The Commission notes that the effect of EAPL's proposal would be an initial access arrangement period which, at the time of lodgment was expected to be approximately five years. However, in practice the duration will depend on the timing of the commencement of the initial access arrangement period which in turn will reflect the duration of the assessment process for the access arrangement.

At present, it would appear that the initial access arrangement period will have a term closer to four years than five. The Commission considers that the most appropriate length of the initial access arrangement period for the MSP is approximately five years.[216] This provides EAPL with a greater degree of regulatory certainty than a shorter term as well as a reasonable time for EAPL to benefit from the incentive mechanisms incorporated into the access arrangement. Accordingly, the Commission proposed an amendment to the revisions submission date. This amendment would require EAPL to amend the access arrangement information to include an additional year's information (the year ending June 2006).

Proposed amendment A3.15

> In order for EAPL's access arrangement for the MSP to be approved, EAPL must change the revisions submission date so that it is four years and six months after the commencement date of the initial access arrangement period.

A service provider may choose to submit revisions in advance of the revisions submission date if, for example, forecasting errors prove to be substantially to its disadvantage. However, it would be unlikely to voluntarily submit revisions early if forecasting errors proved to be to its advantage. Accordingly, the Code provides that mechanisms may be included in an access arrangement in order to help protect users from incorrect forecasts and other 'events'.[217]

The Commission has considered the revisions submission date and the impact of specifying any triggers for an early review of the access arrangement. The Commission does not consider that any trigger are necessary for the MSP in the instance. As stated above, an access arrangement period of approximately five years is considered appropriate by the Commission.

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[216] If the duration of the initial access arrangement period were extended additional access arrangement information and other supporting data would be needed in respect of the extended timeframe.

[217] 'Specific major events' and 'certain events' may trigger a requirement on the service provider to submit revisions prior to the revisions submission date, pursuant to sections **3.17** and **3.18** respectively.

4. Information provision and performance indicators

4.1 Information provision

4.1.1 Code requirements

In conjunction with its proposed access arrangement, a service provider is required to submit access arrangement information. This must contain sufficient information to enable users and prospective users to understand the derivation of the elements in the proposed access arrangement and to form an opinion as to compliance of the access arrangement with the provisions of the Code (section 2.6).

The access arrangement information may include any relevant information, but must at least contain the infomation described in Attachment A to the Code (section 2.7), which is included as Appendix B to this ***Draft Decision.*** **A** summary is contained in Box 4.1 below.

Box 4.1 : Summary of Attachment A information

The information required is divided into six categories:

Category 1 : access and pricing principles

Tariff determination methodology; cost allocation approach and incentive structures.

Category 2: capital costs

Asset values (by, for example, pricing zone) and valuation methodology; depreciation and asset life; committed capital works and planned capital investment (including justification for); rates of return for equity and debt; and debt/equity ratio assumed.

Category 3: operations and maintenance costs

&xxtion between, for example, pricing zone, and cost categories.

Category 4: overheads and marketing costs

Costs at a corporate level; regulated versus unregulated; cost allocation between, for example, pricing zone, and cost categories.

Category 5: system capacity and volume assumptions

Description of system capabilities; map of piping system; average and peak demand; volumes; system load profiles and customer numbers.

Category 6: key performance indicators

Indicators used to justify 'reasonably incurred' costs.

Information included in the access arrangement information may be categorised or aggregated to the extent necessary to ensure that disclosure of the information is not, in the opinion of the relevant regulator, unduly harmful to the legitimate business interests of the service provider, a user or prospective user (section **2.8).**

If the regulator is not satisfied that the access arrangement information meets the requirements of the Code, it may, of its own volition, require the service provider to

make changes to the access arrangement information. Likewise, if requested to do so by any person, the regulator must review the adequacy of the access arrangement information. However, the regulator must not require access arrangement information to be released which, in the regulator's opinion, could be unduly harmful to the legitimate business interests of the service provider or **a** user or prospective user (section 2.9).

If the regulator requires the service provider to change the access arrangement information, it must specify the reasons for its decision and allow the service provider a reasonable time to make the changes and resubmit the access arrangement information.

A summary of the responsibilities of the relevant regulator and procedures to be followed are contained in Box 4.2 below.

Box 4.2: Information disclosure - regulator's responsibilities and procedures

1) The regulator must decide whether the access arrangement information meets the requirements of sections 2.6 and 2.7. That is, whether the access arrangement information includes:
   - the information described in Attachment A (section 2.7); and
   - such information as in the opinion of the regulator would:
   - enable users and prospective users to understand the derivation of the elements in the proposed access arrangement; and
   - form an opinion as to the compliance of the access arrangement with the provisions of the Code (section 2.6).
2) The regulator must also consider whether changes to the access arrangement information are required. This in **turn** requires the regulator to consider:
   - whether the disclosure of the information could be unduly harmful to the legitimate business interests of the parties; and thus
   - the extent to which the information needs to aggregated or categorised (or possibly excluded).
3) In making this decision:
   - the regulator must correctly interpret sections 2.6 and 2.7;
   - take into account relevant considerations (submissions received); and
   - provide procedural fairness to the service provider and other parties.
4) If the regulator requires the service provider to make changes to the access arrangement information, then under section 2.9, the regulator must:
   - specify the reasons for its decision; and
   - specify a reasonable time for the service provider to make the changes.
5) When the regulator makes its draft decision and proposed amendments to the access arrangement have been released for public comment, as a requirement of procedural fairness, the regulator should consider:
   - whether parties have received sufficient information to enable them to understand and make submissions on the proposed amendments; and
   - whether amendments must also be made to the access arrangement information.

4.1.2 EAPL's proposal

EAPL submitted access arrangement information in conjunction with its access arrangement on 5 May 1999. Following on going discussions with Commission staff

EAPL agreed to make public additional information and on 28 October 1999 voluntarily released supplementary access arrangement information. Moreover, EAPL provided further information to the Commission in confidence on the basis that the information is commercially sensitive, particularly in light of the commissioning of the EGP.

4.1.3 Submissions by interested parties

AGUG submitted that EAPL's access arrangement information did not comply with Attachment A of the Code.[218] However, AGUG did not elaborate on any specific areas of deficiency.

4.1.4 Commission's considerations

While the Code specifies a minimum level of information disclosure on behalf of the service provider, it also places an obligation on the regulator not to release any information that may be unduly harmful to the legitimate business interest of the service provider (or users and prospective users). Therefore the Code, and the Gas Pipelines Access Law,[219] recognises that the regulator is likely to possess more information than is publicly available. In addition to the information released publicly, EAPL also provided further information to the Commission on a confidential basis. Moreover, on 17 August 2000 EAPL provided a response to submissions from interested parties.

Also in August 2000, APT raised some concerns with the access arrangement as proposed originally by EAPL and submitted proposed revisions to the access arrangement. The revisions relate to the issues of asset valuation, depreciation, rebatable services and gas fuel. In some instances EAPL has not provided full details of its proposed revisions.

APT initially wished its proposals to be raised as revisions to the access arrangement after the Commission released its *Draft Decision.* However, the Commission considered that such an approach would require a further round of public consultation and would delay the decision-making process. Therefore the Commission has raised APT's proposals for discussion in this *Draft Decision* in the appropriate sections and invites comments from interested parties.

Also in August 2000, Agility, on behalf of APT, submitted an alternative proposal for determining the value of DORC. Agility's approach is forward looking and calculates DORC in accordance with the future revenue stream of a new entrant in a competitive market and takes into account the remaining life of the existing asset. It differs from the more traditional approach of calculating DORC on the basis of straight line depreciation. Agility's proposal is discussed in section 2.2 of this *Draft Decision.*

In addition to the information released publicly, EAPL provided the Commission with confidential material. In the absence the EGP, EAPL may have been willing to release publicly some of the information that it provided to the Commission in confidence.

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[218] AGUG submission, 19 July 1999, p. 4.
[219] Refer to sections 41 and 42 of the Gas Pipelines *Access (NSW) Act 1998.*

However, the Commission appreciates EAPL's concern that release of such information in the current environment may be unduly harmful to its legitimate business interests.

4.2 Key performance indicators

4.2.1 Code requirements

The Code identifies the need for key performance indicators (KPIs) to be disclosed by service providers to interested parties. Category 6 of Attachment **A** of the Code lists the following relevant items:

- industry KPIs used by the service provider to justify 'reasonably incurred' costs; and
- service provider's KPIs for each pricing zone, service or category of asset.

Section 8.6 of the Code allows the regulator to 'have regard to any financial and operational performance indicators it considers relevant in order to determine the level of costs within the range of feasible outcomes under section 8.4 that is most consistent with the objectives contained in section 8.1.' The regulator must then identify the indicators and provide an explanation of how they have been taken into account (section 8.7 of the Code).

4.2.2 EAPL's proposal

EAPL submitted a number of key performance indicators to demonstrate that EAPL's performance compares favourably with other gas pipelines. Those indicators are:[220]

- total expenses per km;
- general and administrative expenses per volume-distance;
- operating and maintenance expenses less fuel per km;
- total expenses per volume-distance;
- operating costs $ million per 1 000 km; and
- average tariffs for firm transportation service.

EAPL states:

> It is common to benchmark performance on some standardised denominator and compare each organisation's performance against that standard eg cost per GJ per km. Normalisation of data is an essential practice in developing comparable data in surveys **of** this nature.

EAPL has presented benchmarking data which excludes fuel costs in order to eliminate distortions caused by different pipelines having varying degrees of compression. Likewise, depreciation charges have been omitted fi-om some indicators in recognition of dissimilarities in practices in accounting for depreciation charges.

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[220] Access arrangement information pp. 63-65 and Supplementary access arrangement information, pp. **42-45.**

Operating and maintenance costs

The first four indicators mentioned above were taken from a confidential study conducted by Ernst and Young.[221] EAPL states that in each case EAPL's figure falls below the median of those companies which participated in the study. EAPL also compares its performance with several other Australian pipelines on a $ million/1 000 km basis. EAPL concludes that:

> The benchmarking process has found that EAPL compares favourably with other pipeline operators. It demonstrates EAPL's commitment to reducing managed costs and when referenced against volume-distance, EAPL ranks as the best performer. Further, for Operations and Maintenance expense, EAPL is well below the median.[222]

More specifically, EAPL states:[223]

- EAPL compares favourably with other Australian pipeline companies in terms of operating costs per 1 000 km.
- for total expenses per km EAPL is below the median whether or not depreciation is included.
- EAPL's general and administrative costs are well below the median.
- EAPL's operating and maintenance costs less fuel per km are well below the median.
- EAPL ranked as the best performer in the Ernst and Young study for expenses on a volume-distance basis.

Tariffs

EAPL commissioned Foster Associates Incorporated (Maryland, USA) to calculate the tariffs for firm transportation services in North American for comparison with EAPL. According to EAPL, the results demonstrate that the MSP falls into the second lowest quartile in a sample of 14 pipelines.[224]

In response to a submission from Innovative Energy Australia Pty Ltd (Innovative Energy) on behalf of Incitec comparing the MSP with Canadian pipelines, EAPL discusses differences in economies of scale between Canadian and Australian pipelines. EAPL states:

> Clearly there are a number of similarities between Canada and Australia but a major point of difference is the scale of the gas industry, including the transmission sector, in the two countries. The fundamental flaw in the Incitec submission is that it ignores the very significant influence of economies of scale in comparing pipelines in the two countries. The submission points out that Canada's annual gas production is five times that of Australia (p 5, 8th dot point) and that is a broad indicator of the scale difference. A number of Canadian pipelines have an annual throughput many times that of the EAPL system.[225]

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221 Ernst and Young Natural Gas Transmission Industry Study, 1998. This study comprised 15 participating companies from USA, Canada, UK, Brazil, Argentina, Indonesia and New Zealand. (Access arrangement information p. 63.)

222 Supplementary access arrangement information, p. 45.

223 EAPL response to submissions, 17 August 2000, p. 12.

224 Access arrangement information, p. 64.

225 EAPL response to submissions, 17 August 2000, p. 13.

EAPL states that significant economies of scale apply to gas pipelines because of the following factors:[226]

- capacity increases approximately in proportion to diameter raised to the power of **2.5,** whereas many construction costs are approximately proportional to diameter.
- there is a basic element of fixed costs for any pipeline project which means that smaller diameter pipelines are relatively more expensive to construct per unit of capacity.
- many construction costs are approximately proportional to length, so that smaller diameter pipelines are again relatively more expensive to construct.
- there is a strong relationship between length of pipeline and operating cost, so that higher capacity pipelines have proportionately lower operating costs per unit of capacity.

The optimised design of the MSP, which forms the basis of EAPL's proposed value for the initial capital base, has a diameter of 24 inches compared with a range of 36 to 48 inches which according to EAPL applies to most of the North American pipelines mentioned by Innovative Energy. Accordingly, because of differences in economies of scale, Canadian pipelines incur lower unit costs than the optimised design for the MSP. Analysis presented by EAPL shows that a hypothetical pipeline of 1000 km in length with a 24 inch diameter typically incurs transportation costs in the range of $0.36 to $0.52/GJ (depending on throughput). On the other hand, a pipeline with a 48 inch diameter incurs costs between $0.19 to $0.23/GJ. EAPL concludes that its proposed tariffs for the MSP compare favourably with Canadian pipelines when differences in economies of scale, and hence unit costs, are taken into account.

4.2.3 Submissions by interested parties

Innovative Energy was critical of the benchmarking presented by EAPL, in particular the comparison of operating costs with other Australian pipelines. While acknowledging that benchmarking should be encouraged, Innovative Energy lists several 'pitfalls' some of which it argues are evident in the information presented by EAPL. Those pitfalls are:[227]

- distortion due to embedded variables (currency exchange rates in the case of the EAPL toll data);
- inappropriate massaging of information as data is normalised for comparison purposes ($ per 1 000 km point-to-point basis as in the case of the EAPL data):
- an 'apples to oranges' comparison (as in the case of the EAPL O&M cost data);
- the manipulation of data through the selection of many worse performers in the comparison sample in order to achieve an attractive 'quartile' rating; and
- the omission of data that is not favourable to one's argument.

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[226] EAPL response to submissions, 17 August 2000, pp. 13-14

[227] Report prepared by Innovative Energy Australia Pty Ltd on behalf of Incitec, July 1999, p. 3. Submitted by Incitec 18 August 1999.

Innovative Energy noted that compressor fuel is a major component of operating costs and, as EAPL has little compression in comparison with other pipelines, it is inevitably that EAPL's costs will be lower than other pipelines. Innovative Energy states that such comparisons reveal little about the performance of EAPL in relation to world's best practice.[228]

While recognising the limitations associated with benchmarking one gas pipeline against other pipelines, Innovative Energy argues that similarities between Australia and Canada facilitate comparisons between Canadian gas pipelines and Australian gas pipelines. Hence many, if not all, of the pitfalls mentioned above are eliminated. Innovative Energy compares tariffs (on the basis of $/GJ/1000 km) of various pipelines serving the Western Canadian Sedimentary Basin (WCSB) with the 2001 tariffs proposed by EAPL for the MSP.

While Innovative Energy argues that tariffs in Canada can be as low $0.20, most of the tariffs quoted by Innovative Energy fall within the range of $0.30 to $0.50 GJ/1000 km compared with $0.54 GJ/1 000 km for EAPL (for the initial year of the access arrangement period). Table 4.1 contains a sample of the pipelines quoted by Innovative Energy. Innovative Energy choses Canada as benchmark because of its similarity with Australian conditions, including land mass, population density, long distances and small markets. Innovative Energy also notes that the Canadian and Australian dollars are virtually on a par.

Table 4.1: Comparison of average Tariff, $/GJ/1 000 km

Pipelines	Length of Pipes (km)	$/GJ/1000 km
MSP	1299	0.54 (Aus $)
Alberta to Central Canada	3 500	0.36 (Canadian $), April 1998
Alberta to Niagara Falls	3 800	0.34 (Canadian $), April 1998
Alberta to California Border	1600	0.41 (Canadian $), April 1998
BC to California Border	2 200	0.48 (Canadian $), April 1998

4.2.4 Commission's considerations

The Commission noted in its *Victorian Final Decision* the challenges in identifying KPIs and benchmarks especially in a newly deregulated commercial environment such as the Victorian natural gas industry.[229] At that stage the Commission stated its intention to work closely with the Victorian service providers to establish appropriate KPIs but that, in the short to medium term, it would have regard to financial

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[228] Report prepared by Innovative Energy Australia Pty Ltd on behalf of Incitec, July 1999, p. 4. Submitted by Incitec 18 August 1999. Innovative Energy's report was submitted in response to EAPL's access arrangement and access arrangement information. Subsequently, EAPL released supplementary access arrangement information which contained additional material on EAPL's benchmarking analysis.

[229] ACCC, Victorian Final Decision, p. 157.

performance indicators pursuant to section 8.6 of the Victorian Code. The Commission also considered the use of benchmarks such as load factor and energy delivered per employee which are set out by the Steering Committee on National Performance Monitoring of Government Trading Enterprises as a basis for developing non-financial indicators for the PTS.

EAPL has used operating costs per distance and operating costs per volume-distance as its key performance indicators and concluded that EAPL performs favourably in comparison with other pipelines. Innovative Energy is critical of EAPL's analysis and as an alternative suggests that tariff comparisons with Canadian pipelines are a more appropriate benchmarking measure. Innovative Energy concludes that EAPL's tariffs are high in relation to the tariffs of Canadian pipelines.

Key performance indicators are a mechanism for service providers to justify reasonably incurred costs. However, the Commission recognises that inter-company comparisons have their limitations. With regard to the comparisons with Canada companies, the amendments proposed by the Commission in this ***Draft Decision*** will result in a reduction in EAPL's proposed tariffs. The resulting mainline tariff (equivalent to $0.34/GJ/1 000 km) compares favourably with the tariffs of those companies used by Innovative Energy as benchmarks.

5. Draft decision

Pursuant to section 2.13(b) of the Code, the Commission proposes not to approve EAPL's access arrangement for the Moomba to Sydney Pipeline System in its present form. This ***Draft Decision*** states the amendments (or nature of amendments, as appropriate) that would have to be made in order for the Commission to approve the proposed access arrangement.

Appendix A: Submissions from interested parties

The following parties made written submissions to the Commission:

Australian Gas Users Group	19 July 1999
Boral Energy Holdings Ltd	2 July 1999
Energy Markets Reform Forum	6 September 1999
Epic Energy South Australia Pty Ltd	2 July 1999
Esso Australia Ltd	2 July 1999
Incitec Ltd	30 July 1999, 18 August 1999, 24 September 4999 and 19 October 1999
NERA on behalf of Incitec Ltd	15 July 1999
Santos Ltd	29 July 1999 and 23 December 1999

Appendix B: Attachment A of the Code

INFORMATION DISCLOSURE BY A SERVICE PROVIDER TO INTERESTED PARTIES

Pursuant to section 2.7 the following categories of information must be included in the access arrangement information.

The specific items of information listed under each category are examples of the minimum disclosure requirements applicable to that category but, pursuant to sections **2.8** and **2.9,** the relevant regulator may:

- allow some of the information disclosed to be categorised or aggregated; and
- not require some of the specific items of information to be disclosed,

if in the relevant regulator's opinion it is necessary in order to ensure the disclosure of the information is not unduly harmful to the legitimate business interests of the service provider or a user or prospective user.

Category 1: Information regarding access & pricing principles

Tariff determination methodology
Cost allocation approach
Incentive structures

Category 2: Information regarding capital costs

Asset values for each pricing zone, service or category of asset
Information as to asset valuation methodologies - historical cost or asset valuation
Assumptions on economic life of asset for depreciation
Depreciation
Accumulated depreciation
Committed capital works and capital investment
Description of nature and justification for planned capital investment
Rates of return - on equity and on debt
Capital structure - debt/equity split assumed
Equity returns assumed - variables used in derivation
Debt costs assumed - variables used in derivation

Category 3: Information regarding operations & maintenance

Fixed versus variable costs
Cost allocation between zones, services or categories of asset & between regulated unregulated
Wages & Salaries - by pricing zone, service or category of asset
Cost of services by others including rental equipment
Gas used in operations - unaccounted for gas to be separated from compressor fuel
Materials & supply
Property taxes

Category 4: Information regarding overheads & marketing costs

Total service provider costs at corporate level
Allocation of costs between regulated/unregulated segments
Allocation of costs between particular zones, services or categories of asset

Category 5: Information regarding system capacity & volume assumptions

Description of system capabilities
Map of piping system - pipe sizes, distances and maximum delivery capability
Average daily and peak demand at 'city gates' defined by volume and pressure
Total annual volume delivered - existing term and expected future volumes
Annual volume across each pricing zone, service or category of asset
System load profile by month in each pricing zone, service or category of asset
Total number of customers in each pricing zone, service or category of asset

Category 6: Information regarding key performance indicators

Industry KPIs used by the service provider to justify 'reasonably incurred' costs
service provider's KPIs for each pricing zone, service or category of asset

Appendix C: Description of classes of services

Reference services

Firm transportation service - Class FT

- Class FT service will be provided on a firm basis and will not be subject to curtailment or interruption except as set out in the access arrangement and the service agreement;
- Class FT service may include multiple receipt or delivery points if individual receipts and delivery obligations are set out on a point-to-point basis in the service agreement;
- the minimum term is one year and the maximum is twenty years;
- users are required to submit daily nominations in accordance to operational requirements and provisions by EAPL; and
- users will be required to establish an MDQ and MHQ which fairly reflect their maximum daily and hourly requirement at each delivery point.

Small take-offpoints- Class STP

- Class STP service has the same level of priority as FT, WFT, and OFT and will not be subject to curtailment or interruption except as set out in the access arrangement and service agreement;
- provision for transfer of delivery points does not apply as it is not commercially and technically reasonable;
- the minimum term is one year and the maximum is twenty years;
- users will not be required to submit daily nominations but may provide a nomination for each day for a period not exceeding one month. In the absence of such nomination, EAPL will determine the delivery quantity for each day from the estimated annual quantity set out in the service agreement;
- users will be required to establish a MHQ which fairly reflects their maximum hourly requirement at the delivery point;
- EAPL will provide and the user will pay for an offtake from the pipeline with pipework extending to an isolating valve at the edge of EAPL's easement;
- Users will pay for an offtake, maintain and operate suitable pressure reduction, control equipment, associated facilities and land at the delivery point; and
- quantity of gas at a new delivery point is not expected to exceed 200 TJ per year, beyond which the user may convert the service agreement to a Class FT service.

Non-reference services

Winter season firm transportation service- Class WFT

- terms and conditions will be available to prospective users at the time expression of interest are sought. These will be similar to those applying to Class FT service;
- this service will be provided on a firm basis and will not be subject to curtailment or interruption except as provided in this access arrangement and service agreement;
- subject to capacity availability, this service will be offered for a period between 1 June and 30 September each year;
- expressions of interest will be called in national press prior to 1 March each year;
- the term for WFT service is between 1 and 4 months as determined by EAPL;
- service agreements for Class WFT service will not be renewable;
- a user's tariff, MHQ and MDQ will be established by a bidding process;
- a user will be required to submit daily nominations. Any daily nomination up to the MDQ will be treated as FT service;
- users will be required to establish a MDQ and MHQ which fairly reflects their maximum daily and hourly requirements at each delivery point; and
- Class WFT service may include multiple receipt or delivery points if individual receipt and delivery obligations are set out on a point-to-point basis in the Service Agreement.

Off-season firm transportation service- Class OFT

- terms and conditions will be available to prospective users at the time expression of interest are sought. These will be similar to those applying to Class FT service;
- this service will be provided on a firm basis and will not be subject to curtailment or interruption except as provided in this access arrangement and service agreement;
- subject to capacity being available, maintenance schedule and demand, this service will be offered between October and May each year;
- expressions of interest will be called in national press prior to 1 July each year;
- the term for OFT service is between 1 and 8 months as determined by EAPL;
- service agreement for Class OFT service will not be renewable;
- a user's tariff, MHQ and MDQ will be established by a bidding process;
- a user will be required to submit daily nominations. Any daily nomination up to the MDQ will be treated as FT service;
- users will be required to establish a MDQ and MHQ which fairly reflects their maximum daily and hourly requirements at each delivery point; and
- Class OFT service may include multiple receipt or delivery points if individual receipt and delivery obligations are set out on a point-to-point basis in the service agreement.

Interruptible transportation service- Class IT

- terms and conditions relating to Class IT service will be available to prospective users at the time expression of interest are sought;
- this service will be subject to whole or partial interruption by EAPL at any time or by the user on short notice subject to the terms and conditions specified in the service agreement;
- subject to capacity being available, this service will be offered at least twice a year;
- service agreements for Class IT service will not be renewable;
- expressions of interest will be called in national press prior to each bidding period;
- the term for IT Service will be at least one month as determined by EAPL;
- a user's tariff, MHQ and MDQ will be established by a bidding process;
- a user will be required to submit daily nominations in accordance with operational requirement by EAPL; and
- Class IT service may include multiple receipt or delivery points if individual receipt and delivery obligations are set out on a point-to-point basis in the service agreement.

Negotiable service

- available if a prospective user's requirements and circumstances vary significantly from reference services;
- negotiable terms and conditions, including tariffs; and
- negotiable service will have priority agreed on a case by case basis but will not be higher than firm service.

Appendix D: Approaches to depreciation in deriving DORC from ORC

Once the Optimised Replacement Cost (ORC) of the existing set of assets is estimated it is necessary to decide to what extent that value should be depreciated in order to derive its Depreciated Optimised Replacement Cost (DORC). In a cost of service framework for establishing tariffs estimated costs including capital costs are used to establish target revenues which will cover those costs. Asset values may be reset mid-way through the life of an asset, for example as a result of the introduction of regulation. If the reset value is too high the owner will receive an increase in revenues above that which would have been expected if no reset had taken place. Conversely, if the reset value is too low, the owner would incur a capital loss realised in future revenues. If a DORC valuation is to be used as the basis for the reset in asset value, whether it is too high or too low will depend on what allowance is made for depreciation in moving for the ORC to a DORC estimate.

This paper describes two simple cost of service models which have been developed to explore approaches to depreciation that may offer future target revenues free of windfall gains or losses to the owner of the existing assets.

Both models conform to the building block approach, which adds the different components of cost (cost of capital, depreciation and operating costs) to establish the appropriate regulated revenue should be. To keep the models simple, the framework considers all quantities only in real terms and assumes operating costs are zero. The models differ only in the approach to depreciation, which forms part of the costs of service for each period.

The example used for the models is based on the following assumptions:

- the initial cost of the assets is $1 000;
- the assets have an economic life of 10 years;
- the real weighted average cost of capital (WACC) is set at 30 per cent per annum and operating and maintenance costs are zero. (Note: 30 per cent is chosen so that the relativity of building block components is similar to that typically calculated for assets with much longer economic lives);
- there is no ongoing capital expenditure; and
- MAR is equal to the WACC multiplied by the regulated asset base (RAB), plus depreciation. Note that MAR declines linearly over time because the RAB declines linearly.

The models

Model 1: ***Straight line depreciation***

Depreciation is straight line, that is it is spread in equal instalments over the economic life of the asset. This means that the RAB reduces by a fixed amount ($100) each year.

Model 2: Annuity depreciation

Annuity depreciation is calculated so that the depreciation in each year is just sufficient to maintain the target revenue (the sum of return on capital and depreciation) at a steady level as the value of the RAB (on which the return is calculated) reduces over time. The depreciation in the first year (and the annual value of the annuity) is calculated so that the RAB reaches zero at the end of its economic life (just as in the straight line depreciation example). The amount of depreciation required each year is calculated within the spreadsheet itself by imposing these requirements as constraints. Alternatively, a formula can be used which has the WACC and the life of the asset as the only parameters to give precisely the same outcome.

Annuity depreciation is 'back-end-loaded', whereby depreciation charges increase over the life of the asset, in contrast to 'straight line' depreciation with constant depreciation charges.

In this example revenue is the same every year in which the asset continues to operate. The building block approach interpretation is maintained as the depreciation and return on capital add to the annuity amount in every period.

Model variations

The two models are used to explore the implications of re-setting the asset value mid-way through the life of an asset for the purpose of establishing future tariffs. The implications of changing the regulatory depreciation framework mid-way through the life of the asset are also considered. The results and conclusions of this analysis are presented below.

Comparison of scenarios

The difference in revenue outcomes from the two approaches to depreciation is illustrated in Figures D.1 and D.2. As shown in Figure D.2, the revenue in the straight line approach starts at a higher level than the annuity but falls well below it after a period. The cross-over is to be expected since both revenue paths have been designed to give the same value to the investor over the life of the asset.

The annuity approach results in a slower reduction in the value of the RAB due to the 'back-end loaded' feature of annuity depreciation (Figure D.1). This aspect illustrates the key difference between Agility's new approach to DORC based on annuity depreciation and the traditional straight line approach.

Suppose a regulator was seeking to assign a fair value to the asset at the end of five years to be used as the basis for a future regulatory framework and was considering the use of DORC for that purpose. Assuming there are no changes in the asset replacement costs, the straight line DORC value after five years is just $500 whereas the Agility approach would assign a DORC value at about **$787.8** based on the annuity RAB path.

Clearly, if the DORC was based on a depreciation methodology that is used consistently throughout the life of an asset, the cash flows will not change from that indicated in the simple examples in Tables D.1 and D.2. This ensures that the business will achieve an IRR over the life of the asset equal to the regulatory WACC.

If the straight line regulatory framework had been in place the $500 would represent a fair value. If the annuity framework had been operating the $787.8 would be the fair value. It would be possible to change the regulatory framework from that point on using the fair value as the starting point (the ICB) and to preserve the IRR and NPV outcomes required for regulatory consistency. Again the IRR over the life of the asset is unaltered. These cash flows are illustrated in Tables D.3 and D.4.

This contrasts with the outcome if the DORC used to establish a new mid-life RAB is based on a different framework from that used for pricing over the first part of the life of the asset. **As** illustrated in Table D.5, if the annuity DORC is used to establish the RAB in the future regulatory regime there is a windfall capital gain to the owner of $287.8 ($787.8 less $500) at the beginning of year 6. This translates to **a** higher IRR achieved over the life of the assets than the benchmark WACC. Table D.6 shows the alternative switch-over where the initial pricing framework is based on annuity depreciation and the DORC on straight line depreciation. In this case there is a windfall capital loss of $287.8 to the owner at the beginning of period 6.

Whether or not a value is fair depends on what framework has been applied up to that point in time. The conclusion is that for the DORC methodology to deliver what may be considered a fair value for an existing asset it is critical that the DORC approach must be consistent with the pricing arrangement in place prior to the establishment of the new RAB value based on the DORC calculated. The proposed future regulatory framework is irrelevant.

Figure D.1: Time profile of regulatory asset values for frameworks with straight line and annuity depreciation

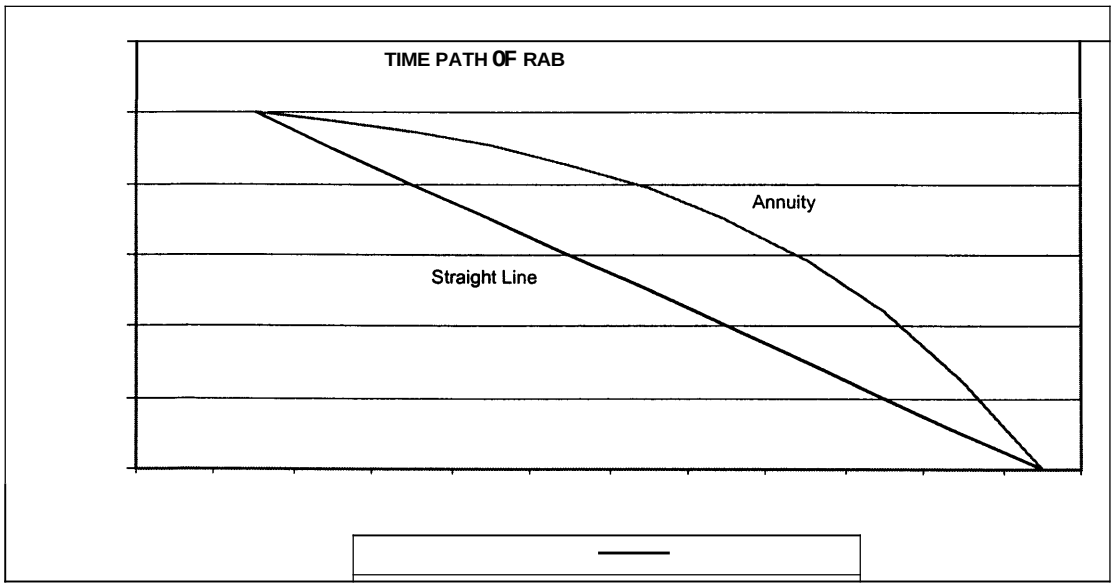

Figure D.2: Time profile of MAR for frameworks with straight line and annuity depreciation

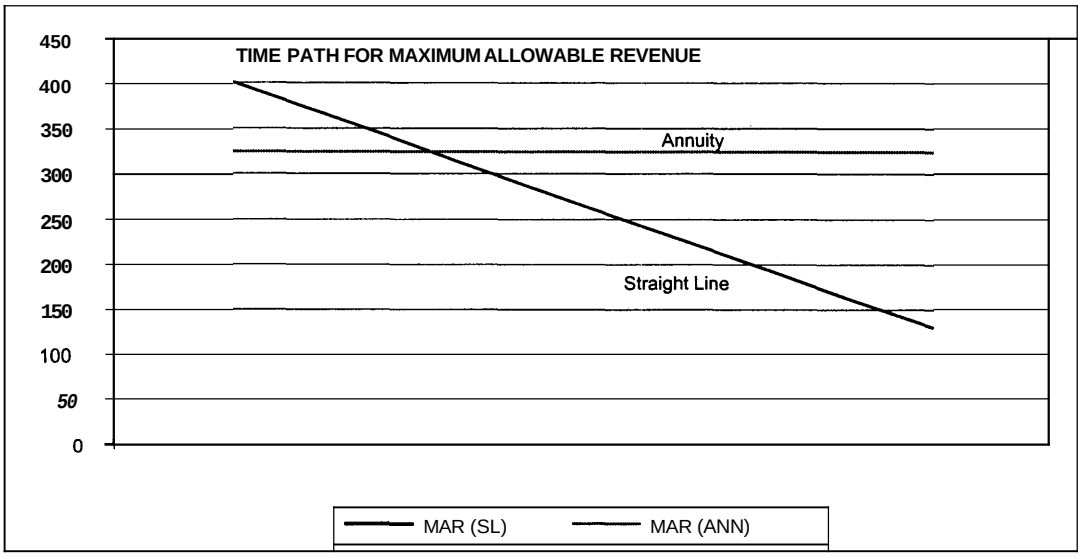

Table D.1: Building block based regulatory model, straight line depreciation

Assumptions:

Initial Asset Value (K)	1000	Depreciation:	straight line
Asset life (N yrs)	10	O&M	nil
Real WACC (W)	30%		

Period	0	1	2	3	4	5	6	7	8	9	10
Asset Roll Forward											
Regulatory Asset Value at start of period (A)		1000.0	900.0	800.0	700.0	600.0	500.0	400.0	300.0	200.0	100.0
Depreciation During Period (D)		100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Regulatory Asset Value at end of period (A-D)		900.0	800.0	700.0	600.0	500.0	400.0	300.0	200.0	100.0	0.0
teal Revenues (based on building block costs)											
Return on capital (R = W x A)		300.0	270.0	240.0	210.0	180.0	150.0	120.0	90.0	60.0	30.0
Depreciation (D = K / N))		100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Maximum allowable revenue (R + D)		400.0	370.0	340.0	310.0	280.0	250.0	220.0	190.0	160.0	130.0
NPV of revenue stream		$1000.0									
)verall Cash Flow to Asset (valued at end of period)											
	-1000	400.0	370.0	340.0	310.0	280.0	250.0	220.0	190.0	160.0	130.0
Internal rate of return		30.0%	=	WACC							

Table D.2: Building block based regulatory model, annuity depreciation

Assumptions:

Initial Asset Value (IS)	1000	Depreciation:	annuity
Asset life (N yrs)	10	O&M	nil
Real WACC (W)	30%		

Period	0	1	2	3	4	5	6	7	8	9	10
Asset Roll Forward											
Regulatory Asset Value at start of period(A)		1000.0	976.5	946.0	906.4	854.8	787.8	700.7	587.4	440.2	248.8
Depreciation During Period (D)		23.5	30.5	39.7	51.5	67.0	87.1	113.3	147.2	191.4	248.8
Regulatory Asset Value at end of period (A-D)		976.5	946.0	906.4	854.8	787.8	700.7	587.4	440.2	248.8	0.0
Real Revenues (based on building block costs)											
Return on capital (R = W x A)		300.0	293.0	300.0	293.0	283.8	271.9	256.4	236.3	210.2	176.2
Depreciation (D = ANUITY - R)		23.5	30.5	23.5	30.5	39.7	51.5	67.0	87.1	113.3	147.2
Maximum allowable revenue		323.5	323.5	323.5	323.5	323.5	323.5	323.5	323.5	323.5	323.5
NPV of revenue stream		$1,000.0									
Overall Cash Flow to Asset (valued at end of period)											
	-1000	323.5	323.5	323.5	323.5	323.5	323.5	323.5	323.5	323.5	323.5
Internal rate of return		30.0%	=	WACC							

Table D.3: Building block based regulatory model, straight line depreciation for mid-life DORC then apply annuity framework

Assumptions:

Initial Asset Value (K)	1000	Depreciation:	mixed
Asset life (N yrs)	10	O&M	nil
Real WACC (W)	30%		

Period	0	1	2	3	4	5	6	7	8	9	10
Asset Roll Forward											
Regulatory Asset Value at start of period(A)		1000.	900.0	800.0	700.0	600.0	500.0	444.7	372.8	279.4	157.9
Depreciation During Period (D)		100.0	100.0	100.0	100.0	100.0	55.3	71.9	93.4	121.5	157.9
Regulatory Asset Value at end of period(A-D)		900.0	800.0	700.0	600.0	500.0	444.7	372.8	279.4	157.9	0.0
Real Revenues (based on building block costs)											
Return on capital (R = W x A)		300.0	270.0	240.0	210.0	180.0	150.0	133.4	111.8	83.8	47.4
Depreciation (D)		100.0	100.0	100.0	100.0	100.0	55.3	71.9	93.4	121.5	157.9
Maximum allowable revenue		400.0	370.0	340.0	310.0	280.0	205.3	205.3	205.3	205.3	205.3
NPV of revenue stream		1000.									
Overall Cash Flow to Asset (valued at end of period)											
	-1000	400.0	370.0	340.0	310.0	280.0	205.3	205.3	205.3	205.3	205.3
Internal rate of return		30.0%	=	WACC							

Table D.4: Building block based regulatory model, annuity depreciation for mid-life DORC then apply straight line framework

Assumptions:

Initial Asset Value (K)	1000	Depreciation:	mixed
Asset life (N yrs)	10	O&M	nil
Real WACC (W)	30%		

Period	0	1	2	3	4	5	6	7	8	9	10
Asset Roll Forward											
Regulatory Asset Value at start of period(A)		1000	976.5	946.0	906.4	854.8	787.8	630.3	472.7	315.1	157.6
Depreciation During Period (D)		23.5	30.5	39.7	51.5	67.0	157.6	157.6	157.6	157.6	157.6
Regulatory Asset Value at end of period(A-D)		976.5	946.0	906.4	854.8	787.8	630.3	472.7	315.1	157.6	0.0
Real Revenues (based on building block costs)											
Return on capital (R = W x A)		300.0	293.0	283.8	271.9	256.4	236.3	189.1	141.8	94.5	47.3
Depreciation		23.5	30.5	39.7	51.5	67.0	157.6	157.6	157.6	157.6	157.6
Maximum allowable revenue		323.5	323.5	323.5	323.5	323.5	393.9	346.6	299.4	252.1	204.8
NPV of revenue stream		1,000									
Overall Cash Flow to Asset (valued at end of period)											
	-1000	323.5	323.5	323.5	323.5	323.5	393.9	346.6	299.4	252.1	204.8
Internal rate of return		30.0%	=	WACC							

Table D.5: Building block based regulatory model, straight line depreciation until mid-life, mid life RAB based on annuity DORC then apply annuity framework

Assumptions:

Initial Asset Value (K)	1000	Depreciation:	mixed
Asset life (N yrs)	10	O&M	nil
Real WACC (W)	30%		

Period	0	1	2	3	4	5	6	7	8	9	10
Asset Roll Forward											
Regulatory Asset Value at start of period(A)		1000.	900.0	800.0	700.0	600.0	787.8	700.7	587.4	440.2	248.8
Depreciation During Period (D)		100.0	100.0	100.0	100.0	100.0	87.1	113.3	147.2	191.4	248.8
Regulatory Asset Value at end of period (A-D)		900.0	800.0	700.0	600.0	500.0	700.7	587.4	440.2	248.8	0.0
Real Revenues (based on building block costs)											
Return on capital (R = W x A)		300.0	270.0	240.0	210.0	180.0	236.3	210.2	176.2	132.1	74.6
Depreciation		100.0	100.0	100.0	100.0	100.0	87.1	113.3	147.2	191.4	248.8
Maximum allowable revenue (R+D)		400.0	370.0	340.0	310.0	280.0	323.5	323.5	323.5	323.5	323.5
NPV of revenue stream		1077.									
Overall Cash Flow to Asset (valued at end of period)											
	-1000.0	400.0	370.0	340.0	310.0	280.0	323.5	323.5	323.5	323.5	323.5
Internal rate of return		33.0%	>	WACC							

Table D.6: Building block based regulatory model, annuity depreciation for five years, re-establish RAB = straight line DORC, then apply straight line framework

Assumptions:

Initial Asset Value (K)	1000	Depreciation:	mixed
Asset life (N yrs)	10	O&M	nil
Real WACC (W)	30%		

Period	0	1	2	3	4	5	6	7	8	9	10
Asset Roll Forward											
Regulatory Asset Value at start of period(A)		1000.	976.5	946.0	906.4	854.8	500.0	400.0	300.0	200.0	100.0
Depreciation During Period (D)		23.5	30.5	39.7	51.5	67.0	100.0	100.0	100.0	100.0	100.0
Regulatory Asset Value at end of period (A-D)		976.5	946.0	906.4	854.8	787.8	400.0	300.0	200.0	100.0	0.0
Real Revenues (based on building block costs)											
Return on capital (R = W x A)		300.0	293.0	283.8	271.9	256.4	150.0	120.0	90.0	60.0	30.0
Depreciation		23.5	30.5	39.7	51.5	67.0	100.0	100.0	100.0	100.0	100.0
Maximum allowable revenue		323.5	323.5	323.5	323.5	323.5	250.0	220.0	190.0	160.0	130.0
NPV of revenue stream		$922.									
Overall Cash Flow to Asset (valued at end of period)											
	-1000	323.5	323.5	323.5	323.5	323.5	250.0	220.0	190.0	160.0	130.0
Internal rate of return		26.8%	<	WACC							