Australian Government

Department of Health and Ageing

PRODUCTIVITY COMMISSION REVIEW OF ECONOMIC COSTS OF FREIGHT INFRASTRUCTURE AND EFFICIENT APPROACHES TO TRANSPORT PRICING

Department of Health and Ageing Submission

Summary

The economic and social costs of road and rail freight infrastructure include local air pollution and accidents. Pollution and accidents impact on health through increased morbidity and premature deaths of individuals, resulting in significant direct and indirect costs. While research on health impact of transport externalities require further development, sufficient information exists to establish the significance of these externalities and guide a policy response.

The Bureau of Regional Transport and Economics has estimated that the total annual economic cost to society of vehicle emissions and road and train accidents is approximately $17.8 billion. These costs include direct health costs, such as medical and long-term care, and indirect economic costs to society from reduced labour force participation.

Such costs are not currently included in pricing of transport infrastructure. Calculating the social benefits and costs arising from transport infrastructure would be useful for understanding the net benefits of freight transport to the community.

Environmental health and road safety are policy areas involving inter-sectoral collaboration and whole-of-government policy approaches. These policy approaches are complementary to a national transport market policy approach that includes a focus on transport externalities.

Decisions about national transport market reforms would benefit from consideration of the health impacts of road and rail freight transport in pricing, in order to make informed decisions on individual developments and to gain a fuller picture of the contribution of transport infrastructure to Australia's productivity.

Introduction

This submission comments on the economic and social costs of freight transport. The Department of Health and Ageing (DoHA) supports the Productivity Commission's intention to use the review to establish a framework and principles for pricing road and rail infrastructure, and considers that there is value in recognising the externalities of road and rail infrastructure among the pricing principles.

Local air pollution and accidents are significant externalities of transport infrastructure use that result in health impacts and costs. Such costs are currently not taken into account when calculating the benefits and costs for freight transport infrastructure.[1] Accounting for the social costs of freight transport is important, with Australia's domestic freight task already significant and expected to double in the next two decades.

The net benefits of freight transport to the community cannot be fully understood without including direct and indirect social costs. Road and rail freight brings significant social and economic benefits; such benefits need to be viewed against social and economic costs to gain an accurate understanding of the impact of freight transport on Australia's productivity. The review's aim to identify factors for economically efficient pricing of road and rail freight transport and related infrastructure provides an opportunity to account for the quantified health costs arising from transport-related air pollution and road and rail accidents.

Limited data is available to separate the health and economic costs of freight vehicles from other vehicles (such as passenger cars). Much of the information about the health impact and costs of road and rail infrastructure apply to passenger transport as well as freight transport. While the policy implications for mitigating health impacts can vary due to the different volume, types of usage and risk factors for passenger and freight transport, the value of including externalities to achieve a full economic costing of transport infrastructure applies to both.

In this context, this submission comments on:

- methodologies for estimating the health impacts and related economic costs of transport externalities;
- available information that estimates health impacts and costs of externalities;
- Australian Government policy approaches on environmental health and road safety, and their compatibility with a national transport reform agenda; and
- considerations around incorporating costs of external effects associated with transport into road and rail charges.

Comments on Methodology

The health and related economic costs of road and rail infrastructure use have been established in a number of studies. In particular, we refer to the Bureau of Transport and Regional Economics (BTRE) studies referenced in the Productivity Commission's Issues Paper for this review. BTRE, which is a research unit operating within the Department of Transport and Regional Services (DOTARS), has produced recent studies of the health

[1] Bureau of Transport and Regional Economics (BTRE) (2004), *Land Transport Infrastructure Pricing: An introduction*, BTRE working paper 57, p. x.

impacts of transport emissions in Australia, rail accident costs in Australia, and road crash costs in Australia.[2]

While the methodologies for quantifying the health impacts of transport emissions and road/rail accidents vary, the key consideration of this submission related to methodology is that sufficient evidence exists to establish the significant health impact and costs of transport emissions and accidents. While this evidence is not as comprehensive or indisputable as may be desired, there is enough common ground established to provide a basis for informed policy-making at a strategic level.

Establishing the Health Impacts of Air Pollution

Studies on the health impacts of air pollution have been published by the World Health Organisation (WHO), the Organisation for Economic Cooperation and Development (OECD), government agencies, and by research scientists in reputable medical journals. BTRE's report on the health impacts of air pollution includes a literature review of significant Australian and overseas studies.[3]

Another relevant source on the impacts of air pollution is the State of the Knowledge Report (SoK) on air toxics and indoor air quality in Australia, produced by the Department of the Environment and Heritage.[4] The report compiles existing knowledge on air toxics in Australia as of 2001.

Sufficient evidence has been gathered to establish that different types of air pollutants from motor vehicles (such as carbon monoxide, ozone, lead and particles) have adverse health impacts in some individuals. The current research is not conclusive, with areas requiring further research including isolation of the individual impacts of each pollutant on human health and the threshold levels of air pollution required for adverse health impacts.[5] Research is also being undertaken to determine the different health impacts of children and adults.[6]

While detailed scientific evidence is necessary for developing technical standards for acceptable levels of air pollutants in the environment, the existing research provides sufficient information for policy-making at a level relevant to the Productivity Commission's review.

For example, guidance on air pollution is provided by WHO to its member countries, which are demographically, geographically and socio-economically diverse. The WHO *Air Quality Guidelines for Europe*, which provide international guidelines for member countries to set national air quality policies, are now being generalised to be globally applicable.[7] An

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[2] Bureau of Transport and Regional Economics (BTRE) (2004), *Health impacts of Transport emissions in Australia: Economic costs*, BTRE working paper 63, Department of Transport and Regional Services; Bureau of Transport and Regional Economics (BTRE) (2002), *Rail Accident Costs in Australia*, Report 108, Department of Transport and Regional Services; Bureau of Transport and Regional Economics (BTRE) (2000), *Road Crash Costs in Australia*, Report 102, Department of Transport and Regional Services.

[3] BTRE (2004), *Health impacts of Transport emissions in Australia: Economic costs*, pp 56-72.

[4] Department of the Environment and Heritage (2001), *State of the Knowledge Report: Air Toxics and Indoor Air Quality in Australia*.

[5] BTRE (2004), *Health impacts of Transport emissions in Australia: Economic costs*, p. 72.

[6] For example, see Organisation for Economic Cooperation and Development (2006), *Economic Valuation of Environmental Risks to Children*.

[7] World Health Organization (2005), *WHO air quality guidelines global update 2005: Report on a Working Group meeting, Bonn, Germany, 18-20 October 2005*.

example of policy-making from current evidence is in the European Commission, which has a Thematic Strategic on air pollution that aims to cut the annual number of premature deaths from air pollution-related diseases by approximately 40% of the 2000 levels.[8]

Health Costs of Road/Rail Accidents

The costs of road and rail accidents are more easily quantified than the costs of air pollution. As opposed to estimating the impact of air pollution, where the pollution is a contributing factor to a range diseases and health conditions dependent on a number of variables, a direct link can be made between accidents and injuries sustained. The exact number of injuries and deaths from road and rail accidents in Australia is known. The challenge in terms of methodology is in calculating the direct and indirect costs of these accidents. Costs are estimated through economic evaluations.

Economic Evaluations

Estimates of the economic cost of both air pollution and accidents from road and rail transport can vary significantly according to what types of costs are included in the evaluation, and which methodology is used in valuing life as a basis for establishing indirect costs. The two types of methodologies that place an economic value on premature mortality and disability are willingness-to-pay, and the human capital approach. The willingness-to-pay approach values life based on a calculation of the amount individuals place on reducing risk to life. The human capital approach measures the economic impact of mortality and disability through loss of productivity. The two methodologies tend to produce significantly different values, although both have their advantages depending on what the study aims to achieve. BTRE considers the human capital approach most appropriate for a higher level study as it produces consistent estimates that can be easily replicated.[9] This reasoning would also apply to pricing of the economic impact of externalities from freight transport.

There are a number of methods for measuring years of healthy life lost due to premature mortality and disability, which is the basis for the human capital approach. The method used by the Australian Institute of Health and Welfare (AIHW), which BTRE draws from, is Disability Adjusted Life Years (DALY). One DALY is a year lost of 'healthy' life. A useful discussion on methodology for calculating years lost to disability and premature death can be found in a publication by the AIHW that calculates the burden of disease and injury in Australia.[10] The methodology used by the AIHW publication in the context of burden of disease is relevant to the Issue Paper's questions on how a quality-adjusted life year should be valued and what discount rates are appropriate.

Full Economic and Social Costs of Road and Rail Freight

Health Impacts of Transport Emissions

Air pollution from motor vehicles emissions produces adverse health impacts. Exposure to high levels of air pollution from vehicle emissions has been linked to increased morbidity and

[8] European Commission, press release IP/05/1170, 'Commission proposes clean air strategy to protect human health and the environment', Brussels, 21 September 2005.

[9] BTRE (2004), *Health impacts of Transport emissions in Australia: Economic costs*, pp. 95-96.

[10] Mathers et. al, (1999), *The Burden of Disease and Injury in Australia*, Australian Institute of Health and Welfare, AIHW cat. no. PHE 17, pp. 4-27.

increased premature mortality through damage to respiratory and cardiovascular systems. Individuals susceptible to air pollution include young children, older persons, and persons suffering from asthma, other chronic respiratory conditions or at risk of heart problems.

BTRE estimates that in Australia in 2000, motor vehicle pollution accounted for approximately:

- 900-2,000 premature deaths;
- 900-4,500 cases of morbidity from cardio-vascular disease, respiratory disease and bronchitis; and
- 700-2,050 asthma attacks (as a contributing factor).[11]

The economic cost of the health impact of motor vehicle air pollution includes direct costs, such as the costs of hospital and medical care costs. These direct costs are significant. For example, in 2000-2001 respiratory illnesses accounted for $3.7 billion or 7.5% of total recurrent health expenditure from all sources.[12]

There are also indirect costs, which relate to lost productivity due to absences from work and reduced labour-force participation due to illness and premature mortality. BTRE's calculation of the economic cost of the health impacts of vehicle emission is focused on indirect costs, through a human capital approach (discussed above). Based on this methodology, BTRE estimates that the total economic cost in Australia in 2000 of the health impact of vehicle emissions is $2.7 billion.[13]

Limited data is available on air pollution from rail emissions. However, BTRE reports that, based on available data, rail emissions are negligible.[14] Therefore, there is unlikely to be significant costs related to air pollution from rail transport.

Australian Government Environmental Health Policy

The health impact of air pollution is currently addressed by the Australian Government, in collaboration with State and Territory governments, as an aspect of environmental health policy. Environmental health policy requires inter-sectoral collaboration, and is focused on integrating economic, environmental and health factors. The National Environmental Health Strategy, agreed by the Australian Health Ministers' Conference in 1999, provides a framework for national management of environmental health. As part of the Strategy, the *Australian Charter of Environmental Health* (the Charter) sets out basic entitlements of individuals and communities for the protection of human health from environmental hazards, and responsibilities for governments to provide leadership and direction in this field.

The enHealth Council, as a sub-committee of the National Public Health Partnership, provides national leadership on environmental health issues and drives the implementation of the National Environmental Health Strategy.

The Charter is based on recognition that economic development, human health and environmental protection are inextricably linked. Tools have been developed to facilitate an integrated policy approach. One of these tools is the *Health Impact Assessment Guidelines*,

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[11] BTRE (2004), *Health impacts of Transport emissions in Australia: Economic costs*, pp. 90-91.

[12] Australian Institute of Health and Welfare (2005), *Health system expenditure on disease and injury in Australia, 2000-01*, second edition, AIHW cat. no. HWE 28, p. 11.

[13] BTRE (2004), *Health impacts of Transport emissions in Australia: Economic costs*, p. 105.

[14] BTRE (2004), *Health impacts of Transport emissions in Australia: Economic costs*, pp. xii.

which has been developed by the Department of Health and Ageing to support the incorporation of both positive and negative health impacts in environmental and planning impact assessments for development activities.[15] The aim is to maximise the economic and other benefits of development while managing the adverse impacts. Health Impact Assessments (HIAs) recognise that some development activities, such as road improvements, can reduce ambient air pollution. However, if the negative impacts are substantial and not capable of amelioration, these must be weighted against the benefits of the proposed development.

HIAs are performed as a component of Environmental Impact Assessments (EIAs), and are common both in Australia and overseas (including the United Kingdom, New Zealand and Canada). The value of HIAs was endorsed by the National Health and Medical Research Centre (NHMRC) in 1992.

The relevance of the *Health Impact Assessment Guidelines* is in providing a methodology for HIAs endorsed by the inter-governmental National Public Health Partnership. A copy of the *Health Impact Assessment Guidelines* is provided at Attachment A.

DoHA and the enHealth Council have also developed the *Guidelines for Economic Evaluation of Environmental Health Planning and Assessment* (Volumes 1 and 2) to complement the *Health Impact Assessment Guidelines* by providing a methodology for environmental health economic evaluations. [16] The guidelines were developed for environmental health policy makers and practitioners to bring together environmental and health economics techniques in making economic evaluations specifically applicable to environmental health policy. Economic evaluations are conducted when policy decisions need to be made about best use of resources. An economic evaluation values policy impacts in monetary terms, including quantification of non-marketed goods and individual values (such as the value of a year of life). Volume Two of the guidelines provides case studies of the way economic evaluation methods have been applied to environmental health policy issues in Australia.

The guidelines include discussion on the methods of valuing health, and provide an estimate of the value of a statistical life (VOSL) to be used in environmental health studies in Australia.[17] The guidelines recommend VOSL as $150,000, allowing a 5% discount rate. This contrasts with the equivalent estimate by BTRE in relation to air pollution impact of $50,000 per life year.[18] These differences highlight the fact that the objectives of the study will influence the methodological approach chosen, and the estimates produced. Therefore, while previous studies can provide useful guidance, any study that might attempt to price the cost of freight transport externalities would need to assess the parameters of the study and the data available to determine the most appropriate methodological approach. A copy of the

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[15] Department of Health and Aged Care (2001), *Health Impact Assessment Guidelines*, Commonwealth of Australia. Available from: http://www.health.gov.au/internet/wcms/publishing.nsf/content/health-pubhlth-publicat-document-metadata-env_impact.htm

[16] Department of Health and Ageing and enHealth Council (2003), *Guidelines for Economic Evaluation of Environmental Health Planning and Assessment: Volume 1 – The Guidelines*, Commonwealth of Australia. Available from: http://www.health.gov.au/internet/wcms/publishing.nsf/Content/health-pubhlth-strateg-envhlth-index.htm

[17] Department of Health and Ageing and enHealth Council (2003), *Guidelines for Economic Evaluation of Environmental Health Planning and Assessment: Volume 1 – The Guidelines*, pp. 32-35.

[18] BTRE (2004), *Health impacts of Transport emissions in Australia: Economic costs*, pp. 97.

Guidelines for Economic Evaluation of Environmental Health Planning and Assessment: Volume 1 – The Guidelines is provided at Attachment B.

Both these tools are designed to be used by government agencies at all levels in planning developments through intersectional collaboration. The tools can be used to increase the information used in decision-making on developments that have environmental and health impacts. They provide principles that are endorsed by a high-profile intergovernmental body, and are likely to be useful in incorporating environmental health into a wider perspective on national economic efficiency and productivity.

Social and Economic Costs of Road and Rail Accidents

Injury is the principle cause of death in people under 45 years of age, and road traffic accidents have the second highest burden of injury (incorporating morbidity and mortality) after suicide and self-inflicted injuries.[19] In 2005, there were a total of 1,481 fatal crashes resulting in 1,636 fatalities in Australia. Of these, 135 fatal crashes involved articulated trucks, resulting in 158 deaths. Crashes involving articulated trucks accounted for ten per cent of total fatalities from road accidents in that year.[20]

The direct health costs of road accidents include medical care and rehabilitation, and long-term care for accident victims. In 1993-1994, it is estimated that road accidents cost the health system $372 million.[21] Other direct costs relate to vehicle towing and repairs, legal costs, emergency services, insurance and funerals. Indirect costs, as mentioned above, include loss of productivity, loss of life, and loss of quality of life. BTRE estimates the total cost of road crashes in Australia in 1996 at approximately $15 billion.[22]

BTRE provides statistics comparing fatality risk level by type of vehicle. The number of rigid and articulated trucks involved in accidents in 1996 (at 44,850) was small compared to car accidents (at 1.132 million). However, level of road usage per vehicle is also an important consideration. Based on all fatalities in crashes per billion vehicle kilometre travelled (BVKT), rigid trucks and articulated trucks each have approximately three times the fatality risk level of cars (at 34.05, 37.89 and 11.05 respectively).[23]

Australian Government Road Safety Policy

Road safety has had a significant policy focus over the last 30 years. Road safety programs, including road improvements, regulations for vehicle improvements, driver education and enforcement measures such as random breath testing, have contributed to the significant reduction in fatalities from road accidents in that period.[24] However, reducing road accidents remains a policy priority. Injury prevention and control (including injury from road accidents) is one of the Australian Government's National Health Priority Areas. The Department of Health and Ageing works in partnership with the lead agency on road safety, the Australian Transport Safety Bureau, in implementing the National Road Safety Strategy.

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[19] Mathers et. al, (1999), *The Burden of Disease and Injury in Australia*, p. 91.

[20] Australian Transport Safety Bureau, *Road Deaths Australia: 2005 Statistical Summary*, p. 1.

[21] Mathers et. al, (1999), *The Burden of Disease and Injury in Australia*, p. 93.

[22] BTRE (2000), *Road Crash Costs in Australia*, p. xi.

[23] BTRE (2000), *Road Crash Costs in Australia*, p. 8.

[24] Applied Economics (2003), *Returns on Investment in Public Health: An epidemiological and economic analysis prepared for the Department of Health and Ageing*, pp. 99-105.

The Strategy aims to reduce Australia's road fatality rate from 9.3 per 100,000 in 1999 to no more than 5.6 per 100,000 in 2010.[25] Implementation of the Strategy is based on inter-jurisdictional and inter-sectoral action.

The scale of rail accidents is significantly less than that of road accidents. BTRE estimates the total cost of road related fatalities in 1999 (excluding suicide) as $143 million. In 1999, there were a total of 48 rail-related fatalities excluding suicide. Suicides (which are not categorised as accidental) accounted for 31 fatalities.[26] Level crossing accidents and persons struck by trains are the key issues in rail safety. Train drivers generally do not have the capacity to stop the train in time to avoid individuals or motor vehicles on the track. However, there is potential to reduce fatalities through safety measures at points where trains may collide with pedestrians or motor vehicles. The BTRE report discusses the success of various safety measures at level crossings to reduce incidents. The report does not distinguish between accidents involving freight trains and those involving passenger trains.

Inclusion of Social and Economic Costs in Road and Rail Freight Infrastructure Pricing

One focus of the review is investigating the feasibility and advisability of including the costs of externalities into road and rail user charges. The health impacts of air pollution and accidents related to road and rail infrastructure are externalities, and thus are not accounted for in normal market pricing mechanisms. Neither road nor rail transport currently charge for externalities. Mechanisms to internalise external costs into transport pricing are available. Tools such as health impact assessments and economic evaluations, described in this submission, indicate that it is possible to develop ways to assess health and economic impacts.

An example of how social costs can be reflected in pricing is provided by the United Kingdom. In 2002 the UK revised vehicle excise duty (VED) for lorries to reflect environmental and track costs of different types of lorries. Relevant costs were established in a commissioned research report. The revisions to lorry VED occurred as part of the UK government's policy of environmental pricing. The UK Treasury released a paper in 2002 that discussed environmental taxes as a means of internalising environmental costs into prices. The UK supports the use of environmental taxes to '…provide incentives for behaviour that protects and improves the environment, and deter actions that are damaging to the environment'.[27]

The Bureau of Regional Transport and Economics discusses the feasibility of pricing for externalities of transport in its working paper on land transport infrastructure pricing.[28] Issues around charging for externalities in the transport sector that BTRE raises include the large number of variables affecting externalities that make it difficult to quantify, and the fact that some externalities are already partially internalised (such as through compulsory third party premiums).

Whether or not the health impacts of road and rail freight infrastructure should be recovered in pricing in the Australian context would need to be determined through research on the

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[25] Australian Transport Council (2000), *The National Road Safety Strategy 2001-2010*.

[26] BTRE (2002), *Rail Accident Costs in Australia,* p. xi.

[27] HM Treasury (2002), *Tax and the Environment: using economic instruments*, p. 1.

[28] BTRE (2004), *Land Transport Infrastructure Pricing: An introduction*, pp. 18-19.

impact of internalising the cost of externalities in transport pricing on reducing air pollution and accidents. Tools such as HIAs and economic evaluations can help in assessing the relative benefits of pricing regulation compared to other policy tools.

A wider benefit of costing externalities of transport would be to provide information on the social costs and benefits of transport infrastructure. It is relevant to consider these costs in decision-making about national transport market reforms in order to more accurately calculate the net benefits to the community of such reforms.

For example, the review's Issues Paper notes that the current road and rail pricing arrangements give road use an unfair advantage over rail use. The Productivity Commission's assumption that negative external effects are more substantial for road use than for rail use appears to be supported by the available data on health-related impacts summarised in this submission. However, there is considerable scope for further research in this area (including comparing fatalities by the level of infrastructure usage for both modes of transport). Consideration of the health and economic costs of these modes of transport may be of value in comparing the costs and benefits of road and rail transport.

The current Australian Government policy approaches to environmental health and road safety, which are focused on national strategies implemented through intergovernmental and intersectoral collaboration, are complementary to a national transport market policy approach that may include a focus on transport externalities.