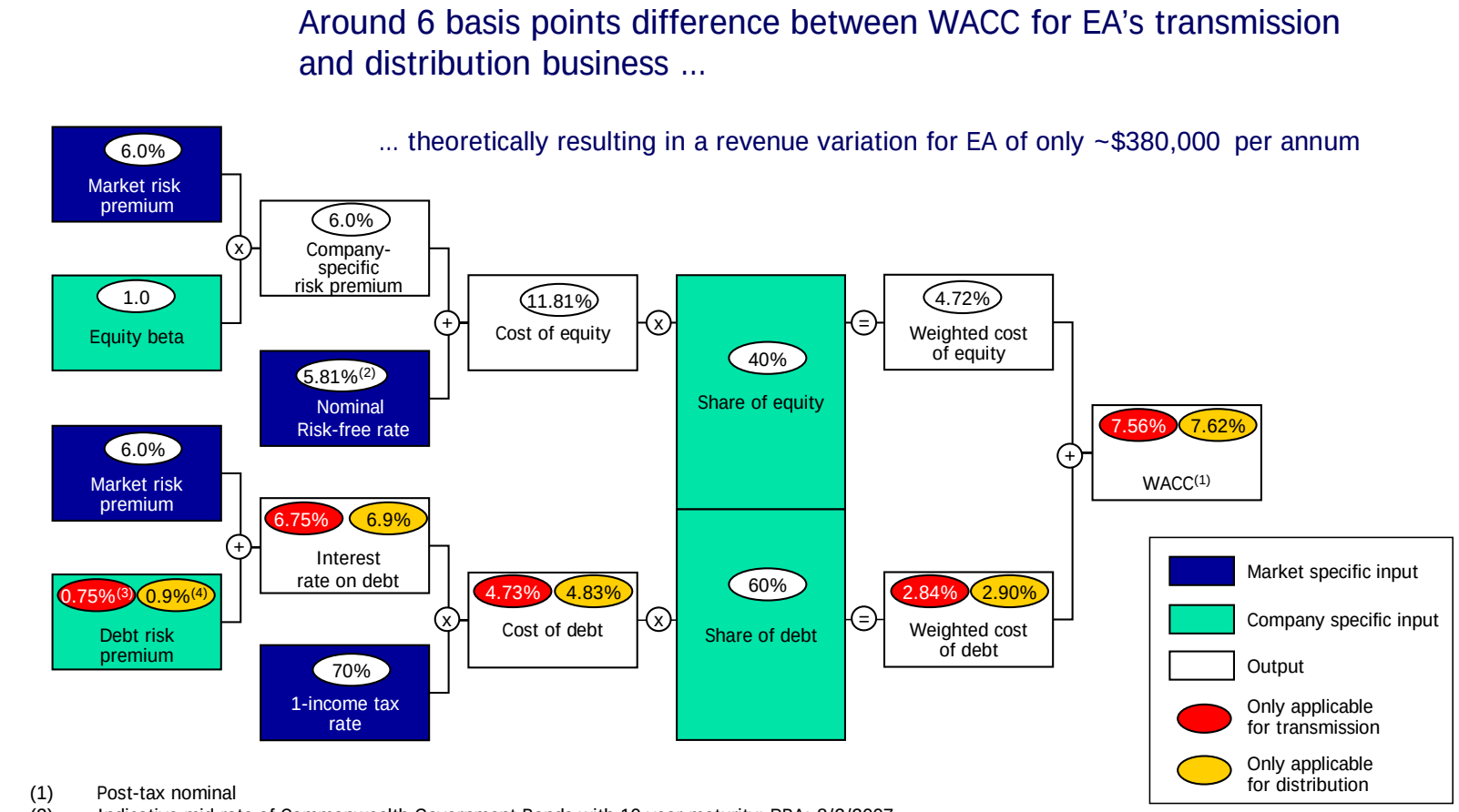
As described above, in order to make a qualified comparison and quantify the potential impact of the single regulatory review on EA's regulated revenues, PB has assumed the same input parameters for both the distribution and transmission WACC calculation with the exception of the debt margin. The debt margin for the transmission business assumes the yield of a corporate bond having a BBB+ credit rating while the distribution business debt margin assumes the yield of a corporate bond with BBB credit rating. The debt margins of corporate bonds, as published by Reserve Bank of Australia (RBA), are illustrated in Figure 4-1.

Figure 4-1 – Debt margin estimates for transmission and distribution businesses



As shown on Figure 4-1, the average debt margin for a 'BBB' rated company is around 90 basis points or 0.9%. Even though debt margins for 'BBB+' rated corporations are not published by RBA it is not unreasonable to expect that these would average above the debt margin of 'A' rated companies, but below the debt margins of 'BBB' rated companies. PB has assumed 75 basis points or 0.7% debt margin for an average BBB+ rated company. Figure 4-2 shows the calculation of the WACC for a transmission and distribution business. As described above all the input parameters are the same other than the debt margins which is estimated at 0.9% for distribution business and 0.75% for transmission business.

Figure 4-2 – WACC calculation for a transmission and distribution business



(1) Post-tax nominal
(2) Indicative mid rate of Commonwealth Government Bonds with 10 year maturity; RBA; 8/2/2007
(3) Estimate of risk premium for a BBB+ corporate bond with 10 year duration
(4) Estimate of risk premium for a BBB corporate bond with 10 year duration

Source: RBA, ASX, Chapter 6A of NER, PB analysis

Calculation results in only 0.06% difference between the distribution and transmission WACC. Applying this 0.06% to the transmission asset base of EA[14] would imply a variation in total (distribution and transmission) regulated revenue of around $380,000 per annum. This represents approximately 0.045% of the combined EA regulated revenue[15].

Whilst this variation would not appear to be material, this could be corrected under a single regulatory framework through the application of an average debt margin for distribution and transmission business (weighted according to the respective RAB).

Furthermore this variation would need to be weighed against:

- The likely outcome that parameters other than debt margin will change under a distribution regime (as described in Section 4.1.2).
- Market benefits from the simplification of regulatory processes.
- Impacts from movement in capex incentive arrangements[16]
- Impact from movement in incentive arrangements for service standards[17]

4.2 IMPACT ON CUSTOMER PRICES

Assuming no differences in the allocation methodology, and unchanged processes for the setting of transmission and distribution prices, the impact of the single regulatory review on customer prices will be immaterial.

14 $635.5m opening asset base at the beginning of present regulatory period.

15 Based on allowed revenues per annum (2004-2009 period) of $24m for transmission and $826m for distribution.

16 Contingent projects and general re-openers

17 It is unlikely that there will be any service standard incentives for distribution services while EA has advised that the financial incentives for transmission service standards amounted to $0.639m in 2005 and $0.456m in 2004.

5. CONCLUSION

The overall aim of this assignment by PB has been to undertake an independent review of current regulatory practice and to assess whether the benefits of moving to a single determination for EA's entire network outweigh any adverse market or customer effects.

As part of this review PB has undertaken an independent review of EA's existing processes associated with transmission and distribution price determinations and has identified the potential process efficiency gains which might be realised in the event that a single regulatory review process is adopted.

PB has also explored the processes associated with developing transmission and distribution prices in the context of a single network regulatory review process. Our conclusions are set out below.

The introduction of a single regulatory review would increase process efficiency and reduce costs – both for the regulator and the network business

The introduction of a single regulatory review process for distribution businesses having a minority of assets deemed *transmission* (by virtue of the Rules definition), would result in the elimination of procedural duplications and a simplification of the processes. This, in turn, would increase process efficiency and lower costs – both for the businesses and for the regulator.

The opportunities for rationalisation of the price setting processes are limited and any changes to pricing may result in significant customer price disturbances

The processes for determining customer prices for distribution and transmission are different. Price incentives for typical transmission and distribution customers are also very different as a result in notable differences in both cost allocation principles and the structure of final price tariffs. The opportunities for rationalisation and simplification of the price setting processes are, therefore, somewhat limited. Moreover, any changes in pricing processes could lead to unacceptably high customer price disturbances.

PB understands that transmission and distribution pricing, including the allocation of costs to customer prices, will remain unchanged under the proposed framework.

EA should continue with its current principles of revenue allocation to avoid customer price disturbance

There are a number of alternatives for the allocation of revenues between distribution and transmission but in order to maintain the cost reflective characteristics of prices and to avoid considerable price disturbance, PB recommends that EA continues with the allocation of costs between transmission and distribution at a building block level.

There will be no impact on customer prices, nor on the financial position of EA, as a direct result of the proposed single review process, other than the potential effects of a change in WACC

If the business continues with its present pricing methodologies, and assuming that the regulator aligns its approach to the regulation of transmission and distribution services (e.g. a *post-tax nominal* WACC and an *ex-ante* treatment of investment), then PB's preliminary analysis confirms that there will be no impact on customer prices. The main impact on the financial position of the business will be a potential change in WACC.

The impact of applying a distribution WACC to EA's transmission assets is likely to be negligible and could anyway be easily corrected if required

PB believes that it is reasonable to expect that the only difference in the input parameters for a 'distribution WACC' compared to a 'transmission WACC' will be associated with debt margin. Our preliminary analysis shows that the application of the distribution WACC to

the transmission business would result in a variation in total (distribution and transmission) regulated revenue of around $380,000 per annum. This represents less than 0.05% of the combined EA regulated revenue

Whilst this variation would not appear to be material, it could easily be corrected under a single regulatory framework through the application of an average debt margin for distribution and transmission business (weighted according to the respective RAB).

The potential change in WACC should be weighed against the potential change of the parameters other than debt margin, market benefits from the simplification of regulatory processes, impacts from movement in capex incentive arrangements and impact from movement in incentive arrangements for service standards.

APPENDIX A

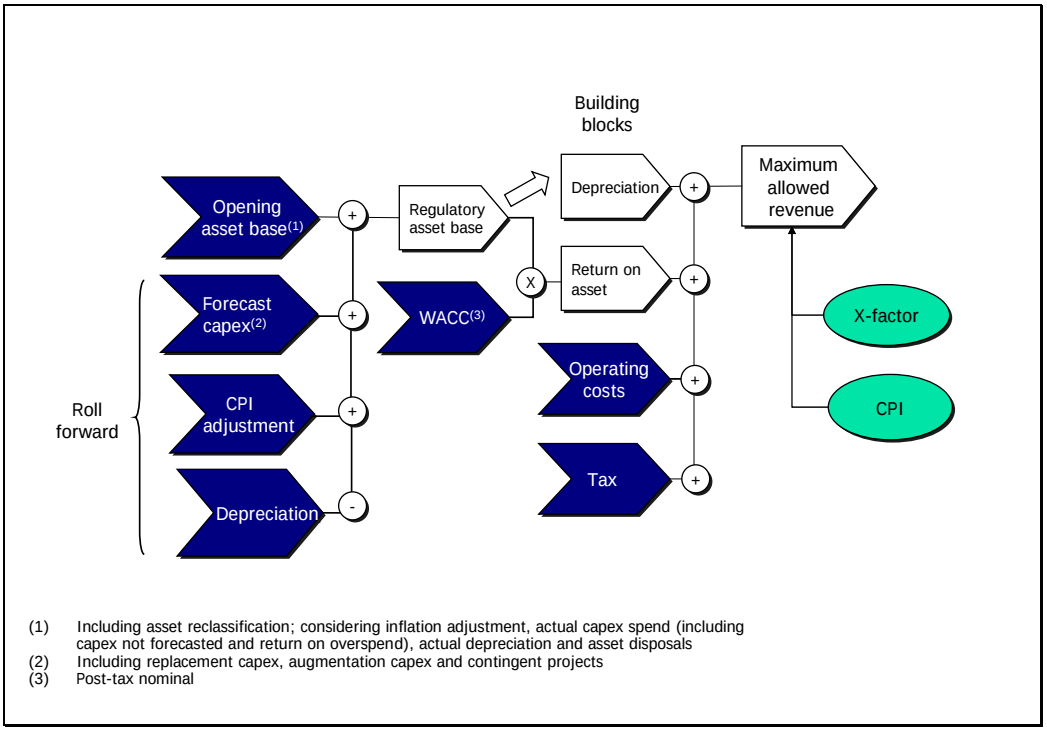
Revenue determination and cost allocation

This section provides an overview of the revenue determination and cost allocation processes for transmission businesses. As described above, under the present framework EA, is subject to two separate regulatory reviews which are preceded by an allocation of regulatory asset base and capex and opex expenses, between distribution and transmission.

A.1 TRANSMISSION SERVICES

Transmission services are subject to a *revenue cap*[18] approach, as set by the Rules. Under the present framework a total revenue allowance is determined based on the building block approach[19]. Using this approach a decision is made on forward looking costs in relation to the regulatory asset base (RAB), weighted average cost of capital (WACC) and forecast operating and maintenance expenditure (opex). Calculation of maximum allowed transmission revenues is illustrated on Figure A -5-1.

Figure A -5-1 – Calculation of maximum allowed transmission revenue (MAR)



Transmission regulatory asset base (RAB)

The Rules require a determination of the opening value of transmission assets for the calculation of the revenue cap. Firstly, this requires a determination of the value of the transmission asset base at the time of last revenue reset review. Secondly, there is a need to consider any potential reclassification of assets from distribution to transmission (or vice versa). Thirdly, to add to the regulated asset base ('roll-in') the actual investment undertaken following this last review. This opening RAB is then determined in accordance with the following formula.

18 As opposed to a *price cap* approach which is applied to distribution businesses.

19 The 'building block' model approach consists of two equations: the revenue equation and the asset base roll forward equation. These two equations are used to determine the allowed revenue stream for the regulated business. The approach aims to ensure that the present value of the allowed revenue stream is equal to the present value of the cost stream.

Opening RAB + Forecast Capex - Depreciation + Indexation = Closing RAB

Forecast capex includes replacement capex, augmentation capex, plus any contingent projects. The consideration of any investment associated with contingent projects is subject to pre-determined "triggers". When a trigger event occurs, the network service provider (e.g. EA) is required to undertake further process.

Transmission Weighted Average Cost of Capital (WACC)

The WACC is established through the application of a risk-adjusted rate of return which would be required by investors in commercial enterprises facing similar business risks. For the purpose of revenue cap determination, a post-tax nominal WACC is being used. The WACC formula is:

$$WACC = r_e \cdot \frac{E}{V} + r_d \cdot \frac{D}{V};$$

where:

r_e is the required rate of return on equity (or cost of equity

r_d is the cost of debt

E is the market value of equity

D is the market value of debt

V is the market value of equity plus debt

Required rate of return on equity r_e is calculated as:

$$r_e = r_f + \beta_e (r_m - r_f);$$

where:

r_f is the expected risk-free rate of return (usually based on government bond rates of an appropriate tenure)

$(r_m - r_f)$ is the expected market risk premium (MRP) which measures the return of the market as a whole less the risk free rate for the same period

β_e is the systematic risk (equity beta) of the individual company's equity relative to the market

Cost of debt r_d is the sum of the risk-free rate of return r_f and debt margin d_m.

Forecast operating and maintenance expenditure (Opex) for transmission

Most recent actual operating expenditures are used as the basis for the opex allowance. In order to calculate the allowance, adjustments are made for the following:

- identified efficiencies;
- any reclassification of assets;
- expected growth; and any changes in the cost allocation framework.

A.2 DISTRIBUTION SERVICES

Distribution tariffs are regulated through the application of a weighted average *price cap*[20]. The weighted average price cap operates by restricting the (weighted) average change in the distribution prices[21] to a limit which is determined by a weighted average price cap control formula. Below is an excerpt from the IPART document 'NSW Electricity Distribution Pricing 2004/05 to 2008/09, Final Report (Section 3.3.1, page 16). It sets out the basis formula used as the basis for the determined of the weighted average price cap associated with EA's distribution assets.

The formula for Year *t+1* is given by the following:

$$\frac{\sum_{i=1}^{n}\sum_{j=1}^{m} p_{ij}^{t+1} * q_{ij}^{t-1}}{\sum_{i=1}^{n}\sum_{j=1}^{m} p_{ij}^{t} * q_{ij}^{t-1}} \leq 1 + \Delta CPI + X_{t+1} + D_{t+1} \qquad i=1,\ldots, n \text{ and } j=1,\ldots, m.$$

where:

the DNSP has n Relevant Prescribed Distribution Service Charges,[19] which each have up to m components:

p_{ij}^{t+1} is the proposed price for component j of the Relevant Prescribed Distribution Service Charge i for Year $t+1$

p_{ij}^{t} is the price charged by the DNSP for component j of the Relevant Prescribed Distribution Service Charge i in Year t (being the Year which immediately precedes Year $t+1$)

q_{ij}^{t-1} is the Audited Quantity of component j of the Relevant Prescribed Distribution Service Charge i that was charged by the DNSP in Year $t-1$ (being the Year immediately preceding Year t)

D_{t+1} is demand management cost recovery factor for Year $t+1$ calculated to recover certain approved demand management implementation costs and foregone revenue incurred in Year $t-1$

X_{t+1} is the allowed real change in average prices from Year t to Year $t+1$ of the regulatory control period as determined by the Tribunal, as set out for that DNSP in Annexure 4 of the determination and discussed in chapter 7 of this report

ΔCPI is the change in the Consumer Price Index in the 12-month period from January of the Year $t-1$ to December of the Year t, as compared with the preceding twelve month period (see below).

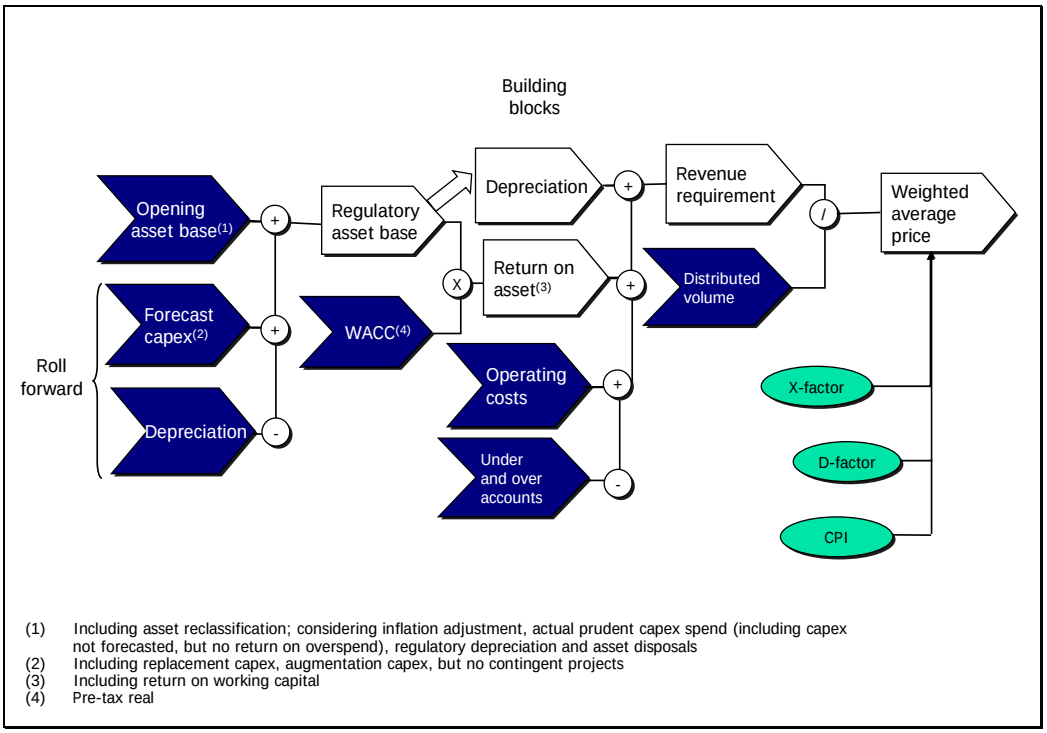
20 As opposed to a *revenue cap* approach which is applied to transmission businesses

21 Includes DUOS tariffs, miscellaneous charges and monopoly fees, and charges for recoverable works for emergency services.

The prices are weighted by the corresponding energy volumes distributed by the distribution business. In setting prices for the forthcoming year (t+1), the distribution business must ensure that the average price change (relative to the prices it is charging in the current year, t) satisfy the constraint given by the formula.

An overview of the weighted average price cap calculation process is illustrated in Figure A-5-2. Since the distribution price cap is based on a *pre-tax real* cost of capital, inflation indexation is not applied as part of the asset roll-forward process.

Figure A-5-2 – Calculation of weighted average distribution price cap



Distribution regulatory asset base (RAB)

As illustrated in Figure A-5-2 the RAB value is determined by 'rolling-forward' the forecast capital expenditures plus the allowance for depreciation. Under the current *pre-tax real* framework there is no inflation adjustment within the regulatory period.

Distribution Weighted average cost of capital (WACC)

A pre-tax real return on capital is used for the purpose of calculating the building block allowance for distribution services. In determining a suitable rate of return within the WACC range, and to reach an appropriate balance, a number of items are considered including the impact on customers, businesses and shareholders. The calculation method for the distribution business WACC is the same as the method described in Appendix A., except for the use of a *pre-tax real* return on capital (as opposed to the application of a *post-tax nominal* return for transmission).

Furthermore, the difference between transmission and distribution WACC is that input parameters used for the calculation of the distribution WACC are not pre-ordained (as in the case of transmission). In the case of distribution, the regulator (IPART) has, to date, had discretion to select an appropriate rate of return within WACC range.

Forecast operating and maintenance expenditure (Opex) for distribution

The determination of efficient operating and maintenance expenditures relies on similar principles and analyses as for transmission.

APPENDIX B

Price setting

Once the Aggregate Annual Revenue Requirements (AARR) for transmission and distribution services are set there is a need to allocate revenues to network users (customer groups) on a cost reflective basis[22]. Final customer tariffs – having fixed and variable components – are designed (and set) such as to deliver the required total allowed revenue, based on expected levels of demand.

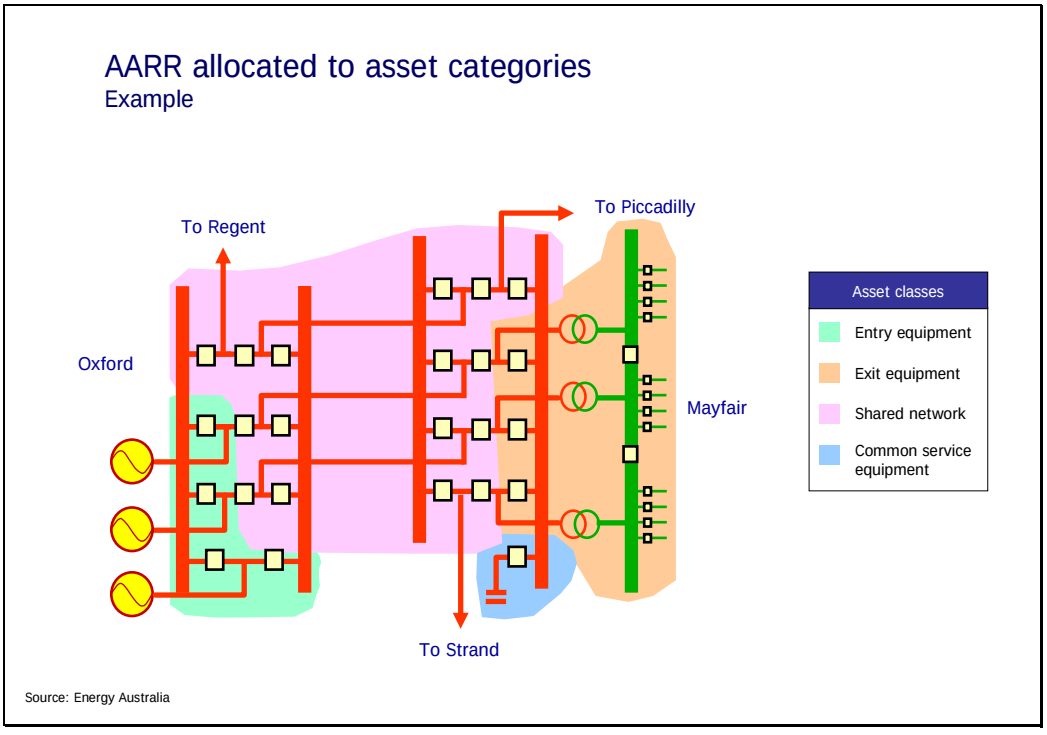
B.1 TRANSMISSION SERVICES

Pricing principles for Prescribed Transmission Services are described in the Rules[23]. The rules require the AARR for a Transmission Network Service Provider to be allocated to each category of prescribed transmission services in accordance with the attributable cost share for each such category of services. These 'prescribed' services are as follows.

- entry services;
- exit services;
- common transmission services;
- transmission use of system (TUOS) services – locational component; and
- TUOS services – the adjusted non-locational component.

This allocation results in the Annual Service Revenue Requirement (ASRR) according to the category of service. An example of the allocation of AARR to the prescribed transmission services is shown on Figure B-1.

Figure B-1 – Example of allocation of AARR to prescribed transmission services



The next step is for the annual revenue requirement associated with each individual asset (ARR) to be determined by allocating the ASRR for the (relevant) prescribed transmission

22 The extent to which costs can be recovered on a cost-reflective basis is often constrained by the on-site metering equipment as well as social issues associated with differential pricing within established customer groups.

23 Section 6A.23.

on the basis of the Optimised Replacement Costs (ORC), on a pro rata basis. This described by the following formula:

$$ARR_{ij} = \frac{ASRR_j \cdot ORC_{ij}}{\sum_{i=1}^{m} ORC_{ij}}$$

Where:

i is the individual asset

j category of service

m is number of assets in prescribed category of service

The require that the whole of the ASRR for prescribed *entry and exit services* are allocated to connection points. In addition, prices for prescribed entry and exit services must be a fixed annual amount.

Prices on *common services* are required to be set on a 'postage-stamp' basis.

The Rules require that fifty percent of the ASRR for prescribed TUOS services is to be covered by a locational price component and fifty percent by non-locational price component.

Prices for recovering the *locational component* of providing prescribed TUOS services are required to be based on demand at times of greatest utilisation of the transmission network (i.e. the time at which network investment is most likely to be contemplated). A software tool (T-Price) is used to determine the allocation of the locational price component to connection points. The following approach (algorithm) is applied:

- each connected load is supplied by each connected generator in the network in turn;
- the component of power flow on each line required to supply each load (for each connected generator scenario) is calculated and costs are allocated according to these flow components; and
- the component of flow on each line required to supply each load is calculated

Prices for recovering the adjusted *non-locational component* of prescribed TUOS services are required to be set on a postage-stamp basis.

B.2 DISTRIBUTION SERVICES

For its large distribution customers, EA applies a cost-reflective network pricing (CRNP) approach similar to that used for transmission pricing. In general, customers with demand over 10MW have individually calculated prices and individual distribution loss factors.

For smaller customers, average pricing is applied for each of a small number of customer tariff classes. Average prices can vary with geographic area and customer type. The sophistication of these prices largely depends on the type of metering equipment installed. An overview of NSW distribution customer's metering arrangements is shown in Table B-1.

Table B-1 – Overview of customer metering arrangements in NSW

	Dynamic peak ToU	kVA demand ToU	kW demand ToU	Seasonal energy	ToU energy	Single rate energy
Type 3 meter (>735 MWh p.a.)	√	√	√	√	√	√
Type 4 meter (> 160 MWh p.a.)	√		√	√	√	√
Type 5 meter (MRIM[24])				√	√	√
Type 6 ToU energy meter					√	√
Type 6 Single rate energy meter						√

24 Manual Read Interval Meter