While the Code permits a reference tariff policy to include a mechanism to subtract redundant capital from the capital base, it also allows for other mechanisms that have the same effect on reference tariffs while not reducing the capital base (section 8.29 of the Code).

2.3.2 EAPL's proposal

New facilities investment

This section focuses on the capital expenditure forecast by EAPL for the initial access arrangement period. EAPL's broad policy regarding new facilities investment is discussed in section 3.6 of this ***Draft*** *Decision* under 'Extensions and expansions policy'. EAPL's forecast capital expenditure for the initial access arrangement period is shown in Table 2.9. In addition, EAPL proposes to roll-in its share of the cost of the Interconnect.

Table 2.9: Estimated capital expenditure, 2001 to 2005 (July 2000 $)

	$'000					
Year ending 30 June	**2001**	**2002**	**2003**	**2004**	**2005**	**Total**
Partial looping of Canberra lateral	3 458					3 458
Uranquinty compressor			13 919			13 919
Operating capital expenditure	1886	1676	1306	1321	1333	7 522
On line inspections				2 707		2 707
Total[(a)]	5 345	1676	15226	4028	1333	27608

In the event that the actual capital costs differ from the forecasts, EAPL proposes that the capital base at the commencement of the next access arrangement period will be adjusted for the actual costs rather than the forecast costs.[60]

The Interconnect

The Interconnect, which was commissioned in July 1998, links the NSW and Victorian gas transmission systems. It extends from Wagga Wagga, NSW on the MSP to Barnawartha, Victoria on the PTS. EAPL owns and operates the 89 km Wagga Wagga to Culcairn segment, while GPU GasNet owns and operates the remaining **62** km leg from Barnawartha to Culcairn.

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[60] Access arrangement, clause 8.2(3).

EAPL states that the 457 mm diameter of the pipeline was selected in order to achieve a forecast capacity of 90 PJ/year northbound. It describes this diameter as the 'optimum' for linking the MSP and the PTS.[61] Capacity enhancements to both the existing Wagga Wagga to Young and Wollert to Albury pipelines would be needed to achieve the capacity of 90 PJ/year.

EAPL describes the uncompressed capacity of the Interconnect (subject to operating pressure conditions on the MSP and PTS being met) as:

- southbound: 20 TJ/day average over seven Gas Day period, with a minimum daily capacity of 17.5 TJ/day; and
- northbound: 17.6 TJ/day average over seven Gas Day period, with a minimum daily capacity of 13.5 TJ/day.

Excluding the contract arrangements for the winter of 1999, contracted capacity was 13.7 TJ/day of firm service southbound, which EAPL states represents the foundation contracted quantity of 5 PJ/year established for the Interconnect, and falls just below the uncompressed capacity. While EAPL has not as yet installed compression on the Interconnect, it proposes to install a compressor at Uranquinty in 2003.

EAPL has proposed to roll the cost of its segment of the Interconnect into the MSP capital base as part of the initial capital base. In the same manner to other pipeline segments of the MSP, EAPL proposes that the Interconnect's DORC is the appropriate value when setting the value of the initial capital base of the MSP. While EAPL has not fully addressed the criteria set out in section 8.16, it cites similar system-wide benefits to those identified by GPU GasNet in support of its roll-in application[62]. EAPL has specified the following system-wide benefits as arising from its segment of the Interconnect:

- facilitation of interstate trade in natural gas; and
- enhanced security of supply to NSW, Victoria and the ACT.[63]

In relation to interstate trade, EAPL has stated that the Interconnect 'now enables gas supplied to markets anywhere in the South-East of Australia.' It notes that, as existing contracts to supply gas expire or wind back, competition between difference sources of gas (for example, Cooper, Gippsland and Otway basins) will be possible. EAPL cites the following provisions of the Code in support of roll-in:

- the public interest, including the public interest in having competition in markets (section 2.24(e)); and

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61 Supplementary access arrangement information, p. 21.

62 On 28 April 2000 the Commission issued its *Final Decision* to approve an application by GPU GasNet to include its section of the Interconnect (and associated compressor and valves) in the PTS asset base and to increase reference tariffs commensurately.[62] GPU GasNet contended that its new facilities investment did not pass the economic feasibility test (section 8.16(b)(i)) but that it did pass the system-wide benefits test (section 8.16(b)(ii)) due to the system security and competition benefits generated. In reaching its decision, the Commission concluded that the new facilities investment met the prudent investment test and the system-wide benefits test. A total of $40.4 million in capital expenditure was rolled into the PTS capital base.

63 Supplementary access arrangement information, p. 22.

- a reference tariff and reference tariff policy should be designed with a view to replicating the outcome of a competitive market (section 8.1(b)).

In respect of system security, EAPL states:

> Although commercial considerations of interstate trade were a major factor in proceeding with the Interconnect, it was also recognised that the interstate link would have significant benefits in terms of system security in the event of a failure of critical sections of the transmission pipeline in NSW and Victoria. There is little doubt that the Interconnect has demonstrated its contribution to enhancement of direct system security since its completion.[64]

EAPL has identified the following instances as examples of the Interconnect providing system security benefits:

- the 'ice blockage' incident in Victoria in June 1998;
- the explosion at the Longford gas plant in September 1998;[65] and
- the failure of the Moomba production facility in August 1999.[66]

EAPL states that:

> The timing and nature of these recent events is not coincidental. Over the next decade, much of Australia's gas production infrastructure is now more than thirty years old. While maintenance strategies and judicious use of new capital can extend the life of such facilities, it is clear that the aging of Australia's gas production infrastructure combined with the limited amount of gas storage available close to markets will increase the risk of supply disruption. Accordingly it will be essential for the gas industry to supply major gas markets from more than one basin in order to minimise disruption to personal and public life and economic activity.[67]

EAPL cites the following sections of the Code in the context of system security benefits:

- the regulator must take into account the operational and technical requirements necessary for the safe and reliable operation of the pipeline when assessing an access arrangement (section 2.24(c));
- a reference tariff and reference tariff policy should be designed with a view to the safe and reliable operation of the pipeline (section 8.1(c)); and
- the regulator must take into account the interests of users and prospective users when assessing an access arrangement (section 2.24(f)).

EAPL has attempted to quantify the value of enhanced system security, and has adopted a methodology similar to that employed by GPU GasNet in support of its roll-in application.[68] EAPL estimates that the Interconnect provided enhanced system security during the Longford emergency valued at between $35.2 million and $352 million. EAPL considers that the system security benefits arising from this single event would be likely to exceed the cost of the pipeline of $43.5 million.[69] EAPL also notes GPU

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[64] Supplementary access arrangement information, p. 23.
[65] Supplementary access arrangement information, p. 23.
[66] Supplementary access arrangement information, p. 25.
[67] Supplementary access arrangement information, p. 25.
[68] GPU GasNet, Application for revisions to PTS access arrangement, 25 August 1999, p. 18.
[69] This is the cost of the pipeline from Wagga Wagga to Barnawartha. As GPU GasNet's segment cost $19.5 million, EAPL's segment would be expected to have cost approximately $24 million.

GasNet's estimate that system security benefits arising during the winter of 1999 were valued between $56 million and $2.2 billion.[70]

EAPL notes the difficulty in quantifying benefits to gas users as a result of increased competition. However, it comments that, if enhanced competition led to a one per cent fall in the current average price per year over two years of the approximately $2.5 billion of sold annually in east Australia, the reduction would exceed the cost of the Interconnect.[71] EAPL states that interstate trade may be discouraged if the Interconnect is not rolled-in to its asset base at this stage. EAPL concluded:

> As a vital link between the gas transmission networks of Australia's two most populous states, the Interconnect will continue to provide security of supply benefits over its working life. Since the benefits of competition and security of supply are conferred upon all gas users, it is appropriate to include the Interconnect Pipeline in EAPL's asset base.[72]

Partial Iooping of the Canberra lateral

Partial looping of the Canberra lateral is forecast for the year 2000-2001 at an estimated cost of $3.46 million (in July 2000 dollars). According to EAPL the Canberra/ Queanbeyan market has consistently grown by five per cent per annum since its construction in 1981 and is forecast to continue to grow. At present the Canberra lateral is operating at near capacity and augmentation is required to meet the forecast growth in demand.[73]

EAPL undertook a study to evaluate the alternative methods of enhancing capacity on the Canberra lateral, namely compression at the Dalton offtake and partial looping of the lateral pipeline, and concluded that looping was a more economic proposition. While acknowledging that compression is normally a more attractive option for initial expansion of capacity, EAPL concluded that in this instance looping had technical advantages over compression because of 'the high daily peak flow rate and the low useable linepack'.[74] EAPL considered four different options for the looping of the Canberra lateral, with varying pipeline lengths and diameters. The option selected by EAPL provided the required capacity at least cost.

EAPL has argued that the new investment satisfies the economic feasibility test of the Code (section 8.16 (b)(i)). It draws this conclusion by comparing the NPV of estimated incremental revenue for the years 2001 to 2006 to the capital cost of $3.46 million. Moreover, EAPL states that the investment passes the prudent investment test of the Code (section 8.16 (a)) and states that the cost of $970/km/mm for the looping 'is in line with actual costs incurred by efficient operators for short distance, small diameter pipelines of this nature in Australia'. EAPL gives the EGP as a comparative example.[75]

Uranquinty compressor station

EAPL states that the need for compression on the Interconnect was foreseen at the time of conceptual design of the Interconnect and the pipeline design incorporated

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70 Supplementary access arrangement information, p. 25.
71 Supplementary access arrangement information, p. 22.
72 Supplementary access arrangement information, p. 26.
73 Supplementary access arrangement information, pp. 31-32.
74 Supplementary access arrangement information, p. 33.
75 Supplementary access arrangement information, pp. 34-35.

compression at Uranquinty. According to EAPL, the compression is required to cater for a forecast increase in volumes. EAPL outlines constraints on the NSW and Victorian systems which necessitate the construction of a compressor station on the Interconnect to meet the forecast volumes. As well as enhancing the capacity of the Interconnect in either direction the Uranquinty compressor station will enable the directional flow to be reversed quickly as required.[76]

The Uranquinty compressor station is forecast to be commissioned in 2003 at an estimated cost of $13.92 million (in July 2000 dollars). EAPL states that this amount compares favourably with the costs of the Springhurst compressor station on the Victorian system, which is similar to the Uranquinty compressor station. The Springhurst facility was constructed in 1999 at a cost of $18.7 million. After deducting airfreight costs and the costs of fast-tracking the project, EAPL states that the base cost of the Springhurst compressor was $13.96 million. According to EAPL, when allowance is made for the cost of bi-directional valve assemblies and control equipment of the Uranquinty compressor, the comparative cost of the Uranquinty compressor is lower than the cost of the Springhurst compressor.[77]

EAPL estimates that the incremental revenue attributed to the Uranquinty compressor station is $8 million to $10 million, while the NPV of the capital cost is $10.2 million. EAPL states that other benefits would more than offset any revenue shortfall. Those benefits include:

- enhanced system-wide benefits of the Interconnect in terms of increased capacity in either direction and flow reversal in a shorter time frame;
- greater contractual certainty to users and greater operational flexibility to EAPL to meet the demands of the south east Australian gas market; and
- increased capacity will further facilitate interstate trade.[78]

Capital redundancy

EAPL is proposing that the capital base at the commencement of the subsequent access arrangement will be adjusted for redundant assets incurred during the preceding access arrangement period.[79] However, no specific mechanism is contained in the access arrangement to determine the extent of the redundant assets, if any.

2.3.3 Submissions from interested parties

No comments from interested parties were received in relation to EAPL's proposal to roll-in its segment of the Interconnect into the MSP capital base, or EAPL's forecast capital expenditure. However, NERA did have some concerns with EAPL's broad policy and these are addressed in the discussion on EAPL's proposed extension and expansions policy (section 3.6).

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[76] Supplementary access arrangement information, pp. **26-28.**
[77] Supplementary access arrangement information, p. 30.
[78] Supplementary access arrangement information, pp. 30-31.
[79] Access arrangement, clause 8.2(2).

2.3.4 Commission's considerations

New facilities investment

EAPL's proposed access arrangement provides for new facilities investment to occur and to be included in the access arrangement. ***An*** assessment in relation to sections 8.16-8.17 is required. This policy of the MSP access arrangement reflects the requirements of the Code.

Two major items of capital expenditure are forecast during the access arrangement period; the partial looping of the Canberra lateral in 2001 at a forecast cost of $3.46 million, and the construction of the Uranquinty compressor in 2003 at a forecast cost of $13.92 million.

While EAPL proposes that any differences between actual and forecast costs will be accounted for in the capital base at the commencement of the next access arrangement period, EAPL will retain the benefits (or wear the loss) of any differences during the initial access arrangement period. As a result, EAPL may have an incentive to inflate the forecast capital expenditure. For example, in the event that actual costs are lower than forecast, EAPL would retain the difference in the return on forecast and actual costs and recover higher depreciation charges than would have otherwise applied. The additional revenue to EAPL in those circumstances may be viewed as the result of an incentive mechanism if the difference is the result of efficiency improvements. The Commission would have concerns, however, if the additional revenue was a result of inflated forecasts.

The Commission invariably faces the problem of information asymmetry in relation to forecasts of capital expenditure. While the Commission relies on the service provider to provide accurate information it also carries out its own assessment of the appropriateness of costs.

Interconnect pipeline

The Commission notes the parallels between the roll-in proposals by GPU GasNet and EAPL for their respective legs of the Interconnect pipeline. In GPU GasNet's instance, the capital cost of $40.4 million (which also included the Springhurst compressor and valves) was found to be prudent. However, it did not pass the Code's economic feasibility test. After careful consideration of the issues, the Commission concluded that this new facilities investment did pass the system-wide benefits test.

While EAPL has also relied on the system-wide benefits test, the first step in the Cornmission's assessment of section 8.16(b) of the Code is to determine whether EAPL's investment in the Interconnect pipeline passes the economic feasibility test.

In assessing whether the Interconnect passes the economic feasibility test, the Commission has compared the anticipated incremental revenue generated by the Interconnect with anticipated incremental costs for each year of the access arrangement period. The incremental revenue includes the revenue directly related to the Interconnect (Wagga Wagga to Culcaim) and the contribution to the mainline from Moomba to Wagga Wagga. In the absence of supply constraints on the trunk, additional costs relate almost entirely to those directly attributable to the Interconnect.

In contrast, most incremental revenue will be earned on the Moomba to Wagga Wagga segment.

Based on proposed tariffs and projected Interconnect volumes, sufficient revenues will accrue to cover costs over the life of the assets. On this basis the Commission considers that EAPL's investment in the Interconnect would pass the Code's economic feasibility test and that there is no need for a higher reference tariff. However, this assessment is predicated on the Interconnect achieving forecast volumes over an extended period. When reviewing the MSP access arrangement the Commission will assess Interconnect usage as part of its evaluation of potential capital redundancy.

As the Commission's assessment is that EAPL's investment in the Interconnect passes the economic feasibility test (section 8.16(b)(i)) it has not considered the system-wide benefits test (section 8.16(b)(ii)) or the need to maintain the safety, integrity or contracted capacity of services (section 8.16(b)(iii)).

The prudency of EAPL's investment in the Interconnect has not been raised explicitly by EAPL nor by interested parties. EAPL does, however, state that the foundation contracted quantity for the Interconnect of 13.7 TJ/day southbound is slightly less than the uncompressed minimum daily southbound capacity of 17.5 TJ/day and that the maximum compressed capacity of 90 PJ/year is the optimum to match the MSP and PTS.

The Commission closely considered the prudency of the Barnawartha to Culcairn leg of the Interconnect in its *GPU GasNet Final Decision.* It will include this and other information available to it in the assessment of EAPL's proposals. **A** key consideration in the GPU GasNet assessment was the interaction between the prudent investment test and the system-wide benefits as the latter determines whether a higher reference tariff is justified for all users. However, EAPL has not proposed a higher reference tariff for all users of the MSP.

Pursuant to section 8.17, in assessing the prudency of an investment, the regulator must consider factors such as:

- whether the new facility exhibits economies of scale or scope and the increments in which capacity can be added; and
- whether the lowest sustainable cost of delivering services over a reasonable time frame may require the installation of a new facility with sufficient capacity to meet forecast sales of services over that time.

Of its nature, as a link between two pipeline systems, the capacity and other characteristics of the Interconnect must be appropriate to both the MSP and the PTS. **As** noted earlier, the Commission assessed GPU GasNet's investment in the Interconnect (and associated facilities) to be prudent and approved its roll-in application. The Commission considers that a potential compressed capacity of 90 PJ/year is appropriate to match the MSP and the PTS.

The Commission notes that the current contracted flows on the Interconnect match the pipeline's uncompressed capacity. All compression to date has been installed by GPU GasNet. The Commission's assessment of EAPL's Uranquinty compressor roll-in

proposal is provided below. The Commission is satisfied that the Interconnect exhibits economies of scale and that its installed capacity is appropriate.

In considering GPU GasNet's application, the Commission noted that the physical flows through the Interconnect may be less than the financial swaps that may arise over time. Nevertheless, the Commission was satisfied that the GPU GasNet section of the Interconnect met the prudent investment test. The same consideration is relevant to EAPL's segment.

In relation to the current application, the Commission has considered the prudency of EAPL's investment in the Interconnect in light of the circumstances at the time and sections 8.17 of the Code. The Commission has concluded that EAPL's expenditure was prudent pursuant to section 8.16(a) of the Code.

The Commission's assessment is that EAPL's investment in the Interconnect is prudent and that it passes the economic feasibility test. Consequently it proposes to approve roll-in of the new facilities investment to EAPL's capital base. However, as noted earlier, this assessment is predicated on the Interconnect achieving forecast volumes over an extended period. When reviewing the MSP access arrangement the Commission will assess Interconnect usage as part of its evaluation of potential capital redundancy on the MSP.

Partial looping of the Canberra lateral

Augmentation of the Canberra lateral is required to cater for a forecast increase in volumes and EAPL considers that partial looping is the most economic means of achieving this. EAPL has justified the cost of the looping on the basis that it satisfies the economic feasibility test (section 8.16(b)(i) of the Code). EAPL's analysis shows that the total capital cost of $3.46 million is exceeded by total incremental revenue by the year 2006 (in NPV terms).

The Commission's analysis compares the annual costs of the looping (return on capital, depreciation and operating and maintenance costs) to the incremental revenue for each year of the access arrangement period. This also indicates that based on EAPL's forecast volumes partial looping of the Canberra lateral passes the economic feasibility test. The results of the Commission's analysis are shown in Table 2.10. The incremental revenue includes both the revenue directly attributable to the Dalton to Canberra lateral and that lateral's contribution to the mainline's revenue from Moomba to Dalton.

Table 2.10: Economic feasibility test of the partial looping of the Canberra lateral

	2001	2002	2003	2004	2005	NPV
Incremental contracted capacity (TJ/day)	1.02	1.94	2.88	3.83	4.81	
Costs ($m)[(a)]	0.32	0.32	0.31	0.31	0.31	1.28
Incremental revenue ($m)[(b)]	0.13	0.27	0.39	0.56	0.67	1.58

Source: Supplementary access arrangement information, p. **32** and ACCC analysis.

Notes: (a) Based on ACCC proposed rate of return, straight line depreciation over 80 years and O&M costs of one per cent of capital costs.

(b) Based on ACCC proposed tariffs.

EAPL submits that the Canberra looping passes the prudent investment test and states the forecast cost of $970/km/mm in is line with actual costs incurred by efficient operators for similar short distance, small diameter pipelines in Australia. Kinhill Pty Limited, the consultant engaged by the Commission to evaluate EAPL's proposed optimised design and replacement costs for the MSP, commented that the costs of recent Australian transmission pipelines have typically been in the range of $500 to $1 000/km/mm. GPU GasNet recently submitted to the Commission a capital cost benchmarking analysis indicating an average Australian figure for the last ten years of $812/km/mm with a standard deviation of $163/km/mm.[80] EAPL's forecast cost of the Canberra looping is consistent with these benchmarks.

Two recent developments appear likely to have an impact on the decision and timing of constructing the Canberra looping. Firstly, AGL has proposed to construct an interconnect from the EGP to the Canberra distribution network. Secondly, the ACT Government has announced a feasibility study into a new 90MW gas-fired power station, which could be operational by the end of 2001.

The uncertainty arising from these announcements may be addressed in two ways. One option is to remove the forecast costs of the Canberra looping from EAPL's proposed capital expenditure and revise downward EAPL's forecast volumes. EAPL would be able to submit revisions to the access arrangement in the event that the looping of the Canberra lateral proceeds. Another option is to retain the forecast costs and volumes, but also include in the access arrangement a trigger mechanism that would require a review of the access arrangement in the event that the Canberra looping does not proceed. Both these options may involve compliance costs on the **part** of the service provider, the Commission and interested parties.

According to EAPL, the Canberra lateral is currently operating at near full capacity and augmentation is required to cater for the forecast increase in demand. **A** decision by EAPL not to proceed with the looping of the Canberra lateral would be a consequence of forecast volumes being revised downward because, for example, of loss of market share to AGL's interconnect with the EGP. While EAPL's costs would be lower (the capital costs of the looping would no longer be incurred) this would be more than offset by a loss of revenue as a result of the lower volumes. If EAPL's volumes on the Canberra lateral were to remain static at current levels, for example, EAPL would incur a net loss (the difference between incremental revenue and costs in Table 2.10).[81] In this manner EAPL will bear the risk of a loss of market share to the AGL/EGP interconnect. Accordingly, the Commission does not propose an amendment to the access arrangement either to exclude the costs of the Canberra looping from the access arrangement or include a trigger for a review in the event that the looping does not proceed.

Based on the information available at present, it appears that the Canberra looping project would meet the criteria in section 8.16 of the Code. The forecast capital expenditure has been included in the calculation of reference tariffs. However,

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[80] GPU GasNet, Application for revisions to the PTS access arrangement, 11 September 2000, Annexure 5.

[81] That is, the alternative scenario of the exclusion of the Canberra looping from the asset base coupled with lower forecast volumes (e.g. static at current levels) would result in higher tariffs.

pursuant to section 8.21 of the Code, this does not imply that the Commission considers that the section 8.16 criteria are met. An assessment of the actual capital costs incurred will be made by the Commission when EAPL seeks to review the access arrangement.

Uranquinty compressor station

EAPL's analysis suggests that the Uranquinty compressor station fails the economic feasibility test. EAPL submits that the facility can instead be justified on the basis of system-wide benefits. However, the Commission's analysis (based on a similar approach to that outlined above for the Canberra looping) suggests that the Uranquinty compressor would be likely to pass the economic feasibility test.

In assessing the prudency of the investment proposal, the Commission has also considered relevant information provided by GPU GasNet in support of its application for roll-in of the Interconnect Assets to the PTS capital base. According to GPU GasNet, the system planning carried out for the Moomba-Melbourne Augmentation Project (MMAP) did consider placement of a compressor at Uranquinty along with installation of compressors at Young and Springhurst (Victoria). GPU GasNet reported that it was able to dispense with the need for a compressor at Uranquinty by adopting a strategy that included re-rating the MAOP of the Young to Wagga Wagga pipeline from 8 120 kPa to 8 500 kPa, which it stated saved approximately $15 million in investment costs.[82]

The Commission understands that GPU GasNet's assessment was based on achieving north to south gas flows to specified levels during the winter of 1999. EAPL's requirements might be expected to differ. Most importantly, EAPL may place a higher priority on the volume and reliability of potential northward flows. The Commission's modelling of the steady state interaction of flows between the MPS and the PTS has provided some support for installation of the Uranquinty compressor during the initial access arrangement period. In particular, forecast north to south demand would appear to require additional compression by 2005. The Commission notes, however, that installation of a dedicated compressor for the gas flowing south at Young might provide superior support for these flows. Installation at Uranquinty (along with some capacity upgrades on the PTS) may be appropriate to provide greater flexibility and reliability for northerly flows. EAPL states that commissioning of the Uranquinty compressor is conditional on a significant increase in gas flow through the Interconnect in the last two years of the initial MSP access arrangement period. In the event that the facility does not proceed because of lower actual volumes than forecast, lower costs (the capital costs of the compressor will not be incurred) will be offset by lower revenue (due to lower volumes). In some respects this is a similar situation to that discussed above in relation to the looping of the Canberra lateral, although more complex because of the existence of two pipeline systems and consideration of both southbound and northbound flows.

EAPL has suggested that the proposed Uranquinty compressor meets the test in section 8.16 of the Code and can be rolled into the capital base. The Commission's assessment is that this investment may satisfy the requirements of section 8.16. However, it is uncertain from the information available at this stage that this investment would be

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[82] **GPU GasNet, Application for revision to access arrangement, 25 August 1999, Annexure 6, p. 3.**

prudent and that it would be undertaken. The Commission is currently of the view that the forecast capital expenditure should be included in the calculation of reference tariffs. The Commission will consider any further information available to it this issue when determining its final decision.

As noted earlier, inclusion of forecast capital expenditure for an investment would not in itself imply that the Commission considers that the section 8.16 criteria are met. As assessment in relation all actual capital costs incurred will be made by the Commission when EAPL seeks to revise the access arrangement.

If the Uranquinty compressor is excluded from the initial capital base but it is installed on the MSP in the future, **a** proposal from EAPL to roll those costs into the MSP access arrangement will be considered by the Commission at that time in accordance with the Code and the MSP extensions and expansions policy.

Capital redundancy

While EAPL's access arrangement contains the provision that the capital base will be adjusted for redundant assets, no specific mechanism is included for determining redundant capital. Such a mechanism is desirable to reduce uncertainty and to ensure that users do not pay for assets that have ceased, or substantially ceased, to deliver services. Accordingly, pursuant to section **8.27** of the Code, the Commission proposes inclusion in the reference tariff policy, a mechanism dealing with redundant capital.

Proposed amendment A2.2

> In order for EAPL's access arrangement for the MSP to be approved, the reference tariff policy must be amended to allow the Commission, at the commencement of the subsequent access arrangement period, to review, if necessary, adjust the capital base for wholly or partially redundant assets.

2.4 Depreciation and inflation indexation of the capital base

2.4.1 Code requirements

Under the cost of service approach (based on forecast costs) proposed by EAPL, depreciation of the capital base represents one element of the costs used in establishing reference tariffs. Each asset or group of assets must be assigned a depreciation schedule designed so that:

- the impact on reference tariffs is consistent with the efficient growth of the market for the related services (and which may involve a substantial portion of depreciation taking place in future periods, particularly where reference tariffs have been set on the assumption of significant market growth); and
- depreciation occurs over the life of the assets with progressive adjustments where appropriate to reflect changes in economic lives; while

- ensuring that the asset is depreciated only once and that total accumulated depreciation does not exceed the valuation of the asset when initially incorporated in the capital base.

Section 8.5A of the Code provides that the amount of total revenue can be determined under either a nominal or real approach, or 'on any other basis in dealing with the effects of inflation' provided that it is specified in the access arrangement, approved by the regulator, and applied consistently.

2.4.2 EAPL's proposal

Current cost accounting framework

EAPL is proposing a current cost accounting (CCA) framework for establishing target revenues, under which the capital asset base is notionally revalued annually in line with inflation. The revalued asset base in combination with a real rate of return effectively provides the same overall return as an unadjusted capital base coupled with a nominal rate of return. The former approach, however, provides a more level tariff profile over time than alternative approaches.

Under the CCA approach, the capital base is adjusted for an estimate of inflation over the access arrangement period to derive the capital base at the commencement of the next access arrangement period (after appropriate adjustments for capital expenditure, depreciation and redundant assets). The adjustment for inflation would be achieved through the following formula:[83]

$$CB_{2005}^{\$2005} = CB_{2005}^{\$2000} x(CPI_{July\,2005} / CPI_{July\,2000})$$

$CB_{2005}^{\$2005}$	is the opening capital base at 1 July 2005 in July 2005 dollars
$CB_{2005}^{\$2000}$	is the opening capital base at 1 July 2005 in July 2000 dollars
$CPI_{July\,2000}$	is the relevant price index at 1 July 2000
$CPI_{July\,2005}$	is the relevant price index at 1 July 2005

The relevant price index is the Consumer Price Index (All groups – weighted average of eight capital cities) as published by the Australian Bureau of Statistics (ABS).

EAPL further proposes that in the event that the ABS suspends or ceases publication of, or materially alters the CPI, EAPL will substitute an alternative that reflects changes in consumer prices.

Depreciation

EAPL originally proposed a '5/8:3/8' kinked depreciation schedule for its pipeline assets. Under this methodology the major proportion of the asset (62.5 per cent) is depreciated over the first half of the (remaining) economic life of the asset, while a lesser proportion (37.5 per cent) is depreciated over the second half. In EAPL's

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[83] **Access arrangement information, p. 20**

opinion, recovery of a significant portion of the value of its pipeline assets in the early years is justified because EAPL faces significant stranded asset risk as a result of competition from the EGP.

For the Moomba to Wilton section of the MSP, EAPL has estimated an economic life of 60 years (remaining life of 36 years), in contrast to other pipeline segments which it states have an economic life of 80 years (average remaining life of **68** years). EAPL states that this is realistic because of the 'known presence of Stress Corrosion Cracking (SCC) and the type of coating on the Moomba to Wilton section'.[84]

For other assets, compressors, metering, plant, machinery and equipment, and mobile equipment, real straight line depreciation is used over the remaining economic lives of the assets.

Table 2.11 shows EAPL's original depreciation schedule for MSP over the initial access arrangement period.

Table 2.11: EAPL's proposed depreciation schedule, 2001 to 2005 (July 2000 $'000)

Asset class	Method	2001	2002	2003	2004	2005	Total
Mainline	kinked	18097	18 109	18 114	18 120	18 126	90 566
Laterals	kinked	1423	1426	1427	1428	1429	7 133
On line inspections	straight line				271	271	542
Compressors	straight line	1938	1940	2408	2410	2 412	11 108
Metering	straight line	938	940	944	945	948	4 715
Plant/machinery/equipment	straight line	721	751	772	803	839	3 886
Mobile equipment	straight line	637	682	732	777	814	3 642
Access arrangement	straight line	277	277	277	277	277	1385
Total		24032	24 125	24674	25032	**25** 115	122978

Source: Access arrangement information, **p.** 38.
Note: Some totals may not add up due to rounding.

Subsequent to EAPL's original proposal, APT submitted that in its opinion a kinked depreciation schedule should not apply to the MSP and that straight line depreciation is more appropriate.[85] APT further submitted that the life of the Moomba to Wilton segment of the pipeline could be extended to 80 years through refurbishment costs. APT estimates that some 250 km of pipeline would need to be refurbished between the years 2033 and 2056 at a cost of $560 000 per kilometre (a total of $140 million).

2.4.3 Submissions from interested parties

No submissions were received on EAPL's proposed depreciation schedule or CCA approach.

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[84] Access arrangement, p. 27.
[85] APT letter to **the** Commission, 11 August 2000, **p.** 3.

2.4.4 Commission's considerations

Current cost accounting framework

EAPL's use of a CCA framework is consistent with section 8.5A(b) of the Code.

In terms of future access arrangement periods, section **8.9** of the Code requires the capital base to be determined, by adjusting for depreciation, new facilities investment and redundant capital. For the MSP, the appropriate formula for determining the capital base at the start of the next access arrangement period is:

Capital base = initial capital base (indexed) – depreciation (indexed)
+ new facilities investment (indexed) – redundant capital

CPI adjustment

An issue for the Commission is whether the CPI is the most appropriate index for adjusting the capital base. While a general price index needs to be selected, it should be one which reflects the difference between real rates of return and nominal rates of return as perceived by financial markets. In this context the CPI may not be the ideal index. Its consumer costs orientation means that it is over sensitive to some consumer costs such as specific taxes and prices of products and services which may have only marginal relevance to general financial conditions. Futhermore, factors relevant to business oriented costs may be somewhat muted. Nevertheless, the Commission acknowledges the advantage of using a well recognised index such as the CPI. In principle the Commission considers that EAPL's proposal to use the CPI (All groups - weighted average of eight capital cities), as published by the ABS, for the calculation of reference tariffs is appropriate. An Australia-wide based CPI, in contrast to a specific capital city index, has the advantage of being sufficiently broad and less likely to be susceptible to fluctuations. Further support for the use of this index is the fact that it is also used as the basis for adjusting the value of Treasury capital indexed bonds.

Under EAPL's proposed current cost accounting framework, tariffs and the capital base are adjusted in accordance with the March CPI. Because of the timing of the lodgment of EAPL's proposed revisions to the access arrangement for the next access arrangement period (six months prior to the revisions commencement date), by necessity the access arrangement will contain an estimate of the CPI on which the value of the capital base at the commencement of the next access arrangement period will be based. The Commission is proposing an amendment to the effect that the capital base at the commencement of the next access arrangement period will be in accordance with the actual CPI, rather than an estimate. The actual CPI adjustment reflected in the Commission's final decision relating to the next access arrangement period.

Proposed amendment *A2.3*

In order for EAPL's access arrangement for the MSP to be approved, the relevant index for determining the value of the initial capital base at the commencement of the next access arrangement period is the actual CPI.

The introduction of the New Tax System (NTS),[86] in particular the GST, has resulted in a one-off increase in prices which has been estimated as having an impact of approximately 2.75 percentage points on the CPI.[87] The Commission considers that the effect of the CPI indexation factor should be exclusive of the impact on the CPI of the NTS. Failure to exclude this effect of the NTS would result in a windfall gain to investors over and above their expected rate of return at the expense of users and end-users.

Proposed amendment A2.4

> In order for EAPL's access arrangement for the MSP to be approved, the CPI index used in EAPL's current cost accounting methodology must be exclusive of the impact of the New Tax System.

The Commission notes EAPL's intention that, in the event that the ABS suspends or ceases publication of, or materially alters the CPI, EAPL will substitute an alternative that reflects changes in consumer prices. The Commission considers that if the ABS suspends or ceases publication of, or materially alters the CPI, an alternative well recognised index for measuring inflation, such as one published by the Commonwealth Treasury or the Reserve Bank, should be substituted.

Proposed amendment A2.5

> In order for EAPL's access arrangement for the MSP to be approved, EAPL must amend its access arrangement so that, in the event that the ABS suspends or ceases publication of or materially alters the CPI, a well recognised alternative index for measuring inflation, such as one published by the Commonwealth Treasury or the Reserve Bank, will be substituted.

Depreciation

One of the Code principles relating to the depreciation schedule is that it should be consistent with efficient market growth (section 8.33(a)). Such an approach would avoid delivering tariffs which are excessively high in early years and low in later years. EAPL has proposed a kinked depreciated schedule because of the perceived risk of assets being stranded as a result of competition from the EGP.

While EAPL has forecast a reduction in volumes over the initial access arrangement period, increasing volumes are forecast over the next access arrangement period. In a situation of increasing volumes **a** kinked depreciation schedule seems contrary to the Code principle that the depreciation schedule should be consistent with market growth.

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[86] In August 1998 the Commonwealth Government proposed a New Tax System **and** legislation was passed by parliament in June 1999. The New Tax System includes, among other **things,** the introduction of a broad-based Goods and Services Tax (GST) and the abolition of some indirect taxes, such as wholesale tax.

[87] Treasury mid-year estimates, November 1999.

The Commission is of the view that EAPL's proposed kinked depreciation schedule is inappropriate and notes that this opinion is shared by APT. The Commission proposes that straight line (in real terms) depreciation be adopted. Table 2.12 compares EAPL's proposed depreciation schedules with the revised depreciation schedules after factoring in a straight line depreciation rate and the value of the initial capital base proposed in this ***Draft Decision.***

Table 2.12: ACCC proposed depreciation schedule, 2001 to 2005 (July 2000 $'000)

Asset class	2001	2002	2003	2004	2005	Total
Mainline pipelines	7 051	7 060	7 067	7 070	7 074	35 321
Lateral pipelines	860	904	906	906	907	4483
On line inspections	0	0	0	0	527	527
Compressors	1602	1604	1606	2 062	2 064	8 937
Metering	1208	1210	1212	1215	1217	6 062
Plant etc	631	664	693	714	744	3 446
Mobile equipment	554	591	634	683	727	3 190
Access arrangement costs	277	277	277	277	277	1385
Total - ACCC	12 182	12310	12394	12928	13536	63351
Total - EAPL	24 032	24 125	24674	25 032	25 115	122978

The above figures are gross of CPI adjustments to the asset base under the CCA framework and deferred tax liabilities. The combined depreciation schedule in Table 2.13 summaries the net change in the value of the asset base from period to period (in a sense this can be referred to as economic depreciation) and incorporates:

- the straight line depreciation schedule shown in Table 2.12;
- CPI adjustments to the asset base;
- adjustment to the depreciation schedule to take account of the reduction in the initial capital base in accordance with the value of accumulated deferred taxes to date;
- the 'normalisation' of fbture tax payments over the life cycle of the assets. The depreciation allowance is adjusted for future taxes to remove the 's-bend phenomenon' so that fbture users do not pay a disproportionately higher charge for tax payments.

The lower depreciation charges in Table 2.13, compared with Table 2.12, encompass the netting effect of straight line depreciation and the inflation adjustment to the asset base each year. The 'additional depreciation' amount in Table 2.13 reflects the Commission's approach to normalising tax payments. Briefly, normalisation involves the process whereby future tax liabilities are spread over the life of the assets to avoid discontinuity in the revenue requirements, and therefore tariffs, as taxes become payable in the future. The normalisation factor represents an additional depreciation

allowance (return of capital) in EAPL's revenue requirements in earlier years to offset expected future tax liabilities. This issue is discussed in detail in section 2.5.

Table 2.13: ACCC's proposed depreciation schedule and asset base roll-forward ($'000)

	2001	2002	2003	2004	2005
Opening assets	502 081	506 674	507 009	521 112	522 515
less nominal depreciation[a]	-1 948	-1 664	1294	-811	158
less additional depreciation	2 764	3 068	3 379	3 798	**4** 189
plus capex	5 409	1739	16 189	4 390	1489
Closing assets	506 674	507 009	521 112	522 515	519 657

Minimum payments under the Gas Transportation Deed

During the initial access arrangement period EAPL is largely sheltered from the Commission's decisions affecting revenue because of minimum guaranteed payments made by AGL Wholesale Gas Limited to EAPL under the Gas Transportation Deed (GTD) until 2007. The question arises as to whether the existence of the GTD should be recognised in setting the regulated tariff.

One approach would be that any difference between the guaranteed minimum payments and the regulatory revenue requirements represents economic depreciation and should be incorporated in the depreciation schedule. Any excess of the minimum payments over the regulatory revenue requirements would represent accelerated depreciation, whereas any shortfall would lessen the depreciation charges.

Conversely, the arrangements between EAPL and AGL may be considered to be outside the scope of the access arrangement and should not be taken into account by the Commission in assessing EAPL's proposed tariffs. This consideration is particularly relevant as the GTD replaces an existing contract, the Gas Transportation Agreement (GTA), which was in existence prior to the commencement of the Code. The principle that revenue under existing contractual arrangements should be disregarded by the Commission in setting reference tariffs could be applied in this instance. The Commission proposes to adopt this approach for EAPL's access arrangement.

Non-linear (back-end loaded) depreciation schedule

EAPL's proposed tariffs are based on its forecast volumes, which assume a loss of market share to the EGP. In the absence of the EGP, EAPL's forecast volumes would be higher and hence its tariffs would be lower. In other words, the entry of the EGP is leading to higher tariffs on the MSP, which is contrary to the outcome which would be expected in a competitive market.

The Commission considered whether the application of a non-linear (back-end loaded) depreciation schedule (in real terms) was a feasible option to address this issue. This

was one of the options considered by NERA in its report to the Commission regarding regulation of tariffs for potentially competing pipelines, and more generally, excess capacity.[88] Other options considered by NERA concern the level of forecast volumes on which tariffs are based and are discussed in detail in section **2.8.**

Under a back-end loaded approach to depreciation, depreciation charges would be lower during the initial access arrangement period than, say, under a straight line depreciation schedule, and would increase during the subsequent access arrangement period(s). This approach would be consistent with volumes that are forecast to fall initially and then rise in later years, as is the case with EAPL's forecast volumes. Back-end loaded depreciation would shift the burden of depreciation charges from current users to future users. The service provider would still able to recover its efficient costs – the difference between straight line and back-end loaded depreciation becomes a timing issue. Therefore, the service provider would be shielded from the loss of revenue normally associated with the emergence of an alternative supplier, as fbture users pay higher tariffs.[89] However, users would benefit to the extent that competition itself grows the overall market.

Of concern to the Commission would be any price shocks to users in the next access arrangement period resulting from the higher depreciation charges. However, while the higher depreciation charges in the next access arrangement period would have an upward impact on tariffs, higher forecast volumes would have a counter-balancing effect, shielding users from upward price shocks in the next access arrangement period.

Under a strict cost of service approach (based on EAPL's forecast volumes and a straight line depreciation schedule) tariffs would be relatively high during the initial access arrangement period and then fall substantially in the next period as volumes increase. Under a back-end loaded depreciation schedule the tariff path would be more level over the two periods. If the expected pattern of demand over these periods does not eventuate, users may experience increased tariffs in the subsequent access arrangement period(s) under a back-end loaded approach.

Under the back-end loaded depreciation approach, the capital base at the commencement of the next access arrangement period would be higher than it would have been under straight line depreciation. EAPL's return on capital and return of capital for the next access arrangement period would be assessed on this higher asset base value. In practice, EAPL would have received from AGL the guaranteed minimum payments under the GTD. At the same time, the capital base that would have depreciated relatively little in value. Such an outcome would raise equity which may be of particular concern to users and end-users.

NERA does not favour the back-end loaded depreciation approach. It considers that the service provider, rather than users, should bear the costs of any excess capacity on a pipeline and be given the incentive to reduce the excess capacity. NERA notes that a back-end loaded depreciation profile merely shifts the burden of the costs of excess capacity from current to fbture users. Moreover, in NERA's opinion, the back-end

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[88] NERA, **Regulation of Tariffs for Gas Transportation in a case of 'Competing' Pipelines: Evaluation of Five Scenarios, A report to the ACCC, October 2000, pp. 18-19.**

[89] **In the absence of any stranding or partial stranding of assets.**

loaded depreciation approach raises questions about the consistency of treatment over time and therefore increases regulatory risk.

While the Commission considers that a back-end loaded depreciation schedule can have merit in some situations it does not consider it appropriate for the initial access arrangement period for the MSP.

Proposed amendment A2.6

In order for EAPL's access arrangement for the MSP to be approved, EAPL should adopt a straight line method of depreciation (in real terms) in place of its proposed kinked depreciation schedule.

amendment A2.7

In order for EAPL's access arrangement for the MSP to be approved, the basis of the depreciation schedule for the initial capital base should be the value of the initial capital base as proposed by the Commission in this ***Draft Decision.***

2.5 Rate of return

2.5.1 Code requirements

The Code (sections 8.30-8.31) states that the rate of return used should provide a return which is commensurate with prevailing conditions in the market for funds and the commercial risk associated with the provision of reference services. As an example, it suggests using a weighted average of the returns applicable to each type of capital (equity, debt and any other source of funds) with such returns, in the case of equity, determined on the basis of a well accepted financial model such as the capital asset pricing model (CAPM). The financing structure assumed should also reflect standard industry structures and best practice. However, a service provider may adopt other approaches if the regulator is satisfied that the objectives regarding the design of reference tariffs and the reference tariff policy set out in section 8.1 of the Code are met.

2.5.2 EAPL's proposal

The rate of return proposed by EAPL is a weighted average cost of capital (WACC), with the return on equity component based on the CAPM approach. EAPL is proposing a pre-tax real rate of return of 8.4 per cent. Adoption of a real, rather than nominal, rate of return is consistent with EAPL's current cost accounting (CCA) approach to asset valuation.

EAPL considers the Commission's 1998 decision on the Victorian transmission access arrangement[90] (which adopted a cost of equity of **13.2** per cent and a pre-tax real WACC of **7.75** per cent) to be an appropriate benchmark. In EAPL's opinion the risk associated with the MSP is higher than the Victorian system and justifies a higher rate of return.

The parameters of EAPL's cost of capital are shown in Table 2.14 and are discussed below.

[90] **ACCC, Access arrangement by Transmission Pipelines Australia Pty Ltd and Transmission Pipelines Australia (Assets) Pty Ltd for the Principal Transmission System, 6 October 1998 (Victorian Final Decision), p. 65.**

Table 2.14: EAPL's proposed CAPM and WACC parameters

Parameter	Value
Generalparameters:	
Real Risk Free Rate[(a)] (rr_f)	3.3%
Inflation (f)	2.5%
Nominal Risk Free Rate (r_f) $r_f = 1 - (1 + \text{real } r_f).(1 + f)$	5.85%
Gearing:	
Debt to total Assets (DN)	60%
Taxation:	
Effective tax rate (T,)	36%
Value of imputation credits (gamma) (y)	0.4-0.5
Cost of equity:	
Asset beta (β_a)	0.55-0.65
Debt beta (β_d)	0.12
Equity beta (derived) (β_e) $\beta_e = \beta_a + (\beta_a - \beta_d).D/E$	1.2-1.45
Market risk premium (MRP)	6.0%
Nominal cost of equity (r_e) $r_e = r_f + \beta_e.MRP$	13.1%-14.6%
Cost of debt:	
Debt margin (DM)	1.3%-1.4%
Nominal cost of debt (r_d) $r_d = r_f +$ debt margin	7.2%-7.3%
*Cost of capital **(WACC):***	
Post-tax nominal **WACC** (W) $W = r_e[(1-Te)/(1-Te(1-\gamma))].E/V + r_d(1-T).D/V$	6.8%-7.5%
Pre-tax real WACC[(b)] (W,) $W, = r_e/(1-Te(1-\gamma)).E/V + r_d . DN$	7.9%-9.0%
EAPL's proposed real pre-tax WACC	8.4%

Source: Access arrangement information, p. 32 and Supplementary access arrangement information pp. 19 and 36.

Notes: (a) Based on ten year bond rates.
(b) Converted from post-tax nominal WACC by grossing-up for the assumed taxation liability and then deducting inflation (through the Fisher conversion).

Risk free rate

EAPL considers that the current yield on CPI indexed bonds (3.5 to **3.6** per cent at the time of lodgment of the proposed access arrangement in May 1999) is the best indicator of the real **risk** free interest rate. EAPL also notes that the nominal yield on ten year bonds is around 5.5 to *5.6* per cent which, after deduction **an** inflation rate of 2.0 to 3.0 per cent, leaves an implied real **risk** free rate of around 3.0 per cent. To arrive at its proposed nominal **risk** free rate of 5.85 per cent, EAPL has adjusted **a** real **risk** free rate of 3.3 per cent by an inflation rate of 2.5 per cent.

Gearing

EAPL has used an 'industry standard' gearing structure of 60 per cent in its calculations.

Taxation

EAPL's proposed effective taxation rate of 36 per cent is in line with the statutory rate at the time of lodgment of its proposed access arrangement. EAPL states that 'the effective tax rate has been set at the statutory rate of 36 per cent as used in the Victorian ORG and ACCC decisions.'[91] EAPL states that this is appropriate given that it will begin to incur tax liabilities during the financial year ending 30 June 2001.[92]

Risk and beta

While noting that the ACCC and ORG adopted a range for the asset beta of 0.45 to 0.60 in the Victorian decisions, EAPL argues that a higher beta is justifiable for the MSP. Accordingly, EAPL is proposing a range for the asset beta of 0.55-0.65. EAPL derives the range for the equity beta, 1.2 to 1.45, from the asset beta. To justify the higher values, EAPL argues that it faces a greater exposure to systematic risk as a result of the following factors:

- volatility in the revenue stream resulting from the higher proportion of the NSW gas market attributed to large users (70 per cent) compared with the Victorian market (50 per cent);
- as the gas market in NSW is not as deep as Victoria, the resulting higher prices increase the exposure to competition from other energy sources; and
- notwithstanding that Moomba is predicted to be an important gas supply hub in the longer term, the timing and pricing of gas supply sources beyond the Cooper Basin is uncertain.

Market risk premium

EAPL is proposing a market risk premium of 6.0 per cent in accordance with the ACCC and ORG's decisions with respect to the Victorian gas pipelines. EAPL states:

> The most extensive and authoritative work on the issue of the market premium in Australia has been undertaken by Professor Officer. His view is that the midpoint of the plausible range for the market premium in Australia is around *6* per cent above the real bond rate ..[93]

Cost of equity

EAPL has calculated a range of 13.1 to 14.6 per cent, suggesting that it considers this is appropriate for the MSP.

Cost of debt

The risk-free rate plus a margin of 1.3 to 1.4 per cent is the basis for EAPL's proposed 7.2 to 7.3 per cent range for the cost of debt, which EAPL states is based on the benchmark financing structure and an investment grade rating.

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91 Access arrangement information, p. **33.**
92 EAPL response to submissions, 17 August 2000, p. 7.
93 EAPL response to submissions, 17 August 2000, pp. **4-5.**

WACC

To obtain a pre-tax real rate of return EAPL has converted the post-tax nominal rate by grossing up for the assumed taxation rate to obtain a pre-tax nominal rate and then adjusted for inflation by means of the Fisher conversion to obtain the pre-tax real rate.

Applying the above parameters and the range of values applicable to each parameter results in a pre-tax real WACC in the range of 7.9 to 9.0 per cent. Within this range EAPL is proposing a pre-tax real WACC of 8.4 per cent as the appropriate cost of capital based on commercial judgment and relevant benchmark rates of return.

EAPL contrasts the situation in Australia and United Kingdom where, according to EAPL, rates of returns are lower because both the risk free rate and market risk premium are lower.[94]

2.5.3 Submissions by interested parties

AGUG considers that EAPL's proposed pre-tax real rate of return of 8.4 per cent is too high and a rate less than five per cent would be more appropriate. According to AGUG, historical real rates of returns from investing in the share market have been: eight to nine per cent over the past ten years; just over six per cent over the past 30 years; and 5.8 per cent over the past 70 years. AGUG also notes that historical real returns to ten year bonds, generally accepted as a risk free investment, have been about 2.8 per cent. Although stating that regulators in the United Kingdom are setting rates of 6.0 to 6.5 per cent, AGUG considers that this range is 'not consistent with returns to companies carrying comparable risk ratings'.[95]

NERA, in a submission on behalf of Incitec, also considers that EAPL's proposed rate of return is too high and focuses primarily on two aspects of the rate of return. Firstly, NERA notes that EAPL's proposed nominal risk free rate of 5.85 per cent is greater than the nominal ten year bond rates quoted by EAPL of around 5.5 to 5.6 per cent. In NERA's opinion a fundamental inconsistency exists in having 'an implied risk free rate (which indeed should be the lowest rate available) that is higher than the rate on 10 year bonds'.[96]

Secondly, NERA is of the view that EAPL's proposed range for the equity beta of 1.2 to 1.45 is overstated. For comparison purposes NERA has derived the equity betas for five **gas** transportation companies operating in the USA and determined an average equity beta (adjusted at a 60 per cent gearing level) of about 1.0. NERA states that this average figure is likely to overstate the equity beta for a regulated gas transmission business, as the US companies also undertake unregulated and more **risky** operations. Accordingly, in NERA's opinion, an equity beta of at most 1.0 should be attributed to EAPL.[97]

Incitec is critical of the use of the 36 per cent statutory tax rate as the effective tax rate when tax concessions result in a lower effective rate than the statutory tax rate. Incitec

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[94] EAPL response to submissions, 17 August 2000, p. 5.
[95] AGUG submission, 19 July 1999, pp. 3-4.
[96] Incitec submission prepared by NERA, 15 July 1999, p. 6.
[97] Incitec submission prepared by NERA, 15 July 1999, pp. 6-8.

cites the situation in the Victorian gas industry following privatisation. According to Incitec, the new owners are unlikely to pay tax for a period of 20 years or more. Incitec assumes a similar situation would apply to EAPL since its acquisition of the MSP in 1994. Incitec notes that the pre-tax real WACC of **7.75** per cent approved by the Commission for the Victorian gas pipelines assumed a tax rate of **36** per cent. Incitec argues that the new owners would pay no tax and therefore the appropriate pre-tax real WACC is 5.35 per cent. Accompanying Incitec's submission is a paper on the Victorian gas industry experience by Professor David Johnstone, who suggests that the high prices paid for the Victorian gas pipeline assets indicates that the rates of return allowed by the regulators were excessive.[98]

2.5.4 Commission's considerations

Introduction

The regulatory rate of return is a critical element of the pricing principles since it determines the prospective profitability of the service provider. The value for the rate of return should be in accordance with prevailing financial market conditions taking into account the level of risk to the service provider in providing the reference services. If the rate of return is set too low, the service provider will not be able to recover the efficient and fair costs of service provision and may not have adequate incentive to invest further in the pipeline. However, if the rate is set too **high** the service provider will be able to earn monopoly rents and may be encouraged to over-capitalise in the pipeline.

EAPL has adopted a formula-based approach to calculate its proposed pre-tax real WACC from the post-tax nominal cost of equity. This has been done by the 'forward transformation'. That is, EAPL has grossed up the post-tax nominal rate by the assumed taxation rate and then adjusted for inflation by means of the Fisher conversion to obtain the pre-tax real rate. As noted in previous decisions and the *Draft Regulatory Principles,* the Commission considers that this transformation (and the alternative 'reverse transformation')[99] give rise to errors and do not result in appropriate WACCs. Consequently, the Commission has adopted cash flow modelling to derive a WACC from the cost of equity determined from the CAPM.

In addition, while EAPL has proposed a pre-tax real WACC, the Commission considers that a post-tax framework is appropriate for regulatory decisions. This *Draft Decision* will indicate the Commission's proposed cost of equity, post-tax nominal WACC and pre-tax real WACC. Further discussion relating to this can be found in the following sections of this chapter.

Regardless of whether a pre-tax real or post-tax nominal WACC is used by service providers and the Commission, the basic rate of return critical to the regulatory framework is the post-tax nominal cost of equity from the CAPM. The cost of equity

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[98] **Incitec submission, 19 October 1999, p. 1. Johnstone, Prof. D, Comments on the Cost of Capital with Regard to Regulated Gas Transmission Entities, 16 November 1999.**

[99] **The post-tax nominal rate is adjusted for inflation to obtain a post-tax real rate and then grossed up by the rate of taxation to obtain a pre-tax real rate.**

determines whether investors will be willing to advance equity to finance the capital infrastructure required to provide services.[100]

The determination of the appropriate rate of return requires certain parameters and assumptions. The values assigned to the financial parameters remain contentious and warrant discussion in some detail since they form the basis for determining the rate of return that will be applied to the regulated assets. Accordingly, each parameter will be dealt with in turn in the remainder of this section. The post-tax approach used by the Commission is then discussed.

The key parameters are:

- the risk free interest rate (r_f), the real risk free rate (rr_f) and the expected rate of inflation **(f);**
- the cost of debt (r_d);
- the market risk premium (MRP);
- the level of gearing;
- the likely utilisation of imputation credits (y);
- the effective tax rate (T_e); and
- the asset beta (β_a), debt beta (β_d) and equity beta (β_e).

Interest rates and inflation

EAPL has proposed a nominal **risk** free rate of 5.85 per cent based a real risk free rate of 3.3 per cent adjusted for an inflation rate of 2.5 per cent. The Code (section 8.30) states that the rate of return should be 'commensuratewith prevailing conditions in the market for funds'. The Commission interprets this as implying that all information for deriving the rate of return should be as up to date as possible at the point at which the access arrangement comes into effect and match the circumstances of the regulatory framework. For interest rates and inflation the Commission uses selected data from financial markets over the previous 40 business days. This 40 day average reduces the impact of day to day market volatility.

Ten year bond rates can be used as a proxy for the risk free rate. However, the Commission considers that the term associated with the risk free rate should coincide with the duration of the access arrangement period. Thus, five year bond rates are used in reference to access arrangements with an expected initial access arrangement period of five years. In addition, the five year bond rate has the advantage of a lower built-in premium to compensate for inflation risk. **A** ten year bond rate is usually higher than the five year rate because, in part, it accommodates a risk premium for inflation uncertainty. **As** the regulatory framework already compensates the service provider for inflation risk the inclusion of an inflation risk premium in the risk free rate used for determining the cost of capital is inappropriate. Accordingly, the Commission considers that five year rates are appropriate for this analysis.

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[100] **ACCC, Draft Regulatory Principles, p. 73.**

Based on the methodology outlined above the relevant average 40 day five year bond rate as at 20 November 2000 is 6.04 per cent (with an equivalent real risk free rate (rr_f) of 3.07 per cent) as indicated in Table 2.15. These rates will be amended for the release of the Commission's ***Final Decision*** to reflect prevailing market rates at that time.

Table 2.15: Current financial market interest rates and inflation expectations

Financial indicator	**40 day moving average ending 20 November 2000[a] (per cent)**
5 year government bond rate	6.04
Indexed bonds (August 2005 series)	3.05
Estimated 5 year real rate[b]	3.07
Implied 5 year inflation expectation[c]	2.88

Notes: (a) Based on daily closing quotes as published in ***The Australian Financial Review.***
(b) Interpolations based on indexed bond figures.
(c) Inferred from the difference between nominal and real interest rates over the corresponding period using the Fisher Equation.

The expected inflation rate is fundamental in deriving real rates of return. ***An*** understatement of the expected inflation rate will lead to an overstatement of the real rate of return (and vice versa).

In its pre-tax real WACC calculation EAPL has adopted an inflation rate of 2.5 per cent. An indication of the rate of inflation anticipated by financial markets is provided by the difference between nominal bond rates and indexed bond rates for the same term. While the indexed bonds do not have maturity dates that correspond to the current five year nominal bond rates, the corresponding figures can be readily derived by interpolation as indicated in Table 2.2. These figures indicate that the current expectation of average inflation (f) over the initial access arrangement period is 2.9 per cent. The Commission will use this market derived inflation rate in its calculations.

Debt margin and cost of debt

EAPL's proposed range of 7.3 to 7.4 per cent for the cost of debt is based on a margin of 1.3 to 1.4 per cent over the risk-free rate. EAPL states that this is consistent with the benchmark financing structure and investment grade rating.

In its ***CWP Final Decision*** and ***MAPS Draft Decision*** the Commission considered that a debt margin of 120 basis points was appropriate with respect to both pipelines. The Commission remains of the view that a 120 basis point margin is appropriate for the reasons outlined in those decisions. Accordingly, the Commission has used this margin in this assessment. A debt margin (DM) of 1.2 per cent above the proposed risk-free rate of 6.0 per cent results in a nominal cost of debt (r_d) of 7.2 per cent. With an inflation rate of 2.9 per cent the corresponding real cost of debt (rr_d) is 4.2 per cent.

Market risk premium

EAPL has proposed a market risk premium of 6.0 per cent, stating that this is in accordance with the value adopted by the Commission and ORG.[101]

The Commission considers that the market risk premium may be declining and that a more appropriate value may be 5.5 per cent.[102] However, the downward trend is not yet fully accepted by market participants and commentators. The Commission considers that there is little evidence to suggest that the market risk premium is above 6.0 per cent, while the lower end of a reasonable range remains in debate. Accordingly, the Commission has used a market risk premium (MRP) of 6.0 per cent in its calculations. However, the Commission will reconsider the appropriate level of the market risk premium over time as decisions are made and further empirical work becomes available.

Gearing

EAPL is proposing a 60 per cent gearing level. This is the level generally accepted at present by regulators of gas pipelines and other infrastructure. The Modigliani-Miller theorem suggests that the cost of capital in the absence of taxes is invariant over a broad range of rates of gearing and this holds approximately true when taxes are considered.[103] Therefore, the level of gearing is not a critical factor in the formulation of the WACC. The Commission proposes to accept EAPL's debt to equity ratio of 60:40.

Imputation credits

The availability of tax imputation credits requires a modification to the standard CAPM/WACC model to reflect the return to shareholders of tax credits associated with their share dividends. Thus, gamma (γ) is included to represent the proportion of franking credits which can, on average, be used by shareholders of the company to offset tax payable on other income. The higher the gamma, the lower will be the required return to equity holders and therefore the lower the estimated WACC. EAPL is proposing a range of 40 to 50 per cent for the value of imputation credits.

For regulatory purposes it is debatable whether an average for the value of imputation credits is appropriate. Generally, if an average rate is used in the regulatory rate of return, investors who are able to take advantage of more than the average will receive a rate of return greater than their expected rate of return. As a consequence the company's share price will be bid up until the actual rate of return (based on market value of the assets and not the regulated value) equals the required rate of return of those investors able to take the most advantage of the tax credits. Investors who are at a comparative disadvantage will either sell their shares or accept a lower rate of return. This argument tends to suggest that the appropriate value for utilisation of imputation credits for regulatory purposes should approach 100 per cent.

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101 Access arrangement information, p. **34.**

102 ACCC, Access Arrangement by AGL Pipelines (NSW) Pty Ltd for the Central West Pipeline, Final Decision (CWP Final Decision), 30 June 2000, p. **22.**

103 For example, if the level **of** gearing is increased, the WACC will not decrease despite the increase in the level of debt, the cost of which is less than the cost of equity, because of **an** offsetting increase in the riskiness of the business.

The Commission considers it important to maintain consistency in the development of parameter benchmarks and this includes an ownership assumption. In line with the treatment of other parameters, Australian ownership is assumed. This further supports the value of 100 per cent for the utilisation of imputation credits. However, uncertainty remains regarding the appropriate value of imputation credits. While a gamma (γ) of 50 per cent could be considered the minimum value appropriate in calculating the WACC, the Commission will on this occasion retain this value for the present analysis.

Effective tax rate

To convert from a post-tax rate of return to a pre-tax rate, EAPL has adopted the statutory tax rate of 36 per cent (this rate was applicable at the time EAPL lodged its submission).

Due to the timing differences in tax payments caused by the different rates of depreciation for tax and accounting purposes, the effective tax rate over the life of the asset is likely to be less than the statutory tax rate. The deferral of tax liabilities results in an improved cash flow, a more rapid payback of capital and a resulting internal rate of return greater than might otherwise be the case.

The basis of the CAPM approach is the post-tax return on equity, suggesting that the effective tax rate (T,) rather than the statutory tax rate (T) is the appropriate parameter.

At the WACC forum conducted as part of the Victorian decision and in subsequent discussions, some experts suggested that, rather than a pre-tax approach to WACC, a post-tax approach should be adopted. Tax payments would be included in the cash flows as a cost in a similar manner to operating and maintenance expenses. Such an approach would avoid the need for a post-tax to pre-tax formula or estimation of a long term effective tax rate and treats taxation in a transparent manner.

An application of this post-tax approach considers first the cash flows necessary to operate the business including the post-tax returns required by shareholders. To this is added any tax liabilities (net of the value of imputations credits) assessed for each period. Because of tax concessions (especially accelerated depreciation) available to the owners of the assets, tax liabilities can be deferred for a significant period. This issue is particularly relevant to the MSP. For taxation purposes EAPL has been able to apply accelerated depreciation to its purchase price of the MSP. Consequently, to date EAPL has been able to defer its income tax liabilities and will be able to do so for the duration of the initial access arrangement period (based on regulated forecast revenue and costs). During this period no taxes will be payable.[104] This would result initially in relatively low tariffs, which would rise in subsequent access arrangement periods when EAPL no longer has the ability to take advantage of the benefits associated with tax depreciation and the tax liabilities are added to the cost structure.

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[104] **EAPL** argues that the statutory **tax** rate is applicable because it will commence to incur tax liabilities during the initial access arrangement period. That may be the case on the basis of EAPL's actual revenue. However, that revenue is based on the minimum payments guaranteed by the GTD and will be different to the regulated revenue stream determined in this ***Draft Decision*** and unaffected by any regulatory decisions.

While some users may prefer lower tariffs now and argue that they could budget for higher tariffs later, it is doubtful whether this approach would be equitable to future users who would be disadvantaged by the deferral of tax liabilities. To avoid timing distortions the Commission's preferred approach is to use cash flow analysis and a post-tax normalisation approach (which is discussed in detail later in this section). The modelling associated with the normalisation approach requires initial assumptions about the parameters comprising the rate of return, including the rate of corporate taxation. To this end a statutory rate of taxation of 34 per cent for the year 2000/01 and 30 per cent thereafter as proposed in the Ralph report have been used in the model where appropriate.[105] In addition, accelerated depreciation will no longer apply to new investment.

The cash flows generated from the modelling can be used to determine an effective tax rate for the business over the life of the asset. The effective tax rate can be estimated from the cash flows by comparing the achieved pre-tax nominal return on equity to the post-tax nominal return on equity. Formula-based calculations to determine **a** pre-tax WACC become superfluous since the cash flow analysis also determines the revenue necessary to deliver the desired return to equity holders consistent with the CAPM framework. The Commission's cash flow modelling indicates an effective tax rate (T,) of 13.6 per cent for the MSP. It is important to note, however, that while the effective tax rate is an outcome of the modelling, a long term estimate of the effective tax rate is not an input to the model. The cash flows are generated independently of the effective tax rate.

***Risk** and beta*

The risk facing a company can be classified as either specific risk (also known as diversifiable risk) or systematic (also known as non-diversifiable or market risk). Specific risk is related to occurrences unique to the firm (or industry) and can be eliminated by diversification, the practice of a rational investor holding a portfolio of stocks so that losses on some stocks may be offset by gains on others. Systematic risk arises from external events affecting all firms and cannot be eliminated by diversification.

The equity beta in the CAPM is intended only to measure systematic risk and for a particular stock measures its volatility relative to the market as a whole. **A** beta greater than one indicates that the movement in the stock is more volatile than the average stock (which by definition has a beta of one). While betas for businesses listed on the Australian Stock Exchange may be measured empirically, some judgment is required for unlisted firms. One method is to compare asset (or unlevered) betas for different businesses.[106]

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[105] EAPL's access arrangement was submitted prior to the release of the Ralph Report.

[106] Asset betas are derived by assuming the firm is financed with 100 per cent equity and accordingly allow comparisons with other firms with dissimilar capital structures.

While there are a number of levering and de-levering formulae, the Commission has adopted the Monkhouse formula:

$$\beta_e = \beta_a + (\beta_a - \beta_d)\left[1 - \left(\frac{r_d}{1+r_d}\right)(1-\gamma)T_e\right]\frac{D}{E}$$

EAPL has proposed a range of 0.55 to 0.6 for an asset beta. With a debt beta of 0.12 the equity beta range calculated is 1.2 to 1.45. These values have been selected with reference to the betas selected for the Victorian transmission and distribution access arrangements. EAPL notes that the values it has proposed are slightly higher than those used for the Victorian systems as it regards the MSP faces greater exposure to systematic risk. This additional risk is the result of:

- the composition of the final market – large users account for a higher proportion of the NSW market than the Victorian market and so the volatility in demand is influenced by market-wide factors;
- maturity and final prices in NSW – the NSW market is not as deep as the Victorian market, has higher city gas prices and greater exposure to competition from alternative energy sources;
- supply from Moomba – 'there is some uncertainty about the timing and pricing of the gas supply sources beyond the Cooper Basin'.[107]

Greater reliance on large industrial users may result in the volatility of demand moving in accord with general economic and market conditions. This may suggest that an equity beta for the MSP could be higher than that for the PTS. However, EAPL itself has commented on the strong growth in the tariff market.[108] As the penetration in the tariff market increases relative to the industrial market the risk suggested by EAPL should diminish.

The argument that the NSW market is not as deep as the Victorian market, particularly with respect to the domestic market, suggests an opportunity to increase gas sales in this market segment. As noted above, EAPL has suggested that there is future growth in the tariff market.

EAPL has also suggested that it faces competition from alternative energy sources. However, this is not related to systematic risk as reflected in the CAPM but is specific to the MSP. For example, the operation the EGP may impact on the MSP business. However, any impact should be reflected in the demand forecasts for the MSP, as EAPL has done, rather than in the beta.

EAPL has suggested that the MSP faces greater risk than the Victorian PTS. However, it should be noted that the systems operate differently. The PTS is a market carriage system, in which revenue is derived from transportation charges based on throughput. Conversely, the MSP is managed as a contract carriage system, in which revenue is generated mainly from tariffs based on reservation of capacity and pipeline investment is backed by long term supply contracts. Accordingly, variations in gas demand associated with changing economic conditions are likely to have a greater impact on the

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[107] **Access arrangement information, pp. 33-34.**
[108] EAPL **access arrangement information p. 14.**

pipeline owner's revenue under a market carriage system than a contract carriage system.

The Commission has considered the arguments forwarded by EAPL in support of its proposed range of betas and concludes that there is no evidence that the MSP requires higher betas than the PTS.

In its recent *CWP Final Decision* the Commission proposed an asset beta of 0.60 and equity beta of 1.5.[109] The CWP is a small relatively new pipeline servicing regional NSW without foundation contracts. In contrast, the MSP is a mature pipeline with established customers and services major NSW centres as well as Sydney. The Commission does not consider a similar asset beta for the two very different pipelines would be appropriate.

A more relevant guide in determining a suitable asset beta for the MSP may be the Commission's recent ***MAPS Draft*** *Decision.* Like the MSP, the ***MAPS*** is a mature pipeline. The Commission considered that an appropriate asset beta for the ***MAPS*** was 0.50[110] and, on balance, the Commission considers that the appropriate asset beta (β_a) for the MSP is also 0.50.

Recent decisions of the Commission have suggested a range for the debt beta of 0.0 to 0.06. In the ***MAPS*** *Draft Decision* a debt beta of 0.06 is proposed and the Commission is proposing the same rate on this occasion. With the asset beta valued at 0.5 as noted above and a debt beta of 0.06, the equity beta for the MSP is determined to be 1.16.

The Commission notes NERA's argument in its submission on behalf of Incitec that the equity beta for EAPL should be no more than 1.0, based on comparable North American gas transmission enterprises. In addition to NERA's arguments in its submission, a further factor to be considered is the different treatment of volumes between the Australian and American jurisdictions. In a report commissioned by the Commission, NERA[111] noted that the standard in the USA is to base tariffs on defined capacity rather than volumes, the approach generally adopted in Australia. This raises the issue of who bears the costs of excess capacity. In a situation where tariffs are based on defined capacity, the pipeline owner is bearing the costs of excess capacity, whereas users bear the costs of excess capacity when tariffs are based on volumes. This tends to suggest that gas transportation businesses in the USA are more risky than in Australia. While inter-jurisdictional comparisons have their limitations, the Commission considers that **an** equity beta of 1.16 for the MSP is reasonable.

Post-tax ***nominal return*** *on equity*

Table 2.16 summarises the parameters discussed above. As noted earlier, the rate of return critical to the regulatory framework is the expected post-tax nominal cost of equity (r_e) for the business, since it determines whether investors will be willing to advance equity to finance the capital infrastructure required. The CAPM approach

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[109] **ACCC, CWP Final Decision, p. 42.**

[110] **ACCC, Access arrangement proposed by Epic Energy South Australia Pty Ltd for the Moomba to Adelaide Pipeline System (MAPS Final Decision), 16 Augutst 2000, p. 71.**

[111] **NERA, Regulation of tariffs for gas transportation in a case of 'competing' pipelines: evaluation of five scenarios: A report to the ACCC, October 2000, p. 21.**

measures an investor's required rate of return in terms the risk free rate plus a margin to compensate for the riskiness of the investment. The CAPM formula is:

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

The resulting post-tax nominal cost of equity for the MSP is 13.0 per cent. This is just below the low end of the range of 13.1 to 14.6 per cent proposed by EAPL. The corresponding post-tax real cost of equity is **9.8** per cent.

Table 2.16: Comparison of WACC parameters

Parameter	EAPL Low	EAPL High	ACCC Draft Decision
Nominal risk free rate (r_f)	**5.9%**	5.9%	6.0%
Real **risk** free rate (rr_f)	3.3%	3.3%	3.1%
Inflation rate (f)	2.5%	**2.5%**	2.9%
Debt Margin (DM)	1.3%	1.4%	1.2%
Cost of debt (r_d)	7.2%	7.3%	7.2%
Real cost of debt (rr_d)	4.6%	4.7%	4.2%
Imputation credits (γ)	50.0%	40.0%	50.0%
Statutory tax rate (T) [(a)]	36.0%	36.0%	30.0%
Effective tax rate (T,)	36.0%	36.0%	13.6%
Market risk premium	6.0%	6.0%	6.0%
Asset beta (β_a)	**0.55**	0.65	0.50
Debt beta (β_d)	0.12	0.12	0.06
Equity beta (β_e)	1.20	1.45	1.16
Post-tax nom. return on equity (r_e)	13.1%	14.6%	13.0%
Post-tax real return on equity (rr,)	10.3%	11.8%	**9.8%**

Source: Access arrangement information and ACCC analysis.
Note: (a) In this Draft ***Decision*** 34 per cent applies for the year 2000/01 and 30 per cent thereafter.

*Post-tax determination of **WACC***

The CAPM produces a post-tax return on equity. Formulae are often used to calculate a post-tax nominal WACC from this cost of equity and to convert from the post-tax nominal WACC to a pre-tax real WACC. This approach has been adopted by EAPL. However, as discussed by the Commission in its *Draft Regulatory Principles* and recent regulatory decisions, the formulae have limitations and, when applied in a regulatory framework, do not deliver the intended return to equity holders. The timing differences between prima facie tax expenses and actual payment of taxes as a result of accelerated depreciation and other tax concessions are likely to have the effect of improved effective returns to shareholders. Therefore, inclusion of the statutory tax rate in the formula is likely to result in an overstatement of the effective tax rate and in turn an overstatement of the required return on equity.

The Commission's preferred approach is to model cash flows in a post-tax framework. This overcomes problems associated with pre-tax frameworks, such as the need to forecast accurately tax payments beyond the access arrangement period being considered. The Commission's reasons for this preference and its move to implement this methodology have been well documented and therefore have not been included in this document.[112] The post-tax approach removes the risks faced by the service provider associated with long term future tax liabilities and provides a return that is commensurate with market requirements.

Under the post-tax framework the regulatory revenue stream provides compensation for actual tax liabilities as they occur. As a result, the profile of that revenue stream will initially be low when the firm takes advantage of available tax concessions such as accelerated depreciation, and will become much higher as those concessions expire and tax liabilities become payable. This would leave customers susceptible to a 'rate shock' when taxes become payable. This tariff path would be inequitable as future customers would be paying a disproportionate level of the service provider's tax liabilities. Further, this dramatic increase in tariffs would not be consistent with a tariff path associated with a competitive market.

To remove these undesirable features the Commission has 'normalised' the forecast revenues over the life cycle of the assets. Essentially, normalisation of post-tax cash flows involves an adjustment to the depreciation profile, and hence tariffs, by allowing a higher rate of depreciation when taxes are not payable which is offset by lower depreciation when taxes are payable. This adjustment can be interpreted as pre-compensation of future tax liabilities.

One method of doing this would be to equate the amount of pre-compensation each year to the amount that the prima facie tax expenses exceed actual tax payments (adjusted for gamma). As the pre-compensation of future tax liabilities represents a return of capital (that is, depreciation) it is deducted from the asset base when calculating the return on capital. Failure to do so would result in the investor earning a rate of return in excess of that determined by the CAPM.

The Commission has adopted, however, a refinement to this approach, which is designed to generate a revenue stream equivalent to that which would be generated in a pre-tax framework, while at the same time delivering the desired post-tax returns to equity holders. The Commission has used the tax wedge, which is equal to the difference between the nominal vanilla WACC[113] and the nominal pre-tax WACC,[114] to normalise tax payments over the life of the assets.

The cash flow modelling undertaken by the Commission for the MSP is based on the CAPM-generated post-tax nominal cost of equity of 13.0 per cent, which gives rise to a nominal vanilla WACC of 9.5 per cent. The cash flow analysis indicates that this is

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[112] **The Commission's assessment of the problem and solution are summarised in ACCC,** *CWP Final Decision,* **Appendix C. See** *MAPS Final Decision,* **p. 34 onwards for a description of the implementation of** this **methodology by the Commission and other regulators.**

[113] **The vanilla WACC is a weighted average of the cost of debt and the post tax return on equity calculated by the CAPM.**

[114] **The pre-tax WACC** is **derived from the Commission's cash flow analysis and is the internal rate of return of the pre-tax cash flows to the asset.**

consistent with a post-tax nominal WACC of 7.9 per cent, while the equivalent pre-tax real WACC generated from the model is 7.0 per cent. The key rates of return for the MSP are shown in Table 2.17.

Table 2.17: WACC estimates

	EAPL		ACCC
	low (%)	high (%)	Draft decision (%)
Post-tax nominal cost of equity $r_e = r_f + \beta_e (r_m - r_f)$	13.1	14.6	13.0
Post-tax nominal WACC[(a)] $W = r_e[(1-Te)/(1-Te(1-\gamma))].E/V + r_d(1-T).D/V$	6.9	7.6	7.9
Pre-tax nominal WACC[(a)] $W_t = r_e/(1-Te(1-\gamma)).E/V + r_d .DN$	10.6	11.8	9.9
Effective tax rate (Te)	36.0	36.0	13.6
Pre-tax real WACC"" $W_{tr} = (1+W_t)/(1+f)-1$	7.9	9.0	7.0
Nominal vanilla WACC $W, = r_e.E/V + r_d.D/V$	9.6	10.2	9.5
Implied tax wedge $= W_t - W_v$	1.04	1.58	0.38

Source: Access arrangement information, p. 32, Supplementary access arrangement information, p.36 and **ACCC** analysis.

Note: **(a)** **EAPL's** proposed WACCs are formula-based whereas the Commission's are derived from cash flow analysis.

EAPL's proposed range for the pre-tax real WACC of 7.9 to 9.0 per cent, is based on a target post-tax return on equity between 13.1 and 14.6 per cent and an assumed effective tax rate of 36.0 per cent. Based on its proposed parameters, EAPL's proposed pre-tax real WACC of 8.4 per cent is equivalent to a post-tax nominal return on equity of about 13.8 per cent. However, as the effective tax rate is less than the statutory tax rate, a pre-tax real WACC of 8.4 per cent is equivalent to a higher post-tax return on equity than that proposed by EAPL. Based on the Commission's cash flow analysis, a pre-tax real WACC of 8.4 per cent is equivalent to a post-tax nominal return on equity of about 17.2 per cent.

While 13.0 per cent is proposed by the Commission as the regulated rate of return on equity, it is important to note that scope exists for EAPL to earn a rate of return in excess of this rate because of the incentive mechanisms contained in EAPL's proposed access arrangement. The incentive mechanisms are discussed in section 2.10.