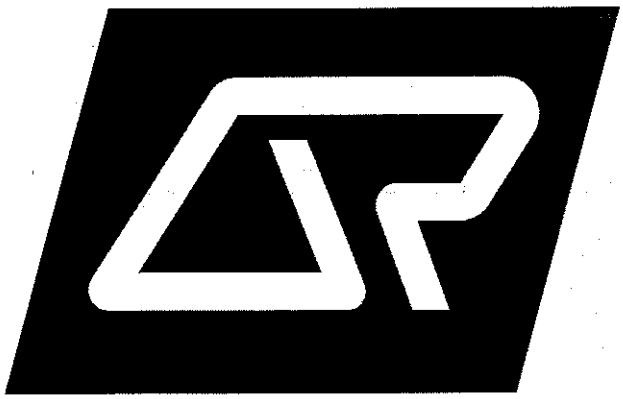
Annexure 5



QR Submission to Productivity Commission

Review of the Economic Costs of Freight Infrastructure and Efficient Approaches to Transport Pricing

05 July 2006

QR engaged Synergies Economic Consulting Pty Ltd to assist with the preparation of this submission.

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Externalities

Externalities are not currently factored into the cost bases for road or rail.

The key findings that can be taken from the literature relevant to the present review are:

- all modes of transport generate externalities, although rail generates fewer externalities than road transport;
- the estimated economic cost from transport externalities are substantial but subject to major estimation challenges;
- most costs are generated within major population centres; and
- measures to correct externalities mainly involve 'command and control' regulation, supplemented by economic instruments involving fuel taxes (although fuel taxes are typically applied to raise revenue).

QR submits that in principle social marginal cost pricing for externalities ought to be further investigated for transport pricing.

In the interim, QR believes the following actions should be taken because of the large costs in economic and social wellbeing from transport externalities:

- transport infrastructure investment appraisal should explicitly include the external costs. This is necessary to limit distortions to use of existing infrastructure rather than perpetuating current price distortions;
- where non-price measures are proposed to deal with externalities, further investigation of incentive mechanism should be pursued to achieve greater alignment with policy targets;
- mass distance charging should be progressed in parallel as it provides a pricing system with far clearer signals than the current heavy vehicle charging regime; and
- further consideration of increased rates of fuel charges for pollution and greenhouse related externalities.

Pricing

QR believes that pricing of road infrastructure must start to develop a greater degree of economic sophistication consistent with trends in other Australian infrastructure industries. As a priority, the Commission should map out a reform process for the implementation of individual user charging for heavy vehicles.

Executive Summary

QR welcomes this opportunity to present a submission to the Productivity Commission's Review of the Economic Costs of Freight Infrastructure and Efficient Approaches to Transport Pricing. Given the lack of progress made on road pricing reform in recent years, including the National Transport Commission's recent Third Heavy Vehicle Pricing Determination, the review is particularly timely.

As the only remaining fully integrated rail business in Australia with expertise across the full scope of rail services, QR is well placed to provide comments on its experience of providing rail infrastructure services within a price and access regulatory framework, as well as competing with road transport in the highly competitive freight and logistics market.

The thrust of QR's submission is that the Review should produce a set of recommendations which will maximise efficiency in the provision and use of Australia's road and rail freight infrastructure.

In this regard, QR believes that the priority of this review should be to address the cross-subsidy that exists between road charging for articulated vehicles and other road users, which in turn significantly undermines any attempt to achieve neutral competitive frameworks for the road and rail freight sectors.

Costs

A key issue for the Review will be to examine how costs change with usage of road and rail infrastructure.

There are a number of similarities between road and rail infrastructure costs:

- cost characteristics, such as economies of scope, scale and density, are important considerations for pricing structures;
- cost drivers are similar, particularly in construction;
- cost causation is similar for both modes, with large fixed capital costs and significant usage-related maintenance costs driven by the rail/wheel and road/wheel interfaces; and
- cost causation is complex because infrastructure service providers and operators can affect each others costs.

Importantly for this review the methods used by rail and road to recover these costs are very different and undermining the competitive advantage of rail. How costs are recovered from road users is a critical component of the reform task.

There are a number of well-accepted pricing principles associated with the use of and investment in monopoly infrastructure in Australia. In particular, prices should:

- send signals as to the economic impact of each user's use of the infrastructure to promote efficient consumption decisions; and
- allow the owner of the assets to have the opportunity to recover the full cost of service provision (including the recovery of capital costs) to facilitate efficient investment decisions.

Under their respective regulatory frameworks and consistent with these principles, Australian rail infrastructure providers have at least begun to develop economically sound pricing frameworks based on the establishment of price/revenue floors and ceilings reflecting incremental and full economic costs respectively.

In contrast, road pricing appears significantly out of line with rail pricing and general infrastructure pricing trends in Australia over the past decade. Currently, heavy vehicle pricing is based on a crude two part tariff, including a variable component based on diesel fuel excise, which does not reflect the costs imposed by various road users on the road infrastructure and consequently fails to send any meaningful signals to road users about their consumption decisions.

QR believes that a completely new tariff structure is required for heavy vehicle charges, including both fixed and variable components. Critically, the variable component of the tariff structure must be a mass distance charge.

Mass Distance Charging

The introduction of mass distance charging (MDC) is the critical first step in establishing a road charging mechanism which sends appropriate signals to road users about the cost of their road use.

Practical implementation of MDC in Australia has been a problem in the past, but electronic technology for distance based charging has now been successfully applied in a number of countries.

QR acknowledges that there will be a large upfront cost due to the introduction of MDC and that there are likely to be winners and losers from implementation, if for no other reason than it involves moving from the current system of average pricing to individual pricing. Consideration of how losers might be compensated is an important component of the reform process but is not unique in the Australian reform processes over the past decade.

Price distortions affecting bulk freight

To achieve an efficient allocation of resources between road and rail infrastructure, the price for use of each transport mode must reflect the resources cost of providing infrastructure services. To achieve efficient use decisions it is vital that variable charges are based on incremental costs and that common costs are allocated by methods that have some economic rationale.

Where prices do not fully reflect costs, transport operators will face distorted price signals which will, in turn, distort the pattern of usage between road and rail, as well as having a longer-term impact on economic welfare through distorted investment decisions.

The modal choice for different traffics will be driven by economic considerations such as the cost of access to road and rail infrastructure respectively and the nature of the product being shipped. Reflecting these factors, rail transport generally has a competitive advantage over road in bulk freight transport. This advantage is increasingly apparent the longer the length of a haul. However, the current pricing of road and rail does not reflect their relative cost competitiveness.

QR believes that, due to the pricing approaches applicable to road and rail infrastructure respectively, the price for using each mode does not reflect the true costs of provision. In current circumstances, freight traffic is being won by road transport by inefficient pricing of roads rather than the underlying comparative advantage of each mode.

For traffics where rail haulage still predominates, such as coal, the regulatory arrangements create a significant risk of a service provider under-recovering the true cost of service provision. QR considers that price distortions arising from the limitations of the regulatory framework that applies to rail will also have an impact on incentives to invest in rail infrastructure.

This impact is magnified by the tendency of regulators to impose a level of precision that does not exist and by the asymmetric consequences of regulatory error.

QR's views on optimal regulatory architecture revolve around the following considerations:

- the need for clear regulatory objectives;
- providing more significant status to the infrastructure provider's initial proposal;
- the availability and scope of merits review; and
- timeframes for regulatory processes.

Investment

Price is unable to efficiently direct investment in rail and road infrastructure if:

- prices are not fully cost reflective;
- institutional arrangements for the ownership and management of roads, including the receipt of revenue and allocation of funding, do not signal or facilitate efficient investment; and
- the regulation of road and rail inhibits efficient outcomes.

The reform of road pricing will require reform of the current institutional arrangements for heavy vehicle charges and the provision of road infrastructure, including the objectives of road agencies, their governance structure and their funding arrangements. Railways have made the transition from non-commercial government agencies to public and private commercial organisations. This has also been the experience in other infrastructure industries in Australia. Clearly a more commercial governance structure for road agencies should be a cornerstone of future reform.

In the absence of efficient prices, it is critically important that investment decision reflect true economic costs. Funding decisions by government need to be underpinned by cost benefit analysis. Auslink is yet to demonstrate its effectiveness in delivering efficient investment decisions, although work is underway to improve investment analysis.

Assessing the impact of reform

The correct approach to evaluating the benefits and costs of road pricing reform is to measure the national welfare gains, assessed using an appropriate model of the Australian economy. Given the importance of transport to the national economy, QR believes that a general equilibrium approach is appropriate.

QR suggests the following principles should be considered in assessing equity and efficiency trade-offs associated with higher road prices:

- equity be assessed on the final economic incidence of the price change (not the initial impact);
- any equity principles applied be transparent; and
- past benefits received by road transport operators (from under-recovery of costs) receive equal consideration to any impacts of increased charges.

Most reform processes will result in winners and losers. QR believes that effective policy implementation requires information on the available gains and a clear picture of the winners and losers from reform.

A case for phasing reform exists where:

- the immediate application of reform can be shown to increase losses compared to a phased application; and
- there are no more effective instruments for winners to compensate losers from reform.

With respect to the design of transitional arrangements QR believes the following principles should apply:

- the impact on existing suppliers/industries considers forecast market growth – often assessments of price changes on existing market size rather than future markets;
- reforms are applied where rail and road transport are substitutes – QR believes the AusLink National Network should initially define that portion of the national freight network;
- transition arrangements have a defined and preferably legislated timeframe; and
- industry compensation –to the extent appropriate – is performance based.

The way forward

QR believes an extensive program of reform is needed in many of the issues being examined by this review. QR recommends that the Commission include in its recommendations:

- Transport pricing reform should aim to achieve a situation where:
  - transport infrastructure is priced so that alternative modes may compete on their economic and practical merits;
  - investments are made in transport infrastructure which maximise social welfare; and
  - equity and other government policy objectives are transparent and delivered in an efficient manner.
- An appropriately experienced and independent research body report to COAG on how to achieve practical implementation of principle social marginal cost pricing for internalising transport externalities specifically:
  - the appropriate policy instrument for each externality;
  - the optimal level of emissions;
  - the least cost method for reducing externalities; and
  - in respect to pricing instruments, the set of prices necessary to achieve efficient levels of externalities.

- the following actions should be taken because of the large costs in economic and social wellbeing from transport externalities:
  - transport infrastructure investment appraisal should explicitly include the external costs. This is necessary to limit distortions to use of existing infrastructure rather than perpetuating current price distortions.
  - where non-price measures are proposed to deal with externalities, further investigation of incentive mechanism should be pursued to achieve greater alignment with policy targets. Regulatory impact statements should be prepared for each measure.
  - mass distance charging should be progressed in parallel as it provides a pricing system with far clearer signals than the current heavy vehicle charging regime.
  - consideration be given to increased rates of fuel charges to reduce pollution and greenhouse externalities.
- land transport prices should be structured so that:
  - in the absence of individual road user pricing, the price for the use of a road by the vehicle type which determines the ultimate standard of the road (ie the heaviest axle load) should cover at least the total incremental cost that it imposes on the road infrastructure. In addition, there are also incremental road capacity costs of relevance. Under the current road pricing approach, non-separable costs are recovered on the basis of kilometres travelled which do not reflect in any way the nature of road capacity consumption;
  - the recovery of common road costs should follow the pricing objective that is applied in rail (and other) infrastructure industries - namely that, prices should be set in such a way that minimises the distortions to consumption with the objective of recovering the full cost of infrastructure provision. Both volume and distance are likely to form part of any assignment of common costs to vehicle types. However, under a true usage-based pricing regime, care would need to be taken that common costs were not solely recovered on the same basis as any usage-related cost drivers so as not to over-signal the impact of alternative vehicle operational configurations on road costs; and
  - in allocating common costs, distortions to consumption would be minimised where prices are charged so that products whose output is less sensitive to higher charges pay relatively more of the common costs. As for rail, such price discrimination is likely to be efficient and desirable because common costs constitute a significant proportion of the total road costs to be apportioned and different traffics have differing capacities to pay.

- The introduction of mass distance charging is an essential first step in minimising these economic costs associated with the current distorted pricing arrangements. It is important to reflect the nature of freight flows in Australia where potential for modal competition exists and covers the major freight corridors. The desirable features of an MDC system in Australia would include:
  - an initial concentration on major freight corridors where road/rail competition exists, however the potential to extend the system to other parts of the road network in the future should not be excluded. In QR's view the Auslink National Network – which is the backbone of the national freight network – would be a well defined network for initially implementing MDC;
  - a recognition that the scheme's revenue recovery objective should embrace the full costs of the road infrastructure involved;
  - a variable charge reflecting incremental costs which is location specific to reflect road type (as incremental costs vary by road type and condition);
  - an emphasis on accurate measurement of both distance travelled and specific route used as well as the actual vehicle mass. The level of accuracy achieved will be subject of course to the technical and economic feasibility of the various monitoring and measurement devices available; and
  - a mechanism to ensure that revenues earned from mass distance charges flow to the infrastructure owner where the costs occurred.
- Reform of rail regulation must comprise:
  - the need for a single regulatory objective of economic efficiency;
  - the introduction of a 'propose-respond' regulatory architecture – enshrined in legislation - which will produce a more efficient regulatory framework through reduced incentives to submit ambit claims and reduced risk of regulatory error;
  - the availability and scope of merits review to ensure better quality decisions; and
  - ensuring that any mandatory timeframes for regulatory processes will not prejudice a robust and fair regulatory process.
- A more commercial governance structure for road agencies should be a cornerstone of future reform.
- On the basis of existing practice and learning from the work undertaken in Europe, the following actions are required:
  - coordination and approval for land transport investment relating to ensure that investments are consistent with economic efficiency;
  - a consistent project appraisal approach using cost benefit analysis;
  - transparent corridor assessments should support all funding decisions; and
  - projects are funded on the basis of their net economic benefit.

Contents

Chapter 1
Setting the Scene

QR welcomes the opportunity to make a submission to the Review of the Cost of Freight Infrastructure and Efficient Approaches to Transport Pricing. The Review is timely given the lack of progress achieved on road pricing reform in recent years. It also provides an opportunity to ensure the pricing and regulatory approach in the rail industry is serving the national interest.

Solutions to the deficiencies in land transport pricing and investment must be found so that the rail and road industries can maximise its contribution to the national economy.

1.1 About QR

QR is one of Australia's largest and most innovative transport providers. On any day, the QR network runs 1,000 train services and moves more than 440,000 tonnes of freight. In fact, QR moves more freight than any other organisation in Australia. A wide range of customers rely on QR's freight, transport and logistics solutions within and throughout Australia.

QR is also the only remaining fully integrated rail business in Australia with expertise across the full scope of rail services. QR is also a major provider of rail infrastructure services. QR manages network access, control of train operations and infrastructure assets worth $3.8 billion. QR is constantly investing in its rail network, although in some freight markets investment is clearly impacted by road pricing.

QR is structured into the following business operations:

- QRNational which aims to become Australia's leading coal and bulk logistics provider and a leading national freight and logistics business. It also provides services to general freight customers in regional areas;
- Passenger Services which carried approximately 49.5 million passengers in 2004-05 in Queensland;
- Network Access which delivers a safe, reliable and sustainable network in Queensland; and
- three support groups - Infrastructure Services Group, Rollingstock and Component Services and Shared Services.

1.2 The Need for Reform

The rail industry has undergone a sustained period of reform since the Industry Commission's 1991 Report into the rail industry. Since that time the efficiency and service quality of the rail industry has continually and significantly improved. Moreover since the introduction of National Competition Policy in 1995 a national market for rail has emerged and now traditional state borders are irrelevant and competition is now a permanent part of the rail industry operating reality. There has also been a considerable degree of consolidation in the rail industry.

This Review comes at a critical time where further and broader reform of land transport pricing and investment is necessary to allow the Australian economy to achieve its potential. Long-run forecasts of transport services are for sustained growth and in this environment it is critical that infrastructure is operated and expanded efficiently. Clearly the challenges for infrastructure pricing and the consequences for the community are well recognised by Government.[1]

> Modern infrastructure is costly and involves long lead times. Australia cannot afford poor and uncoordinated infrastructure decisions that impose high costs on the community, the economy and the environment.

A consistent message with respect to infrastructure performance is the absolute necessity to ensure pricing and supporting institutional arrangements support efficient outcomes.

Over many years there has been a vast amount of work done on road rail competitive neutrality but with very little in the way of practical reform in road pricing. In contrast, rail pricing has increased in sophistication and consistency with economically efficient outcomes, although further improvement is likely. While concerns put forward in the past by QR and the rail industry regarding road pricing remain valid, QR has recognised that the reform agenda is broader.

From QR's perspective the road pricing debate cannot solely focus on modal share. The real issue is the performance of infrastructure; its efficient operation and development, which is about setting infrastructure prices correctly. QR believes that there is now wide recognition that the current system administered by the National Transport Commission (NTC), with its emphasis on cost recovery, is not an efficient pricing system.

With the exception of some bulk traffics, the rail industry and QR operate in the face of competition from other transport modes. Modal competition is a positive discipline on QR to continually improve and innovate its service offerings. However, the current pricing arrangements disadvantage rail and impact its short term and long term competitiveness in most major freight markets.

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1 Department of Transport and Regional Services (2004), *Auslink Whitepaper*, p viii.

1.2.1 The Context for Reform

In an environment of intense global competition it is vitally important that non-tradable sectors such as infrastructure are provided and operated efficiently because of their impact on sectors more open to competition. For around two decades, micro-economic policy has scrutinised and made improvements to the regulation, structure and pricing of industries in the non-tradable sector, particularly infrastructure. Indeed, the current process of heavy vehicle road pricing arose during this period of reform.

The Auslink White Paper highlighted the importance of efficient transport infrastructure for an open economy like Australia.[2]

> Efficient infrastructure facilitates specialised production, price competitiveness, time sensitivity and reliability of Australian goods and services in both intra-industry and world trade markets.

The importance of transport as a production input is outlined in the Appendix A. In summary, in half of all industry sectors, transport costs form over 10 percent of total intermediate costs, and exceed 30 percent for several sectors. In most sectors, with the exception of Coal, Oil and Gas, road transport is the most significant form of transport used. While this is based on Queensland data, QR believes that it is likely to be representative for Australia. Clearly transport costs are a significant component of final prices and, as such, pricing below or above efficient levels will distort production and consumption decisions throughout the economy.

One of the key objectives of micro-economic policy is to ensure the institutional arrangements for setting prices are consistent with economically efficient outcomes. Studies of the benefits of reform have consistently shown the opportunity cost of not progressing reform to be significant. In many cases reform was achieved through market mechanisms, complemented where necessary with appropriate regulation. Arguably the past two decades has been a period of great change, learning and innovation in infrastructure price setting in Australia. Infrastructure pricing is increasing in sophistication and efficiency, except for roads.

1.3 Road Pricing Arrangements

The current system of setting road prices is far from ideal. QR considers that the Third Heavy Vehicle Pricing Determination was a timely opportunity for Australia to undertake major reform of road infrastructure pricing. Unfortunately, the Third Determination will continue to apply the current road pricing arrangements, which are not in the long-term interests of national economic performance. In this context, the costs of under-recovery of road infrastructure costs will continue to rise.

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[2] Department of Transport and Regional Services (2004), op cit, p 1.

Inefficient road prices have implications for rail's competitiveness with road infrastructure. The Auslink initiative recognises that rail is underutilised in the national transport task. For example, one of the eight key Auslink strategies is directed to increasing rail's competitiveness.

> The Australian Government will improve the capacity and performance of the vitally important eastern seaboard north-south interstate corridors by upgrading critical road and rail links, increasing rail's market competitiveness, and improving intermodal integration.[3]

In general, the allocation of tasks between road and rail should accord with the competitive characteristics of each mode. For example, rail's competitive advantage over road increases the longer the haul and for bulk commodities. Road has an advantage on shorter hauls, in particular, where road transport is required to achieve final delivery.[4] Analysis by the BTRE for the Auslink National Network corridors shows rail achieving higher growth rates than road on longer hauls, with the general trend of a shift of non-bulk freight to road (see Appendix A for further details).

The Productivity Commission[5] noted that competition between road and rail will be shaped by the responsiveness of transport customers to:

- prices (freight rates); and
- service characteristics (eg. punctuality, reliability, frequency, damage to goods, transit time and capacity to carry specific commodities).

However, the allocation of tasks between modes is also heavily influenced by current pricing and investment arrangements for land transport. Where these arrangements are distorted, as they are with the current heavy vehicle charging arrangements for road, the competitiveness of rail relative to road will be adversely affected. This has already occurred, with a growing shift from road to rail in recent years, including in areas where rail has traditionally had a competitive advantage, such as bulk freight haulage. These issues will be discussed in Chapter 6.

In addition to distortion in the pricing structures, differences in institutional arrangements applicable to road and rail have also had an impact on investment decisions. In particular, rail freight providers operate in a commercial environment (and typically also a regulated environment), with a direct link apparent between costs and revenue earned. This differs from road infrastructure provision, which is not subject to the same commercial framework for service provision and where, in effect, there is no direct relationship between the costs of provision and the revenue from

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3 Department of Transport and Regional Services (2004), *op cit*, p31.

4 National Transport Commission (2005), *Effect of Truck Charges on Rail.*

5 Productivity Commission (2000), *Progress in Rail Reform*, p. 231

road use. These regulatory and governance issues are addressed in more detail in Appendix A.

It is QR's view that the pace of learning and development in heavy vehicle road pricing has been hampered by the current institutional arrangements. The focus of attention through the Determination process has been on the intricacies of the model and not whether its outputs, road prices, are providing clear signals to users on the social costs of their transport choices.

The policy objectives for heavy vehicle charging need to and are changing as part of national reform to improve resource allocation in the provision of transport infrastructure. For example, the Australian Transport Council has accepted the need for pricing arrangements to move from average to variable pricing to promote efficiency in infrastructure use and modal neutrality. However, the current principles for setting road prices have multiple objectives and need to be simplified. As discussed in Chapter 6 QR believes that economic efficiency should be the objective of road pricing arrangements.

1.4 Reform delays are costly

Several factors suggest that the opportunity cost of delaying the move efficient pricing will be significant:

- the significance of road funding in the national economy, especially given projected growth in the traffic task;
- the low traffic densities and relatively high costs of creating transport corridors in Australia serves to increase the importance of achieving modal efficiency;
- the spillover effects of distorted prices for land transport along the logistics chain.

1.4.1 Significance of road funding in the national economy

As noted in the Appendix A, the non-bulk freight task, which currently is largely serviced by road, is forecast to grow faster than road (road accounted for 69% of the freight transported in 2005, with rail accounting for 21%. Non-bulk road freight is expected to grow at 3.3 percent per annum between 1999 and 2025. Non-bulk rail freight is projected to increase at less than half the rate of growth for road). An implication of this growth, highlighted in the AusLink White Paper, is the challenge this presents to road construction and maintenance in terms of roads needing to be built to a greater depth and width and to a higher quality. Given the projected demand growth of the transport task, it is critical that future investments in transport corridors, particularly roads, are based on better price signals.

Currently governments are expected to expend around $10 billion on roads in 2005-06.[6] This is more than 1% of GDP and is greater than in any other infrastructure industry. This will be required to meet the projected growth in road market share which, according to the Business Council of Australia, will require an additional 900,000 truck trips between capital cities over the next 15 years.[7] It has been demonstrated in other infrastructure industries undertaking pricing reform that improving pricing levels and structures so as to facilitate infrastructure being expanded when it is efficient to do so.

1.4.2 Australian geography increases importance of modal efficiency

Australia's population is geographically dispersed resulting in long intercity haul distances. This means that the provision of road and rail infrastructure involves relatively high costs, a fact that is exacerbated by the relatively low traffic densities on major freight corridors.

The combination of relatively high costs of linking population centres and relatively low traffic densities highlights the importance of achieving modal efficiency in the provision of transport infrastructure for the efficiency of the economy overall.

1.4.3 Spillover effects of poor infrastructure pricing

The distortions in road rail infrastructure pricing have broader implications in terms land use decisions. Transport infrastructure costs will influence the location and design of urban areas. Sub-optimal location of activities due to distorted price signals are not easily reversed, which means the efficiency costs persist through time.

Future investment decisions across a range of industries will be sub-optimal if road pricing is not improved. As noted above, given that land use decisions are influenced by transport costs, the opportunity costs of sub-optimal decisions extend well beyond the decisions of transport operators and therefore the costs will be far greater when assessed from this broader context.

Distorted price signals reduce the efficiency of national transport as subsidies rather than relative efficiency is influencing choices of transport mode. It also makes the task of maintaining competitiveness more difficult for other transport modes. Investments which improve service capacity, quality and productivity cannot be commercially justified while market prices for land transport are effectively set by inefficient road prices.

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6 National Transport Commission (2005), *Third Heavy Vehicle Road Pricing Determination: Technical Report*, p 12.

7 Business Council of Australia (2005), *Infrastructure Action Plan for Future Prosperity*, p. 12.

Moreover, the distortions are not confined to the transport industry. Business decisions regarding inventories, production and business location across a range of other sectors are affected by inefficient road pricing. Ultimately the community will forgo higher income because a subsidised business input is displacing a more efficient option.

1.5 Direction for Reform

QR doubts that appropriate price signals will be achieved through the current road pricing arrangements. There are a number of organisations, including the BTRE that have highlighted a number of deficiencies in the heavy vehicle charging methodology that produce inefficient price signals:

- the fuel tax component is not a precise measure for infrastructure consumption;
- cross recovery based on vehicle classes produces subsidies which impact on modal neutrality;
- arbitrary cost allocation shortfalls; and
- prices do not reflect externalities which tend to be more significant for road than for competing modes (externality issues are discussed in Chapter 3).

QR believes that the future of road pricing lies in individual user charging. However there is a range of issues that need to be addressed before the benefits from individual user charging can be secured. These issues will be discussed in Chapter 5.

1.6 Components of the Reform Task

The objectives of the transport pricing reform should be to achieve a situation where:

- transport infrastructure is priced so that alternative modes may compete on their economic and practical merits;
- investments are made in transport infrastructure which maximise social welfare; and
- equity and other government policy objectives are transparent and delivered in an efficient manner.

QR notes that intergovernmental financial reform was not part of the Commission's Terms of Reference but, given the objective of improving investment signalling, a greater nexus must be achieved between costs and revenues for road owners, something which is not achieved with current heavy vehicle pricing arrangements. The Queensland Government submission provides examples of the problems of the present financial arrangements.

1.7 Structure of the submission

The submission seeks to address many of the questions asked in the Productivity Commission's Issues Paper, *Road and Rail Freight Infrastructure Pricing*, although not necessarily in the order they were asked.

The structure of the submission is as follows:

- Chapter 2 discussed the cost characteristics of land transport infrastructure and particularly the incremental costs;
- Chapter 3 reviews the literature on externalities and further work that needs to be undertaken before they can be reflected in prices;
- Chapter 4 discusses pricing objectives and contrasts approaches to rail and road;
- Chapter 5 reviews overseas experiences with mass distance charging and considers the benefits and issues associated with its implementation in Australia;
- Chapter 6 considers the impact of road pricing regulation and rail economic regulation on bulk freight railways;
- Chapter 7 considers the issues and reform of investment processes; and
- Chapter 8 concludes the submission with QR's views on the analysis of economic benefits, distributional impacts and transition arrangements necessary to support fundamental reform.

Chapter 2
Costs

2.1 Main Points

There are a number of similarities between road and rail infrastructure costs:

- cost characteristics such as economies of scope, scale and density are important considerations for pricing structures;
- cost drivers are similar particularly for constructing new assets;
- cost causation is similar for both modes with respect to capital and maintenance;
- cost causation is complex because infrastructure service providers and operators can affect each other costs.

Both road and rail infrastructure providers use rules to limit costs imposed by operator choices but there remains scope for cost reflective pricing to influence choices. The concept of incremental pricing is being generally applied in rail pricing in respect to capacity and maintenance. It does not appear to be applied to heavy vehicle charges.

2.2 Introduction

This chapter provides information on both rail and road costs and will show that they exhibit similar characteristics.

A key issue for the review will be to examine how costs change with use of infrastructure. This chapter will discuss the key drivers of rail and road costs.

Efficient infrastructure use decisions will be made when the marginal benefit to users equal the marginal cost. In the presence of indivisibilities in costs, the concept of incremental costs is more usefully applied. The Chapter concludes with a discussion of the concept of incremental costs for both road and rail transport.

2.3 Description of Costs

Road and rail infrastructure costs are characterised by high fixed costs associated mainly with construction but also aspects of operations and maintenance. Short-run variable costs largely comprise maintenance activity. Marginal costs are small given the predominance of fixed costs in total costs.

Both road and rail exhibit economies of scale, density (due to the presence of indivisibilities in capital) and scope. These characteristics are important considerations for the structure of prices.

As in most infrastructure activities, the separation of outlays into capital and costs in the context of roads and railways is not clear cut. The approach tak chapter is a predominantly time based categorisation of costs wherein capita the initial costs of establishment, while operating costs relate to the on-go costs associated with maintenance of the infrastructure's service standard. In a whole of life or life-cycle cost (LCC) framework such delineation is somewhat less significant than in the case of an annualised costing approach.[8]

For a typical freight railway, capital counts for around 60% of total cost with operation and maintenance cost comprising the remaining 40%. Maintenance costs comprise around 25% of total costs.

2.3.1 Capital costs

Land

An important capital cost for road and rail is the value of land under the infrastructure.

For road corridors, land costs are largely a function of traffic volumes, environmental and safety standards, and value of the land being traversed. The impact of heavy vehicles on land costs relate to:

- alterations to approaches to urban centres or the construction of by-passes to minimise the impact of heavy vehicles; and
- alterations to horizontal alignments to achieve desired performance standards for heavy vehicles.

In Queensland the value of land under infrastructure is treated differently for rail and roads. QR understands that the value of land under state controlled roads in Queensland under the road pricing regime is effectively zero.[9] For QR's coal network, the cost of the land for existing rail corridors is its value in the next best alternative use and reflected in prices. For proposed new rail corridors, costs associated with land acquisition are likely to include compensation for land resumption and legal fees.

Earthworks

Earthworks account for approximately 45% of the total cost of road construction. The cost of earthworks is largely a function of road alignment, both vertical and horizontal.

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[8] As the title suggests, life-cycle costing models consider the totality of costs associated with a particular facility over its full economic life and do not explicitly recognise the economic return on the assets involved or the depreciation of those assets. Hence, there is little or no requirement to delineate between capital and maintenance outlays. On the other hand, annual costing models require the calculation of the annual depreciation and return on investment for each component of the asset.

[9] The cost of acquiring land is included in project costs but is value is written down to zero after construction is completed.

In particular, the amount of cutting and filling undertaken to achieve a particular maximum gradient will have a significant impact on the total cost of earthworks for a particular road. Maximum gradients in turn are largely determined by target vehicle speeds, maximum loads and safety considerations.

The design criterion for roads carrying heavy vehicles would be for a maximum gradient (or slope) significantly less than a road built only for light vehicles. This requirement therefore potentially has a considerable impact on the cost of earthworks. Also, the greater length of heavy vehicles will necessitate the construction of roads with more sweeping curves. This will require changes to the horizontal alignment of the road and potentially increase in earthworks. McLean[10] concluded that a comparison of truck-based and car-based standards for earthworks design suggests that, at least in hilly terrain, the adoption of truck-based standards would result in an increase in earthworks of some 25 to 50 %.

Railway construction also requires earthworks to provide a finished construction surface prepared in readiness to receive the track. The greatest constraint on railway design is the need to strictly control gradient, which sets the steepest slope over which a fully loaded train can be hauled.

The cost of earthworks is therefore determined by the amount of cut and fill necessary for the desired horizontal and vertical track alignment and gradient. Track alignment and curvature (which determine maximum permissible train speeds, as well as the level of wear on rail and rolling stock) also necessitate earthworks. Greater limitations on grades and curvatures exist for rail than on roads.

Road Pavements

Modern pavements can be constructed as either flexible or rigid structures. The selection of pavement type depends on a number of parameters, including:

- the standard and availability of materials, particularly the standard of the sub-grade i.e. a rigid pavement would be preferred where there is a low strength sub-grade;
- the required level of pavement performance and reliability;
- the curvature of the pavement and topography of the right of way[11] i.e. rigid pavements are preferred for straight sections, while flexible pavements are preferred for roads in built-up areas with tight cornering, roundabouts and intersections;

[10] McLean, J. (2006) Earthworks Cost and Heavy Vehicle Use. Heavy Vehicle Charges Cost Allocation Workshop. Melbourne (April, 2006)

[11] A narrow length of land used for the route of a railway, electric power line, or public road

- the totality of capital and operating costs incurred over the economic life of the road;
- traffic intensity and composition; and
- other environmental factors, e.g. noise level.

The most important factors affecting pavement cost are traffic volume and composition. Austroads[12], for example, suggests that rigid pavements are required to carry design traffics over 1×10^6 heavy vehicle axle groups (HVAG). This level of traffic would be applicable to major arterial roads and highways.

Rigid pavements are more expensive to construct than flexible pavements. However, they have a lower life cycle costs per unit of use.

Track

Decisions made with respect to earthworks and track components determine the standard of the track and the forces imparted by rolling stock that the track can safely absorb. For example, the choice of sleeper type, depth of ballast and the size of the rail.

Similar to the situation for roads, train characteristics will determine the choice of track standard.

The track standard typically varies across a network depending on the traffic mix on each rail corridor. Most importantly, track standard determines the maximum permissible axle loads and speed at which a locomotive and its wagons/carriages can operate (loaded and unloaded) safely on the tracks. Other things being equal, a higher quality track should be able to deliver a more reliable below rail service, measured in terms of on-time running for timetabled (passenger and intermodal freight) traffics and shorter cycle times for cyclic (heavy haul) traffics. This higher reliability could also increase the capacity of the track through potentially allowing more train services to operate in a given period.

In contrast to roads, heavy haul railways are normally purpose built for the particular traffic eg coal in Queensland and iron ore in the Pilbara.

2.3.2 Maintenance Costs

Road

Road maintenance is usually categorised as routine or periodic (or intervention). Box 1 lists the type of activities normally associated with each category of maintenance.

12 Austroads (2004), *Pavement Design – A Guide to the Structural Design of Road Pavement* p 91.

Box 1 Road maintenance activities

Routine maintenance includes:

- pothole repair;
- cracking sealing and other minor resealing and resurfacing (limited thickness and length);
- edge repair and shoulder maintenance;
- drainage clearing;
- vegetation control; and
- maintenance of road side equipment.

Periodic or intervention maintenance includes:

- major resealing and resurfacing;
- pavement rehabilitation; and
- renewal.

The effects of routine maintenance only last for one to two years and hence expenditure levels need to be maintained at a reasonably constant level over time. Broadly speaking, there are two types of routine maintenance. The first type includes activities such as vegetation and drainage management that are largely independent of traffic volumes and composition. The second type includes minor pavement maintenance (crack sealing, pothole filling), edge repair and minor resealing, and minor culvert and bridge maintenance. This type of routine maintenance is related to both traffic volumes and loading.

If sufficient routine maintenance is not undertaken there will be long term implications for the formation of the road and the level of future intervention or periodic maintenance activities. Hence routine maintenance is usually given the highest priority by road management authorities.

The relationship between heavy vehicle use and routine maintenance costs is the most difficult to define. This is because the relative impact of load and environmental factors (moisture and temperature) is difficult to delineate. For this reason routine maintenance is usually time based as opposed to condition based. The proportion of routine maintenance that is variable with load was the subject of research undertaken by Zongzhi (2002).[13] This research concluded that the more rigid the pavement the greater the proportion of routine maintenance costs attributable to load. The explanation of this outcome is that flexible pavements are more vulnerable to environmental factors than to traffic loading. If rigid pavements are less vulnerable to weathering (and other non-load factors) a given performance should be achievable with relatively less routine maintenance, most of which would be attributable to load.

[13] Zongzhi, Li. A determination of load and non-load shares of highway pavement routine maintenance expenditure. (2002).