

# Road Pricing Reforms in Australia

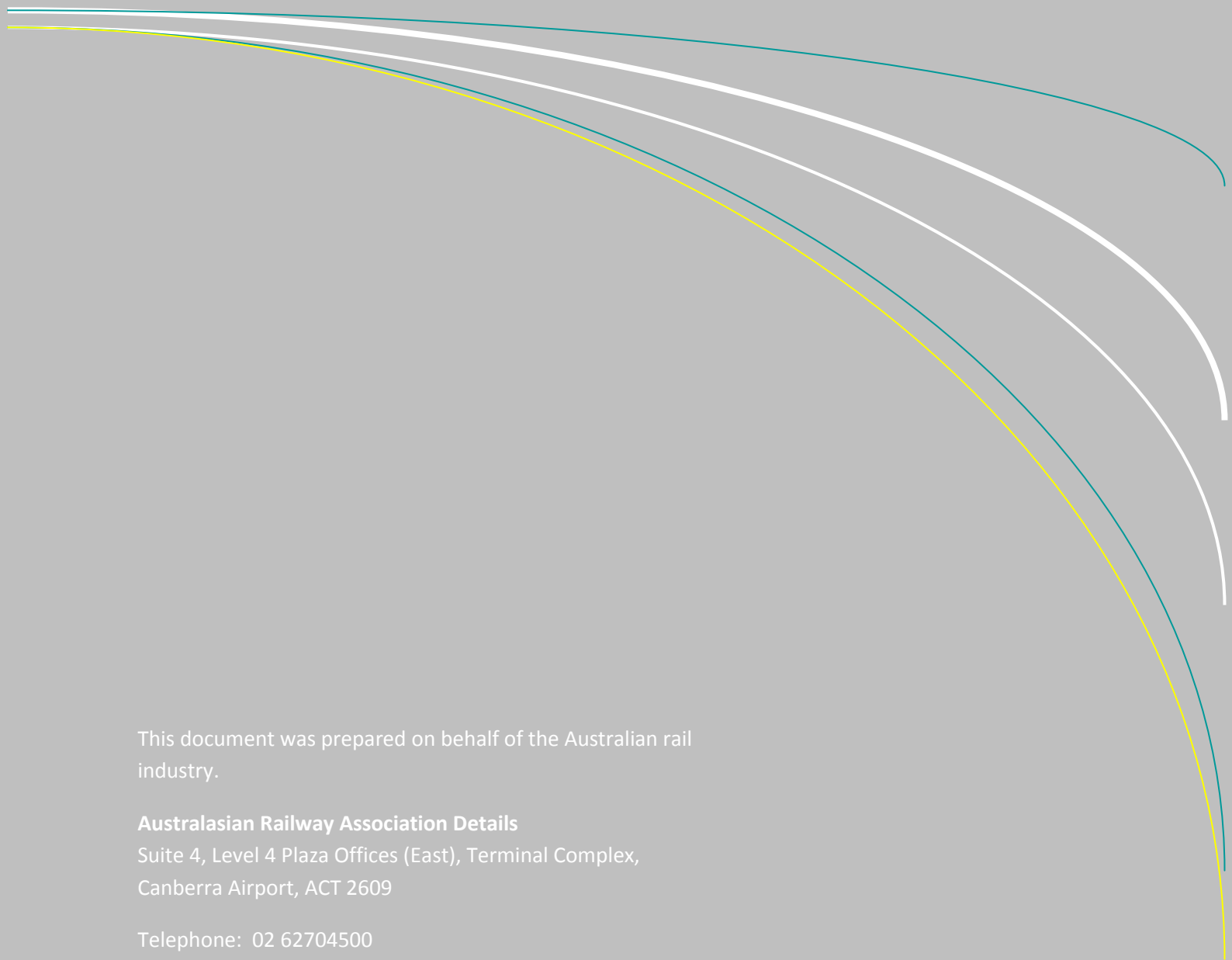
## Why Road Pricing is Vital to Australia's Economic Prosperity

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AUSTRALASIAN RAILWAY ASSOCIATION INC



This document was prepared on behalf of the Australian rail industry.

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# Executive Summary



## Executive Summary

### Background

Australia faces mounting pressures in ensuring the productivity growth needed to maintain its economic position and the living standards of its residents. The impacts from significant population growth, increasing urban congestion, increased energy security risks and the need to move towards a carbon restricted economy have already begun to impact on Australia's productivity performance, international competitiveness and the liveability and sustainability of our local communities.

The Reserve Bank of Australia (RBA) has identified the stagnation of productivity performance as one of the major concerns for the Australian economy<sup>1</sup>. The Organisation of Economic Cooperation and Development (OECD) has also pointed to a continuing 15% deficit in the productivity performance between Australia and other leading OECD countries<sup>2</sup>.

Australian governments have placed transport at the centre of national reforms to improve productivity performance. In March 2008, the Council of Australian Governments (COAG)<sup>3</sup> endorsed a far-reaching reform agenda, *The Seamless National Economy Partnership Agreement*, for enhancing productivity and workforce mobility in areas of shared Commonwealth, State and Territory. In July 2008, COAG agreed that the seamless national economy initiatives were amongst the most significant and far-reaching of the potential reforms identified by COAG. COAG has included national transport policy reform as a part of the agreement.

### The Transport Challenge

Without significant reform and investment in transport infrastructure, the economic and social prosperity of Australia will be under threat. For example, road congestion costs Australia \$15 billion while the cost of road accidents is around \$35 billion p.a. These problems will be exacerbated by significant increases in Australia's population, the increased incidence of car ownership, the inadequate state of current transport infrastructure, and the limitations of supply side solutions (given the scarcity of urban land for future transport corridors).

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<sup>1</sup> Speech: Assistant Governor of RBA, Philip Lowe (2010). *Sydney NatStat 2010 Conference*, 16 September

<sup>2</sup> OECD (2008), *Compendium of Productivity Indicators*, OECD, April

<sup>3</sup> COAG (2009), *National Partnership Agreement to Deliver a Seamless National Economy*, COAG,

Transport is fundamental to the productivity of all other sectors and industries. The transportation of people and goods is central to all economic activity in Australia.

Incremental piecemeal reforms will not address the urgent need for a transport network that will ensure Australia's prosperity. The quality of our transport infrastructure is already falling behind that of the rest of the advanced economies, leading the OECD to conclude that: "Australia ... [has] experienced a sharp deceleration in capital productivity growth."

### Why Road Pricing Reforms?

Road pricing reforms are an absolute necessity if Australia is to have a productive, efficient and sustainable transport network. The recently released Henry Tax Review<sup>4</sup> has acknowledged that the existing road pricing regime has not delivered the most efficient use and supply of land transport.

The current charging regime governing road infrastructure has significant shortcomings that have severely restricted the efficient operation of the land transport market:

- **Does not guarantee competitive neutrality between land transport modes:** The current road and rail access charging regimes provide an artificial price advantage to road freight. Rail access charges account for 30-40% of a rail freight's operational costs, while road charges accounts for around 5-10% of road freights operating costs<sup>5</sup>. This bias towards road freight transport severely restricts the use of the safer, more fuel efficient and sustainable rail option.
- **Fails to capture the social and environmental costs benefits of transport options and decisions:** The cost of negative transport externalities, such as congestion, road accidents and environmental degradation, has not been accounted for and has been left to society as a whole to deal with. Governments must intervene to capture the social and environmental impacts of transport decisions, through their inclusion in market based mechanisms where possible. This will ensure an efficient, safe and sustainable transport system.
- **Does not adequately price scarce road infrastructure or promote required behavioural change:** The supply of urban road infrastructure has been heavily restricted by the lack of available urban lands. The only remaining supply options are expensive tunnelling or bridges, which have been shown not be commercially viable. This has led to severe congestion in our major cities. Demand side solutions are most viable; however the current road pricing regime does not have the capacity to promote behavioural change.

<sup>4</sup> Australian Treasury (2010), *Australia's Future Tax System*, The Commonwealth Government of Australia

<sup>5</sup> Port Jackson Partners (2005), *The Future of Freight*, published by the Australasian Railway Association

Real and significant action is required on road pricing. While COAG has set out a three-phase COAG Road Reform Plan (CRRP)<sup>6</sup> to consider alternative models of heavy vehicle road pricing and funding, the scope and pace of change of the plan has been underwhelming. For example, under Phase 1 of the Plan, externalities were explicitly excluded from the scope of reforms.<sup>7</sup>

The reluctance in Australia to significant road pricing reforms is at odds with international experience, where there has been successful introduction of road pricing regimes, particularly in Europe and Asia, to deal with issues such as infrastructure cost recovery, congestion and environmental concerns.

### International Experience

Road pricing reforms have been initiated across the world including, amongst others, Sweden, Germany and Singapore. These international examples highlight the merits of different road pricing mechanisms:

- **Cordon pricing & congestion charges (Sweden):** Cordon and congestion charging has been successful in changing behaviour, reducing urban congestion and encouraging greater public transport use. Successful implementation of such charges requires a well functioning mass transit system. In Sweden, revenues raised from the charges have gone to improving urban public transport networks.
- **Network charges (Netherlands):** This type of regime monitors individual road use on all urban and non-urban roads based on a combination of distance, mass and location. This regime has been successful in ensuring full cost recovery for infrastructure, improved allocation of infrastructure investment, and is a strong demand management tool.
- **Heavy vehicle charging (Germany):** Heavy vehicle charging is the limited application of network charging. Given heavy vehicle's higher propensity to damage road infrastructure, heavy vehicle charging can significantly reduce implementation and operational costs by targeting the heaviest contributors to road damage. Heavy vehicle charging can include mass-distance-location charging.
- **Variable toll charges (Singapore)<sup>8</sup>:** Variable toll charging can be a relatively cheap and simple method of road pricing and can be used as a demand management tool. However, some of the more simple methods of road pricing do not account for distance travelled or mass

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<sup>6</sup> See url: [www.roadreform.gov.au](http://www.roadreform.gov.au)

<sup>7</sup> Australian Transport Council (2009), *COAG Road Reform Plan Phase I*, COAG May

<sup>8</sup> Singapore uses toll charges as a part of a broader network wide scheme.



carried and as such are not a very good tools for infrastructure cost recovery, and may simply shift demand to roads that are not tolled in the absence of network wide charges.

These international examples have proven that the introduction of road pricing has improved the operation, social and environmental performance of road transport. Road pricing reforms have resulted in traffic flow speed improvements to 45kmph on freeways and 30kmph on arterial roads during peak times in Singapore, a 58% shift to more fuel efficient truck models in Germany (significantly improving emissions performance), and a 10-15% decrease in traffic volumes in Stockholm<sup>9</sup>. These international experiences have also shown that the cost of implementation and continued operations of road pricing regimes have significantly decreased as a result of improved in vehicle technologies and greater public acceptance.

A key lesson highlighted by international experience is the need for public awareness and acceptance. The Stockholm congestion charge provides the best example of successful road pricing reform. The congestion charge was introduced as a 7 month trial with a corresponding awareness campaign as to the implications of the reforms. The trial period allowed stakeholders to judge the benefits of the reform including, less congestion, improved travel times within the cordon, increased amenity and improved public transport services. Revenue raised from the charge was directed to public transport upgrades and the introduction of an extensive park-and-ride car space network within the cordoned area. Due to the overwhelming support for the reform, the project was permanently reinstated in August 2007.

### Recommendations

Economic and institutional reform is required in the transport sector, given the inability of the current road charging regime to adequately and sustainably provide road infrastructure, and the sub-optimal manner in which transport is provided across Australia. The current economic and institutional arrangements do not guarantee an efficient, reliable, safe and sustainable transport network.

To address these systemic problems, it is recommended that:

- **Mass-distance-location heavy vehicle charging be implemented:** Mass-distance-location heavy vehicle charging (MDL) is the most viable road pricing reform option that can be

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<sup>9</sup> Transport Research Board & American Association of State Highway & Transport Officials (2010), *International Scan: Reducing Congestion & Funding Transportation Using Road Pricing*, US Department of Transport, April

implemented in Australia. MDL would address the significant shortcomings of the current PAYGO system, target vehicles that cause the most damage to road infrastructure, be cost effective in terms of implementation and operation, and have the ability to capture the social and environmental impacts of freight transportation. Unlike other examples of road pricing regimes, MDL can be quickly and effectively implemented in Australia.

- **A single national land transport regulator be established:** The arbitrary delineation of road and rail has created inconsistent economic regulations that have provided an artificial price advantage to road freight. A single national economic regulator for land transport would ensure consistent principles underpinning any road pricing regime and rail access charges. This in turn will ensure competitive neutrality between road and rail freight and an efficient and competitive market for land transportation.

# Introduction

# 1



## 1. Introduction

The Council of Australian Governments (COAG) has identified productivity growth as a central driver for Australia's economic growth and prosperity. In March 2008, the Council of Australian Governments (COAG) endorsed a far-reaching reform agenda, *The Seamless National Economy Partnership Agreement*<sup>10</sup>, for enhancing productivity and workforce mobility in areas of shared Commonwealth, State and Territory responsibility. COAG has included national transport policy reform as a part of the agreement. In July 2008, COAG agreed that the seamless national economy initiatives were amongst the most significant and far-reaching of the potential reforms.

Following the COAG agreement, Infrastructure Australia (IA) was asked to implement strategies to move towards the goal of a seamless national economy, including the establishment of a national freight network. The interaction and competition between road and rail freight is fundamental to the agreement. An efficient and sustainable road network system is central to the success of rail, A key issue within this is road pricing reforms.

Road pricing reforms are fundamental to any substantial national transport reforms. Road pricing reforms are an absolute necessity, especially in the land freight transport market, to ensure productive, efficient and sustainable transport networks.

The recently released Henry Tax Review<sup>11</sup> has acknowledged that the existing road charging regime has not delivered the most efficient use and supply of land transport and land transport infrastructure. The current regime fails to adequately recover the full cost of road infrastructure delivery and maintenance from certain vehicle classes. This under-recovery is not only detrimental to governments' budgetary position but creates a price advantage for road freight to the detriment of rail freight. The current regime also fails to capture or address the social and environmental impacts of road use. The cost of road congestion and accidents, which cost Australia up to \$50 billion p.a., is placed on local communities and individuals.

The reluctance for meaningful road pricing reforms places Australia at a significant disadvantage, and threatens our international competitiveness. Substantial road pricing reforms have been initiated throughout Europe and Asia, with significant success in improving the transport network and the provision of transport infrastructure. The introduction of road pricing has resulted in traffic

<sup>10</sup> COAG (2009), *National Partnership Agreement to Deliver a Seamless National Economy*, [COAG](#)

<sup>11</sup> Australian Treasury (2010), *Australia's Future Tax System*, [The Commonwealth Government of Australia](#)

flow speed improved to 45kmph on freeways and 30kmph on arterial roads during peak times in Singapore, a 58% shift to more fuel efficient truck models in Germany, and a 10-15% decrease in traffic volumes in Stockholm. The proposed Netherland road network pricing regime is set to reduce road delays by 40-60%.<sup>12</sup>

International experiences has also shown that the cost of implementation and continued operations of road pricing regimes have significantly decreased as a result of improved in-vehicle technologies and greater public acceptance.

Substantial and meaningful road pricing reform is required in Australia.

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<sup>12</sup> Transport Research Board & American Association of State Highway & Transport Officials (2010), *International Scan: Reducing Congestion & Funding Transportation Using Road Pricing*, US Department of Transport, April

# What is Road Pricing

# 2



## 2. What is Road Pricing

### What is Road Pricing

Road pricing refers to the direct charging of a price for the use of roads. This is in contrast to road based taxation such as vehicle registration and fuel excise, where charges are applied for the ownership of vehicles and the consumption of fuel. There are a variety of methods in applying road pricing including toll charges for specific road infrastructure, cordon charging or whole-of-network charging.

#### Toll charges

A toll charge is a fee applied to individual vehicles for access to a particular roadway. It is the most common form of road pricing found in Australia, particularly in eastern state capital cities and has been predominantly used in Australia as a cost recovery mechanism for the construction and maintenance of road infrastructure. Overseas experience shows that it can be used for road demand management and as a means to achieve environmental objectives such as reduced emissions and congestion alleviation.

#### Cordon charges

Cordon Charging refers to a charge for access to a defined geographical area, usually highly dense CBD areas. Cordon charging is predominantly used as a road demand management tool, limiting the demand for scarce inner-city road infrastructure. In most cases, revenue raised from such charging goes towards road infrastructure maintenance, the provision of public transport and other government policy objectives such as environmental protection.

#### Whole-of-network charges / Heavy Vehicle Charging

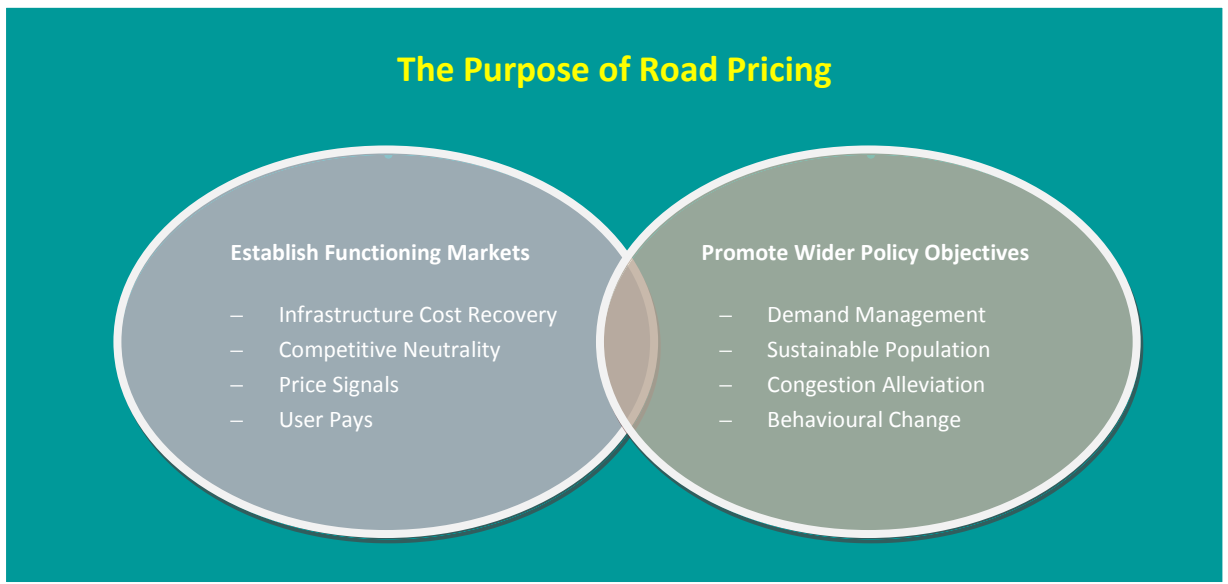
Whole-of-network charging is a more comprehensive method of road pricing, where all road infrastructure is priced according to use (distance travelled, location, time, weight etc.). As the name suggests, this method of road pricing encompasses urban and non-urban areas. To achieve a whole-of-network pricing system a combination of toll and cordon charges could be applied. Infrastructure cost recovery, demand management and the internalisation of transport externalities can all be outcomes of such a system.

Heavy vehicle charging is a limited application of network charging, where heavy vehicles are tracked and charged for their actual use of road infrastructure.

## What is the Purpose of Road Pricing

The basic objective underlying road pricing regimes is to establish functioning markets for road infrastructure. A functioning market implies full cost recovery for road infrastructure and maintenance, a user pay system and infrastructure supply based on price signals. An outcome of a functioning market is to create competitive neutrality for land transportation, where infrastructure supply and pricing does not provide quasi subsidies to any particular market participant, ensuring a competitive and efficient market.

A further objective of road pricing is to promote the Federal Government's wider policy objectives and to correct market failures within the land transport market. Road pricing can be an effective tool in internalising transport externalities<sup>13</sup> by providing price signals that encourage behavioural change. These price signals can be used to manage demand to reduce road congestion, promote sustainable transport options and improve safety and environmental performance of transportation.



Adapted from US Department of Transportation, Transport Research Board & American Association of State Highway & Transport Officials (2010), *International Scan: Reducing Congestion & Funding Transportation Using Road Pricing*, [US Department of Transport, April](#)

<sup>13</sup> Transport externalities include impacts on safety, climate change, the environment, amenity, accessibility and energy security.



# Road & Rail Charges

# 3



## 3. Current System of Road & Rail Access Charges

### Current System Governing Road Infrastructure Charges

Under the current road pricing regime, road vehicles are charged for the use of arterial and local roads via a national system referred to as 'pay as you go' (PAYGO).

#### The PAYGO Approach

The PAYGO approach estimates the cost of road service provision and recovers expenditure in the period in which it is incurred. The National Transport Commission (NTC) calculates a three year moving average of road expenditure to determine the cost base that is to be recovered.

The main road infrastructure charges applying to vehicles are an annual fixed registration charge on vehicles, and a fuel excise levy.<sup>14</sup> To calculate registration charges and the fuel excise, the NTC undertakes four steps:

- The NTC reviews the historical costs incurred for the provision of road infrastructure within each state.
- In estimating total road infrastructure costs, the NTC assumes that costs are equal to the average level of road expenditure, based on a three year average which includes the expenditure for the preceding two years and forecast expenditure for the coming year.
- Given that roads are used by heavy vehicles and passenger vehicles, these costs are then allocated to each vehicle type.
- Finally, the NTC makes recommendations to the Australian Transport Council (ATC) on how that apportioned cost should be distributed between different vehicle classes in the form of registration charges and the fuel excise.

#### Calculating the Costs under the PAYGO Approach

The PAYGO system calculates the following expenditure as costs:

- road surface<sup>15</sup> maintenance, rehabilitation and new construction costs;
- servicing and operating expenses (cleaning and repairs to drains, maintenance of street lighting, line markings and traffic signals etc.);
- bridge maintenance and rehabilitation costs;

<sup>14</sup> In practice, the diesel fuel excise is treated more like a tax than a user charge and is a component of the Federal budget.

<sup>15</sup> The NTC refers to this as pavement but this does not include footpaths, curbing or guttering.

- safety/traffic improvements costs (installation of traffic signals, roundabouts etc.);
- non-pavement asset extensions/improvements costs (e.g. land acquisition costs associated with road improvements); and
- costs incurred in other miscellaneous activities (for arterial roads only) such as: corporate services; and enforcement of heavy vehicle regulations.

Of these costs only around 50% of costs are attributed by vehicle class, due to the fact that different vehicle classes have a significant impact on the costs incurred. An example of an attributable cost is road maintenance as a result of damage caused by heavy loads. The remaining costs are deemed to be common costs and shared equally by all road users.

The NTC excludes 75 per cent of urban local road expenditure and 50 per cent of rural local road expenditure from its cost base. In the draft Third Determination these costs amounted to \$2.87 billion or a 27% reduction in total costs.<sup>16</sup> Expenditure removed from the cost base includes<sup>17</sup>:

- expenditure recovered through other fees and charges (administering registration and licensing systems and expenditure on roads financed through tolls);
- interest on borrowings;
- a proportion of local road expenditure; and
- the enforcement of road rules for heavy vehicles.

The NTC further assumes that:

- all costs (including both capital and non-capital costs) should be entirely recovered during the period of a determination;
- there should be no recovery for historically provided infrastructure; and
- financing costs associated with the source of financial capital should not be recovered, meaning that there is no return on capital.

## Rail Access Charges

As a consequence of market reforms of the 1990s, rail operations have generally been split from infrastructure ownership. Rail operators seeking access to third party rail infrastructure can do so through:

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<sup>16</sup> NTC 2005

<sup>17</sup> NTC (2006), *Submission Productivity Commission Inquiry into Road and Rail Infrastructure Pricing*. [NTC](#)

- private agreement with the infrastructure providers;
- the national access regime as provided for in Part IIIA of the *Trade Practices Act 1974 (Cth)* (TPA); or
- state-based access regimes as provided for in the relevant state-based legislation.

Access to below rail infrastructure has been facilitated by the enactment of a number of jurisdictional access regimes overseen by six jurisdictional regulators. These jurisdictionally based access regimes have a common purpose of providing third party access to rail infrastructure.

In contrast to road infrastructure charges, charges for rail infrastructure are generally based on future costs that will be incurred for the maintenance and provision of rail infrastructure. These charges are generally set between a floor and ceiling price level.<sup>18</sup> The ceiling price is estimated based on measuring various costs including an allowance for operating costs, depreciation costs and a return on capital. Rail infrastructure providers may set access prices below the ceiling price if it is commercially in their interest.

The capital cost items generally included in the asset base for rail infrastructure pricing include:

- railway track, associated structures and supports;
- turnouts;
- tunnels and structures including rail bridges, footbridges and culverts;
- earthworks;
- signalling, train control and safe working systems;
- communications systems;
- fences and level crossings; and
- stations and platforms (where relevant).

### The Short Comings of the PAYGO System

The PAYGO system under-recovers costs, especially those generated by heavy vehicles employed for freight movements. The reasons for this include the inappropriate classification of some costs as common costs, the exemption of many road costs from the PAYGO system, cross-subsidisation within vehicle classes and the inadequate approximations in allocating attributable costs.

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<sup>18</sup> The ceiling price is generally defined as the full economic cost of providing the service while the floor price is defined as the marginal or incremental cost of providing the service on a particular line segment. The exception to this general approach is Victoria which has recently adopted a revenue cap for establishing prices.

### Inappropriate classification of common costs

A large proportion of costs associated with bridge maintenance/extensions/upgrades, road and pavement rehabilitation and extensions, land acquisitions are treated as common costs amongst all classes of vehicles. This ignores the fact that heavy vehicles disproportionately damage bridges, road and pavements due to their weight and the need to reinforce these structures to accommodate the weight of heavy vehicles (this is a cost above and beyond road maintenance for heavy vehicle use). In effect, passenger vehicles subsidise commercial freight operators for the provision of roads.

### Exemption of certain road costs

Costs associated with the provision of local and rural roads are largely excluded from the PAYGO system, where 75% of the cost of urban roads, and 50% of the cost of rural roads, are excluded from the PAYGO system. Local councils, in effect rate payers, are asked to provide subsidised road infrastructure for all road users. While the provision of access and amenity to passenger vehicles has strong merit, it is less clear as to why local residents should subsidise road infrastructure for commercial businesses such as trucking companies.

### Cross-subsidisation within vehicle classes

Within each vehicle class, high frequency users are subsidised by low frequency users as the PAYGO simply calculates the total kilometres travelled by each vehicle class and attributes costs equally to each vehicle in operation. A heavy vehicle owned by an interstate freight company will be used continuously and will, on the most, travel on well maintained interstate routes. In comparison, a heavy vehicle owned by a farmer will be used infrequently and mostly during high seasons, and will use less well maintained regional roads. In effect the farmer, and users similar to the farmer, will subsidise the commercially run freight company.

### Inadequate approximation of costs

The PAYGO system use of approximation inadvertently creates under-recovery of costs from heavy vehicles. The use of the fuel excise is one such example. Fuel excise is used as a proxy for actual road usage. However this is a poor proxy. There is little correlation between road damage and fuel use.

The use of historical costs to approximate future road costs also lends itself to under-recovery. In general road usage and the need to provide and maintain road infrastructure has been increasing.

This suggests that using historical evaluation would underestimate costs associated with the maintenance of current infrastructure and the provision of new infrastructure.

#### Road Pricing & Impact on Rail

PAYGO's shortcomings effectively subsidises heavy use of heavy vehicles on Australia's interstate roads. This subsidisation gives road freight a price advantage over the more cost-effective, safe, environmentally friendly and sustainable rail alternative, leading to sub-optimal transport outcomes for Australia.

# Why Road Pricing Reforms

# 4

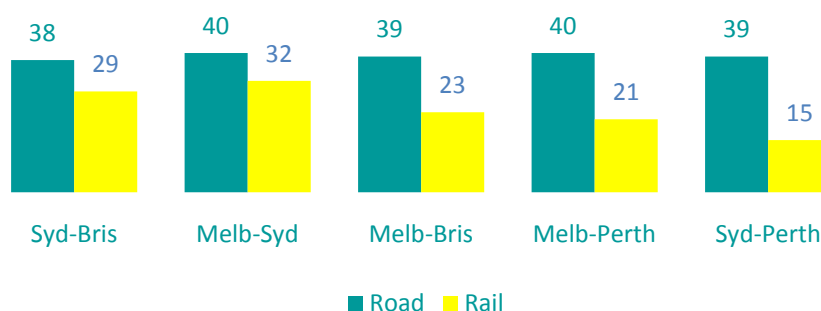


## 4. Why Do We Need Road Pricing Reforms

### The Need for Competitive Neutrality between Land Transport Modes

The PAYGO system, as compared to rail access charges, creates an effective subsidy for heavy use heavy vehicles (see section **Current System of Road Charges**). Rail access charges are determined on the principle of full cost recovery, in contrast to the PAYGO system. This places rail at a competitive disadvantage by increasing its operating costs.

**Above Road / Above Rail Operating Cost Comparison<sup>19</sup> (\$ per 000 net tonne km (ntk))  
(Containerised Freight)**



Source: Port Jackson Partners (2005), *The Future of Freight*, [The Australasian Railway Association](#)

This competitive disadvantage is best highlighted by a breakdown of road and rail costs. The operating costs comparison between road and rail, as demonstrated in the graph above, shows that rail freight's costs (excluding access charges and road charges) are some 50-75% lower than road freight<sup>20</sup>. Rail has a significant cost advantage in all major interstate containerised freight movements.

However rail's cost advantage is negated by the significant differences in track access charges and road charges. This leads to a disparity in costs where rail service providers must spend up to 30-40% of their operating costs on rail access charges while heavy vehicle operators only spend 5% of total costs on road charges<sup>21</sup>.

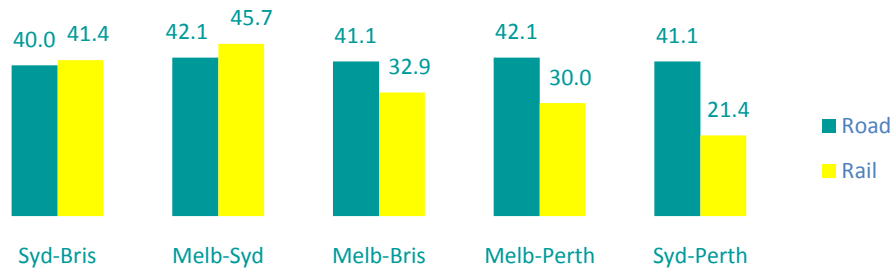
<sup>19</sup> Excludes road charges and track access charges

<sup>20</sup> Port Jackson Partners & Access Economics (2005), *The Future of Freight*, published by [the Australasian Railway Association](#)

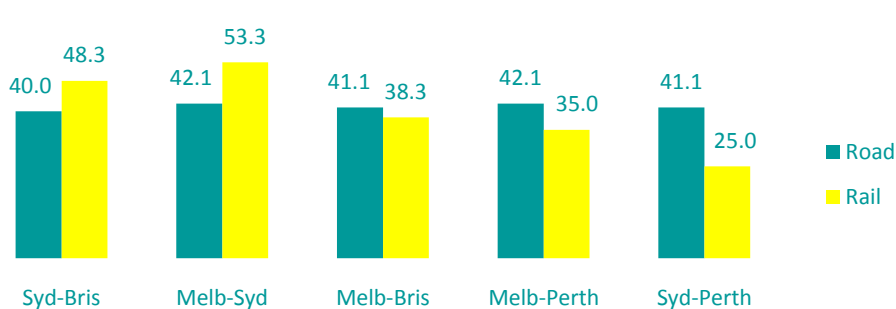
<sup>21</sup> Port Jackson Partners & Access Economics (2005), *The Future of Freight*, published by [the Australasian Railway Association](#)



**Road / Rail Operating Cost Comparison Inc. Access & Road Charges Low Scenario<sup>22</sup>**  
 (\$ per 000 ntk, Containerised Freight)



**Road / Rail Operating Cost Comparison Inc. Access & Road Charges High Scenario<sup>23</sup>**  
 (\$ per 000 ntk, Containerised Freight)



When the high cost of access charges are incorporated into the analysis, rail only holds a definite cost advantage on Melbourne-Perth and Sydney-Perth interstate routes. Given the differences in frequency and duration of road and rail freight services on the Melbourne-Brisbane route, it is unlikely that a small cost advantage will give rail an overall competitive advantage.

### The Need to Account for the Social Costs and Benefits of Land Transport

Road pricing reforms need to account for the social costs and benefits of land transport use. These social impacts may include urban congestion, safety, energy security, safeguarding against increasing energy prices and a move towards an increasingly carbon restricted economy.

The current road pricing and rail access charging regimes do not take into account the relative social costs and benefits associated with transport. This is a poor outcome for Australia. The recently released Henry Tax Review<sup>24</sup> acknowledges that the existing road pricing regime has not maximised the social benefits of land transportation for Australia:

<sup>22</sup> Assumes that road access charges are 5-10% of total operating costs for road freight and that rail access charges are 25-30% of total operating costs for rail freight.

<sup>23</sup> Assumes that road access charges are 5% of total operating costs for road freight and that rail access charges are 40% of total operating costs for rail freight.

<sup>24</sup> Australian Treasury (2010), *Australia's Future Tax System*, The Commonwealth Government of Australia

*“Current road tax arrangements will not meet Australia's future transport challenges. Poorly functioning road networks harm the amenity, sustainability, liveability and productivity of society. Moving from indiscriminate taxes to efficient prices would allow Australia to leverage the value of its existing transport infrastructure. Less congested roads, shorter travel times and investment in road infrastructure that addresses user demand would provide a foundation for further productivity growth, improved living standards and more sustainable cities.”*

### The social benefits of rail

Rail is the safest, most environmentally friendly cost effective and sustainable mode of land transportation. Rail is also the solution to the urban road congestion problem and is the only form of transport that can ensure Australia's energy security through the consumption of indigenous energy sources.

Road pricing reforms are required to ensure that such social impacts are incorporated into the market price for land transportation and into the decision making process for transport infrastructure investments. Such reforms will ensure that the social costs associated with land transportation will be minimised and the benefits maximised.

#### SOCIAL BENEFITS OF RAIL

- Rail is the **most fuel efficient** form of land transport (passenger rail is up to 2-4 times and freight rail is up to 10 times more fuel efficient than road);
- Rail is the **solution to congested roads**, where one freight train can remove up to 150 trucks and one passenger train can remove up to 500 cars off the road;
- Rail **promotes and accommodates active forms of transport**, such as cycling, improving our health and wellbeing;
- Public transport, such as rail, **ensures social inclusion and access** to those who cannot afford private transport;
- Rail relies heavily on indigenous sources of fuel enhancing our **energy security**;
- Rail **is a less carbon intensive** mode of land transport; and
- Rail is up to 7-9 times **safer** than road transport.

**Safety:** Rail is the safest mode of land transportation and a solution to mitigating the number of fatal and serious road accidents. Over 1500 people die on our roads every year, many more are seriously injured or permanently disabled<sup>25</sup>. These road accidents cost the Australian economy up to \$35 billion per annum<sup>26</sup>.

A modal shift towards rail transport is the solution to this needless waste of lives and money. Rail transport is 7-9 times safer than road transport in relation to both passenger and freight<sup>27</sup>.

Cross Modal Fatality Rate Comparisons 1985/86	
Mode	Fatalities per 100 million passenger kilometres
Passenger Rail	0.24
Road	1.54

Source: Adena & Montesin (1988)

Source	Freight Fatalities per Billion Tonne Kilometres	
	Road	Rail
ARA 2006 Estimate	.94	.1
Freight Corp 1998 Estimate	3.8	.55

The Freight Corp estimates show the incidence of fatalities in 1998 for both rail and road to be much higher than in 2006. This conclusion would seem to be consistent with the improved safety of freight transportation and the significant increase in freight tonne kilometres.

The cost of road accidents in 2006<sup>28</sup> was calculated by the Bureau of Infrastructure, Transport and Regional Economics (BITRE) to be nearly \$20.1 billion per annum in 2010 dollars (assuming 3% rate of inflation).

However the above estimates have been criticised for using a very low statistical value of a human life (VSL) in calculating the cost of road accidents. International comparisons would suggest a VSL of around \$6.8 million<sup>29</sup>. Using a VSL of around \$6.8 million, and using the methodology of BITRE, would increase the cost of road accidents to around \$31 billion and the cost of heavy vehicle accidents to approximately \$3 billion per annum (in 2010 dollars). This has been confirmed by a 2010 BITRE study<sup>30</sup> and research conducted by LECG Consulting puts the figure of road accidents closer to \$35 billion per annum.

**Energy Security:** Rail is the only mode of transport that can use wholly indigenous sources of energy, reducing Australia's reliance on foreign energy sources and significantly reducing the risks of a

<sup>25</sup> Australasian Railway Association (2010), *Towards 2050: The National Freight Strategy & the Role of Rail*, [the Australasian Railway Association](#)

<sup>26</sup> LECG Consulting (2010), *The cost of road crashes*, published by the [Australasian Railway Association](#)

<sup>27</sup> Extracted from ATSB Transport Safety Report, Rail Statistics (2009) & the Australian Roads Death Database

<sup>28</sup> LECG Consulting (2010), *The cost of road crashes*, published by the [Australasian Railway Association](#)

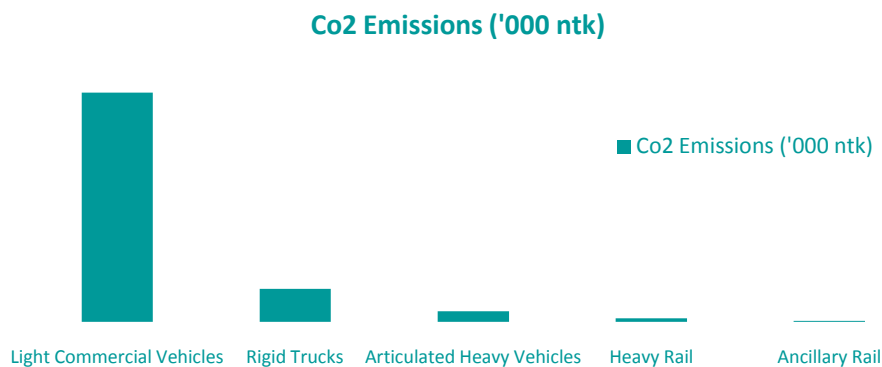
<sup>29</sup> LECG Consulting (2010), *The cost of road crashes*, published by the [Australasian Railway Association](#)

<sup>30</sup> BITRE (2010), Update: *Estimating urban traffic and congestion cost trends for Australian cities*, [Working Paper 71](#)

supply shock. The use of indigenous fuel sources also reduces exposure to fluctuating international energy prices. Large parts of the rail network are electrified, allowing the use of stationary energy sources. Rail can also easily use liquefied natural gas, a commodity readily found in Australia, as a fuel source.

**Climate Change:** Rail transportation produces less green house gas emissions and is more fuel efficient than road transportation. The Federal Department of Climate Change and Energy Efficiency<sup>31</sup> estimated that the transportation industry accounted for 13.2% of Australia’s domestic emissions in 2007. Emissions from cars account for approximately 54% of Australia’s total domestic transport emissions, and are projected to increase by 40% between 1990 and 2020<sup>32</sup>. Trucks and light commercial vehicles account for 31% of Australia’s transport emissions, and emissions from these modes are projected to increase by 112% between 1990 and 2020.

Passenger and freight rail services are only responsible for 2.4% of total transport emissions<sup>33</sup>. This is despite the fact that passenger rail accounts for 5-10%<sup>34</sup> of passenger journeys and freight rail accounts for approximately 50% of the land freight task<sup>35</sup>.



With increasing electrification of rail networks, rail has the potential to be a zero emissions mode of transport.

**Urban Congestion:** The Bureau of Transport and Regional Economics has estimated that congested road costs Australia up to \$15 billion per annum, or about one per cent of GDP, and that the cost will double by 2020.<sup>36</sup>

<sup>31</sup> Department of Climate Change (2007), *National greenhouse gas inventory*,  
<sup>32</sup> Garnaut Climate Change Review (2007), *Transport, Planning and the Built Environment*, Issues Paper - Forum 5  
<sup>33</sup> Department of Climate Change (2007),  
<sup>34</sup> BITRE – Australian Transport Statistics Yearbook 2007  
<sup>35</sup> Bureau of Infrastructure, Transport and Regional Economics (2009), *Australian Transport Statistics Yearbook*, Canberra

The growth in road transportation, particularly road freight, in the last 30 years has grown much faster than GDP. Given the limited availability of urban land for new road infrastructure, the growth in road transportation has created a serious congestion problem in Australia's road network.

Rail is a high density mode of transportation that can create significant new capacity for both passenger and freight journeys with limited land availability. One freight train has the potential to remove the equivalent of up to 150 trucks off the road<sup>37</sup>

#### Accounting for the social costs and benefits of transport

The above mentioned social costs/benefits must be accounted for when making decisions on transport infrastructure. Governments must intervene to ensure that market mechanisms incorporate such social costs/benefits into price signals, ensuring optimal social and environmental outcomes from transport decisions. For example congestion alleviation can be effected through differential road pricing, where charges for road supply increase during peak times, encouraging greater use of public transport and off-peak private vehicle travel. Regulatory intervention is required where incorporation into market mechanisms is not possible.

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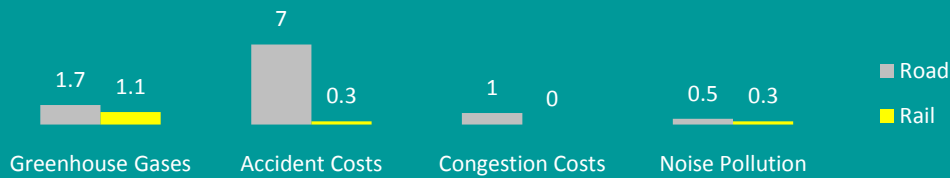
<sup>36</sup> Bureau of Transport and Regional Economics (2007), Estimating urban traffic and congestion cost trends in Australian cities, *Working Paper no. 79*, Canberra.

<sup>37</sup> American Association of Rail (2010), see URL: <http://freightrailworks.org/open-highways-one-train-at-a-time.php>

### Accounting for the Social Costs of Land Transport

A 2005 Port Jackson Partners/ Access Economics study analysed the cost of externalities associated with road and rail. As demonstrated by the graph below, the study found that road freight created up to \$10.3 in externalities per thousand tonne kilometres of freight moved. Rail created \$1.7 in externality costs.

Above Road / Above Rail Externality Costs in Non-Urban Areas (\$ per 000 ntk)<sup>38</sup>  
(Containerised Freight)



Source: Port Jackson Partners (2005), *The Future of Freight*, [The Australasian Railway Association](#)

**“Road freight creates up to \$10.3 in externalities per thousand tonne kilometres of freight moved. Rail creates \$1.7 in externality costs!”**

<sup>38</sup> Assumes a carbon price of \$40/t and uses a cost of accident methodology consistent with the 2010 BITRE estimates.

## The Need for Competitive Markets

### The need for a well functioning competitive national market

Over the past 20 years, The Federal Government has initiated reforms to ensure competitive markets. As a result of the adoption of the Hilmer Report recommendations, national markets were created in the energy, communications and water sectors, where competitive markets have delivered significant efficiency gains, and lower utilities prices, for Australia. These reforms have contributed up to a 2.5% (\$20 billion) of growth per annum to Australia's GDP since 1990<sup>39</sup>.

While significant reforms were undertaken in the transport sector, they have fallen short of creating a well functioning competitive national market for the transport sector. The Productivity Commission considers *"that developing nationally coordinated reform frameworks and programs for the freight transport and passenger transport sectors would ... provide a high return to the community."*<sup>40</sup>

The Henry Tax Review also highlights the imperfections in freight transport market and the need for reforms or intervention to achieve competitive neutrality between modes.

The national land freight transport market is far from a properly functioning competitive market. The major factor for the lack of a functioning market is the inadequate economic regulations governing land transportation (road pricing, rail access charges etc.).

The disparity between the principles underpinning road pricing and rail access charges is a significant impediment in creating competitive neutrality in the land transport market. Rail access charges generally work on the principle of full cost recovery while road pricing, via the PAYGO system, does not recover full costs from heavy vehicles. This leads to a disparity in costs where rail service providers must spend up to 30-40% of their operating costs on rail access charges while heavy vehicle operators only spend 5% of total costs on road charges<sup>41</sup> (for more in depth discussion see section **"Current System of Road Charges"**).

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<sup>39</sup> Productivity Commission (2005), *Review of National Competition Policy Reforms*, [The Commonwealth Government](#)

<sup>40</sup> Productivity Commission (2005), *Review of National Competition Policy Reforms*, [The Commonwealth Government](#)

<sup>41</sup> Port Jackson Partners & Access Economics (2005), *The Future of Freight*, published by [the Australasian Railway Association](#)

### The need for market mechanisms to capture the social costs/benefits of transport options

The current road charge and rail access pricing systems fail to capture the social costs and benefits of transport options. As previously discussed, the costs associated with congested roads, road safety, energy security and climate change will be key determinants of Australia's future economic productivity and international competitiveness.

### Comparisons between Road and Rail in a Properly Functioning Competitive Market

There are many factors in determining competition in the land freight transport market. The three key factors in determining competition between road and rail freight are:

- reliability and availability of services;
- duration of freight journey; and
- price.

There is much conjecture as to which criteria is of most importance. A 2006 Ernst & Young Paper<sup>42</sup> states that reliability and availability is the most important criteria, while a 2010 ACIL Tasman study<sup>43</sup> places price as the most important criteria.

The analysis on page 34 has been derived from a 2005 Port Jackson/ Access Economics study commissioned by Pacific National and the ARA. The analysis looks at various market scenarios to gauge the competitiveness of road v rail on major interstate routes. The analysis shows that under current road and rail access charging regimes, where rail access charges account for up to 30-40% of rail freight's operating costs and road charges account for only 5% of road freight's operating costs, rail only has a competitive advantage for the Sydney to Perth and Melbourne to Perth corridors. Though rail holds a price advantage in the Melbourne to Brisbane corridor, lack of reliability and availability due to inadequate infrastructure makes it unlikely that it could effectively compete against road freight.

A more equitable road and rail access charging regime, where heavy vehicle road charges increase to 10% of operating costs and rail access charges account for 25% of rail's operating cost, would have a significant impact on rail's competitiveness. Rail would have a competitive advantage in the Sydney to Perth, Melbourne to Perth, and Melbourne to Brisbane corridors and could compete effectively in

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<sup>42</sup> Ernst & Young (2006), *North-South Rail Corridor Study- Detailed Study Report*, Commissioned by the Department of Transport and Regional Services

<sup>43</sup> ACIL Tasman (2010), *Study into the Perceptions of Rail*, published by the Australasian Railway Association



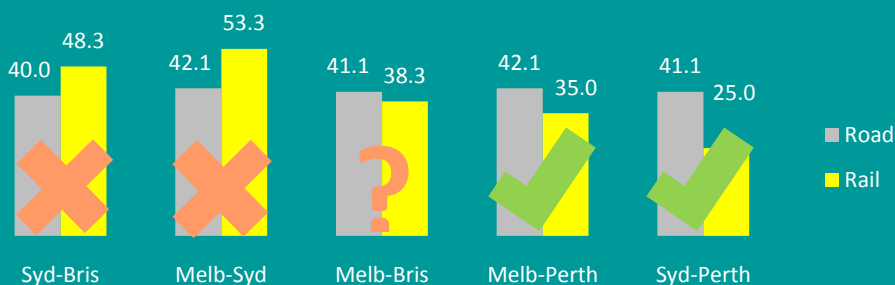
the Melbourne to Sydney, and Sydney to Brisbane corridors with effective investment in infrastructure to improve reliability and reduce journey durations.

If the current road and rail access charging regime was maintained but took into account the cost of externalities such as safety, CO2 emissions, congestion and noise, rail would have a competitive advantage in the Sydney to Perth, Melbourne to Perth, and Melbourne to Brisbane corridors.

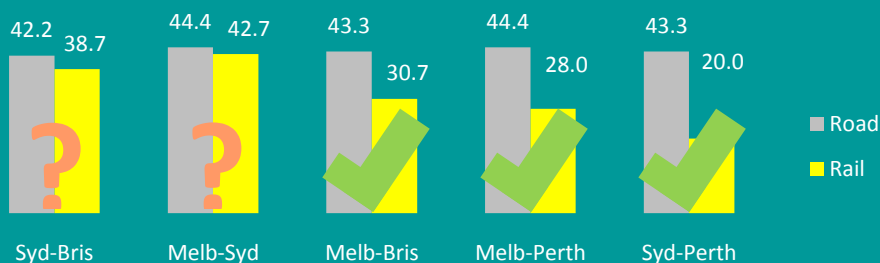
In a properly functioning competitive market, where there is competitive neutrality between road and rail access charging regimes and externalities are internalised, rail will enjoy a significant price advantage in all interstate corridors, as demonstrated by the last diagram on page 34.

## Rail's Competitiveness in Containerised Freight under Various Market Scenarios (Road / Rail Operating Cost Comparison (\$ per 000 ntk))

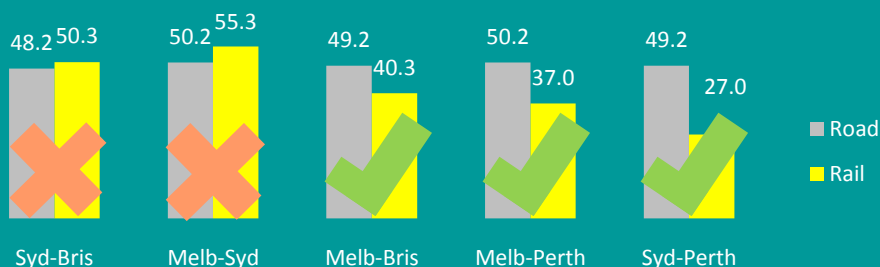
### Access & Road Charges High Scenario<sup>44</sup>



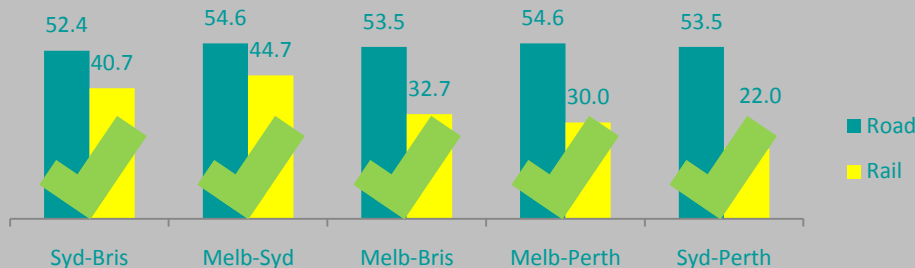
### With Equitable Road & Rail Charges<sup>45</sup>



### Access & Road Charges High Scenario, Externalities Internalised<sup>46</sup>



### With Equitable Rail & Road Charges, Externalities Internalised<sup>47</sup>



Functioning Competitive Market

<sup>44</sup> Assumes road access charges are 5% of total operating costs & rail access charges are 30-40% of total operating costs .

<sup>45</sup> Assumes road access charges are 5-10% of total operating costs & rail access charges are 25-30% of total operating costs .

<sup>46</sup> Includes costs of externalities such a noise pollution, congestion etc.

## User Pay Cost Recovery for Infrastructure

As previously discussed (see section “**Current System of Road Charges**”), the current PAYGO system does not provide a user pay cost recovery regime for road infrastructure. This is a poor outcome in terms of:

- future road infrastructure expenditure allocation;
- needless costs placed on local residents and passenger vehicle owners; and
- creating a bias towards road freight transportation, through the effective subsidisation of heavy vehicles.

The current PAYGO system places substantially more of the burden for road infrastructure provision on local residents and passenger vehicle users, while commercial road freight operators receive an effective subsidy for their use of road infrastructure. A user pay system will ensure that each user pays their fair share for the use of the infrastructure.

This subsidisation of heavy use heavy vehicles distorts the market for land transportation, eroding the price competitiveness rail freight transportation. A recent ACIL Tasman survey<sup>48</sup> of freight forwarders concluded that price is the major determinant in choosing the mode of transport for freight. The deterioration of rail’s price competitiveness will lead to poor social and environmental outcomes, given rail’s superior safety and environmental performance. A user pay system of road pricing would correct the bias caused by heavy vehicle subsidisation under the PAYGO system.

A further benefit of a user pay system of road pricing is the ability to allocate infrastructure expenditure to where it is most needed. Data collated for the purposes of implementing a user pay system, can be used to more accurately determine the need for new road infrastructure and maintenance.

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<sup>47</sup> Includes costs of externalities such a noise pollution, congestion etc. and assumes equitable road and rail charges

<sup>48</sup> ACIL Tasman (2010), “*Study into the Perceptions of Rail*”, published by [the Australasian Railway Association](#)

## Exhaustion of Supply Side Solutions

Supply side solutions to road transportation is no longer tenable given the lack of available urban lands for new roads, significant projected increases in Australia's population<sup>49</sup> (especially in urban population) and increasing road use as a result of passenger and freight journeys.

The lack of preserved transport corridors has necessitated the move towards more complex solutions such as tunnels and bridges to accommodate new road infrastructure<sup>50</sup>. These solutions are prohibitively expensive, complex and not viable as a widely used solution.

Induced demand for road use further restricts the effectiveness of increasing road supply. The concept of induced demand refers to the notion that the new supply of road infrastructure will actually encourage increased demand over and above existing demand for road use. In Australia, per capita car ownership and per capita car usage has increased with the increased supply of road infrastructure over the past 20 years, through Government programs, which have given unprecedented levels of funding to road infrastructure.

Car Usage in Australia			
	1991	2003	2009
Number of Cars	7.5 million	10.2 million	15.7 million
Number of Cars Per Capita	0.43	0.52	0.70

Source: Derived from Australian Bureau of Statistics (2009), *Motor Vehicle Census*, ABS 31 March & Australian Bureau of Statistics, *Australian Demographic Statistics*, ABS at URL: [www.abs.gov.au](http://www.abs.gov.au)

As the table above demonstrates, car ownership has more than doubled in the 18 years since 1991. This is despite moderate population growth of around 30%. As a result the number of cars per capita has grown significantly from 0.43 in 1991 to 0.70 in 2009. This indicates a greater utilisation of road journeys.

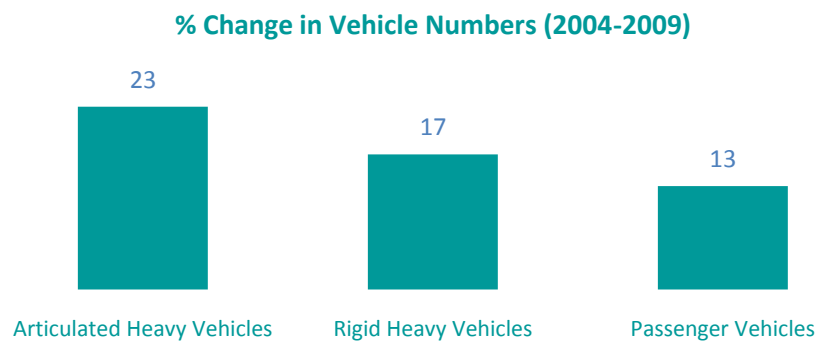
<sup>49</sup> The Australian Government Treasury (2010), "*Australia to 2050: Future Challenges*", see URL: [http://treasury.gov.au/igr/igr2010/Overview/pdf/IGR\\_2010\\_Overview.pdf](http://treasury.gov.au/igr/igr2010/Overview/pdf/IGR_2010_Overview.pdf)

<sup>50</sup> Infrastructure Partnerships Australia (2010), *Urban Transport Challenge: A Discussion Paper on a Role for Road Pricing in the Australian Context*, Infrastructure Partnerships Australia

Registered Heavy Vehicles in Australia			
	1991	2003	2009
Number of Heavy Vehicles (Rigid & Articulated)	384947	424097	502919

Source: Derived from Australian Bureau of Statistics (2009), *Motor Vehicle Census, ABS 31 March* & Australian Bureau of Statistics, *Australian Demographic Statistics, ABS* at URL: [www.abs.gov.au](http://www.abs.gov.au)

The growth in the number of heavy vehicles has shown a similar trajectory as passenger vehicles. In the past 5 years the growth in the number of heavy vehicles has by far outstripped growth in passenger vehicles.



Source: Derived from Australian Bureau of Statistics (2009), *Motor Vehicle Census, ABS 31 March* & Australian Bureau of Statistics, *Australian Demographic Statistics, ABS* at URL: [www.abs.gov.au](http://www.abs.gov.au)

Not only is the growth in heavy vehicle number outstripping passenger vehicles, but the size and weight of each individual heavy vehicle is also increasing. Between 2004 and 2009, the registration of heavy vehicles with a gross combined mass of over 60 tonnes has increased by 62.2%.<sup>51</sup>

Governments around the world have recognised the shortcomings of supply side solutions and are implementing demand side solutions to passenger and freight transportation (see section **Road Pricing Models (International Experiences)**). At the forefront of this step change is the move towards the implementation of road pricing to deal with demand management and infrastructure cost recovery.

<sup>51</sup> ABS (2009)

# Road Pricing Models (International Experience)

# 5



## 5. Road Pricing Models (International Experiences)

### Road Pricing Models

There are many different models of road pricing that can be used to ensure a user pay system for road infrastructure, and to correct market failures such as externalities. The following international examples provide Australia with an opportunity to assess the relative merits of the various road pricing model options.

INTERNATIONAL ROAD PRICING EXPERIENCE				
Country	Purpose	Road Pricing Model	Impacts of Road Pricing	Revenues & Costs
Sweden	Manage congestion & protect environment	Cordon pricing, variable charge based on time of day <i>Technology: number plate recognition (NPR)</i>	20% reduction in city centre congestion 10-14% decrease in emissions	Gross Revenues (2009): \$US 120 million Overhead Costs: \$US 44 million
UK	Manage congestion & protect environment	Cordon pricing, flat daily rate <i>Technology: NPR</i>	Up to 25% reduction in city centre traffic	Gross Revenues (2009): \$US 435 million Overhead Costs: \$US 212 million
Singapore	Manage congestion	Cordon & express way charging by time of day and class of vehicle <i>Technology: dedicated comms (DSRC) &amp; smart cards</i>	Reached average road speed targets of 45-65 kph on expressways & 20-30 kph on roadways	Gross Revenues (2008): \$US 90 million Overhead Costs: \$US 18 million
Germany	Generate revenue, promote user pay principle & protect environment	Mass Distance Heavy Vehicle Charging based on emissions class and axle loads on highways <i>Technology: GPS, GSM, DSRC &amp; NPR</i>	Empty truck trips declined 7% 58% shift to less polluting trucks Less than 2% violation rate	Gross Revenues (2008): \$US 5 billion Overhead Costs: \$US 750 million
Czech Rep.	Generate revenue, promote user pay principle & protect environment	Mass Distance Heavy Vehicle Charging based on emissions class and axle loads on highways <i>Technology: DSRC &amp; NPR</i>	NA	Gross Revenues (2008): \$US 340 million Overhead Costs: \$US 100 million
Netherlands (Proposed)	Manage congestion, generate revenue, promote user pay principle & protect environment	National distance based charging on all roadways <i>Technology: GPS, GSM &amp; NPR</i>	NA	NA

Adapted from US Department of Transportation, Transport Research Board & American Association of State Highway & Transport Officials (2010), *International Scan: Reducing Congestion & Funding Transportation Using Road Pricing*, [US Department of Transport](#), April

## **Registration Charges & Fuel Excise**

In Australia, registration and fuel excise charges have been the most commonly employed mechanism to recover costs for road infrastructure. While not technically road pricing model, it is an indirect mechanism with similar aims to road pricing.

While the implementation of this type of charging is low cost and relatively simple, there are many issues with registration and fuel excise charges. The cost of vehicle registration does not indicate an individual's road usage. It does not indicate distance travelled, or the time and location of that use. For example, a heavy vehicle owned by a farmer will intermittently use regional roads to ship goods to a regional centre. A heavy vehicle owned by a national freight company will be utilised on a daily basis and use well maintained interstate highways and travel long distances. Despite this, both heavy vehicles pay the same registration fee. This leads to the subsidisation of heavy use heavy vehicles.

Fuel excise charges are equally problematic. Fuel excise does not account for time or location and is a poor approximation of distance travelled or damage cause to the road.

The effective subsidisation gives of heavy use heavy vehicles, gives road freight a price advantage over the more cost-effective, safe, environmentally friendly and sustainable rail alternative, leading to sub-optimal transport outcomes for Australia. (For a detailed analysis of Australia's registration and fuel excise regime see '**Current System of Road Charges**').

## **Cordon Pricing & Congestion Charging**

Cordon pricing refers to a charge for access to a defined geographical area, usually highly dense CBD areas. Cordon charging is predominantly used as a road demand management tool, limiting the demand for scarce inner-city road infrastructure.

Cordon pricing can be used to address congestion by placing a variable price on limited urban road space. During peak times, prices are raised to discourage car journeys, while during less congested times the price falls back to base levels. Variable prices can also be imposed on different classes of vehicles. For example smaller vehicles and more fuel efficient vehicles may be charged a lower tariff to encourage climate change objectives.

Cordon/congestion charging can be used as a method of regulating freight movement, through variable charging for different classes of vehicles and using variable time and route based prices to encourage freight vehicles to access roads during off-peak times.



Cordon/congestion charging is a very effective road demand management tool and is one of the most effective mechanisms in reducing congestion and implementing policy objectives such as carbon emissions reduction. In Stockholm cordon/congestion charging has reduced traffic volumes by 10-15% and increased public transport use by 6-9%. In London congestion charging resulted in a 30% reduction (2006) in traffic since the inception of the cordon and increased travel speeds by 37%<sup>52</sup>.

The Victorian Government has proposed a very limited use of congestion charging to regulate heavy vehicle movements in around congested roads leading to port.

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<sup>52</sup> Transport of London (2007), *Central London Congestion Charging*, [Transport of London July](#)

## Stockholm Congestion Charge

The purpose of the Stockholm road pricing project is to reduce traffic congestion and vehicle emissions in the CBD area of Stockholm. The project has developed a cordon around Stockholm city centre, where a variable charge is applied for crossing the cordon. A variable toll is charged depending on the day and time of day up to a maximum of \$US 9. Public transport, taxis, emergency vehicles and eco-friendly vehicles are exempt from the charge.

In 2009, annual revenues were approximately \$US 120 million while overhead costs associated with the program was around \$US 44 million. The relatively high overhead costs can be partially attributed to initial teething problems with tolling system implementation.

Funds raised by the charge went to the improvement of public transport within the cordon including 200 new articulated buses, dedicated bus routes, 2400 new park-and-ride care spaces and improved rail services.

Overall, the congestion charge reduced traffic volumes by 10-15% and increased public transport use by 6-9%. The Stockholm road pricing project was initially a 7 month trial. After the 7 month trial, the system was taken offline and traffic volumes returned to pre-trial levels. The project was permanently reinstated in August 2007; traffic volumes reverted back to levels similar to those during the trial.

US Department of Transportation, Transport Research Board & American Association of State Highway & Transport Officials (2010), *International Scan: Reducing Congestion & Funding Transportation Using Road Pricing*, [US Department of Transport](#), April

Implementation of Cordon/Congestion Charging	
Challenges	Solutions
The need for a mass-transit public transport network	Use revenues raised from the charge to fund public transport upgrades.
The need for road use data and driver education	Initiate trial period or phasing in of charging system to allow for data collation and allow drivers to become acquainted with new procedures and to witness benefits of the scheme.
High implementation costs	Ensure that the charging scheme has significant scale in terms of scope and physical application to benefit from economies of scale.

There are many challenges with the implementation of cordon and congestion charging. In the Australian context, the biggest hurdle facing the implementation of congestion charging is the lack of a viable mass transit public transport system. Congestion charging works on the basis of shifting car journeys to public transportation. Most of Australia’s capital city public transport networks do not have the capacity to accommodate this shift in journey behaviour. Cities that have initiated congestion charging, such as London, Singapore and Stockholm, all have functioning mass transit public transport systems. One solution to this barrier is to use revenues raised from the congestion charge to fund public transport upgrades.

### Network Charging & Heavy Vehicle Charging

Network charging is a comprehensive method of road pricing, where all road infrastructure is priced according to use (distance travelled, location, time, weight etc.). As the name suggests, this method of road pricing encompasses urban and non-urban areas. To achieve a whole-of-network pricing system in vehicle technologies can be used to track vehicle and road use. A combination of toll and cordon charges could be applied as an indirect method of network charging. Infrastructure cost recovery, demand management and the internalisation of transport externalities can all be outcomes of such a system.

## Netherlands Proposed Network Road Pricing System

The Netherlands plan to have a network wide road pricing system for heavy vehicles by 2012 and for all vehicles by 2018. The objective of the reform is to:

- improve mobility and accessibility across the Netherlands (congestion alleviation);
- full cost recovery for transport infrastructure;
- establish a road pricing system based on use not vehicle ownership (user pays);
- improve environmental outcomes; and
- improve road safety.

The road charges will be based on mass-distance charging, also taking into account vehicles emissions performance.

Although the method of toll collection has not been selected, it has been determined that in-vehicle GPS will be the main technology deployed. The overhead cost for administering the system is expected to be between 5-10% of total revenues raised.

US Department of Transportation, Transport Research Board & American Association of State Highway & Transport Officials (2010), *International Scan: Reducing Congestion & Funding Transportation Using Road Pricing*, [US Department of Transport](#), April

Mass-distance-location heavy vehicle charging is a limited application of network charging, where heavy vehicles are tracked and charged for their actual use of road infrastructure. In the Australian context, mass-distance-location heavy vehicle charging would be an effective and more cost effective method to address many of the problems associated with Australia's current system of registration and fuel excise charges.

At present, Australia's urban public transport system is not ready to implement system wide road pricing. To include passenger vehicles into a network charging scheme would cause significant delays and bottlenecks for commuters in urban areas. There is no infrastructure cost recovery imperative to introduce network charging for passenger vehicles as they pay more than their fair share for infrastructure under the current system. The implementation costs for mass-distance-location heavy vehicle charging would be a fraction of the cost for system wide network charging,

with only around 70 000 vehicles requiring the installation of tracking technology as opposed to some 16 million vehicles<sup>53</sup>.

A further benefit of mass-distance-location heavy vehicle charging is the ability to gather credible and accurate metrics on road use, which will be of huge benefit for infrastructure planning.

In 2005 Germany implemented mass-distance-location heavy vehicle charging. The revenues generated from the charging scheme has covered all costs associated with road infrastructure provision and raised additional revenues to meet German Government's environmental and amenity policy objectives. The operating costs of the scheme amounts to around 15% of revenues. This figure will drop significantly when manual payments are phased out (currently accounting for one third of operating costs).

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<sup>53</sup> Derived from Australian Bureau of Statistics (2009), *Motor Vehicle Census*, ABS 31 March & Australian Bureau of Statistics, Australian Demographic Statistics, ABS at URL: [www.abs.gov.au](http://www.abs.gov.au)

## Germany Heavy Goods Vehicle Tolling

The German Heavy Goods Vehicle (HGV) tolling program began operations in January 2005. The program only applies to Heavy Vehicles over 12 tons travelling on all major expressways and highways, and includes foreign trucks that make up to 35% of heavy vehicle roadway usage.

The key policy objective of the program is to raise revenue on the 'user pays' principle. The secondary objective of the scheme is to address congestion and environmental problems by reducing emissions and promoting a modal shift towards rail and waterways.

Pricing is determined by distance travelled, emissions ratings of the vehicle and number of axles. The pricing regime is enforced via a combination of GPS navigation, GSM communications and number plate recognition technologies.

In 2008, annual revenues were approximately \$US 5 billion while implementation costs associated with the program was around 15-20% of total revenues. Implementation costs are set to reduce significantly as the number of manual transactions decline with the further uptake of technologies. At present manual transactions account for 10% of all transactions, while they account for one third of total implementation costs.

Revenue raised from the program covers all costs associated with road infrastructure, and additional revenue is allocated to rail and waterways freight infrastructure. It has also been successful in changing behaviours that contribute to road congestion and air pollution. Empty Truck movements have been reduced by 7% and there has been a 58% decrease in the use of less fuel efficient heavy vehicles.

US Department of Transportation, Transport Research Board & American Association of State Highway & Transport Officials (2010), *International Scan: Reducing Congestion & Funding Transportation Using Road Pricing*, [US Department of Transport](#), April

## Other Mechanisms (Subsidies & Charges)

In the absence of road pricing reforms, other mechanisms such as subsidies or charges may be employed to correct market distortions present in the land transport sector. The Henry Tax Review, for example, highlights the imperfections in freight transport market and the need for reforms or intervention to achieve competitive neutrality between modes. In the absence of a properly functioning land transport market, the Henry Tax Review recommends that:

*“On routes where road freight is in direct competition with rail that is required to recover its capital costs, heavy vehicles should face an additional charge in a comparable basis, where this improves the efficient allocation of freight between transport modes.”*

While this approach is relatively easy to implement, it is only an interim solution with limited merit. Government administered subsidies and charges require significant intervention from Government agencies to set the appropriate level of the subsidy or charge on a particular route. Similarly regular and timely Government intervention is required in adjusting the subsidy or charge as market conditions dictate. Any mistakes or failure to take into account market movements could lead to further market distortions. Subsidies will place further budgetary pressures on the Government, while additional charges for heavy vehicles will be strongly opposed by those affected.

## Technology Issues

Tracking technology is a significant operating cost for the introduction of any road pricing scheme. With significant improvements in-vehicle tracking technologies, technology is no longer an insurmountable barrier to the implementation of road pricing. Both the cost and effectiveness of tracking technologies has improved, and will continue to improve over the coming years.

## Lessons Learnt From International Experience

There are many lessons to be learnt from international experiences in road pricing reform, including;

- the need to raise public awareness of the costs and benefits of the road pricing reform;
- adequate time for stakeholders affected to comply with the new road pricing regime and provide a period of time for behavioural change prior to the full implementation of the new regime;
- linking revenues raised to infrastructure and public transport upgrades; and
- adequate public transport capacity when introducing congestion charging.

The Stockholm congestion charge provides the best example of successful road pricing reform. The congestion charge was introduced as a 7 month trial with a corresponding awareness campaign as to

the implications of the reforms. The trial period allowed stakeholders to judge the benefits of the reform including, less congestion, improved travel times within the cordon, increased amenity and improved public transport services.

Revenue raised from the charge was directed to public transport upgrades and the introduction of an extensive park-and-ride car space network within the cordoned area.

Due to the overwhelming support for the reform, the project was permanently reinstated in August 2007.

The German heavy vehicle road pricing regime highlights how implementation costs can be reduced by the selective targeting of vehicle classes.



**Government's Road  
Pricing Agenda**

**6**



## 6. Government Road Pricing Reform Agenda

There has been considerable policy attention on road pricing reforms in recent years. The centrality of road pricing reforms has come about due to the recognition of the need for national institutional and structural reform in the transport sector. Despite this attention, little action has been taken on road pricing reforms to date.

### Move Towards a National Transport System

In March 2008, the Council of Australian Governments (COAG) endorsed a far-reaching reform agenda for enhancing productivity and workforce mobility in areas of shared Commonwealth, State and Territory responsibility. These reform initiatives came under *The Seamless National Economy Partnership Agreement*<sup>54</sup>. In July 2008, COAG agreed that the seamless national economy initiatives were amongst the most significant and far-reaching of the potential reforms identified by COAG. COAG also included national transport policy reform as a part of the agreement.

Following the COAG agreement, Infrastructure Australia (IA) was asked to implement strategies to move towards the goal of a seamless national economy, including the establishment of a national freight network. The interaction and competition between road and rail freight is fundamental to the establishment of national freight network. A key issue within this is road pricing reforms.

IA will report to COAG on their recommendations of the national freight network in late 2010.

### COAG Road Reform Plan

In April 2007 the Council of Australian Governments (COAG) set out a three-phase COAG Road Reform Plan (CRRP) to consider alternative models of heavy vehicle road pricing and funding<sup>55</sup>. COAG identified the objective of the CRRP as promoting the most efficient, productive and sustainable provision and use of freight infrastructure. A critical direction is ensuring that national heavy vehicle road prices promote the efficient, safe and sustainable use of infrastructure, vehicles and transport modes.

However the work conducted under the CRRP, most notably by the National Transport Commission (NTC), has been very disappointing. Under phase I of the CRRP, the ATC prepared a report to COAG

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<sup>54</sup> COAG (2009), *National Partnership Agreement to Deliver a Seamless National Economy*, *COAG*.

<sup>55</sup> See url: [www.roadreform.gov.au](http://www.roadreform.gov.au)

that partially dealt with the issue of externalities<sup>56</sup>. The report concluded that the issue of externalities be deferred and not included in the scope the CRRP.

The failure by the CRRP to address externalities in examining heavy vehicle road pricing options, severely undermines the CRRP's ability to promote safe and sustainable transport networks.

### The Establishment of National Markets

In the 1990s the Hilmer Report outlined national reforms in the energy, water, communication and transport industries. As a result of the Hilmer Report recommendations, national markets were created in the energy, communications and water sectors, where greater competition has delivered significant efficiency gains, and lower utilities prices, for Australia. These reforms have contributed up to a 2.5% (\$20 billion) of growth per annum to Australia's GDP since 1990<sup>57</sup>. As a part of these reforms, industry specific national economic regulators were established to govern the emerging national markets.

While significant reforms were undertaken in the transport sector, they have fallen short of creating a national market for the transport sector. The Productivity Commission considers *"that developing nationally coordinated reform frameworks and programs for the freight transport and passenger transport sectors would ... provide a high return to the community."*<sup>58</sup>

Road pricing reforms are central to the establishment of a national market for land transportation. Road pricing reforms will provide the mechanism to create a functioning market where there is full cost recovery for infrastructure, establishment of user pays principles and competitive neutrality for all market participants.

### COAG Urban Congestion Review

In February 2006 COAG committed to reducing current and projected urban transport congestion within existing jurisdictional responsibilities, with a focus on national freight corridors, and only examining local networks where they interact with and impact on these corridors. COAG commissioned a review to assist them in considering further actions at their first meeting in 2007, asking that the Review make findings on improving the economic performance of national urban corridors and improving productivity outcomes from urban transport.

The need to assess road pricing alternatives was considered to be directly relevant to the commitment to reducing the problem of increasing urban transport congestion.

<sup>56</sup> Australian Transport Council (2009), *COAG Road Reform Plan Phase I Report*, [Council of Australian Governments](#) May

<sup>57</sup> Productivity Commission (2005), *Review of National Competition Policy Reforms*, [The Commonwealth Government](#)

<sup>58</sup> Productivity Commission (2005), *Review of National Competition Policy Reforms*, [The Commonwealth Government](#)

## The Review of Australia's Future Taxation System

The recently released Henry Tax Review<sup>59</sup> outlined recommendations for an overhaul of Australia's taxation system. The review has acknowledged that the existing road pricing regime has not delivered the most efficient use and supply of land transport:

*“Current road tax arrangements will not meet Australia's future transport challenges. Poorly functioning road networks harm the amenity, sustainability, liveability and productivity of society. Moving from indiscriminate taxes to efficient prices would allow Australia to leverage the value of its existing transport infrastructure. Less congested roads, shorter travel times and investment in road infrastructure that addresses user demand would provide a foundation for further productivity growth, improved living standards and more sustainable cities.”*

The introduction of congestion charging and heavy vehicle charging would go a long way in addressing the inadequacies of the current road pricing regime.

*“The challenge is formidable. It requires coordination across all levels of government. But reform would promote the best investment in and use of our roads, lift national productivity, and improve the lives of millions of Australians.”*

The Henry Tax Review also highlights the importance of a road pricing system that encourages competition between various modes of freight transport, internalises transport externalities and ensures the greatest utilisation of existing infrastructure.

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<sup>59</sup> Australian Treasury (2010), *Australia's Future Tax System*, [The Commonwealth Government of Australia](#)

# Recommendations

# 7



## 7. Recommendations

The Australasian Railway Association, on behalf of the Australian rail industry, recommends regulatory and institutional reforms. The introduction of mass-distance-location charging for heavy vehicles and the establishment of a single national economic regulator for land transportation will ensure:

- A well functioning land transport market
- competitive neutrality between road and rail; and
- a transport system that captures and accounts for the social and environmental impacts of transport decisions.

### Introduction of Mass-Distance-Location Heavy Vehicle Charging

Mass-distance-location heavy vehicle charging (MDL) is the most viable road pricing reform option that can be implemented in Australia. MDL would address the significant shortcomings of the current PAYGO system by targeting vehicles that cause the most damage to road infrastructure, be cost effective in terms of implementation and operation, and have the ability to capture the social and environmental impacts of freight transportation.

#### MDL addresses the shortcomings of the current PAYGO system

Under the current PAYGO system, heavy vehicles are under-charged for their use of road infrastructure (see section **Current System of Road Charges**). MDL would ensure that heavy vehicles pay their fair share for the provision and maintenance of road infrastructure. MDL would also ensure the adequate provision and maintenance of road infrastructure by aligning investments in road to actual use.

#### Cost effective

MDL is the most cost effective option available to Australia. It can be implemented at the fraction of the cost of other options. MDL for heavy vehicles, as compared to whole-of-network charging, would only require a very small fraction of Australia's total vehicles to be fitted with in-vehicle tracking technologies, significantly reducing implementation costs. MDL does not require significant improvements in other transport infrastructure, unlike cordon charging, which would require significant investment in urban public transport systems. Congestion charging is the most effective

road pricing alternative to deal with urban congestion and environmental issues, but requires a sustained commitment to public transport infrastructure.

#### Capturing the social and environmental impacts of freight transportation

MDL can be used to capture and account for the social and environmental impacts of transportation. MDL can be used to regulate road use during congested periods, on stretches of road that have safety concerns, or to effect improvements in emissions performance. Regulatory intervention may still be required for certain social/environmental impacts such as noise in residential areas.

In Germany the introduction of heavy vehicle MDL, with specific provisions to improve emissions performance, saw a 58% shift to more fuel efficient heavy vehicle models and a 7% decrease in empty truck trips.

#### **Establishment of a Single National Economic Regulator for Land Transport**

The establishment of a single national economic regulator for land transport would ensure competitive neutrality between road and rail and ensure a well functioning competitive market for land transportation.

The arbitrary delineation of road and rail has created inconsistent economic regulations that have provided an artificial price advantage to road freight (see section ***Current System of Road & Rail Access Charges***). A single national economic regulator for land transport would ensure consistent principles underpinning road pricing determinations and rail access charges. This in turn will ensure competitive neutrality between road and rail freight.

(For further information on institutional reform please refer to the ARA's discussion paper ***A Single National Land Transport Regulator***.)





