



Issues Paper

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**Queensland Rail's Draft Access  
Undertaking – Reference Tariffs,  
Reference Train Services and Rate  
Regulation**

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***October 1999***

## SUBMISSIONS

The Queensland Competition Authority (the Authority) considers public involvement to be an important element of its decision-making processes. It therefore invites submissions from interested parties concerning the most desirable approach to the establishment of Reference Tariffs and rate regulation to apply to Queensland Rail's coal traffics as part of QR's draft undertaking for third party access to its network.

To facilitate the publication of submissions on the QCA's website, it is preferred if submissions could be made electronically by disk or by e-mail. However, if this is not possible, submissions can be made in writing. Submissions, comments or inquiries regarding this paper should be directed to:

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The **closing date** for submissions is 26 November 1999.

### Confidentiality

In the interests of transparency and to promote informed discussion, the Authority would prefer submissions to be made publicly available wherever this is reasonable. However, if a person making a submission does not want that submission to be public, that person should claim confidentiality in respect of the document (or any part of the document). Claims for confidentiality should be clearly noted on the front page of the submission and the relevant sections of the submission should be marked as confidential, so that the remainder of the document can be made publicly available.

To facilitate disclosure of the non-confidential portion of submissions, it would be appreciated if a copy of the submission with the confidential information excised could be provided in addition to the full submission. Again, it is preferred if the relevant submissions could be made electronically by disk or by e-mail. However, if this is not possible, the submissions can be made in writing. Where it is unclear why a submission has been marked "confidential", the status of the submission will be discussed with the person making the submission.

While the Authority will endeavour to identify and protect material claimed as confidential as well as exempt documents (within the meaning of the *Freedom of Information (FOI) Act 1989*), it cannot guarantee that submissions will not ultimately be made publicly available. As stated in s187 of the *Queensland Competition Authority Act 1997*, the Authority must take all reasonable steps to ensure the information is not disclosed without the person's consent, provided the Authority is satisfied that the person's belief is justified and that the disclosure of the information would not be in the public interest.

### Public access to submissions

Subject to the above, submissions will normally be made available for public inspection at the Brisbane office of the Authority (see below), or on its website at [www.qca.org.au](http://www.qca.org.au). Information about the role and current activities of the Authority, including copies of reports, papers and submissions can also be found on this website.

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## GLOSSARY<sup>1</sup>

- Evaluation Period:** When in reference to an Individual Train Service, the period which is equal to the length of the expected duration of the existing or proposed Access Agreement in respect of the relevant Train Service, or when in reference to a group of Train Services, the period which is equal to the length of the expected duration of the longest existing or proposed Access Arrangement in respect of any of the Train Service comprising the combination of Train Services, provided that such a period does not exceed ten years.
- Gross Tonne km:** The total weight of a loaded train by distance travelled.
- Incremental Costs:** Those costs of providing Access, including capital costs (renewal and expansion) costs, that would not be incurred (including the cost of bringing expenditure forward in time) if the particular Train Service or group of Train Services did not operate.
- Linear Tariffs:** Tariffs that vary with a dependent variable, such as distance travelled or tonnes hauled, and which are portrayed as a single price without differentiation between fixed and variable elements.
- Material Change Event:** Means the occurrence of any of the following events on or after the date upon which the QCA approved the relevant Reference Tariff/s:
- a) any amendment, repeal, modification or enactment of any acts, ordinances, regulations, by-laws, proclamations and subordinate legislation made under, by or pursuant to any Commonwealth or State statute or any relevant Authority (“Legislation”);
  - b) any binding change in the interpretation or application of any Legislation resulting from a decision of a court or tribunal;
  - c) the making of any new policy, instruction, direction or order (“Directive”) of an Authority (including without limitation QR’s shareholding ministers) which impacts on QR, or the modification, extension or replacement of any existing Directive;
  - d) the imposition of a requirement for any license, permit, approval, consent or other authority (“Authorisation”) not required as at the date upon which the QCA approved the relevant Reference Tariff’
  - e) after the date of grant of any Authorisation, a change in the terms and conditions attaching to that Authorisation or the attachment of any new terms or conditions;
  - f) the imposition or abolition of, increase or reduction in the rate of, or change in the basis of calculating, any Commonwealth, State or Local Government imposed tax, charge, levy, duty, impost, rate,

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<sup>1</sup> Several of these terms are taken from Part 8 Definitions and Interpretations of QR’s Draft Access Undertaking.

royalty or imposition (“Tax”) imposed on, or payable by, QR including, without limitation, any Tax relating to the protection of the environment imposed on users of electricity or imposing a form of consumption, value added or sales tax, but excluding any income tax; or

g) a change in the Commonwealth Government ten (10) year bond rate of more than one hundred (100) basis points from the time that the Reference Tariff:

i was endorsed by the QCA; or

ii was varied in accordance with Paragraph 5.3.2(b) to reflect a change in the Commonwealth Government ten (10) year bond rate;

whichever is the later.

<b>Multi-Part Tariffs:</b>	A tariff that consists of at least two components (but generally more) which individually indicate the price of different parts of the service being purchased, inclusive of or in addition to fixed cost elements.
<b>Net Tonne km:</b>	The weight of the payload by distance travelled.
<b>Rail Infrastructure:</b>	Means Rail Transport Infrastructure as defined in <i>the Transport Infrastructure Act 1994</i> for which QR is the Railway Manager.
<b>Railway Operator:</b>	A person who has, or is seeking, Access from QR to operate Train Services on the Rail Infrastructure and who is, or who will become, Accredited in respect of those Train Services.
<b>Reference Tariffs:</b>	An Access Charge applicable for a specified Reference Train Service, the purpose of which is to provide information to Third Party Operators as to the likely level of Access Charge for Train Services of a similar type as the specified Reference Train Service.
<b>Reference Train Service:</b>	A notional Train Service conforming to certain criteria, including carrying a specified commodity type, operating between specified geographical areas and conforming to specified technical characteristics, operational characteristics, contract terms and conditions.
<b>Revenue Limit:</b>	The maximum revenue which QR should be entitled to earn from the provision of Access to the Train Service or Train Service Group (as appropriate) over the Evaluation Period.
<b>Stand Alone Costs:</b>	Those costs that QR would incur if the relevant Train Service or combination of Train Services (as appropriate) was the only Train Service or group of Train Services provided Access by QR.

**Train Service:** The operation of a Train between specified origins and destinations on the Rail Infrastructure.

**Two-Part Tariff:** A tariff that is divided into two components - a variable component (typically reflecting marginal costs) and a fixed component.

## 1. INTRODUCTION

### 1.1 The Role of the Queensland Competition Authority

Queensland Rail (QR) has submitted a draft access undertaking to the QCA covering certain services relating to the use of rail transportation infrastructure owned by QR. Accompanying the draft access undertaking is an explanatory guide which QR has produced to clarify the intent of selected provisions of the undertaking. These documents are available from the QCA (telephone Ms Natasha Bree on (07) 3222 0555) or can be downloaded from the QCA's website at [www.qca.org.au](http://www.qca.org.au).

The draft access undertaking sets out the basis under which QR proposes to provide third party access to certain declared services. Under Part 5 of the *Queensland Competition Authority Act 1997*, the QCA is required to assess the undertaking and decide whether or not to approve it. In determining whether to approve QR's draft undertaking, the Authority is mindful of the role of an undertaking under the QCA Act, which is principally to provide certainty to stakeholders in future arbitrations. If approved, the undertaking will effectively bind the Authority in any future disputes between QR and those seeking to use its network.

The Authority has adopted a consultative approach to its assessment of the undertaking. The Authority has already produced the following papers intended to facilitate stakeholder feedback on a range of issues that are relevant to the Authority's assessment of the draft undertaking:

- a Request for Comments Paper in relation to QR's Draft Undertaking;
- a paper dealing with asset valuation methods, depreciation approaches and the quantification of an allowed rate of return for QR for the purpose of developing Reference Tariffs; and
- a paper on methods for addressing the issue of contributed assets in rail infrastructure.

Copies of these papers are available from the QCA and may be downloaded from the Authority's website.

As part of this process, the QCA considers there are a number of specific issues related to the development of Reference Tariffs that require clarification. The QCA is therefore seeking the views of interested parties on the resolution of these matters. This paper focuses on the Reference Tariffs that QR has proposed in its draft undertaking (ie the provision of access for the transportation of coal on the designated corridors). The Authority is aware that it may be appropriate for Reference Tariffs to be developed for other services. However, it is not the intention of this paper to address this issue.

### 1.2 Queensland Rail's Draft Undertaking

Reference Tariffs, for specified Reference Train Services, have been proposed by QR in relation to Access Charges for coal traffic to overcome the problems that arise from the very broad limits established by floor and ceiling prices under a negotiated pricing regime. QR's proposed framework should provide increased pricing transparency. This will increase certainty for rail users and reduce negotiation costs.

The process of establishing Reference Tariffs will inevitably impose a degree of standardisation on the sale of capacity for the affected corridors, in terms of the way in which services are specified and priced. Accordingly, the adoption of inappropriate parameters will have significant implications for the evolution of the rail market and in the realisation of the benefits of the process for customers.

### 1.3 Reference Train Services and Reference Tariffs

If the services covered by the Reference Tariffs are not representative of the coal traffic that traverses QR's network, then the usefulness of the concept will be undermined. However, the benefit from increased pricing transparency must be balanced against the cost of setting Reference Tariffs.

Reference Tariffs will apply for a given set of Train Service Characteristics (eg axle load, indicative transit times, speed, commodity type, geographic areas, etc). These Train Service Characteristics will therefore set the "benchmark" for Railway Operators in the sense that actual Access Charges are likely to vary for operations involving different Train Service Characteristics.

Accordingly, the specification of Train Service Characteristics will have important implications for the evolution of the market as a whole. Failure to incorporate the most appropriate Train Service Characteristics (considered in the context of the coal chain as a whole) could unnecessarily increase the cost of coal transportation.

### 1.4 Reference Tariff Structure

The key economic characteristic of the rail industry is that a large proportion of the total cost of providing infrastructure services is fixed.<sup>2</sup> Setting access charges on the basis of marginal cost would result in QR failing to satisfy revenue adequacy requirements. Accordingly, if the revenue adequacy constraint is to be fulfilled, fixed costs need to be allocated amongst users.

The following issues arise from the requirement that fixed costs be allocated amongst users:

- what is the appropriate pricing structure for Reference Tariffs (eg a uniform rate per tonne or tonne kilometre (net or gross) or via a tariff arrangement incorporating a flagfall and a variable rate);
- whether Reference Tariffs should be uniform across geographic areas, and if so, how should the mines be clustered for Reference Tariff purposes;
- whether Reference Tariffs should vary amongst products (eg thermal or coking coal) or end users (eg should those using coal for domestic uses pay different prices to those who export coal).

The structure of Reference Tariffs will send important signals to users for the efficient rationing and augmentation of capacity in the rail system. In addition, the structure of Reference Tariffs could also have implications for the assignment of risk between the parties, eg higher fixed charges could, under certain circumstances, impose greater risk on users and a lower risk on QR (and vice versa). Accordingly, inappropriate pricing structures could inefficiently ration capacity.

QR's draft access undertaking essentially nominates seven pricing zones for its coal corridors. However, there are likely to be many possible combinations of rates that satisfy QR's price limits.<sup>3</sup> An inappropriate clustering of mines could have equity implications by conferring an inappropriate commercial advantage to particular mines, and in extreme cases, could affect the viability of mines. Addressing this concern through increasing the extent of Reference Tariffs (eg for individual mines) could create additional complexity which outweighs the benefits.

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<sup>2</sup> In this paper, the term "fixed costs" refers to those costs that cannot be assigned unequivocally to any particular user. These costs represent a combination of joint costs and common costs.

<sup>3</sup> Nevertheless, it is also possible that there does not exist a set of prices that simultaneously meet the ceiling and floor pricing requirements for every combination of services.

It is widely accepted that different traffics have differing capacities to contribute to the fixed costs of providing a range of services to different users. The issue therefore arises whether distinctions should be drawn between the Access Charges for differing coal industry products (eg thermal or coking coal, or haulage for export or domestic consumption). Commodity or use-specific Reference Tariffs may have implications for the evolution of both the coal and the rail industry.<sup>4</sup>

The QCA is particularly concerned to ensure that it does not support a pricing structure that does not meet the requirements of QR and its customers.

## 1.5 Rate Regulation and Incentives for Efficiency

Related to the issue of the structure of Reference Tariffs is the nature of the regulatory environment in which they are set. A key issue to be considered in this context is the way in which QR should be provided with incentives to improve its performance.

Traditional rate-of-return (ROR) regulation allows for a regulated organisation to achieve a profit equivalent to an allowed rate-of-return on its asset base. Since rates are often set annually, ROR regulation creates a predisposition toward a “cost plus” approach to price setting. ROR regulation provides only limited incentives for the regulated organisation to use its superior information to achieve efficiency gains throughout the regulatory period. Cost reductions achieved beyond those budgeted are simply passed on to customers in the next assessment period.

To address this shortcoming, incentive regulation recognises that an organisation will always know more about its business and *how to improve its business* than the regulatory body. Incentive regulation therefore seeks to provide a regulated organisation with an incentive to invest effort (and take the risks) necessary to improve its profitability.

The incentive that is provided often involves allowing the regulated organisation to retain profits generated for a set period, on the basis that, in return, prices for the relevant products will fall by a predetermined amount in each year of the regulatory period. In addition, at the end of the regulatory period, at least some of the additional profit may be returned to customers through lower prices. In this way, a “win-win” environment can be created. However, such an environment may be undermined if the regulated organisation believes its out-performance of the target during a regulated period will be immediately returned to customers at the end of the period.

Accordingly, an inappropriate regulatory environment can jeopardise any incentive for a regulated organisation to improve its performance. This may reduce the regulated organisation’s profitability in the short to medium term and defer or eliminate price reductions for customers in the long term.

## 1.6 Performance Regime

The imposition of any regulatory environment upon an organisation can be expected to alter its behaviour. For example, if prices were the exclusive focus of a regulatory environment, a regulated organisation might be tempted to increase its profitability by reducing service quality. Accordingly, in addition to the need to define service quality, the issue arises as to whether, and if so how:

- monitoring of service quality should be undertaken; and

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<sup>4</sup> Even though QR’s draft access undertaking does not currently allow for differentiation between coal types, this does not mean that Access Charges cannot differentiate between different traffic types (eg coal vs grain).

- transgressions should be addressed.

Failure to incorporate these measures as part of a regulatory environment may result in a loss of service quality which imposes a greater loss on users than excessive prices.

### **1.7 The Purpose of the Paper**

The purpose of this Issues Paper is to elicit comment from interested parties on a range of matters pertinent to the formation of Reference Tariffs, including:

- the development of the characteristics of Reference Train Services;
- the structure of Reference Tariffs;
- the regulatory framework (eg whether incentive mechanisms should be incorporated, and if so, what type of mechanism is appropriate); and
- the development of performance regimes for addressing service quality issues.

This paper focuses on the assessment of QR's proposed Reference Tariffs that are to apply in relation to the transportation of coal. Further consultation will occur with interested parties in relation to the development of any other Reference Tariff Services. In seeking feedback on the issues raised in this paper, the Authority is keen not to inhibit comment. The Authority is also aware that the significance of certain pricing issues may only become apparent with the benefit of financial modelling work which has not yet been undertaken.

## 2. QR'S PROPOSED REFERENCE TARIFFS

Part 5 of the draft access undertaking sets out the pricing framework QR proposes to apply to determine Access Charges. Clause 5.1 states that “in developing access charges, QR’s overriding objective is, over time, to achieve revenue adequacy”. The proposed framework for achieving this objective is to price individual traffic as well as traffic combinations within limits based on Incremental Costs (the floor) and Stand Alone Costs (the ceiling). Access prices are then subject to a process of negotiation constrained within these limits (refer Request for Comments paper).<sup>5</sup>

To provide greater transparency and reduce negotiation costs, QR’s draft undertaking provides that Reference Tariffs will be developed for Reference Train Services. A Reference Train Service is a notional train service that conforms to specified criteria. Details of the Reference Train Services proposed by QR are contained in Schedule G of QR’s draft access undertaking (reproduced in Appendix 4). Schedule G provides that Reference Train Services are to apply to:

- a specified commodity type or different uses. Further, it specifies that coal is the commodity type for which the Reference Train Service is to apply. It does not distinguish between different types of coal (eg thermal and coking) or different users (eg domestic versus export);
- traffic involving clusters of origins (ie mines) and identified destinations (eg the most commonly used port for those mines). Schedule G divides QR’s Rail Infrastructure serving the coal mines into seven geographic areas for the purposes of Reference Tariffs;
- Train Technical Characteristics (eg axle load/configuration, train length, gross tonnage, traction type, terminal configuration, compliance with Rollingstock Interface Standards);
- Train Operational Characteristics (eg nominated sectional running times, availability for operation, loading/unloading time, capacity entitlements defined by regularity, compliance with QR’s coordinated corridor scheduling processes and variability of operation); and
- contractual terms and conditions. The terms and conditions will be based upon Schedule E, except that a term may be specified and Access Charges may vary with changes in Reference Tariffs.

The draft undertaking specifies, but does not define, the Train Service Characteristics (comprising the Train Technical Characteristics and the Train Operational Characteristics) for Reference Train Services. For example, the specified rights in terms of transit times (etc), are currently undefined.

The Access Charge for a Train Service may be higher or lower than the relevant Reference Tariff where the Train Service Characteristics differ from the Reference Train Service Characteristics. Accordingly, the process of establishing Reference Tariffs will inevitably impose a degree of standardisation on the specification of these parameters. The adoption of inappropriate parameters is likely to have adverse implications for the evolution of the rail market and the realisation of benefits for customers. Issues related to the specification of Reference Tariffs are discussed in Section 3 of this paper.

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<sup>5</sup> A number of submissions to the QCA have raised concerns with and criticised the Constrained Market Pricing or Baumol floor/ceiling approach. It has also been suggested that even Reference Tariffs may not help because the actual prices are to be determined on the basis of what QR believes the market will bear.

QR proposes that Reference Tariffs be submitted to the QCA within 3 months of the QCA's approval of QR's draft undertaking (clause 5.3.1(g)). Schedule G indicates that Reference Tariffs will be structured to include fixed and variable components. Section 4 of this paper considers issues associated with the structure of Reference Tariffs.

Once approved, the Reference Tariffs would apply for 3 years (clause 5.3.2(a)), subject to an escalation factor that would be included in the definition of the Reference Tariff and possible revision upon the occurrence of a Material Change Event (clause 5.3.2(b)).

QR's undertaking also proposes that a Revenue Limit be applied to certain Train Service Groups, including those services that are to be the subject of Reference Tariffs (clause 5.2.3, Schedule F). The Revenue Limit would be calculated such that over a 10 year Evaluation Period (or for the length of contracts that last longer than 10 years), expected revenue would cover all:

- operational and maintenance costs reasonably expected to be incurred for the Stand Alone provision of Access for the Train Service Group; and
- the capital related costs, including depreciation and a return on assets.<sup>6</sup>

QR's draft access undertaking does not explicitly address how the Access Charges implicit in its current coal haulage contracts will be treated for the purposes of attribution to the Revenue Limit. However, QR has indicated that clause 5.2.3(c)(i) will extend to Access Charges to existing traffics (ie the appropriate Reference Tariffs will apply for existing haulage contracts).

QR proposes that reasonably achievable efficiency gains for both operating costs and asset utilisation be incorporated into the cash flow modelling during the Evaluation Period. QR proposes that only committed tonnages should be considered for the purposes of assessing expected cashflows. Accordingly, it would appear that QR intends to retain any additional profit that emerges from achieving greater than forecast efficiency gains or from traffic that was not a committed tonnage at the commencement of the Evaluation Period (unless the Material Change Event definition is triggered).

If a Material Change Event occurs, QR reserves the right to revisit its Reference Tariffs (although QR has the discretion not to review such a change in the event that the Material Change Event increases QR's expected revenues in a non-material way). One such Material Change Event occurs if the volume of coal transported falls outside the range nominated for the relevant geographical scope (including from Train Services carrying coal that are not subject to the relevant Reference Tariff).

Other than adjustments for Material Change Events, the basis for the calculation of the Revenue Limit is based entirely on anticipated events – there is no adjustment process to accommodate variations between expectations and actual outcomes. For example, there is 'no unders and overs' adjustment process. The approach QR proposes to take does not appear to address updating the Revenue Limit formula over time.

Accordingly, in relation to QR's proposed Reference Tariff Services, QR's undertaking provides for a form of price control (through the Reference Tariff) and revenue cap (through the Revenue Limit) to be applied. Issues related to the regulatory framework for the determination of QR's Reference Tariffs are discussed in Section 5.

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<sup>6</sup> QR's draft undertaking provided that depreciated replacement cost was the methodology to be applied. However, QR has since indicated that it proposes that the depreciated optimised replacement cost approach be used to value its assets at the beginning and end of the assessment period. QR has also indicated that it proposes that depreciation be determined according to the "competition depreciation" approach. Under this approach, depreciation forms part of an annualised capital charge that incorporates a return on assets component in a manner that ensures the annual capital charge remains constant over the life of the asset.

The draft undertaking indicates that Access Agreements may require the parties to meet specified performance levels and that liquidated damages may be applied where these performance levels are not met. Otherwise, the draft undertaking limits QR's liability to damage caused to property or personal injury arising from its deliberate or negligent acts or omissions. Accordingly, unless set out as part of the specified performance levels, QR does not propose to take responsibility for delays to Railway Operators trains arising from congestion on the track. The issue of QR's performance in relation to minimising delays, including public reporting and possibly compensating Railway Operators for delays in certain circumstances is addressed in Section 6.

### **3. REFERENCE TRAIN SERVICES**

#### **3.1 Reference Train Services and the Coal Chain**

A rail network provides a physical connection upon which transportation occurs. The network does not provide the actual transportation, but facilitates it through the provision of transport capacity (as does an oil or gas pipeline and an electricity grid). Train Operators require access to the capacity provided by QR's track in order to operate Train Services. Consequently, Rail Infrastructure provides a capacity service - the capacity to transport products and people between specified origins and destinations.

In order to ensure that the most appropriate Reference Train Service is specified as part of the process, it is important to consider the capacity service provided by Rail Infrastructure in the context of the entire production chain. For the coal industry, this production chain is known as the coal chain (refer Diagram 1) which includes the following facilities:

- the mine;
- the stockpile at the mine;
- the loadout;
- the rail transport system (ie below and above rail);
- the discharge pit at the port;
- the stockpile at the port; and
- ship loading infrastructure.

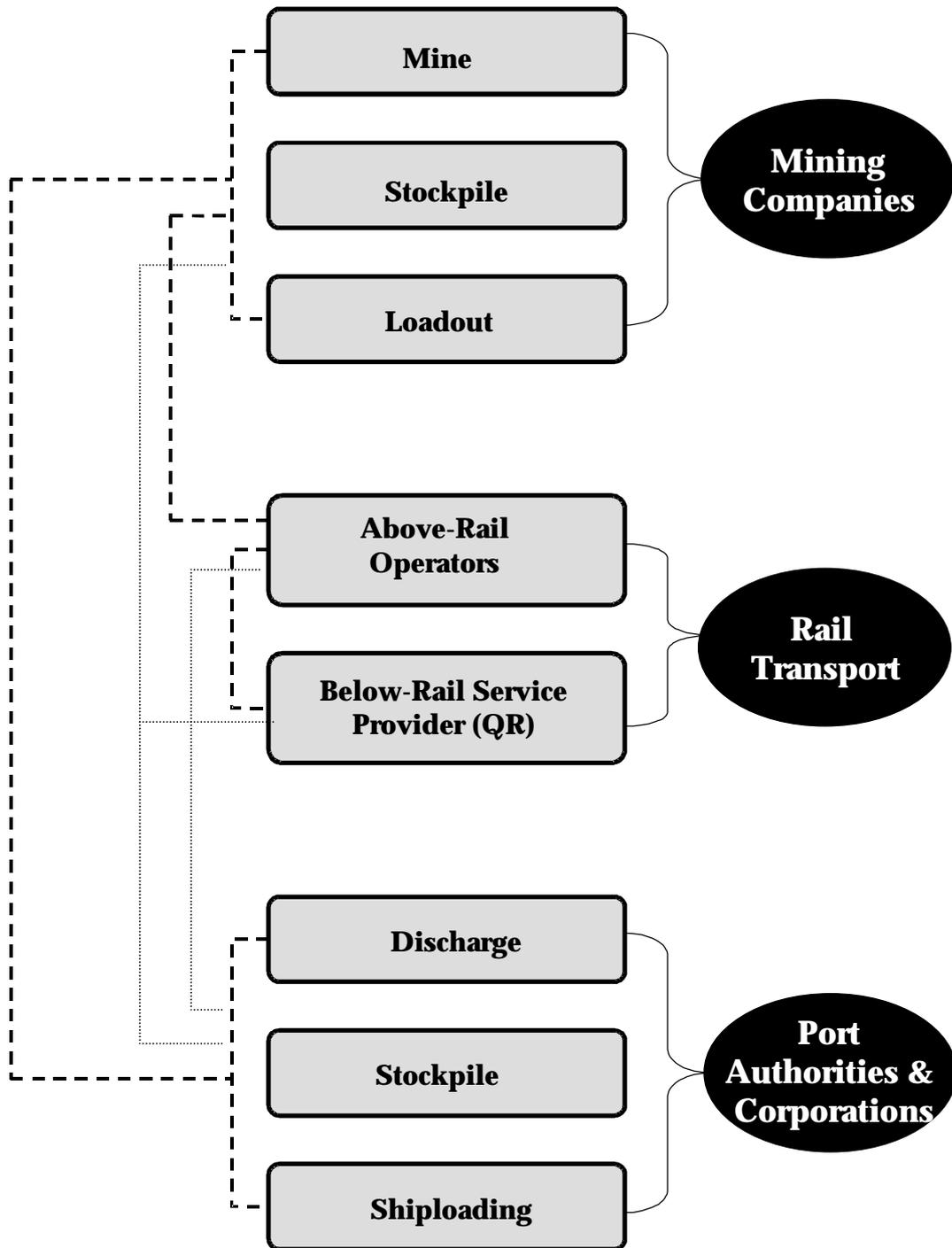
The coal chain represents the series of complementary, yet to some extent substitutable, links in the transportation of coal from the mine face to the ship. For example, stockpiles at the mine and the port may help improve utilisation of the Rail Infrastructure by allowing railings to be more constant. Therefore, it is important to recognise that QR's draft undertaking only addresses one link in this chain. In order to produce the best result for customers, the appropriateness of the Reference Train Service should be considered in the context of the chain as a whole.

#### **3.2 Reference Tariffs**

QR has proposed that Reference Tariffs be developed for the use of its below rail transportation services for coal transportation between specified origins and destinations. However, these Reference Tariffs only apply for a limited range of destinations, for example:

- cross-system traffic, such as mines on the Goonyella system exporting coal through the Gladstone port which is on the Blackwater system, are not incorporated; and
- trains which do not travel within a specified Reference Tariff zone, eg traffic from a mine within the defined origin points to a power station outside the defined destination points, is not incorporated.

**DIAGRAM 1: THE COAL CHAIN**  
**CONTRACTUAL AND IMPORTANT RELATIONSHIPS**



..... Important Non-Contractual Relationship

----- Actual Contract

If the services covered by the Reference Tariffs are not representative of the coal traffic that traverses QR's network, then the usefulness of the concept will be undermined. Thus, there is an issue as to whether the existing categories of clusters of mines and destinations should be increased to reflect the provision of other services by QR. However, establishing Reference Tariffs is not a costless exercise. The benefit from increased pricing transparency must therefore be balanced against the cost of setting Reference Tariffs..

### 3.3 Defining Access Rights

In practice, the specification of the "benchmark" Reference Train Service could have significant implications for the evolution of the above rail market. This is because the draft undertaking envisages that Train Service Characteristics that depart from the Reference Train Service could normally be expected to attract a price premium.

For example, the capacity of the system is dependent upon train speeds – thus the choice of train speed for the Reference Train Service will dictate the standard from which the costs of departures will be assessed. Consequently, if the standard is 80 km/hr, then a 70 km/hr train will require additional capacity and therefore could be a more expensive path, even allowing for the 70 km/hr train creating less of a maintenance requirement.

The process of establishing Reference Tariffs will therefore result in a degree of standardisation in the way services are specified and priced. Accordingly, the adoption of inappropriate parameters may have significant implications for the evolution of the rail market and the realisation of benefits for customers.

As such, the effectiveness of Reference Tariffs depends upon ensuring that the specification of the Reference Train Service represents the most appropriate set or bundle of Train Service Characteristics (both technical and operational), consistent with customers obtaining their preferred price/service quality trade-off.

This highlights the importance of specifying appropriate access rights for a Reference Train Service, and in particular:

- the parameters that should be quantified;
- how the Capacity Entitlement should be defined;
- the geographic scope of the mine clusters;
- the approach to congestion and capacity management; and
- the process by which price/quality trade-offs can be made between Reference Tariffs and Reference Train Services.

#### *Desirability of Quantifying Parameters*

It is important that the access rights encapsulated within Reference Train Services are clearly defined in conjunction with setting Reference Tariffs. It is only through clearly specifying factors such as transit times, regularity, length of intervals between train services etc that all parties will be able to assess:

- the reasonableness of the Reference Tariffs that emerge from the process;
- the appropriateness of the mine clusters QR proposes; and

- their preferred price/service quality trade-off.

However, the process of quantifying these parameters will not be a costless exercise for any of the parties involved. Accordingly, the issue arises as to which characteristics justify the effort required for their specification.

One area of particular importance that should not be unduly onerous to formalise is the Train Technical Characteristics proposed to apply to each Reference Train Service. The Train Technical Characteristics include factors such as:

- axle load/configuration;
- train length;
- gross tonnage;
- traction type;
- terminal configuration; and
- compliance with Rollingstock Interface Standards.

Train Operational Characteristics will also require specification. In this context it is noted that QR is allowing for variability in operations defined by the Train Service Characteristics. This raises the issue as to the appropriate extent of operational variations that should be incorporated in the Train Service Characteristics. It is envisaged that variability of operations will provide some degree of flexibility for both QR and above-rail operators to adjust operations and to use capacity more effectively. However, the most appropriate level of variability for the specification of generic Reference Train Services is likely to be unclear until at least other parameters are specified.

#### *Mode of Specifying Capacity Entitlements<sup>7</sup>*

Rail Infrastructure provides a capacity service. This is recognised in the draft undertaking, which defines Access Rights in terms of Capacity Entitlement. In recognition that different markets might prefer a different specification of access rights, the draft undertaking accommodates two approaches to the definition of an access right:

- an access right to a specific train slot (eg a departure time from an origin and an arrival time at a destination); or
- an access right to a frequency (ie train services per specified time period) or entitlement not directly linked to a specific train slot/s.

However, QR's proposed Capacity Entitlement for its Reference Train Services (which deals exclusively with the transportation of coal) defines Access Rights on a frequency basis (ie number of trips per day/week/month) and time intervals.<sup>8</sup> As Reference Train Services are generic, the QCA recognises that QR's approach provides for the fact that the Reference Train Service is unable to specify particular train slots. For example, it is unlikely to be desirable or viable to set particular arrival and destination times as part of the undertaking. Indeed, it is

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<sup>7</sup> This paper does not address issues associated with the reservation and allocation of Rail Infrastructure capacity to users. It is proposed that this issue be addressed in conjunction with consultation on QR's scheduling and train control protocols.

<sup>8</sup> QR's proposed approach is consistent with that adopted by Railtrack (UK) but different to that adopted by the Rail Access Corporation and the Australian Rail Track Corporation.

quite possible that a specified transit time together with a defined regularity and maximum and minimum intervals between cycles provides a reasonable substitute for a defined train slot.

If the general approach to the definition of access rights is appropriate for QR's Reference Train Services, it is important that those rights are clearly defined in conjunction with setting Reference Tariffs.

While QR's Reference Train Services do not include specific train slots the concept of priority associated with train slots is important for Reference Train Services. For example, a right which provides for a given journey to be completed within a relatively short transit time implies a higher level of priority relative to another which provides for that journey to be completed over a longer period. Thus, the specification of the priority level to be assigned to Reference Train Services is of critical importance to all parties.

#### *Appropriateness of Mine Clusters*

Schedule G of the draft undertaking identifies the seven geographic zones proposed by QR for the definition of Reference Tariff Services as follows:

- one zone for mines on the Newlands system;
- one zone for mines on the Moura system;
- one zone for mines on the West Moreton system;
- one zone for mines on the Blackwater system; and
- three zones for mines on the Goonyella system divided into Goonyella South, Goonyella North and Goonyella West.

QR's proposed approach appears to involve a set of uniform Train Operational Characteristics for each of the seven zones. This approach, for example, could generate for a Reference Train Service a uniform transit time in relation to the mines contained in each geographical zone. In the case of the Goonyella South Reference Train Service, this would lead to traffic originating from Gregory operating on the same transit time as traffic originating at Peak Downs up to 100 kms closer to destination ports.

The clusters of mines that QR proposes to be subject to a single Reference Tariff involve mines significantly distant from one another. Therefore, it is questionable whether one mine at the far extremity from the port should "buy" the same transit times, etc as another mine that is much closer to the port. (Appendix 6 provides a series of maps which outline the coal production areas of Queensland.)

However, an alternative and potentially more desirable approach might involve QR specifying in respect of a Reference Train Service a transit time for a common point (or points) in the corridor used by the cluster of mines (or a subset of them). If this approach is adopted, then an issue arises as to how transit times for particular mines might be determined (ie as part of the process of setting Reference Tariffs or some other mechanism, such as by negotiation or by application of a formula).

Accordingly, the range of distances involved in a geographic zone raises the issue as to whether transit times set for the Reference Train Service should relate to:

- clusters of individual line section running times that make up the complete transit time profile; or

- given origin-destination points defined by the seven geographic zones.

### *Delays*

A further issue for capacity entitlement is the trade-off between above rail and below rail capacity. In practice, this trade-off is complex as it involves many competing and countervailing factors, especially when regard is had to the entirety of the coal chain (refer Diagram 1). In particular, above rail operators incur significant costs when trains are delayed. This significance follows naturally from the capital-intensive nature of above rail operations. In some cases, train delays on the network may be as expensive to an end customer (ie a mine) as demurrage charges for a ship waiting in a port.

These delays may occur for a number of reasons, including unloading delays at a port or because another Railway Operator fails to adhere to its contractual requirements. It is also possible that delays may arise because of a failure on QR's part to meet contracted transit times. Therefore, an inappropriate assignment of responsibility for train delays could unnecessarily increase the cost of coal transport for the mines.

The efficient allocation of risk requires it be assigned to the party best able to manage it. QR controls the granting of access rights to customers and the management of capacity on its network (including augmentation of that capacity). There is little Railway Operators can do other than meet loading times, departure times, sectional running times and so on (which they are contractually bound to observe). However, the draft undertaking does not contain any explicit recognition of QR's liability for any delays it causes.

The issue then arises as to whether it is more efficient for QR to bear more of the risk associated with transit time variations (within its control) on the basis that it is compensated for doing so through higher access charges. For example, in an extreme case, Access Charges could rise to the point where Railway Operators are guaranteed a path with minimal interruption and interval before commencing their next service, with full compensation being provided to Train Operators for any delay caused by QR. In this structure, QR would be provided with a very strong incentive to schedule trains in a manner that minimises waiting time in transit or delays between cycles.

Applying such a regime in the development of Reference Tariffs would become highly complex if the costs associated with disruption were not relatively uniform across Train Operators. It also requires some basis for assigning responsibility for delays to the various parties in the coal chain, including mines, Train Operators, and so on. These issues are addressed in more detail in Section 6 of this paper.

## **3.4 Request for Comments**

**The Authority seeks comment on:**

- **whether Reference Tariffs should be established for origin – destination points other than those referred to in Schedule G (eg cross-system traffic);**
- **the characteristics of the access right for Reference Train Services that should be defined (eg. regularity on a weekly basis, specified intervals between train cycles and specified transit times) and the appropriate quantification of the characteristics of the access right for each Reference Train Service;**
- **whether variability of Train Operational Characteristics is applicable to a generic Reference Train Service, and if so, the degree of variability of operational characteristics that should be incorporated;**

- **whether the geographical scope to which access rights are proposed to apply is appropriate having regard to the definition of Reference Train Services;**
- **whether transit times for the Reference Train Service should be expressed as running times for clusters of line sections or in aggregate as a time between origin and destination;**
- **how Reference Tariffs should accommodate incentive issues that emerge from train delays;**
- **any other issues which should be considered by the Authority in regard to defining access rights.**

## 4. PRICING FRAMEWORKS FOR ACCESS TO THE RAIL NETWORK

### 4.1 The Economics of Access Pricing in the Rail Industry

In determining appropriate access charges, a number of difficult issues must be addressed that flow from the basic economic characteristics of the industry. The key economic characteristic of the rail industry is that a large proportion of the total cost of providing Rail Infrastructure services is fixed in the sense that additional traffic imposes relatively low additional cost to the system as a whole (in the absence of congestion or disruption to existing traffic)<sup>9</sup>. Consequently, only a proportion of the total cost of infrastructure use can be attributed to the particular user.

In practice, these cost characteristics mean that average costs reduce as traffic levels increase, since fixed costs can be spread over a greater volume of traffic. Accordingly, pricing on the basis of average cost may result in traffic that can cover in excess of its incremental costs, but not its average costs, being priced off the network. However, setting access charges on an incremental cost basis will result in QR failing to meet its revenue adequacy requirement. Consequently, Access Charges cannot be determined on the basis of incremental cost alone since the financial viability of Rail Infrastructure providers requires that fixed (or unattributable) costs be recovered from users. The question therefore arises as to how prices should be set without inappropriately pricing traffic off the network.

A number of pricing methods have been developed which seek, to varying degrees, to minimise the risk of pricing traffic off the network whilst recovering the unattributable costs of providing and maintaining rail infrastructure. These approaches are discussed in Appendix 2. Access charging frameworks adopted in jurisdictions reviewed by the QCA (see Appendix 1) incorporate the following main principles: demand-based differential pricing, rate ceilings and floors, and revenue adequacy requirements.

### 4.2 Reference Tariffs in QR's Draft Access Undertaking

When setting Reference Tariffs, the following issues emerge:

- what is the appropriate structure of Reference Tariffs;
- what are the appropriate geographical zones around which to base Reference Tariffs; and
- whether Reference Tariffs should vary with the product being carried.

#### *Pricing Structure*

The key issues in relation to pricing structure are to:

- create an environment where capacity is efficiently rationed and appropriate signals are provided to QR for augmentation of the system's capacity;
- recover costs in a way that creates minimal distortion upon the production decisions of mines<sup>10</sup>; and
- ensure that users face the full economic costs of their decisions.

<sup>9</sup> Indeed, if this were not the case, there would be little reason for regulatory intervention in the industry at all.

<sup>10</sup> In this regard, the regulatory process is inherently cost-based. However, in that the regulatory environment and capacity allocation processes will likely evolve and become more sophisticated with experience and time, it is expected that mechanisms will emerge (eg secondary trading and capacity auctions) which facilitate a more value-based approach to pricing capacity in the Queensland Rail transport market.

In addition, it is desirable if tariff arrangements are transparent and simple so that all parties can have confidence that Reference Tariffs represent a reasonable price for the service. Transparency in tariff structure may also be desirable once account is taken of the complexity in negotiating Access Charges where Train Service Characteristics depart from the relevant benchmarks. This is especially the case if relative simplicity in the pricing structure can be accomplished without inducing inappropriate distortions. In particular, if alternative pricing structures have little or no impact on behaviour, then there is likely to be little reason to depart from the most simple arrangement that is perceived as being fair to all parties.

There are many pricing structure possibilities that could emerge, such as:

- a tariff structure where a relatively high proportion of the price is recovered via the variable component (which in the extreme would tend to produce a linear, or average price Reference Tariff arrangement);
- a tariff structure where a relatively high proportion of the price is recovered via the fixed component (which in the extreme would tend to produce a Reference Tariff arrangement where Access Charges comprised a fixed price per user, regardless of the volume of traffic);
- a tariff structure where a user's directly attributable (or marginal) costs formed the variable component of the Reference Tariff with the remaining (unattributable) costs recovered through the fixed component, based, for example, on a per path or slot basis (a two-part tariff).<sup>11</sup>

QR's draft access undertaking (refer Appendix 4) proposes that the price structure for Reference Tariffs be as follows:

- an amount of Reference Tariff identified as \$/,000 gtk;
- a proportion of Reference Tariff payable as a fixed charge; and
- an escalation of Reference Tariff.

QR's Reference Tariff structure can be interpreted in two ways. First, it could be interpreted as a two-part structure where a Reference Tariff consists of a variable and fixed component. Under a two-part Reference Tariff, it is therefore necessary to decide the basis for levying the variable or usage based component. The most appropriate basis for the charge is likely to depend upon whether it is important to send a signal to users about the scarcity of available capacity. If network capacity is constrained then it will be appropriate that the relevant pricing signal in respect of the variable component of the charge should include:

- the additional variable costs imposed upon the system from the traffic (eg additional maintenance required);
- the capital costs associated with augmenting capacity to accommodate the transportation of an additional tonne of coal;<sup>12</sup> and
- the costs associated with congestion (to the extent that the cost is not internalised).<sup>13</sup>

<sup>11</sup> It is possible that a two-part tariff could reduce output in some industries because the high initial (fixed) charge discourages users from participating in the market altogether. This is not expected to be a concern in the coal transport market. It is also possible that a sliding scale (multi-part) tariff arrangement could apply.

<sup>12</sup> Where variable costs are defined as incorporating this capital component they are generally referred to as long run marginal costs (as opposed to short run marginal cost where capital costs are not included). Where systems are not capacity constrained, the merit of assigning a capital component to the charge will diminish, although revenue adequacy needs to be maintained.

With two-part tariffs, as the level of congestion in the system rises, the proportion of costs that are recovered through the variable charge also rises. Ultimately, this could result in the variable charge recovering virtually all of the costs associated with a service so that the effect of a two-part tariff tends towards that produced under a linear tariff arrangement.<sup>14</sup>

The remaining costs that cannot be attributed are recovered through a fixed charge, which may be levied, for example, on a per train path or slot basis. Given the complexity of the task and the extent of unattributable costs, some degree of cost averaging of the fixed component of the charge will form an inevitable part of setting Reference Tariffs. In this regard, the establishment of Reference Tariffs requires the identification of principles to govern this averaging process. It is likely that these principles should recognise that any assignment of genuinely unattributable costs to any user or group of users will have an arbitrary element.

The other approach might be a linear tariff where all charges are levied on a linear basis (ie \$/000 gtk) and the fixed component is merely a reservation charge (eg for risk management purposes). It is understood that QR intends to adopt this second approach.

In assessing the most appropriate pricing structure, several considerations are relevant, including:

- the assignment of risk;
- simplicity and transparency;
- the efficient utilisation of the network; and
- equity.

The structure of Reference Tariffs could have implications for the assignment of risk between parties – higher fixed charges could, under certain circumstances, impose a greater risk on users and a lower risk for QR. While risk assignment remains an important issue in practice, QR's Reference Tariff proposal requires that a portion of the linear Reference Tariff be fixed in the sense that it must be paid irrespective of whether or not the service operates. In this respect QR is prescribing a risk sharing arrangement with above-rail operators. Similarly, the adoption of a two part tariff approach does not preclude the inclusion of risk sharing arrangements – ie a portion (or all) of the fixed component could represent a non-refundable charge in the event that a user does not utilise its contracted capacity.

Linear tariffs, based on, for example, a gross tonne kilometre basis, are simple and easy to understand. However, they are not necessarily transparent since rates will not accurately reflect underlying costs. For example, linear tariffs will not provide a transparent basis against which a mine or a third party operator can assess the cost implications of departures from the relevant Train Service Characteristics. This is because linear tariffs do not provide above-rail operators (or end users) with information on the marginal cost implications of their operating decisions.

The major benefit of cost reflective two part tariffs is that prices reflect underlying costs – users face the marginal cost of providing additional units, while fixed costs are recovered through an additional network charge. This provides a transparent basis for pricing departures from the Reference Train Service (eg to accommodate different Train Service Characteristics) and allows operators to make better decisions, based on price, about use of resources.

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<sup>13</sup> Congestion costs will be internalised to the extent that the organisation which causes the congestion pays for it through higher above rail charges due to rollingstock being forced to wait to transport coal. Strictly speaking, additional costs imposed upon the environment should also be charged in some form. However, the desirability of QR collecting revenue on account of environmental damage it is not required to repair is questionable if it does not pass that revenue on to the Government.

<sup>14</sup> However, this outcome depends upon the level of congestion and the assignment of fixed costs between congested and uncongested periods. This issue is addressed below.

Because linear tariffs are not cost reflective, they may result in reduced efficiency in use of below-rail infrastructure. For example, a flat rate per tonne or gross tonne kilometre (a linear pricing structure) could encourage shorter trains (relative to a two-part pricing structure), which might not utilise the available below rail capacity as effectively as longer trains, thereby creating pressures for premature network augmentation. This is because linear tariffs do not send the same signal as a two-part tariff. Generally speaking, as the proportion of the tariff represented by a variable charge increases, the cost effectiveness of longer trains is reduced. If this is not reflected separately in an Access Charge, linear tariffs may encourage greater use of shorter trains even though they “consume” essentially the same amount of network capacity.<sup>15</sup>

Two part tariffs potentially provide:

- over time, for capacity to be more efficiently rationed. For example, under a two part tariff arrangement, the “fixed” component can vary with the time of day or the season (according to demand). This enables the pricing mechanism to provide incentives for mines to schedule coal railings at “off-peak” times (whether at particular times of the day, week, month or year) when capacity (or the fixed component) is less expensive. In addition, the congestion component of the variable charge may also be lower at off-peak times, as the potential cost of disruption to other traffic is lower than in peak periods. This will facilitate the smoothing of traffic flows enhancing network utilisation. It will also provide better information to QR regarding network expansions (eg enabling network expansions to be delayed);
- a pricing structure consistent with the future adoption of secondary markets.<sup>16</sup>

Accordingly, to the extent that the train configurations are sensitive to the structure of Reference Tariffs, any departure from two part tariffs could increase the cost of the service to all users as it might result in capacity not being efficiently utilised. However, if above-rail operators’ decisions are not influenced by alternative pricing structures, there may not be a significant difference between the adoption of two-part tariffs and linear tariffs. Accordingly, a balance must be struck between the benefit of additional information conveyed by more complex pricing arrangements, the capacity of those more complex pricing arrangements to better satisfy customer preferences and the additional cost in developing and applying them.

There are likely to be many possible combinations of rates that satisfy QR’s price limits on individual train services and train service combinations.<sup>17</sup> Schedule G of QR’s draft undertaking nominates seven pricing zones in its coal corridors. One concern is to ensure that the combination of tariff structure and choice of pricing zone achieves a measure of fairness, ie it does not lead to mines or groups of mines:

- not covering the costs they impose upon the system; and

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<sup>15</sup> A shorter train may represent a departure from the Train Service Characteristics for a Reference Tariff, justifying QR increasing the tariff on a cost reflective basis. However, in such a situation, it should be noted that is likely to implicitly apply a two part tariff to calculate the cost of the departure.

<sup>16</sup> It should be noted that this approach is similar to that which was used by the Federal Energy Regulatory Commission (FERC) for the United States gas industry prior to regulatory reform in 1992. Prior to this reform, rates for pipeline capacity were established on the basis of a ‘modified fixed variable’ approach in which some of the fixed costs were assigned to the variable portion of the charge according to the FERC’s goals and the current conditions of the market. In Order # 636 of 1992 the FERC acknowledged that the ‘modified fixed variable’ approach resulted in the shipment of gas on uneven terms and hindered competition between gas sellers because competition is not based on the seller’s costs and therefore not on their ability to compete directly with each other. Consequently, FERC amended the ‘modified fixed variable’ approach to the ‘straight fixed variable’ approach in which cost reflectivity is required in establishing variable and fixed costs (ie a users variable component includes all variable costs imposed by that user).

<sup>17</sup> However, it is also possible that no set of prices simultaneously meet the ceiling and floor pricing requirements for every service considered by itself and in every possible combination of services.

- obtaining an inappropriate commercial advantage over other mines.

Any pricing structure will result in unattributable costs being assigned to users in a particular way. For example, a linear tariff arrangement is likely to result in greater variation amongst user's rates within a cluster than a two part tariff arrangement. This is because, under a two part tariff arrangement, the fixed proportion of the tariff is constant within each cluster.

However, this does not mean that one pricing structure is more fair than another, especially if each approach results in every user (and every combination of user) covering all of the costs it (they) imposes (impose) upon the system. The interrelationship between the pricing structure and the appropriateness of geographic zones is addressed below.

There is also the issue of whether volume discounts or penalties are appropriate. Schedule G indicates that Reference Tariffs will apply in relation to an annual volume range, for all coal traffic operating within the geographic area (measured in gross tonne kilometres). If an efficient pricing structure is adopted, volume discounts and penalties are unlikely to provide a means of rationing capacity.

### *Product Differentiation*<sup>18</sup>

According to the draft access undertaking, Reference Tariffs are applicable to the transportation of coal, irrespective of the type of coal that is transported. Coal markets can be differentiated by product type including coking coal and thermal coal. These products have different prices and hence may have differing capacities to contribute toward the fixed costs of rail infrastructure provision. Accordingly, there is an issue as to whether it is appropriate for Reference Tariffs to differentiate on the basis of the product being transported.

The main benefit of differentiating by product (or by end users) in the assignment of fixed costs is that it could lead to increased output from the Queensland coal industry. This might occur, for example, where additional mines (or possibly tonnages) of lower value coal become economic through lower below rail access charges. Such an outcome would be consistent with the goal of increasing the size of the Queensland (and national) economy.

However, adopting such an approach has its limitations, as differentiation:

- will create an issue with coal classification – there could be disputes about the characterisation of coal. This would increase the costs for all interested parties in the regulation of QR's provision of access;
- could change the competitive environment within the Queensland coal industry. By providing some producers with an advantage over others, a competitive advantage could be created for particular mines. The approach is likely to impact upon the value of developed and undeveloped coal reserves in this State. In turn, it may change the development path for the industry;<sup>18</sup>
- may also significantly affect the long-term evolution of the rail infrastructure market. Differentiation of Reference Tariffs on the basis of the type of coal or end use may stifle the emergence of more effective means of allocating and assigning capacity in the coal system (eg secondary markets in capacity) by creating distinct below rail markets.

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<sup>18</sup> The access regime in the United Kingdom explicitly requires that access charges not differentiate between users (other than on cost-based grounds) to the extent that it risks significantly distorting competition in those other markets.

A related issue is whether QR should have the discretion to charge a specific user a rate different from the Reference Tariff where it forms the view that the lower charge is necessary for it to gain the traffic. This could arise where there is an inter-modal alternative (eg road transport or slurry pipeline) or where QR forms the view that the user cannot afford to pay the Reference Tariff.

The advantages and disadvantages of product differentiation are relevant to this issue (where there is an inter-modal alternative, QR and its current users should be better off if there is net benefit from QR retaining the traffic). However, where the discount is necessary to make the traffic viable, there is concern that the discount will induce distortions in a coal market.

In addition, allowing QR to differentiate traffic on a “one-off” basis also suffers from a lack of transparency in its application which could have implications for the above rail market. This concern could be partially addressed by requiring details of such a transaction and the Access Rights be made publicly available.

### *Geographic Scope*

The proposed approach outlined in the draft undertaking appears to involve a uniform charge (\$/gross tonne kilometre) for a cluster of mines within each of the seven geographic areas. This means that Access Charges are likely to vary between mines within a cluster because of the different variable costs associated with differing origins and destinations (apart from differences caused by variations to Train Operational Characteristics, etc). The extent of this variation will depend upon whether linear or two part tariffs are proposed – linear tariff arrangements will tend to increase the amount of variation in charges between mines within a cluster.<sup>19</sup>

This raises the important issue of the interrelationship between the pricing structure adopted and the appropriateness of QR’s geographic zones. The combination of the geographic zones and the pricing structure should provide an acceptable degree of variation:

- within the zone; and
- between the zones (especially in the Goonyella system which has 3 zones).

A balance must be struck between:

- the benefit of additional information conveyed by more complex pricing arrangements (reflected in the more efficient utilisation of capacity, the better satisfaction of user preferences); and
- the additional cost in developing and applying them.

If linear tariffs are to be applied, there is a risk that mines relatively distant (close) to the destination will pay relatively higher (lower) charges than would be the case under a two part arrangement that provides for fixed charges within a cluster. However, this does not mean that a linear approach is necessarily inequitable.

Under a two part tariff arrangement, where the variable component properly reflects the additional costs imposed on the system by the traffic, the extent of variation between Access Charges actually paid by users will be less of a concern. This outcome is likely to be valid even

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<sup>19</sup> However, neither arrangement will completely reflect the fact that different mines will use different proportions of common user track and track dedicated to their mine.

though the Reference Tariff covers a relatively wide geographic area (as variations in Access Charges will be cost based).

Another important, perhaps more subtle, issue arises with the clusters of mines. This issue relates to the uniformity of the fixed component of the charge that will remain constant within a geographic region. In this respect, the issue may be more concerned not with the mines included within a zone, but rather the variation in charges between zones.

There may be an advantage to the State as a whole if a relatively higher proportion of charges that cannot be assigned on any cost causation basis to any user is attributed to mines closer to the coast relative to mines further from the coast. However, this approach would be subject to every user and every cluster of users covering the costs associated with its or their (as the case may be) incremental use of the system, including the costs of the infrastructure used exclusively by that user or cluster. The advantage to the State arises from the prospect of such an approach increasing the attractiveness of mines remote from the coast, enhancing their prospects for development and increasing the output of the Queensland mining industry.

The potential disadvantages of this approach are similar to the concerns expressed in relation to product differentiation. However, issues of competitive advantage may not arise since mines further from the coast would still be paying relatively higher rail Access Charges than those closer to the coast (even though such mines may be paying less on a gross or net tonne kilometre basis).

### 4.3 Request for Comments

The Authority seeks comment on:

- **is the structure of Reference Tariff likely to affect the utilisation of network capacity;**
- **should Reference Tariffs be structured as linear tariffs and if so, what elements should be comprised in:**
  - **the amount of the Reference Tariff identified as \$/,000 gtk;**
  - **the proportion of Reference Tariff, if any, payable as a fixed charge;**
- **should Reference Tariffs be structured as two part tariffs, and, if so, what elements should be comprised in:**
  - **the variable portion of the Reference Tariff;**
  - **the fixed portion of the Reference Tariff;**
- **whether Reference Tariffs should be structured to take account of peak/off-peak considerations, and if so what should constitute the peak and off-peak periods;**
- **whether Reference Tariffs should be based on differentiated products (eg coking v thermal coal) and differentiated uses (eg domestic v export) and if so, what should be taken into consideration;**
- **whether QR should have the discretion to depart from Reference Tariffs for particular coal traffic for other than cost induced reasons, and if so, under what circumstances and with what safeguards;**

- **how many pricing zones should Reference Tariffs be based upon, and what should dictate this choice;**
- **how should the fixed costs be assigned between the various pricing zones; and**
- **how should new mines be assigned to clusters.**

## 5. REGULATORY FRAMEWORK

### 5.1 Introduction

Any involvement in the market will have both intended and unintended consequences. If the intended consequences are overwhelmed by the unintended consequences, the interference may do more harm than good. For example, by allowing too low a rate of return, in an effort to eliminate monopoly profit, the regulator may create an environment in which the regulated business is unwilling to invest. The capacity restrictions that might result from the congested infrastructure could be more costly to users than the original monopoly profits.<sup>20</sup>

Different regulatory approaches will assign rights and responsibilities differently to the affected parties. This assignment of rights and responsibilities will affect the regulated organisation's risks and rewards and, in turn, its incentives. Accordingly, it is important when considering alternative regulatory approaches to be aware of the potential unintended effects of the assignment of rights and responsibilities implicit in those arrangements.

The purpose of this section is to review alternative regulatory frameworks and assess the advantages and disadvantages of each.

### 5.2 Rate-of-Return or 'Cost-Plus' Regulation

Until recently, the dominant method of regulation has been the rate-of-return method. Under traditional rate-of-return (ROR) regulation, regulators determine the revenue required in order to recover the organisation's costs including an allowed rate-of-return on its asset base.<sup>21</sup>

ROR regulation has a number of advantages including:

- it limits excessive returns being earned;
- it ensures a reasonable financial return for the organisation, thereby helping ensure an adequate supply of services for consumers; and
- it provides a stable environment to attract investment.

However, ROR also has a number of disadvantages including:

- by linking allowed revenues to realised or estimated production costs, the regulated organisation is provided with relatively weak incentives to reduce operating costs. That is, under rate-of-return regulation both increases and decreases in costs are passed on to consumers at each regulatory review. Consequently, regulated monopolies have little incentive to manage inputs efficiently<sup>22</sup> or to adopt cost-minimising innovations (eg new technology).
- ROR regulation can limit the organisation's incentive to develop and introduce new products and services. Because it links allowed revenues to realised costs rather than to the value of the products and services produced, rate-of-return regulation generally provides poor incentives for the regulated organisation to discover and fulfil the needs of its customers.

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<sup>20</sup> The Authority intends to consult on QR's proposed cost allocation approach once it receives QR's cost allocation manual.

<sup>21</sup> Several submissions to the QCA in response to its Request for Comments Paper supported a ROR approach based on efficient cost calculations, rather than 'reasonable costs' as currently proposed by QR. These same organisations indicated incentive regulation was a second best approach.

<sup>22</sup> For example, if the organisation's regulated rate of return exceeds the organisation's actual market rate of return, then the regulatory environment will include an incentive for the regulated organisation to undertake excessive investment.

In response to perceived and actual weaknesses of the ROR regulatory method a number of alternative proposals have emerged, including Benefit Sharing Plans and Incentive Regulation.

### 5.3 Benefit Sharing Plans<sup>23</sup>

Benefit Sharing Plans aim to address the lack of incentives to improve efficiency inherent in ROR regulation by allowing regulated organisations to retain a portion of the profits (earnings-sharing) or revenues (revenue sharing) generated beyond a threshold.<sup>24</sup>

#### *Earnings-Sharing*

This form of regulation provides the regulated organisation with the ability to earn more than its allowed rate-of-return, but in doing so requires it to share a portion of the extra earnings (ie profits) it generates with customers. For example, a typical earnings-sharing plan allows an organisation to generate earnings subject to a set of prescribed rates-of-return. Organisations are permitted to achieve a compensatory return (that is, a return consistent with the organisation's weighted average cost of capital) without sharing any benefits. However, in order to provide the regulated organisation with an incentive to achieve efficiency improvements and maximise output it may be allowed to retain a defined proportion (eg 50%) of profits beyond this amount.

#### *Revenue-Sharing*

Revenue-sharing schemes are similar to earnings-sharing except that stronger incentives to achieve efficiency improvements are provided as the regulated organisation is able to retain the entire benefit from reducing its costs. This is because under revenue-sharing schemes, it is revenues (say from increased sales), rather than earnings that are shared. Consequently, the regulated organisation retains the full increase in earnings arising from a reduction in costs, which contrasts with earnings-sharing arrangements where only a portion of increased earnings is retained by the regulated organisation. Accordingly, revenue-sharing plans can provide an enhanced incentive for cost reduction but a diminished incentive to increase output.<sup>25</sup>

Both of these approaches can suffer from a lack of incentives for the regulated organisation to enhance service quality. This concern can be especially pronounced for revenue-sharing schemes. In addition, whilst these arrangements begin to overcome the incentive related limitations of ROR regulation, they may be less likely to provide as strong incentives to improve efficiency as properly designed incentive regulation schemes.

### 5.4 Incentive Regulation

Incentive regulation developed out of dissatisfaction with the cost-plus approach encouraged by traditional ROR regulation. The key idea behind incentive regulation is that an organisation subject to regulatory intervention will always know more about its business and *how to improve its business* than the regulatory body. The effectiveness of any regulatory intervention is limited

<sup>23</sup> Benefit Sharing Plans represent a form of performance incentive plans which offer an alternative to CPI-X incentive regulation mechanisms.

<sup>24</sup> Examples of the application of benefits sharing plans include:

- Southern Bell Telephone - Initial allowed Return on Equity (ROE) of 13.2%. Lower limit of 11.5%. Returns up to 14.0% retained by shareholders. Shareholders retain 40% of earnings above 14.0% up to 19.0%. Earnings above 19.0% returned to ratepayers.
- Illinois Bell Telephone - All earnings up to a 12.76% ROE retained by shareholders. 60% of earnings between 12.76% and 14.0% retained by shareholders. 30% of earnings between 14.0% and 15.0% retained by shareholders. Earnings above 15.0% ROE are returned to ratepayers.

<sup>25</sup> For natural monopolies, such as rail infrastructure, revenue need not increase proportionately with output for the regulated organisation to be adequately compensated, since average costs typically decline as output increases.

by the information available to the regulatory body. It is therefore important that the regulatory environment harness the regulated business' informational advantage to the wider benefit of the community as a whole (rather than purely to its own benefit – a situation that arises in an unregulated monopoly environment). This is the central goal of incentive regulation. Implicit in incentive regulation is that gains for all parties are possible if the organisation can be encouraged to employ its superior information to increase the efficiency and effectiveness of its operations.

Typically, this is achieved through a process of encouraging the regulated entity to “outperform” a benchmark set by the regulatory body by allowing it to retain the benefit from doing so. For example, if a regulator believes a regulated business should be able to improve its efficiency by 3% each year, and the regulated business manages to improve by 5% per annum instead, then the regulated business should retain a portion of the extra benefit from that superior performance.

Clearly, if the regulatory environment prevents the organisation from retaining the benefit of its efforts in this regard, it will have little incentive to devote managerial effort to achieve the gains. However, by allowing the regulated company to retain the benefit of its efforts, there is an incentive for it to invest the time, effort and expense, and accept the risk to seek to improve its performance. In the absence of such an incentive, those potential improvements simply will not be pursued. By providing this incentive, customers ultimately benefit by sharing in the gains that are realised over time. This way a “win-win” environment is created.

There is a range of possible approaches to incentive regulation including:

- price capping for particular products or for average prices; and
- revenue capping.

#### *Price Cap Regulation Plans*

In their most general form, price caps are determined by an index established for individual products or groups of products (ie a tariff basket).<sup>26</sup> Price-cap regulation aims to control the prices charged by the regulated organisation, rather than its earnings or rate-of-return. Thus, in a typical price cap application, an initial level of service prices is set according to traditional rate-of-return procedures.<sup>27</sup> Thereafter, the real prices (ie inflation adjusted prices) for individual services or ‘baskets’ of services are typically reduced each year by an adjustment factor until the next review (which itself is likely to rely upon rate-of-return considerations).

The adjustment factor is generally called the ‘X factor’<sup>28</sup> and is a pre-determined annual percentage rate without reference to the organisation’s actual earned rate-of-return. It represents the percentage reduction in prices the organisation is deemed capable of implementing without jeopardising its financial integrity. If the organisation can realise efficiency gains at a faster rate then it can keep such gains. If not, the organisation’s profit suffers.

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<sup>26</sup>This is called the Tariff Basket method of price-capping. An alternative option is that of “average-revenue yield” price control.

<sup>27</sup> See Armstrong, M, Cowan, S and Vickers, J (1995), *Regulatory Reform: Economic Analysis and British Experience*, p174, MIT Press: USA).

<sup>28</sup>In some cases prices may increase by a factor each year. Often prices increase when the factor is known as a ‘k’ factor rather than an X factor.

Accordingly, price-cap controls assign any risks associated with the regulated entity's costs (other than inflation), including the risk that costs decline in line with the X factor, to the regulated organisation, in this case, QR. This risk may be ameliorated in relation to specific input costs if cost passthroughs are allowed (discussed in Section 5.5 below).<sup>29</sup>

Further, under price-cap regulation, the regulated organisation is exposed to volume risk (whether from the supply side or the demand side). Since the cost structures of regulated organisations typically exhibit reducing average costs as output increases (as is the case with QR), profits can increase if the regulated organisation's sales increase beyond those forecast in the financial modelling undertaken as part of the regulatory review. Conversely, failure by the regulated organisation to secure the sales assumed in the forecasts will mean that profits fall.

Price-cap regulation has a number of advantages:

- it provides more effective incentives for cost reduction and productivity improvements relative to ROR regulation. It also provides an incentive for regulated organisations to invest in the adoption of technological improvements;
- it encourages sales maximisation as there is no limit to the revenue which a regulated organisation can generate;
- it provides price protection to individual users or purchasers of products and services;
- it may reduce regulatory administration costs;<sup>30</sup>
- it can provide a transitional mechanism to manage the reduction in rates over time if there is evidence that significant monopoly profits are being earned.

However, price-cap regulation also suffers from disadvantages, since:

- incentives for productive efficiency may be mitigated if price-cap regulation plans are of a limited duration;<sup>31</sup>
- service quality could be degraded under price-cap regulation as incentives to cut-costs through reduced service quality are encouraged; and
- an incentive is provided to regulated organisations to intertemporally shift costs (eg delay cost cutting until after a fresh price-cap has been set).

### *Revenue Cap Regulation Plans*

Under this type of regulation, an organisation's earnings are limited to a revenue cap. The cap is subject to an annual adjustment for productivity gains and inflationary effects (ie much like

<sup>29</sup> Interest rate risk is another major risk for regulated organisations under this approach. However, the CPI passthrough implicit in price caps substantially alleviates this risk (except that the CPI compensates for past inflation whereas interest rates are affected by inflationary expectations). This could have the effect of reducing the undiversifiable risk associated with a regulated organisation subject to incentive regulation.

<sup>30</sup> Einhorn, M (1991), *Price Caps and Incentive Regulation in Telecommunications*, Kluwer Academic Publishers: USA.

<sup>31</sup> This is commonly known as the 'ratchet effect'. Regulatory-lag provides the regulated organisation an opportunity to capture the benefits of productivity improvements and thereby provides an incentive to strive for greater cost efficiency. When terms or lags are short, regulated organisations become subject to a 'ratchet effect' under which incentives to make cost effective production decisions are diminished as the organisation is unable to realise the benefits of their productivity improving efforts. The ratchet effect arises when a regulator, as the basis for setting revised prices in a subsequent control period, uses the recently achieved cost level. Achieving the previous set cost level reveals to the regulator that the cost level can in fact be achieved, giving the regulator new information. However, knowing that the regulator will act on the information revealed by its performance to set lower prices, produces an incentive for the organisation to under perform and so reveal less information to the regulator about its ability to deliver lower costs through efficiency gains.

price-caps except the revenue cap applies to the organisation's 'global' cash flows rather than to particular prices). Revenue caps can be established for individual segments of the business (eg revenue from access for the lines serving QR's coal and minerals business) or the entire business (eg QR's Network Access Group as a whole). Revenue caps may provide considerable discretion to regulated organisations to set prices for their products within the revenue cap.<sup>32</sup>

Revenue caps come in many guises including:

- pure or absolute revenue caps which typify the process outlined above and which can be applied at the level of a service basket, service classification or an entire regulated organisation;
- revenue per customer caps and statistical revenue caps which have been advocated to mitigate problems inherent in pure revenue caps that restrict the growth of the cap. Under revenue per customer caps, revenue is allowed to grow with the growth in customer base. Under statistical revenue caps, revenue can change depending upon a number of variables included within the initial forecast of revenue requirements. Basically, these are simply variations to pure revenue caps which facilitate changes to revenue with respect to changes in the business environment.

As with price-caps, revenue caps typically involve a fixed term and a preset revenue formula providing increased certainty with regard to retaining financial gains from productivity improving behaviour. It is this certainty that provides an organisation with an incentive to operate more efficiently.

Revenue caps are often accompanied by an "unders and overs" account. An unders and overs account allows (requires) the regulated organisation to increase (decrease) its earnings in the year (or years) subsequent to that in which its revenues fall short of (exceed) the cap. Often an interest rate (at the risk free rate or the regulated organisation's weighted average cost of capital) is applied to the unders and overs account to address timing issues.

As with price-caps, revenue caps assign cost risk to the regulated organisation (both approaches can allow cost passthrough, see below). However, revenue caps are typically less risky than price-caps for a regulated organisation. Under revenue cap regulation, the regulated organisation is guaranteed the opportunity to earn a set level of income, regardless of the actual level of demand. Consequently, volume risk is passed to the customer, especially if an "unders and overs" mechanism is incorporated. This makes the process of fixing future demand projections as part of the regulatory exercise less contentious for revenue caps than for price-caps.<sup>33</sup>

Under a "pure" revenue cap, a regulated organisation is free to set charges for services as it sees fit. The organisation can charge differential prices to customers. Accordingly, unless specific price controls are established, the price risk is transferred to customers under pure revenue cap regulation.

In addition to reducing volume and pricing risk, unders and overs arrangements substantially reduce the importance of forecasting demand in the price setting process. In this respect, revenue caps differ from price-caps which are highly sensitive to demand forecasts. Revenue

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<sup>32</sup> Under "pure" revenue caps, the regulated organisation is free to set prices as it wishes. However, in practice, price-caps on specific products often accompany revenue caps.

<sup>33</sup> Consequently, it could be argued that a regulated organisation's undiversifiable risk under such an arrangement should be less than otherwise would be the case. This could have the effect of lowering the required rate-of-return for the regulated organisation. However, the existence of pricing constraints without an unders and overs arrangement could transfer volume risk to the regulated organisation.

caps can be structured to take account of changes in costs on account of sales or customer growth.

Revenue caps have a number of advantages consistent with those outlined for price-cap regulation, including incentives for cost reduction and productivity improvements relative to rate-of-return regulation. Revenue caps may also be better suited to networks such as rail which exhibit relatively low incremental costs for additional traffic volume. This is because they can accommodate a situation where allowed revenues increase less than proportionately with increases in sales (in contrast to price-caps which assume a direct relationship between total costs and total sales). Accordingly, revenue caps may allow a more direct means of passing the benefits of growth to customers. However, the desirability of revenue caps may be reduced for congested networks, especially if there is no performance regime in place (refer Section 6 below).

However, there are also important disadvantages:

- if the revenue cap is not adjusted for customer numbers or output they provide limited incentives to expand services to new and existing customers (as increases will not be compensated by a reciprocal increase in allowed revenues). Indeed, revenue caps could provide incentives to restrict sales as this could lower costs and increase profits; and
- if the revenue cap is not accompanied for some form of price control, they provide limited price protection for captive customers. Therefore, revenue caps often need to exist alongside methods of cost allocation and price setting procedures.

## 5.5 Price and Revenue Control Variables

CPI-X approaches to regulation are formula driven, for example:

- price caps can be characterised as:  $P_{m,t} = P_{m,t-1} (1 + \text{CPI-X}) \pm Z$ ; and
- revenue caps can be characterised as:  $R_t = (R_{t-1} + \text{CGA} * \Delta\text{Cust}) * (1 + \text{CPI-X}) \pm Z$ <sup>34</sup>

or

$$R_t = R_{t-1} (1 + [\text{CGA} * \Delta\text{Cust}] + [\text{CPI-X}]) \pm Z$$
<sup>35</sup>

In which;

$P_{m,t}$  is the price for a prescribed market basket in time t;

CPI is the annual change in prices or price inflator/deflator;

X is the real reduction in prices that is imposed upon the regulated organisation;

Z is a cost passthrough variable;

$R_t$  is the authorised utility revenue for time t;

CGA is a customer growth factor which can be expressed in either absolute dollar terms or in percentage terms;

$\Delta\text{Cust}$  is the annual change in the number of customers (or the annual change in output).

<sup>34</sup> Applied when using a dollar basis for the customer growth factor.

<sup>35</sup> Applied when using a percentage basis for the customer growth factor.

Consequently for CPI-X incentive approaches to be implemented, the formulation of the control mechanism requires that the variables included in the formula be determined.

There are 3 generic sources of cost changes in a regulatory period with which price adjustment factors need to concern themselves. These are:

- cost inflation – external inflationary increases in the purchase price of inputs which the organisation uses in order to produce its output;
- productivity gains – whether from improved input productivity or growth; and
- cost passthrough – where the costs of external changes or shocks such as tax reform are passed through to customers.

### *Cost Inflation*

Traditionally, regulators have adopted the Consumer Price Index (CPI) as the inflator because it tends to be simple to apply and widely recognised and understood. Moreover, the regulated organisation cannot affect it, and it gives consumers clear and predictable signals about prices.<sup>36</sup>

As the CPI is primarily designed to provide input into income adjustment processes, it is based upon on a representative basket of products and services for household consumption. Nevertheless, despite limitations such as an inability to properly account for quality changes, it remains a recognised measure of inflation for wider macroeconomic policy management (although underlying CPI is preferred for this purpose). In addition, it is used widely for general indexation of public and private sector contracts and charges.<sup>37</sup>

Another concern is that the bundle of products and services used in determining the CPI may bear little resemblance to the inputs of the rail industry.<sup>38</sup> In the United States, a rail-specific cost inflator known as the Rail Cost Adjustment Factor (RCAF) is used for regulatory purposes by the Surface Transportation Board. However, there is no corresponding index in Australia, and even if there were, the small number of heavy haul railroads in Australia might compromise its efficacy.

### *The 'X' Factor*

The key design issue for both price-caps and revenue caps is the selection of X. X is the real (normally annual) reduction in price (or total revenue earned) by the regulated organisation. Often, when assigning an X factor to a regulated organisation, the focus is on quantifying anticipated efficiency improvement. However, in practice, a number of factors, beyond anticipated productivity improvement, could be considered in making an informed judgement about the quantum of X.

Indeed, it may be more useful to consider the X factor in the context of the underlying rationale for incentive regulation – which relates to providing incentives for the regulated organisation to improve its business. Often, investments in value adding initiatives and innovation that may be undertaken by a regulated organisation will have little to do with cost savings. For example,

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<sup>36</sup> Armstrong, et al (1995), *Regulatory Reform: Economic Analysis and British Experience*, p168, MIT Press: London.

<sup>37</sup> The ABS suggests that although the CPI is conceptually inappropriate for a large proportion of these applications, it does possess three features which satisfy the administrative requirements for indexation, namely, it is widely available, it is timely and it is not subject to revision.

<sup>38</sup> Kiss (1991) concluded that "...the experience of the telecommunications industry in the US has been that CPI provides a useful surrogate for the input price indexes of the regulated telecommunications carriers" (Kiss, F (1991) "Constant and Variable Productivity Adjustments for Price-Cap Regulation", in Einhorn, M.A (ed) *Price Caps and Incentive Regulation in Telecommunications*, p 102, Kluwer Academic Publications:USA).

one of the most significant ways in which a Rail Infrastructure provider might increase the value of its business lies in its capacity management. This is because an investment in improved capacity management which allows customers to reduce their above rail costs would not be reflected in a cost saving for the Rail Infrastructure provider. However, it may be desirable for such an investment to take place. If so, it could be necessary to ensure QR is provided with sufficient incentives to induce it to undertake necessary investment.

Accordingly, the issues that might be considered in quantifying an X factor include:<sup>39</sup>

- the gains and advantages realised by a regulated organisation from a more light-handed approach to regulation – such as greater price flexibility, and reduced transaction costs of regulation;
- the capacity of the regulated organisation to reduce costs without compromising customer service quality requirements;
- the opportunities available to the regulated organisation to increase the value of its business;
- the advantages and opportunities to encourage growth in the market;
- the ability of the organisation to finance its operations – X must not be set so tight that the organisation is unable to finance future investment requirements;
- the impact of asset valuation approaches, in particular the impact of optimisation, on realistic productivity improvement capabilities;
- the opportunities provided by the incentive environment for the regulated organisation to increase the value of its business (eg through reducing transit or cycle times);
- revenue smoothing over the regulatory period; and
- desired transitional paths, eg to allow a period of adjustment to new rates.

In translating anticipated cost savings to the determination of X (recognising the significance of the other factors mentioned above), regard should be had to the future scope for productivity improvements in the regulated organisation relative to productivity growth in the economy or industry as a whole. For example, consider a regulated organisation that is assessed as being operationally efficient, with input costs rising with CPI, and productivity growth in the industry is expected to grow at 2% per annum. In such a case, an X factor of 2 might be expected (at least to the extent that expected productivity growth determines the X factor).<sup>40</sup>

<sup>39</sup> Littlechild recognised the importance of judgement in setting the X factor stating that “...the precise figure is a matter for negotiation.”, see Littlechild, S.C (1983) “Regulation of British Telecommunications Profitability”, *Report to the Secretary of State, Department of Industry*. Similarly, Crew and Kleindorfer (1996) have suggested that reliance upon total factor productivity (TFP), a means of estimating productivity, for establishing X factors has been excessive and misleading. They contend that “...just because an economic quantity, TFP, can be measured does not make it appropriate to use for the purpose of setting X. This would be a very misguided policy. It would be better in this case to recognise the importance of judgement in determining the X factor.” See Crew, M.A and Kleindorfer, P.R (1996) “Price Caps and Revenue Caps: Incentives and Disincentives for Efficiency”, *Pricing and Regulatory Innovations under Increasing Competition*.

<sup>40</sup> Methods for determining the value of X can be divided between cost linked (ie an organisation specific standard) or cost unlinked (ie an industry or economy wide standard not directly related to the regulated organisation’s costs of operation) methods. In practice, the absence of an Australian industry standard for heavy haul rail operations means that there is no ready basis to apply a cost unlinked approach.

### *Cost Passthrough*

A cost passthrough allows (requires) a regulated organisation to increase (decrease) its price or revenue cap in response to an increase (decrease) in an input cost that is typically beyond the regulated organisation's control and is readily observable. Cost passthrough arrangements shift the risk associated with a specific input cost from the regulated organisation to the customer. However, because cost passthrough usually only applies to costs that are beyond the regulated organisation's control, the approach could be seen as a way to avoid regulated organisations being subject to windfall gains and losses.

The Office of the Regulator General (ORG) considers windfall profits (or losses) should be passed on to customers from the outset of the next price control period and is confident that doing so will not compromise long term efficiency incentives. The identification of these windfall profits (or losses) however could require significant regulatory intervention in the operations of the business as all relevant cost and revenue impacts need to be categorised as controllable or uncontrollable factors. This approach, if inappropriately applied, could increase regulatory risk and potentially lead to micro-management of the regulated organisation.

QR's proposed arrangements reserve a right for QR to revisit Reference Tariffs upon the occurrence of a Material Change Event. This term is defined to include changes in any aspect of the regulatory environment<sup>41</sup>, changes in taxes and changes of at least 1% in 10 year Treasury bonds (used as a proxy for the risk free rate).

QR's approach to Reference Tariffs provides for an escalation factor. One of the major factors affecting interest rate movements is the expected rate of inflation. If CPI adjustments form a component of the escalation factor for Reference Tariffs, then an issue arises as to whether the CPI will effectively take sufficient account of interest rate changes (despite a lag and the fact that many other factors can affect interest rates from time to time) to adequately protect QR against interest rate movements.

This raises the issue of what events should trigger a review of Reference Tariffs in the context of the wider regulatory framework.<sup>42</sup>

## **5.6 Sharing Efficiency Gains**

The essence of incentive regulation involves offering the regulated organisation an incentive to outperform the X factor as doing so will enable it to increase profitability. However, the incentive to outperform is likely to be undermined if the organisation believes its out-performance will be immediately returned to customers at the end of the period (especially if the regulatory review period is relatively short, eg QR currently proposes 3 years in its undertaking).

However, part of the desirability of incentive regulation stems from the fact that customers should ultimately share in any benefit of superior performance. Questions therefore arise as to:<sup>43</sup>

- the extent to which out-performance of the X factor benchmark should be shared with customers;
- the period over which it should be shared with customers; and
- the profile of the sharing arrangements.

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<sup>41</sup> In practice, a Material Change Event will only be triggered if QR reasonably expects it to result in QR materially exceeding its Revenue Limit or if QR notifies the QCA (eg where it is adverse to QR's interest).

<sup>42</sup> Refer Section 2 of this paper for an outline of QR's proposed Reference Tariff process.

<sup>43</sup> However, different considerations could apply to the extent that the determination of the X factor is based on providing a transitional phase for the removal of monopoly profits

There are several possible approaches that may be adopted to share the benefits of out-performance of X with customers, including:

- a glide path – gains are passed onto customers either entirely (full glide path) or partially (partial glide path) over time, thereby allowing the regulated organisation to realise profit benefits of efficiency gains for a period beyond the regulatory review period (eg the out-performance may be spread over the next regulatory review period);
- one-off reductions – gains in excess of those stipulated by X in the previous period are passed directly onto consumers in the development of new service prices at the commencement of the next price review; and
- gains maintenance – the full gains for each year are retained by the regulated organisation for a pre-specified time (eg 5 to 10 years) unconnected to any regulatory review whereupon gains are passed onto customers in a one-off or phased reduction.

In practice, there are many judgements to be made in applying a benefit sharing arrangement. This merely reflects the range of possible variations. For example, a glide path could incorporate a one-off reduction at the commencement of the following review period. It could return the benefit of out-performance over a long period (say, 10 years) or a shorter period (say, 5 years). The key issue to be considered is the trade-off between the passing on of benefits to customers in a reasonably timely fashion, against the risk of reducing the incentive for regulated organisations to pursue efficiency gains in excess of the X factor.

In addition, it might be expected that the approach adopted would have some impact on the regulated organisation's incentive to pursue efficiency gains at the beginning and the end of regulatory review periods. For example, where out performance is passed onto customers as a one-off reduction, the regulated organisation will have little incentive to invest in efficiency enhancements towards the end of any regulatory period.

Gains maintenance offers the regulated organisation a certain period to retain the benefit of any out-performance it achieves. One advantage of this approach is that it may reduce the incentive for regulated organisations to defer the pursuit of cost savings until the beginning of the next regulatory review period.

The Office of the Rail Regulator (ORR) in the United Kingdom favours use of a glide path approach in order that incentives to reduce costs and improve efficiency are consistent across the control period. The Office of the Water Regulator (OFWAT) also favours a glide path mechanism whereby the regulated organisation retains the full benefit of its out-performance during the current control period, after which it is transferred to customers over the next ten years. IPART has favoured a combination of a glide path with a one-off adjustment. The ORG and the Office of the Electricity Regulator (UK) do not favour glide path mechanisms.<sup>44</sup>

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<sup>44</sup> Under the current price control arrangements the Office of the Electricity Regulator (now the Office of Gas and Electricity Markets) does not have an efficiency sharing mechanism (although error correction mechanisms or cost passthrough is allowed under some circumstances). However, at vesting, the Government put in place initial price controls on the electricity businesses for a period of 5 years. Over the period of these initial controls, it became apparent that the electricity businesses were able to cut their costs and increase profits to a degree much greater than expected. OFFER subsequently introduced revised distribution price controls for England and Wales in 1995 and 1996 which required cuts in real terms of 11-17% in 1995-96 and further reductions between 10-13% in 1996-97. Thereafter, charges were required to fall by 3% pa in real terms for the duration of the price control period (until March 2000).

## 5.7 Request for Comments

The Authority seeks comment on:

- whether rate-of-return regulation, benefit sharing plans or incentive regulation should be applied to QR's Reference Tariffs;
- if incentive regulation is implemented, are price-caps or revenue-caps preferable;
- if revenue caps are preferred, should an unders and overs process be incorporated into the regulatory environment;
- the appropriate methodology for establishing the inflator/deflator and the X factor;
- whether cost passthrough should be allowed, and if so, for what costs;
- the appropriateness of QR's proposed triggers for a review of Reference Tariffs;
- if CPI adjustments form a component of the escalation factor for Reference Tariffs, whether a change in interest rates should trigger the Material Change Event (ie over time, would CPI adjustments take sufficient account of interest rate changes, despite a lag);
- whether efficiency gains should be shared, and if so, the best method for sharing those gains with customers.

## 6. THE ROLE OF A PERFORMANCE REGIME

Whilst the application of any regulatory framework aims to, among other things, encourage regulated organisations to operate more efficiently, the value to users of the regulated organisation's products will depend upon the quality of the service that is provided.

A complicating factor in the case of QR's business relates to the interaction between rail and other links in the coal chain. Improving the efficiency of the rail system in isolation of its interaction with other elements of the transport chain, such as port infrastructure, could result in perverse outcomes. It is therefore desirable for the regulatory framework to provide incentives to encourage all participants in the transport chain to maximise the efficiency of the chain *as a whole* rather than each participant's individual element. Part of this process involves ensuring that prices reflect the full economic cost of actions on the coal chain.<sup>45</sup> However, in the context of QR's draft undertaking, attention may, at least initially, be more appropriately focussed on the quality of service QR provides to its customers.<sup>46</sup>

### 6.1 Service Quality

Trade-offs between costs and service quality are an important element of a regulated organisation's decision making. However, any regulatory approach constraining price or revenue could encourage regulated organisations to cut costs by reducing the quality of the services it provides.

Ideally, customers should be able to choose their quality of service by being able to assess alternative price-service quality options that are available. Such an approach helps to ensure that QR does not achieve cost savings by reducing the quality of its service.<sup>47</sup>

QR's draft undertaking highlights two intertwined aspects of service quality:

- Train Technical Characteristics, which refer to the characteristics of the Reference Train Service (eg axle-load, gross tonnage, speed etc); and
- Train Operational Characteristics, which refer to matters such as service reliability or the consistency with which QR delivers Reference Train Services.

<sup>45</sup> That is, it would be ideal if enhancements to the rail network could be assessed from the perspective of the overall efficiency and performance of the coal chain. However, in practice, such a framework requires that other participants be provided with incentives from a similar perspective. Clearly, this is beyond the scope of QR's draft undertaking, although it is important that it be consistent with such an outcome.

<sup>46</sup> As one submission to the QCA concluded:

"The two essential ingredients of an efficient and competitive rail service are below track performance and above track performance. Unlike other modes, rail operators pay a substantial proportion of their operating costs in access charges, which ultimately are reflected in rail freight rates. Accordingly, rail operators are entitled to expect commitments from track owners about track standards (or corridor performance). This means:

- Guaranteed corridor performance linked to allocated network entry and exit times.
- Performance measurement based on "standard train" modelling.
- Meaningful track access rebates for failure to meet measured performance standards.
- Return all track access charges to improving track performance under a transparent system involving consultation with rail operators.
- No surcharges or additional costs for operating standard trains on standard running times.
- Incentives for efficient trains in the form of concessional track access charges and priority for path allocation, to reflect the lower cost to the system of managing efficient trains."

<sup>47</sup> For example, there is an important distinction between reducing maintenance costs through better focussing the maintenance program in a way that does not affect safety, train speed etc as opposed to arrangements that cause a level of deterioration that adversely impacts on the performance of the network.

Reliability in service provision by QR is central to a third party operator's decision to invest in order to enter the above-rail market. However, assessing the reliability of service delivery is complicated by the fact that many aspects may impact upon QR meeting its commitments, including the decisions and actions of shippers, port authorities and above-rail operators. This also complicates any performance regime that incorporates reporting of performance measures and financial compensation.

For example, the presence of numerous trains on the network complicates any monitoring of service quality since the reliability of services at any point in time depends not only on QR's actions but also the actions of all participants in the coal chain. In a rail network, one party's actions are likely to have flow-on effects, especially where below rail capacity is constrained. These effects tend to impose costs upon other users through reduced service reliability (eg longer cycle times, greater variations to departure, arrival and transit times, etc).<sup>48</sup>

Each participant in the coal chain might therefore adversely affect the efficiency of the network, service reliability and consequently the financial viability of other participants within the coal chain.<sup>49</sup> However, it should be noted that QR cannot feasibly be held accountable for delay risks imposed on the coal chain by the actions of parties outside the undertaking process (eg port unloading times and bottlenecks). In the context of QR's operations, apportioning failure to meet these commitments may be difficult in practice due to the complex nature of managing the network, limited observability and with numerous parties potentially affecting outcomes. Therefore, any arrangements devised to address efficiency and financial implications associated with delays may have to, at least initially, focus on those organisations explicitly linked through the undertaking process.

Consequently, a regulatory framework is arguably incomplete without:

- performance reporting arrangements that provide some transparency to network service quality, and in turn, an incentive for all parties to maintain appropriate service reliability<sup>50</sup>; and
- performance regimes that incorporate financial compensation arrangements.

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<sup>48</sup> A recent report by the National Economic Research Associates (NERA) into rail infrastructure charges for the European Commission identified that disruption costs to Train Operators from congestion are likely to vary significantly between different parts of the rail network, and between different times of the day or week. However, it is not clear that this concern is as relevant to QR's coal traffic, which might be expected to display greater homogeneity than the traffic examined in NERA's report. In addition, the fact that infrastructure charges should only cover delays caused to other operators' services means the impact on charges will also vary between markets and between operators, depending on the number of train operators and their respective market shares. NERA therefore concluded that it is difficult, if not impossible, to include disruption costs within a structure of charges based on published tariffs, and as such that disruption cost should be reflected as part of a separate performance regime. The Office of the Rail Regulator (see Appendix 5) has applied this type of regulation in the UK.

<sup>49</sup> To increase the efficiency of below rail service provision and the coal chain, it is essential that price signals reflect the full system or network costs of consuming services in the chain. This will ensure that shippers (ie those that demand rail transport) make cost effective economic decisions about the allocation of resources, the use of different coal chain units and the augmentation of infrastructure (whether this be stockpiles, loaders, or rail infrastructure).

<sup>50</sup> Addressing this concern within the rail industry is difficult due to existing institutional arrangements between upstream and downstream components of the chain. It may be possible for a series of multilateral contracts with various above rail operators to be structured to ensure appropriate recompense for delays imposed on the operation of the network by above rail operators and/or QR, thereby ensuring that the full cost of actions are borne by the appropriate party. However, the extension of this to include upstream shippers (eg coal mines) and downstream receivers (eg ports) is clearly beyond the scope of the assessment of QR's draft undertaking.

## 6.2 Public Reporting

Normally performance regimes include the publication of information on performance and service quality. This has been recognised by ORG, which regularly publishes reports on high level financial information and comparative service performance information for participants in the electricity and water industries. For example, the public reporting of service performance includes:

- reliability and quality of supply - average minutes off; customer interruption frequency; customer interruption duration; and performance of feeders.
- affordability - price and charges; consumption patterns; instalment plan availability; refundable advances; CSO's; concessions; energy relief grants; and disconnections.
- customer service - guaranteed service levels; and customer complaints.

OFWAT has also recognised the importance of making information public. OFWAT publishes annual reports setting out the performance of regulated organisations against specified service quality standards, efficiency benchmarks and financial indicators, including capital investment.

QR's draft access undertaking does not envisage public reporting on its service quality performance. However, submissions to the QCA suggested that information pertaining to quality of service and performance measurements should be included as part of the access undertaking.

## 6.3 Performance Regimes

There are three broad forms of performance regime that could be utilised as part of the regulatory framework for QR:

- QR could be required to publicly report (perhaps with an independent audit) on defined measures of service quality on an ongoing basis (as discussed above);
- QR could be required to provide access rights incorporating financial compensation arrangements for those affected by non-compliance;<sup>51</sup>
- an explicit measure of quality could be included in the price control mechanism (ie embodied within the form of incentive regulation adopted) such that QR could retain efficiency gains subject to satisfactory performance in service quality.

Each mechanism requires the development of a performance regime which incorporates a set of performance measures based on the observable dimensions of QR's performance and reasonable benchmark performance levels. A key issue in any performance regime is to specify the indicators that should be reported or give rise to compensation claims.

The development of a performance regime which incorporates a set of performance measures based on the observable dimensions of QR's performance and reasonable benchmark performance levels, has a number of potential advantages, including:

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<sup>51</sup> Compensation requirements could also apply to above rail operators where disruptions to the system are caused by failure to achieve schedule departure times and/or equipment failure (locomotives and rollingstock). These could be structured such that 'back to back' payments for disruption caused by others would accrue to QR.

- increasing transparency, revealing information about the extent and cost of disruption on the network, especially where infrastructure managers benefit from deferring investment on congested networks. This information can assist infrastructure managers to prioritise their maintenance and investment;
- it could provide a vehicle for ensuring that infrastructure managers (and possibly users) pay compensation for delays to train operators they cause.

The issue of whether compensation should become payable for the Rail Infrastructure provider's faults cannot be considered in isolation of the pricing structure and wider regulatory framework. For example, it is unreasonable to impose a compensation scheme without some recognition of the risk it imposes on pricing arrangements.

However, the key benefit from a compensatory regime lies in the assignment of responsibility to the person or organisation that can ameliorate the adverse consequences. Without such an assignment of responsibility, there is a risk that ameliorating the adverse consequences of network management will not receive the priority it otherwise might.

A further issue to be addressed concerns the specification of the level of compensation that would apply where QR's performance surpasses or falls short of established benchmark performance levels.

#### **6.4 Request for Comments**

**The Authority seeks comment on:**

- **whether a performance regime should be developed;**
- **what service quality elements should be incorporated in a performance regime;**
- **what publication of performance monitoring and reporting should occur;**
- **whether financial compensation, and the resulting price increases to compensate for the risk, should form part of the performance regime; and**
- **how should the outcomes of coal chain participants outside the undertaking process (eg ports) be incorporated within a performance regime.**

## 7. FURTHER ACTION

The establishment of Reference Tariffs is complicated by the fact that it may be an interactive process. Customers are likely to want to know the pricing implications of various alternative levels of service quality (or specifications of access rights) before settling on the “benchmark” arrangements for the establishment of Reference Tariffs.

Given the importance and complexity of many of the issues raised in this paper, it may be desirable if further consultative processes are undertaken (ie in addition to written responses from interested parties).

The QCA’s preference is that the appropriate specification of the Reference Train Services and Reference Tariffs have regard to existing industry practices, as well as to the costs and benefits of alternative specifications in the context of the coal chain as a whole. In this regard, the QCA is interested in ascertaining whether it is desirable for further consultative processes to be undertaken to assist in the identification of the most appropriate “benchmark” arrangements.

### 7.1 Request for Comments

**The Authority seeks comment on:**

- **any mechanism by which all relevant parties can reach a consensus on the specification of Reference Train Services and Reference Tariffs.**

## APPENDIX 1

### Current National and International Rail Access Pricing Practices

#### *Great Britain*

Regulation of the rail network in Great Britain owned by Railtrack is the responsibility of the Office of the Rail Regulator (ORR). ORR approves the terms, including charges, on which Railtrack provides access to track, stations and light maintenance depots.

The regulatory environment in Great Britain is principally concerned with ensuring competitive access to Railtrack infrastructure for three main groups of above rail operators:

1. Franchised Passenger carriers (by far the largest group of above rail carriers and substantially funded by the Government);
2. Open Passenger or Non-Franchised Passenger carriers; and
3. Freight carriers.

The regulatory environment consists of two key access pricing approaches:

- An ‘administered regime’ which imposes a revenue cap on the access charges which Railtrack levies on franchised passenger carriers.
- A ‘negotiated’ demand-based differential pricing regime for non-franchised (open) passenger services and freight carriers.

#### *Passenger Franchise Access Charges*

Charges for access rights are based on an “administered regime”, whereby a revenue cap is imposed on Railtrack. The revenue cap is the total amount of revenue Railtrack requires to carry out its activities taking account of the scope for efficiency savings and a sufficient return on capital to allow the organisation to finance its activities.

The cap or ‘control total’ aims to recover all of Railtrack’s costs that are not covered by expected contributions from non-franchised services (i.e open access passenger and freight services) or from other revenue services (eg property). The residual is expressed as the aggregate amount to be paid by franchised passenger operators for access to track and stations and is identified as the “control total”.<sup>52</sup>

Franchise passenger train operating companies (TOC’s) are able to negotiate additional access over and above the initial quantum subject to Railtrack setting an access charge which covers the marginal cost of that entry.

The “control total” or alternatively the access charge levied on passenger operators is divided between fixed and variable costs.<sup>53</sup> Variable costs are based on the short run marginal cost (SRMC) of track

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<sup>52</sup> Railtrack estimates its total future revenue requirement from which is deducted anticipated income from unregulated activities and access charges expected to be paid by open access passenger and freight operators. The resulting figure, the control total, is the sum which the Franchising Director underwrites. When bidding for franchises, franchisees will be advised of the associated variable costs and Railtrack’s allocation to them of joint and fixed costs which will be fixed in the short-medium term. The Franchising Director therefore underwrites the great majority of the costs associated with having a national rail network.

<sup>53</sup> Office of the Rail Regulator (1994) *Framework for the Approval of Railtrack’s Track Access Charges for Franchised Passenger Services: A Consultation Document* and Gibson, S (1998) *Existing Structure of Charges: Structure of Rail Track Access Charges ORR and Railtrack Seminar*.

usage<sup>54</sup> and a charge for electric current used for traction. The fixed charge is made up of a long run marginal cost (LRMC)<sup>55</sup> element and a residual or unallocated common cost element distributed between various operators on the basis of a fully-distributed cost rule.

The LRMC reflects the long run costs of maintaining and renewing the infrastructure that can be attributed to an individual TOC. “They are calculated on a ‘last on’ basis by estimating the cost of the modern equivalent infrastructure needed to support the services run by an individual TOC.”<sup>56</sup>

The common costs are those costs which are incurred by Railtrack in operating and maintaining the railway infrastructure but which cannot be allocated to a specific TOC. These costs are allocated on a sub-national (on a planned vehicle mile basis) and national level (on an anticipated revenue basis) to minimise cross-subsidisation between regional and national carriers. Consequently, ORR requires Railtrack to apply a form of Fully Distributed Costing (FDC) pricing for access to the rail network.<sup>57</sup>

Individual access agreements contain RPI-X price controls. The RPI-X control constrains increases in Railtrack's track access charges to a specified level of X below the rate of inflation as measured by the retail price index (RPI).<sup>58</sup>

The RPI-X control applies only to Railtrack's franchised passenger service access charges. Controlling Railtrack prices gives it an incentive to expand output to earn increased revenue for as long as additional revenue is greater than the additional costs it incurs.

#### *Open Passenger Access Charges*

Non-franchised passenger services fall under a negotiated charges regime. The structure of charges is such that:

- They pay at least the avoidable cost or SRMC associated with their service (ie a floor which prevents cross-subsidisation); and
- Contribute to Railtrack's common/joint costs differentially, reflecting the value of the rail infrastructure to each individual user, subject to avoiding unfair discrimination between operator's in the same end-market.<sup>59</sup>

#### *Freight Service Access Charges*

To support a negotiated access charge regime, ORR has established a number of general principles which Railtrack is to apply in the determination of access charges for freight services:

1. Charges should be greater than or equal to the avoidable costs or SRMC incurred by Railtrack as a direct result of carrying that particular freight flow. “The general principles that are to be adopted in the calculation are:
  - the cost floor for each flow should include only those costs which are avoidable to that specific flow;

<sup>54</sup> Short run marginal costs are the additional costs associated with the production of another unit of output assuming at least one input (such as capital) is fixed - ie there is no allowance for capital charges.

<sup>55</sup> Long run marginal costs are the additional costs associated with the production of another unit of output assuming that no inputs are fixed input (ie short run marginal cost and an allowance for the capital costs associated with an additional unit of output).

<sup>56</sup> Office of the Rail Regulator (1994) *Framework for the Approval of Railtrack's Track Access Charges for Franchised Passenger Services: A Consultation Document*.

<sup>57</sup> Office of the Rail Regulator (1994) *Framework for the Approval of Railtrack's Track Access Charges for Franchised Passenger Services: A Consultation Document*.

<sup>58</sup> RPI is the equivalent of CPI.

<sup>59</sup> The implication is that Railtrack is ultimately restricted in differential pricing practices in the same end market.

- avoidability should be assessed over an appropriate timescale, particularly for flows which are likely to be short-lived; and
  - the cost floor for each flow should exclude costs which Railtrack will continue to incur even if that flow leaves the network.” (Office of the Rail Regulator, p33, 1995).
2. Charges should be less than or equal to the standalone cost that would be incurred by a notional efficient competitor.<sup>60</sup>
  3. Charges should not be higher or lower, after allowing for specific factors relevant to each case, than those for other operators or users to such an extent that they risk significantly distorting competition between rail freight operators or users.
  4. The structure of charges should broadly reflect the value to the user of access to the rail network, and should enable Railtrack to recover its total freight-specific costs plus any expected contribution to the shared common costs of its passenger and freight services.

### ***United States of America***

The economic regulation of surface transportation is the responsibility of the Surface Transportation Board (STB), which adjudicates disputes and regulates interstate surface transportation, including railroad rate and service issues.

The structure of the US rail industry is characterised by privately owned vertically integrated organisations subject to regulation only in the presence of ‘captive shippers’. However, these organisations are bound by common carrier obligations to provide rail services upon request.

Generally, rates and service terms are established by commercial contract and are therefore not subject to STB regulation. Voluntary unregulated contracts have also been established for the provision of:

- ‘trackage rights’ (whereby one rail operator for a fee gains access to the network of another operator); and
- ‘interswitching or interlining rights’ (where one railroad hands-over its traffic to another at the point at which the two railroads meet.)

The economic regulation of the US rail industry focuses on two key issues:

- rate reasonableness; and
- competitive access cases.

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<sup>60</sup> It should be noted that SAC in the British case does not apply to the technical definition of SAC and as such should not be confused with actual Stand Alone Costs. ORR’s assessment of standalone costs are based on several broad principles (see Office of the Rail Regulator (1995) *Framework for the Approval of Railtrack’s Access Charges for Freight Services: A Policy Statement*, England):

- it should use specific data where possible, rather than relying on a single national average;
- it should relate to the costs of a notional efficient competitor, and should therefore exclude costs which reflect inefficiency;
- it should take account of the opportunities for the notional efficient competitor to attract traffic from other existing freight flows; and
- standalone costs should be based on the costs of operating the line in question and not a new facility.

### *Rate Reasonableness Complaints*

The Board has jurisdiction to adjudicate complaints challenging the reasonableness of a railroad's common carriage rates where the railroad has market dominance over the traffic involved. Market dominance refers to an absence of effective competition from other rail carriers or intermodal competition for the transportation to which a rate applies.<sup>61</sup>

Under the *Interstate Commerce Act*, the STB is charged with protecting individual “captive shippers” from unreasonably high and unfair rate levels. In assessing rate reasonableness, the Board acknowledges that because railroads serve a mix of competitive and captive traffic, a carrier cannot recover an equal portion of unattributable costs from all traffic without pricing off the network shippers that can cover their own avoidable costs and hence make some contribution towards unattributable costs. Accordingly, US rail regulation has adopted Ramsey pricing principles<sup>62</sup> as the cornerstone of its rate reasonableness tenets for the railroad industry (established in *Coal Rate Guidelines 1985*).

The Coal Rate Guidelines – Nationwide were developed by the Interstate Commerce Commission (ICC) and have since been adopted by the ICC's successor, the STB. The Coal Rate Guidelines set out a framework for constraining rail carriers' rates for the transportation of market dominant coal traffic. The maximum rate guidelines for the transportation of coal are based on what the and the STB have termed Constrained Market Pricing (CMP) principles.

The objectives of CMP can be simply stated.

“A captive shipper should not be required to pay more than is necessary for the carrier(s) involved to earn adequate revenues. Nor should it pay more than is necessary for efficient service. A captive shipper should not bear the costs of facilities or services from which it derives no benefit. Responsibility for payment for facilities or services which are shared (to its benefit) by other shippers should be apportioned according to the demand elasticities of the various shippers.”<sup>63</sup>

There are a number of individual components to this statement on CMP objectives, including differential pricing, stand-alone costs, revenue adequacy and management efficiency. These concepts are discussed below.

#### Differential Pricing

The ICC suggested that the cost structure of the railroad industry, i.e declining average costs associated with economies of scope, scale and density, necessitates differential pricing of rail services. The notion of unattributable costs, which occur as a result of the variance between marginal costs and average costs, gives rise to the need to cover total costs through differential pricing. The ICC indicates that any means of allocating costs among shippers other than on market demand (i.e differential pricing) is arbitrary and may not permit a carrier to cover all of its costs.

In its decision the ICC acknowledged the importance of Ramsey Pricing expressing that if applied to the railroad industry Ramsey pricing would permit an efficient carrier to cover all of its costs (including the cost of capital) and thus become revenue adequate. However, the imposition of Ramsey pricing as a regulatory requirement is not considered practical. As an alternative to pure Ramsey

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<sup>61</sup> The STB will only find that a carrier has market dominance over a movement if the rate charged results in a revenue-to-variable cost percentage that is less than 180%. (Surface Transportation Board, Annual Report 1998)

<sup>62</sup> Under Ramsey pricing principles, a railroad should price its traffic differentially so as to recover a greater percentage of its unattributable costs from the traffic with a greater dependency on its service. It is suggested however that US authorities apply the terminology of Ramsey Pricing to justify market-based differential pricing practices, as noted in Ex Parte # 347 (1981, p8) “...we (ICC) agree that differential pricing is an important tool in assisting the railroads toward revenue adequacy.”

<sup>63</sup> The Interstate Commerce Commission (1985) Coal Rate Guidelines, Nationwide (Ex Parte No. 347 (Sub-No. 1)), p523.

pricing carriers are expected to use the market demand they observe as the basis for their pricing practices without reference to explicit demand elasticities.

### Stand-Alone Costs

An important feature of CMP principles is that a captive shipper should not bear the costs of any facility or service from which it derives no benefit (ie cross-subsidisation should be eliminated). One means of assuring that such cross-subsidisation does not occur is the ‘stand-alone cost’ (SAC) test. This test is used to compute the rate a competitor in the market place would need to charge in serving a captive shipper or a group of shippers who benefit from sharing joint and common costs. A rate level calculated by the SAC methodology represents the theoretical maximum rate that a railroad could levy on shippers without substantial diversion of traffic to a hypothetical competing service. It is in other words, a simulated competitive price.

The ICC and STB recognise that a stand-alone facility would, in reality, seldom be constructed. However, by identifying the costs that would be incurred if it were, an appropriate rate cap can be determined. “In this way, railroads functioning in a non-competitive market will be required to price as if alternatives to their services were available. That is, their rates will be judged against simulated competitive prices”.<sup>64</sup>

The Coal Rate Guidelines view the purpose of a SAC test as to determine the least cost at which an efficient competitor could provide the service, because by doing so it is stimulating the competitive price for the market.<sup>65</sup>

### Revenue Adequacy

By Statute the former ICC and current STB are directed to assist rail carriers in attaining revenues that are “adequate, under honest, economical, and efficient management, to cover total operating expenses, including depreciation and obsolescence, plus a reasonable and economic profit or return on capital employed in the business”.<sup>66</sup>

The revenue adequacy standard provides a constraint on total revenue earnings or an overall revenue cap. According to the ICC “...revenue adequacy ... represents a reasonable level of profitability for a healthy carrier. It fairly rewards the rail company’s investors and assures shippers that the carrier will be able to meet their service needs for the long-term. Carriers do not need greater revenues than this standard permits, and we believe that, in a regulated setting, they are not entitled to any higher revenues. Therefore, the logical first constraint on a carrier’s pricing is that its rates not be designed to earn greater revenues than needed to achieve and maintain this ‘revenue adequacy’ level. In other words, captive shippers should not be required to continue to pay differentially higher rates than other

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<sup>64</sup> The Interstate Commerce Commission (1985) Coal Rate Guidelines, Nationwide (Ex Parte No. 347 (Sub-No. 1)), p542.

<sup>65</sup> The Interstate Commerce Commission (1985) Coal Rate Guidelines, Nationwide (Ex Parte No. 347 (Sub-No. 1)), p535. The Guidelines do not provide a precise formula for the calculation of SAC although the primary factors that must be considered in a SAC presentation are identified as follows:

- the plant should be of optimal size, designed to minimise construction and operating costs and/or to maximise the carriage of profitable traffic. For instance, in selecting the route of a SAC railroad, an overriding factor may be the effort to lower costs by taking advantage of economies of density. Generally, a SAC railroad should attempt to fully utilise plant capacity;
- the revenue contribution from other shippers to the stand-alone facility should be based on current revenue contributions;
- the valuation of assets comprising the investment base should be based on depreciated current cost and applying the current nominal cost of capital to the investment base to compute the return on investment.

<sup>66</sup> The Interstate Commerce Commission (1985) Coal Rate Guidelines, Nationwide (Ex Parte No. 347 (Sub-No. 1)), p536.

shippers when some or all of that differential is no longer necessary to ensure a financially sound carrier capable of meeting its current and future service needs.”

### Management Efficiency Constraint

The above revenue adequacy requirement is predicated on the “honest, economical and efficient management” of the company. Therefore, under the management efficiency constraint of CMP the ICC aims to protect captive coal shippers from bearing the costs of any demonstrated carrier inefficiencies.

There are several forms of efficiency:

1. operating efficiency - captive shippers should not be made responsible for eliminating any portion of the revenue need shortfall associated with demonstrated operating inefficiencies.
2. efficient plant scale - the current rate of return required for revenue adequacy assumes that all assets in the carrier’s investment base are fully productive. However, some assets may in fact not need to be maintained. Captive shippers should not be asked to pay rates which assume that these assets will be replaced and thus provide funds which may not in fact ever be needed. This conforms with the general principle that captive shippers should not pay for facilities from which they clearly derive no benefit (i.e cross-subsidisation).

To account for this, it is necessary to estimate that portion of the revenue shortfall which results from the transportation of freight at rates less than the long-term attributable (hence avoidable) cost of providing the service. The LRMC<sup>67</sup> is the economic measure of the long-term attributable cost of each service. Railroads can eliminate this portion of the shortfall by raising the rates on that traffic to cover LRMC, reducing/discontinuing the service as the assets wear out or reducing the assets attributable to that traffic. In any case, captive coal traffic should not, as a general matter, be held solely responsible for eliminating such avoidable shortfall.

3. short-run and long-run pricing efficiency - it is recognised that pricing considerations differ for short run and long run efficiency. Both the LRMC test and the SAC test are directed at long-run efficiency (ie they provide a rate cap). Under CMP, the efficiency of the carrier’s short-run pricing actions (ie given existing plant scale) are also considered. In the short run, many investments are sunk and produce costs which are fixed or invariant with respect to the level of service produced. So long as rates are above the SRMC, they make some contribution to the going concern of the company. Thus, in the short run, it is efficient for the carrier to price below LRMC that traffic which would otherwise be lost (ie short run efficiency provides a rate floor). That traffic need only cover its SRMC in order to be consistent with CMP minimum rate standards

CMP establishes constraints on the pricing freedom of railroads inducing them to price all traffic efficiently. Services are to be priced according to market demand and to cover only the total costs of an efficient carrier. CMP provides two approaches for determining the revenue requirements of an efficient carrier:

- they can be calculated for the existing carrier on a system-wide basis by applying the revenue adequacy and management efficiency criteria; or
- they can be hypothesised using a potential SAC system.

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<sup>67</sup> LRMC consists of all operating and capital costs directly associated with moving that traffic, but none of the unattributable costs. Baumol and Willig provide an operational definition of LRMC for the rail industry (ICC, 1985, p538):

“The marginal cost of a service is the additional cost that would be incurred in supplying an additional unit, or the saving in total cost that would be made possible by supplying one less unit. As such, the marginal cost of a rail service is the per-unit opportunity cost to the rail carrier of the service. Here the term ‘opportunity cost’ refers to the value a resource can contribute if it is used in some alternative occupation instead of the one to which it is currently assigned by the railroad.”

CMP allows total unattributable costs to be defined and focuses railroad's cost recovery effort on the traffic which can reasonably be expected to pay those costs. At that point, market forces will largely determine the share of the costs to be borne by each shipper. The result of this process is a rate structure which reflects LRMCs, demand elasticities, and the differential pricing of unattributable costs. Thus in spite of the lack of mathematical precision in CMP, it is expected to yield rates similar to those produced by Ramsey pricing.

### *Competitive Access*

Competitive access is the commencement or preservation of railroad services to a particular shipper or group of shippers by more than one railroad. Access rights and access pricing are generally an outcome of commercially determined contractual arrangements. Consequently, clear guidelines as to pricing methodologies are not readily obtainable.

In competitive access cases a bottleneck facility owner is obliged under common carrier requirements to establish rates and routes to move a shipper's traffic from origin to destination and to interchange traffic if doing so is required to complete the transportation.

Dissatisfied shippers can seek "access relief" through competitive access rules where commercial negotiations fail. Three competitive access remedies are prescribed by the STB:

- prescription of alternative through routes more acceptable to the shipper and which prove to be more efficient and effective than those stipulated by the carrier i.e a shipper is entitled to identify alternative routes for shipping products which may improve the cost efficiency of those shipment movements;
- reciprocal switching services in which a bottleneck carrier, for a fee, transports the cars of the non-bottleneck carrier over its lines to destination, thereby permitting the non-bottleneck carrier to establish single-line rates for customers to which it does not have direct access; and
- terminal trackage rights which provide full access, for a fee, permitting the non-bottleneck carrier to provide services over the lines of the bottleneck carrier and thereby complete its own single-line services.

In reciprocal switching and trackage rights cases, the STB focuses primarily on costs, in addition to other information, to establish compensation levels where access has been granted but carriers cannot agree on compensation. The Railroad Accounting Principles Board (RAPB) asserts that these costs are the incremental costs associated with the additional use of specifically identified facilities and services. The RAPB continues in its Railroad Accounting Principles Report (1987)<sup>68</sup> to recommend that:

"... that incremental costs are relevant in competitive access cases. Costs that would not have been incurred without the origin or destination switching of the line-haul railroads traffic are avoidable costs of reciprocal switching. Similarly, costs that would not have been incurred without the movement of the tenant's trains over joint tracks are avoidable costs of trackage rights.

Incremental competitive access costs are necessary as a floor for compensation levels, but they may be insufficient as a ceiling for compensation levels. This insufficiency is due to the presence of common fixed costs which are not causally separable among participants in a competitive access arrangement and the need to set rates above cost in specific situations.

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<sup>68</sup> The RAPB was created by the Staggers Rail Act 1980 to (1) establish a body of cost accounting principles to serve as the framework for implementing the regulatory provisions in which cost determination plays a vital role and (2) to make administrative and legislative recommendations it deems necessary to integrate the principles into the regulatory process. According to the Staggers Act, the former ICC and now STB must implement and enforce the RAPB's Principles through rulemaking processes.

Common fixed costs are costs the landlord or switching railroad may incur for activities, plant, or equipment from which the line-haul railroad (in the case of reciprocal switching) or the tenant railroad (in the case of trackage rights) derives benefits but which would be incurred at the same level regardless of whether competitive access was granted.

Competitive access compensation levels may be set by the ICC so that, in addition to each participant bearing its incremental costs, common fixed costs are shared among the beneficiaries. Such compensation levels would represent an effort by the ICC to provide for the recovery of common fixed cost which, although invariant, must be recovered if the provider of competitive access services or facilities is to survive. Establishing such compensation levels would require allocation of common fixed costs....Allocation of common fixed costs ...is not addressed by the RAPB...the fact that allocation of common fixed costs is not addressed does not preclude the ICC, however, from selecting particular allocation approaches to establish compensation levels ...cost assignments based on direct observation and engineering analysis are normally preferred to those based on average costs.<sup>69</sup>

### ***NSW Rail Access***

The NSW approach to access pricing is similar to the international experience identified above. The main features of the regime are:

- negotiated access prices, for non-coal shippers, subject to satisfying a “Baumol floor/ceiling band” which defines the price parameters within which the Rail Access Corporation may offer access;
- prices for coal haulage:
  - are established on an origin-destination specific haul basis, irrespective of the operator, and irrespective of the route of the haul; and
  - will vary according to which one of a number of categories the origin-destination haul falls<sup>70</sup>.

#### *“Baumol Floor/Ceiling Band”*

The floor/ceiling (or Constrained Market Pricing) approach to price regulation sets a band within which prices can be negotiated. This approach has two overarching purposes:

- the ceiling is based on stand alone costs and aims to prevent the regulated organisation extracting monopoly profits; and
- the floor is based on avoidable costs and aims to ensure that prices are not set so low that some rail operators do not pay for the costs of the services they use.

In this regard the NSW Access regime requires that:

- revenue from every Rail Operator or group of Rail Operators must at least meet the direct cost imposed by that Rail Operator or group of Rail Operators; and for any line section or group of line sections, the full incremental costs, including incremental fixed costs, must at least be met by revenue from the Rail Operators of this section (the ‘floor test’); and
- for any Rail Operator or group of Rail Operators, revenue must not exceed the full economic costs of the infrastructure required by that Rail Operator or group of Rail Operators on a stand alone basis (the ‘ceiling test’).

<sup>69</sup> RAPB (1987) *Railroad Accounting Principles: Final Report: Vol 2 – Detailed Report*, p72, USA.

<sup>70</sup> Category 1 mines pay prices to the ceiling plus a monopoly rent or adjustment component reflecting coal royalties; Category 2 mines pay a price between the ceiling and the floor; Category 3 mines pay a price at the floor.

Following the National Competition Councils's assessment of the NSW Rail Access regime the NSW Government requested IPART to review the access pricing principles.<sup>71</sup> IPART has recently released its Final Report on Aspects of the NSW Rail Access Regime, which will automatically be incorporated within the Access Regime. There is no departure from the legislated floor-ceiling framework detailed in the Regime (as this was not part of the terms of reference), however IPART has:

- provided revised definitions of the economic cost terms contained within the Access Regime, including direct costs, incremental fixed costs, fixed costs, full economic costs, full incremental costs and stand alone economic costs; and
- determined an appropriate maximum rate of return and the methodology for the asset base to which the rate of return will be applied.

### ***The Australian Rail Track Corporation***

The Australian Rail Track Corporation's (ARTC) pricing regime has been designed to recognise differing customer needs but to ensure predicability and transparency in the market place. The aim of the ARTC has been weighted in favour of pricing transparency in order to deliver consistency and reliability in the market with the goal of increasing rail transport's market share.

Access Charges are 'posted' and are applicable for contracted train paths which may fall into one of the following categories:

- long term (3-5 years)
- medium term (1-3 years)
- adhoc (1 year)
- spot (short-term offers to the market generally up to 3 months).

Access prices charges are based on a two-part tariff basis, consisting of a 'flagfall' component and a variable charge, where:

- the flagfall is a fixed component of the access charge (regardless of train size) determined by a combination of train type and market demand; and
- the variable charge is based on the number of gross tonne kilometres associated with the particular train operated by the customer.

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<sup>71</sup> The NCC as part of its certification noted a number of issues with the respect to access pricing under the regime:

- the 'Baumol Floor/Ceiling' approach may encourage Ramsey Pricing which, although theoretically sound, maybe impractical to implement because of information constraints;
- Ramsey Pricing could have the effect of introducing distortions in instances of common good production, such as coal, and thereby change the relative competitiveness of producers in the final market;
- the 'floor test' could work against RAC pricing access efficiently in some instances, such as where lines are underutilised.
- the coal pricing principles could forestall negotiation by allocating coal mines to categories which in turn relate to price ranges set by the RAC. The NCC has asked the NSW Government to give coal mines the right to negotiate access prices within the floor/ceiling range according to costs of service immediately.

Prices are published or 'posted' and are not subject to negotiation once established. They differ by line section and according to the train type. The charges are cost based.

### ***European Conference of Ministers of Transport – User Charges for Railway Infrastructure***

A recent round table of the European Conference of Ministers of Transport (ECMT) formulated a number of recommendations on the development of charges for access to rail infrastructure. The primary economic objective of user charging was highlighted by the ECMT as the need to encourage rational use of infrastructure. The ECMT concluded that appropriate infrastructure charges would ensure the economic value of the infrastructure will become clear through the amount of use made of it. The revenues generated from user charges will give a signal to infrastructure managers that will tell them if infrastructure development will be efficient. The network will thus be managed by demand instead of by subsidies.

The charging principles outlined by the ECMT to achieve this economic objective are indicated below:

- two-part tariffs should be adopted.
- SRMC pricing should be used as the variable component of the two-part tariff;
- SRMC should be adjusted to include congestion charges and externality charges. However where capacity is expanded to address capacity constraints the users of the infrastructure should face the LRMC of the capacity adjustments;
- infrastructure charges (or the fixed element of the two-part tariff) should be demand-based;
- incentives should be adopted for infrastructure managers to improve efficiency and to lower user charges in relative terms;
- charges should be transparent; and
- cross-subsidisation should be eliminated.

## APPENDIX 2

### Access Pricing Options

The following sections provide a brief overview of potential options for an access pricing structure.

#### *Efficient Pricing using Marginal Cost*

Two marginal cost concepts are generally used in the context of pricing:

- short-run marginal cost (SRMC) which measures the cost of increasing output when some production inputs are fixed (such as capital); and
- long run marginal cost (LRMC) measures the cost of increasing output when all inputs can be varied.

For an uncongested railway the SRMC would include costs such as:

- additional track wear and tear;
- any traction current provided to new services;
- a possible increase in signal operations costs as a result of having more trains to control;
- any additional train planning costs;
- any additional management and administrative costs directly related to that traffic; and
- any environmental costs associated with the traffic (even if they are not priced by the market). Environmental costs could include, for example, noise in a populated area.

Given the cost structure of a railway these marginal or variable costs are estimated to account for only a small proportion of total rail infrastructure costs. However, when a given network capacity becomes congested two further costs need to be incorporated within SRMC:

- disruption costs - these additional costs cover the costs of increased disruption to existing traffic; and
- opportunity costs - at higher levels of capacity utilisation, infrastructure managers will find that they cannot satisfy train operators demands for access. Initially this might mean that train operators are unable to obtain the train slots, or journey times they would like. While at extremely congested locations, it may mean that train operators are unable to access the network at all. In each case the opportunity cost (ie the net revenue foregone by the infrastructure manager) should be included in the SRMC thereby reflecting the true value of use of the infrastructure and subsequently ensuring the efficient allocation of capacity to highest value users.

Efficient infrastructure charges, based on SRMC, should include the opportunity costs arising when potentially profitable services are excluded from the network because of capacity constraints. With more than one operator wishing to use the network, however, the infrastructure manager will be responsible for allocating scarce capacity between competing operators. In theory infrastructure charges can provide a fair and efficient way of achieving this.

In a simplified case where there is only one remaining train slot available, and there are two train operators willing to pay more than the “physical” SRMC to use the path, the efficient infrastructure charge will exclude one, but not both, of the operators. In this example, the price is the amount the

excluded operator would have been willing to pay for the path. It therefore acts as a rationing price, and ensures that scarce capacity is allocated efficiently between competing operators. Applying these principles to rail infrastructure charging in anything but a negotiated charges framework (ie Willingness-to-pay) would be complicated in practice through the need to find a reliable measure of opportunity cost for inclusion in posted tariffs. It is in this sense that use of the ECPR approach becomes transparent.

As the National Economic Research Associates (NERA) Examination into Rail Infrastructure Charges for the European Commission asserts:

“The problem of setting rail infrastructure charges in situations where capacity is constrained involves a number of practical difficulties, and highlights the possible conflict between the objectives of ensuring the efficient use of existing infrastructure and ensuring that infrastructure managers have appropriate incentives to invest.

Charges which ensure the efficient use of existing infrastructure should be based on ‘demand side’ measures of opportunity cost, so that scarce capacity is allocated to the operators who value it most highly. Opportunity costs are difficult to measure, however, and a framework of negotiated access rights and charges provides the only practical way at present that these costs can be included in the charging framework... There are, of course, transactions costs associated with negotiations, nevertheless this approach remains the most promising way of ensuring that opportunity costs are properly reflected in rail infrastructure charges.

Charges which aim instead to provide investment incentives should be based on ‘supply side’ measures related to the costs of expanding capacity. We consider that the Long Run Average Incremental Cost as the most appropriate measure...

One clear conclusion, therefore, is that it is very unlikely that the charging framework alone can provide sufficiently accurate investment incentives. Longer term incentives can be provided by ensuring that infrastructure managers total revenues include an appropriate return on investment...<sup>72</sup>

### *Fully Distributed or Average Cost Pricing*

In recognition of the fact that it is impossible to allocate, in a non-arbitrary way, a share of fixed and common costs to users of below rail infrastructure/services, fully distributed cost (FDC) methods simply allocate total costs or the cost of an identified portion of expenditure such as overheads to individual services on an averaging basis.

Kessides and Willig<sup>73</sup> (1998) identify that regulatory proceedings have traditionally focused on three rules for averaging:

- the relative output method where shared costs are allocated in proportion to the number of units of output of each service;
- the proportionate cost method in which the allocation of shared costs occurs in proportion to the costs that can be directly attributed to the various services; and
- the gross revenue approach where shared cost is allocated in proportion to the gross revenues generated by each service.

FDC pricing rules suffer from a number of disabilities:

- FDC’s bear no direct relationship to marginal costs and can lead to traffics which cover more than their incremental costs being priced off the network to the detriment of all customers;

<sup>72</sup> NERA (1998) *An Examination of Rail Infrastructure Charges: Final Report for the European Commission*, p 77.

<sup>73</sup> Kessides, I and Willig, R (1998) *Restructuring Regulation of the Rail Industry for the Public Interest*, OECD.

- there is no basis upon which to assess whether cross-subsidisation is occurring between services because FDC is arbitrary;
- FDC completely neglects demand considerations in price setting.

#### *Ramsey or Demand-Based Differential Pricing*

An alternative to FDC rules is to allocate fixed costs through taking into consideration both cost and demand conditions. Ramsey pricing achieves this recognition of costs and demands. Ramsey prices apportion all unattributable joint and common costs among services on the basis of demand characteristics. Each service is priced as a mark-up over marginal cost which is inversely related to the elasticity of demand for that service. The aggregated magnitude of these mark-ups should ensure that revenue adequacy is achieved.<sup>74</sup> Ramsey prices therefore deviate from marginal costs only to the extent necessary to provide adequate revenues.

To properly apply Ramsey pricing requires a great deal of information, specifically, a quantitative assessment of the sensitivity of the quantity of the service demanded to a change in price (or the elasticity of demand) for every service that it provided. This requirement acutely impacts on the ability of the regulator to set efficient Ramsey prices. As such, Ramsey pricing is often substituted with demand-based differential pricing which takes into account demand conditions – or value of service – without explicit requirements for complex information and calculation procedures.

#### *Constrained Market Pricing*

Demand-based differential pricing has been criticised on the basis that it does not constrain a railroad's pricing of traffic or services over which it possesses market dominance. In response to these criticisms the demand-based pricing framework has been extended to include pricing limits under the 'Baumol Floor-Ceiling' or 'Constrained Market Pricing' approach. Under Constrained Market Pricing (CMP) regulators aim to achieve a number of basic outcomes:

- to prevent the regulated organisation from extracting monopoly profits;
- to ensure that prices charged by the regulated organisation are not set so low or so high that cross-subsidisation is prevalent; and
- to ensure revenue adequacy for the regulated organisation with minimal economic distortions.

“The floor-ceiling approach provides an economically defensible approach to pricing regulation, which can allow the regulated firm to price efficiently within the constraints imposed. The regulated price floor and ceiling reflects the boundaries of pricing which would exist if the market in question was ‘contestable’.”<sup>75</sup>

The critical issue is the criterion used to set the floor and ceiling. Various regulators have proposed that economically rational ceilings are obtainable from the concept of Stand-Alone Costs (SAC). The SAC to any captive entity or group of entities who benefit from sharing joint and common costs, is the cost of serving the entity/entities as if they were isolated from the railroad's other customers. A rate calculated by the SAC methodology represents the theoretical maximum rate that a railroad could levy on shippers without diversion of traffic to a hypothetical competing service. The economic minimum allowable for the floor rate is imposed with respect to the incremental or avoidable costs of the

<sup>74</sup> The logic of the inverse elasticity rules and its implied allocation of unattributable costs is simple. The elasticity of demand provides a quantitative interpretation of the traditional concept – value of service – which is central to public utility pricing. Consumers who place relatively high value on a service will have demand for it that are relatively inelastic and vice versa. The implication is therefore that the allocation of unattributable costs should be based on the value of service (demand based), rather than pro rate sharing or other arbitrary method. (Kessides and Willig, 1998)

<sup>75</sup> KPMG (1997) *National Competition Council: Report on the Pricing Principles in the NSW Rail Access Regime*, p32.

provision of the service. This ensures that each user is charged a minimum price directly associated with the costs imposed by the user and ensures that no cross-subsidisation occurs between users.

#### *Non-linear tariffs - two-part or multi-part tariffs*

Multi-part tariffs are generally believed to be superior to linear tariffs and have been proposed by Freebairn and Trace for the pricing of railway services for coal producers.<sup>76</sup> Two-part tariffs generate more efficient economic decisions than linear tariffs because consumers face the marginal cost of providing additional units, while fixed costs are recovered through an additional network charge.

Care needs to be taken with two-part tariffs where it is impossible to differentiate between access seekers to ensure that the up-front fee does not lead to the exclusion of some producers who value access services above SRMC, but not sufficiently highly to be willing to pay the up-front fee. For example, if the fixed costs were simply to be divided equally among those seeking access, then some of those potential purchasers may be pushed out of the market, to the detriment of economic welfare. To address this potential deficiency economists have recommended the adoption of:

- self-selecting two-part tariffs that provide different fixed and variable cost elements; and
- the use of demand-based pricing principles or differentiated two-part tariffs to reduce efficiency and welfare losses associated with excessive fixed cost components in that the fixed cost will vary between above-rail operators on demand and willingness-to-pay considerations.

#### *Efficient Component Pricing Rule (ECPR)*

The efficient component pricing rule is a variant to marginal cost pricing in which the price charged is adjusted to include opportunity costs. For example, where the owner of the access facility also uses the access and operates in the final market, under the ECPR, the opportunity costs include all profits foregone by the access provider. As Baumol and Sidak readily admit, the rule will tend to enshrine monopoly pricing if this is present. However, they also note that the villain is not the optimal input pricing rule, but that the landlord (owner of the access facilities) was permitted to charge monopoly prices for the final product in the first place.

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<sup>76</sup> “The first-part tariff ... would cover each mine’s allocation of unattributable costs as well as the capital cost of dedicated infrastructure... The second-part tariff would be a per tonne of product charge based on marginal costs.” (Freebairn, J and Trace, K (1992) “Efficient Railway Freight Rates: Australian Coal”, in *Economic Analysis and Policy* Vol 22 # 1 March 1992, p23-38)

## APPENDIX 3

### The UK Performance Regime (Railtrack and Train Operating Companies)

In the UK train operators face a number of performance incentives covering train punctuality (lateness) and reliability (cancellations). Similarly, Railtrack has performance incentives which are designed to be broadly “back-to-back” with the incentives experienced by operators. Thus in theory an incident caused by Railtrack would not impose additional costs on an operator.

The non-passenger Railtrack Access Agreements define a performance regime to focus both the train operating company and Railtrack’s attention on improving performance for all users. In order to protect users of the network the structure of the performance regime in any agreement should provide incentive to avoid persistent failure by either party through making reasonable provision for compensation in respect of failure, delay or cancellation.

The UK scheme primarily revolves around two main concepts - train “lateness” and “delays”, as well as covering cancellations, and a range of other types of service disruption.

- Lateness is measured at major stations (defined as contractual monitoring points), and is a timing relative to timetabled arrival times; and
- Delays are imputed values, calculated on the basis of timing intervals between successive recording points relative to timetabled journey times. Thus if a train is on time at recording point A, and 4 minutes late at the next point (B), then a delay of 4 minutes is deemed to have occurred in the section A-B.

Template regimes stipulate that all delays of 3+ minutes threshold must be recorded and attributed to an incident for which the responsible party must be identified. (Any unidentified causes of delay are primarily allocated to Railtrack, according to a “sharing” formula, with Railtrack retaining an incentive to minimise the incidence of such unexplained delays).

Performance data: Railtrack records information on train delays and lateness and makes an initial attribution of the responsibility for the incidents causing delays. All delays in excess of the minimum contractual threshold at each recording point enter a database system and are linked to an “incident” (new or existing), which must be attributed to a party (“responsible manager”) which allows the apportionment of delays to Railtrack, the TOC or a contractor etc.

The calculations in simplified form reflect:

- a calculation of aggregate daily lateness of trains (actual train lateness and “deemed lateness” for cancellations, diversions etc) at each contractual monitoring point; and
- the apportionment of responsibility for that lateness between Railtrack and the TOC, on the basis of the split of responsibility for delays for that day.

The resulting values, subject to a series of other refining adjustments, are then compared to benchmarks (calibrated as the higher of the existing levels of performance prior to the establishment of the regimes or the level of performance necessary to meet “charter”). The resulting net performance differential is multiplied by a £ value to generate a performance payment.

## APPENDIX 4

### SCHEDULE G

#### Application of Reference Tariffs

##### Part A – Coal Carrying Services

##### 1. Reference Train Services

###### 1.1 Commodity Type

Reference Train Services identified in accordance with this Part A will be defined as Train Services operated for the purpose of transporting coal. Any reference to Train Services in the remainder of this Part A of this Schedule will, unless otherwise specified, be taken to be a reference to a Train Service operated for the purpose of transporting coal.

###### 1.2 Geographical Scope

Each Reference Train Service will be defined with respect to operation between any loading point within the relevant geographical area nominated as origin and any unloading point in the relevant geographical area nominated as origin and any unloading point in the relevant geographical area nominated as destination. Reference Train Service will be developed as follows:

a) Newlands Reference Train Service:

- Origin: geographical area within 2 km of the Rail Infrastructure corridor that exists between the loading points at Newlands and McNaughton;
- Destination: geographical area within 2 km of Abbot Point Coal Terminal;

b) Moura Reference Train Service:

- Origin: geographical area within 2 km of the Rail Infrastructure corridor that exists between the loading points at Boundary Hill, Dunn Creek and Moura Mine;
- Destination: geographical area within 2 km of the Rail Infrastructure corridor that exists between the unloading points at Queensland Alumina Limited, Clinton, Barney Point, Gladstone Power Station, and Queensland Cement Limited;

c) West Moreton Reference Train Service;

- Origin: geographical area within 2 km of the Rail Infrastructure that exists between the loading points at Ebenezer and Box Flat;
- Destination: geographical area within 2 km of Fisherman Islands;

d) Blackwater Reference Train Service:

- Origin: geographical area within 2 km of the Rail Infrastructure that exists between the loading points at Boonal, Koorilgah, Curragh, Boorgoon, Kinrola, Ensham, Gordonstone and Gregory;
- Destination: geographical area within 2 km of the Rail Infrastructure corridor that exists between the unloading points at Queensland Alumina Limited, Clinton, Barney Point, the Gladstone Power Station, and Queensland Cement Limited;

## e) Goonyella South Reference Train Service:

- Origin: geographical area within 2 km of the Rail Infrastructure corridor that exists between the loading points at Coppabella, Peak Downs, Saraji, Norwich Park, German Creek, Oaky Creek and Gregory;
- Destination: geographical area within 2 km of Dalrymple Bay coal terminal and Hay Point;

## f) Goonyella North Reference Train Service:

- Origin: geographical area within 2 km of the Rail Infrastructure corridor that exists between the loading points at Burton, Moranbah North, Goonyella, Riverside, and North Goonyella;
- Destination: geographical area within 2 km of Dalrymple Bay coal terminal and Hay Point; and

## g) Goonyella West Reference Train Service:

- Origin: geographical area within 2 km of Blair Athol;
- Destination: geographical area within 2 km of Dalrymple Bay coal terminal and Hay Point.

### 1.3 Train Service Characteristics

Each Reference Train Service nominated in Clause 1.2 will also be defined in accordance with other characteristics as follows:

## a) Train Technical Characteristics including:

- axle load/configuration;
- train length;
- gross tonnage (loaded and unloaded);
- traction type;
- terminal configuration; and
- compliance with other existing Rollingstock Interface Standards applicable for the relevant Rail Infrastructure.

## b) Train Operational Characteristics including:

- compliance with nominated sectional running times;
- availability for operation (eg 24 hours/day, 7 days/week);
- loading/unloading time on network;
- capacity entitlement defined according to specified regularity on weekly basis, specified intervals between train cycles and specified transit times;
- compliance with QR's coordinated corridor scheduling process; and
- variability of operation.

## c) Contract Terms and Conditions including:

- consistency with the principles incorporated in the summary of the standard Access Agreement at Schedule E;
- term; and
- incorporation of an Access Charge review provision in the Access Agreement which relates movement in the Access Charge to movements in the Reference Tariff.

## **2. Reference Tariff applicable to Reference Train Services**

Reference Tariffs will be defined for each Reference Train Service nominated in Clause 1.2 of:

- a) amount of Reference Tariff identified as \$/,000 gtk;
- b) proportion of Reference Tariff payable as a fixed charge; and
- c) escalation of Reference Tariff.

## **3. Other Conditions applicable to Reference Tariffs**

The validity of the Reference Tariff for each Reference Train Service nominated in Clause 1.2 will be conditional upon:

- a) Traffic Volume Range

The Reference Tariff for each Reference Train Service nominated in Clause 1.2 will be valid within a nominated annual traffic volume range. Traffic volume will be measured as gross tonne kilometres resulting from Train Services operating on the Track between all loading points within the relevant loading geographical area and all unloading points within the nominated unloading geographical area (including from Train Services that are not subject to the relevant Reference Tariff).

## **4. Development of Access Charges for actual Train Services**

### **4.1 Where there is an applicable Reference Tariff**

The Access Charge for a Train Service that is consistent with the specified commodity type and geographical area nominated in a Reference Train Service will only differ from the relevant Reference Tariff where the Train Service characteristics differ from the Reference Train Service characteristics. In such circumstances, QR will determine the Access Charge by assessing variations to the Reference Tariffs to ensure that the change in the revenue that would be received by QR reasonably reflects the change in costs (including the impact of changes in risks) to QR arising from the operation of the Train Service compared to the operation of it if it matched the Reference Train Service.

In doing so, QR will endeavour to ensure that variations in Access Charges from the Reference Tariff to reflect variations in Train Service characteristics from the Reference Train Service characteristics will be assessed consistently for all Train Services within the same specified commodity type and geographic area of the Reference Train Service.

### **4.2 Where there is no applicable Reference Tariff**

- a) Development of Applicable Reference Tariff

Where a proposed Train Service is not consistent with the geographic scope of an existing Reference Train Service as identified in Clause 1.2, QR may, depending on the significance of the traffic flows arising from the proposed Train Service:

- develop an additional Reference Train Service to those identified in Clause 1.2 which identifies a geographic scope that incorporates the loading/unloading points for the proposed Train Service, and develop an associated Reference Tariff for this additional Reference Train Service;
- extend the geographic scope of an existing Reference Tariff incorporating the loading/unloading points for the proposed Train Service due to the relative insignificance of the resultant traffic flows.

- not develop a Reference Train incorporating the loading/unloading points for the proposed Train Service due to the relative insignificance of the resultant traffic flows.

QR will not extend the geographic scope of an existing Reference Train Service to incorporate an additional loading/unloading point, if the inclusion of this additional loading/unloading point would result in an increase in the applicable Reference Tariff.

Where it is proposed to extend the geographic scope of an existing Reference Train Service, or develop an additional Reference Train Service, QR will incorporate in its Indicative Access Proposal for the proposed Train Service its estimate of the expected Access Charge to apply. QR will also submit to the QCA for its approval the Reference Tariff to apply to the existing Reference Train Service (as geographically extended) or the additional Reference Tariff (as applicable). When the Reference Tariff for the Reference Train Service applicable to the proposed Train Service is approved by the QCA, the quoted Access Charge will be replaced by the Reference Tariff, adjusted as necessary for changes in the actual Train Service characteristics from the specified Reference Train Service characteristics in the manner outlined in Clause 4.1.

b) Amendment of Schedule G

Where an applicable Reference Tariff is to be developed in accordance with Paragraph (a) of this Clause, QR will submit to the QCA a Draft Amending Undertaking amending this Schedule G to reflect the amendment to the existing Reference Train Service or the identification of a new Reference Train Service, whichever is applicable.

## **5. *Review of Reference Tariffs***

For the purpose of Reference Tariffs subject to this schedule, a Material Change Event will include:

- a) Actual traffic volume falling outside the volume range nominated for the relevant Reference Train Service pursuant to Paragraph 3(a) of this Schedule.

## APPENDIX 5

### Access Rights Definitions

Access rights have been variously defined under different rail access regimes:

- Rail Access Corporation (RAC) grants access rights which are defined as non-exclusive contractual rights for the purpose of Rail Operations by the Operator in accordance with specific paths described within the RAC timetable for a defined train configuration;
- Australian Rail Track Corporation (ARTC) grants access rights defined as the use of the Network for the Train Paths provided to the Operator and all other ad hoc entitlements. ARTC has developed Reference Rates which are similar to QR's Reference Tariffs. As part of these Reference Rates premium, high and standard priority options are offered to train operators for differing prices. This priority is established as part of ARTC's Train Priority and Management Framework;
- Railtrack (UK) grants access rights which are defined as permission to use the Routes for the operation of Service, Diverted Services and Temporary Stabling. The Route means any route which is capable of accommodating the Service Characteristics of the Train, and the Service means the non-passenger services specified. The Railtrack Access Agreement specifies Services with respect to the following factors:
  - commodity;
  - days per Week (ie the days on which each specified service may run);
  - locomotive type;
  - maximum gross train weight;
  - maximum trains per day/week (ie the maximum number of times the specified service may be operated on the relevant day or week);
  - maximum train length;
  - number of wagons;
  - plan route miles;
  - timing specification;
  - traction electricity and rate.