Australian Shipowners Association

House of Representatives Standing Committee on Transport and Regional Services

Inquiry into interaction of regional road and rail networks and their connectivity to ports

Submission of Australian Shipowners Association

ATTACHMENT 1: SEA TRANSPORT EFFICIENCY AND GREENHOUSE GAS EMISSIONS

Climate Change and Greenhouse Gas Emissions

Although the likely impacts and severity is still often debated, the inevitability of global warming and climate change is generally accepted. As such, the stabilisation and reduction of anthropogenic greenhouse gas emissions is one of the most pressing current environmental challenges.

The Australian Government, as a signatory to the United Nations Framework Convention on Climate Change (UNFCCC) has recognised the issue of global warming and committed to putting measures in place to stabilise national emissions of greenhouse gases. Although not a signatory to the Kyoto Protocol to UNFCCC, Australia has committed to a CO_2 emissions reduction target of 108% of the 1990 baseline figure by 2008-2012.

'…Shipping Supports 28.15% of the domestic freight task…but contributes to just 2% of total emissions from the transport sector.'

The transport sector, which includes passenger cars, domestic aviation, domestic navigation (shipping), rail and other road transport (freight), is responsible for generating 14 percent (or 79 Mt) of Australia's CO_2 emissions[1]. The other designated emission sectors are stationary energy, fugitive emissions (waste emissions from the production and distribution of coal and natural gas), industrial processes, agriculture, land use change and forestry, and waste. Transport is the third highest emitter of greenhouse gases behind stationary energy (47.6%) and agriculture (19.2%).

[1] "Total CO^2 emissions" includes total emissions of other greenhouse gases such as methane, nitrous oxide and perfluorocarbons. In calculating and expressing total greenhouse emissions, these other greenhouse gases are converted to CO^2 equivalent amounts.

Division of Domestic Freight Task Emissions Contributions

Australia's domestic freight task is divided between shipping, road and rail. The non-urban domestic freight task is relatively evenly spread between these three modes.

Shipping supports 28.15 percent of the domestic freight task (Figure 1), consumes 9.6 percent of the total energy used in freight transportation[2] but contributes to just 2 percent of the total emissions from the transport sector (Figure 2).

[3]

Figure 1: Percent share of domestic, non-urban freight task measured in tonne-kilometres.

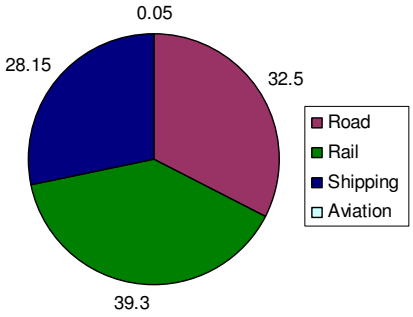
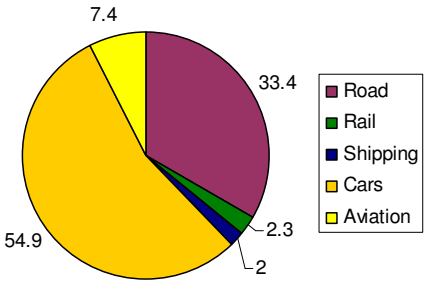


Figure 2 Percent CO2 emissions in 2002 from Transport by mode.



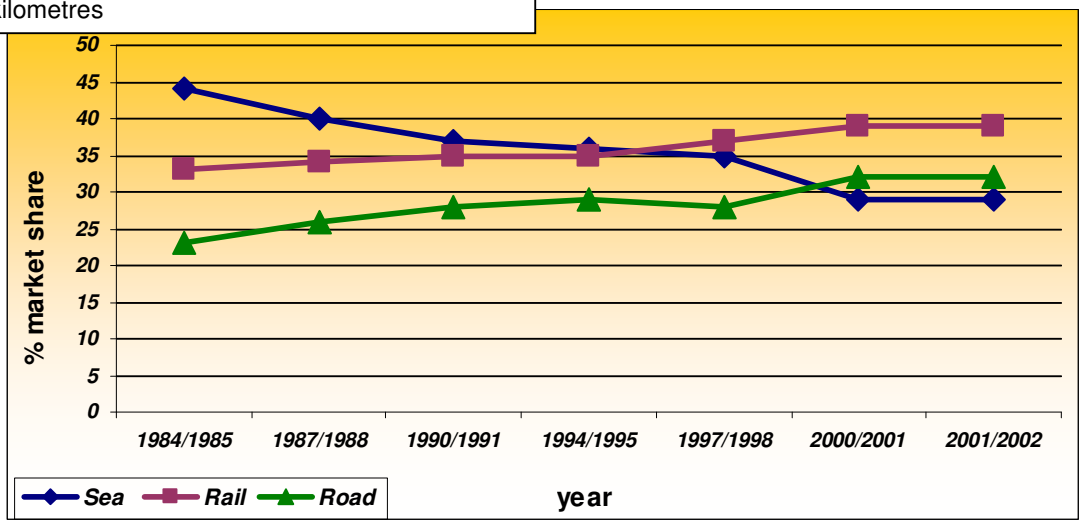
Despite being widely considered to be the most energy efficient transport mode for long distance haulage of large volumes of freight, the share of the domestic freight task (in tonne-kilometres) attributed to shipping has declined from 44 percent in 1984/85 to the current figure of 28.15 percent in 2002/03[4].

[2] 'Australian Maritime Transport 2004', Apelbaum Consulting Group, 2005.
[3] National Greenhouse Gas Inventory 2002, Australian Greenhouse Office.
[4] 'Australian Maritime Transport 2004', Apelbaum Consulting Group, 2005.

Changes in the Market Share over Time

While the market share of the domestic freight task currently designated to shipping has declined, the market share of road and rail has steadily increased.

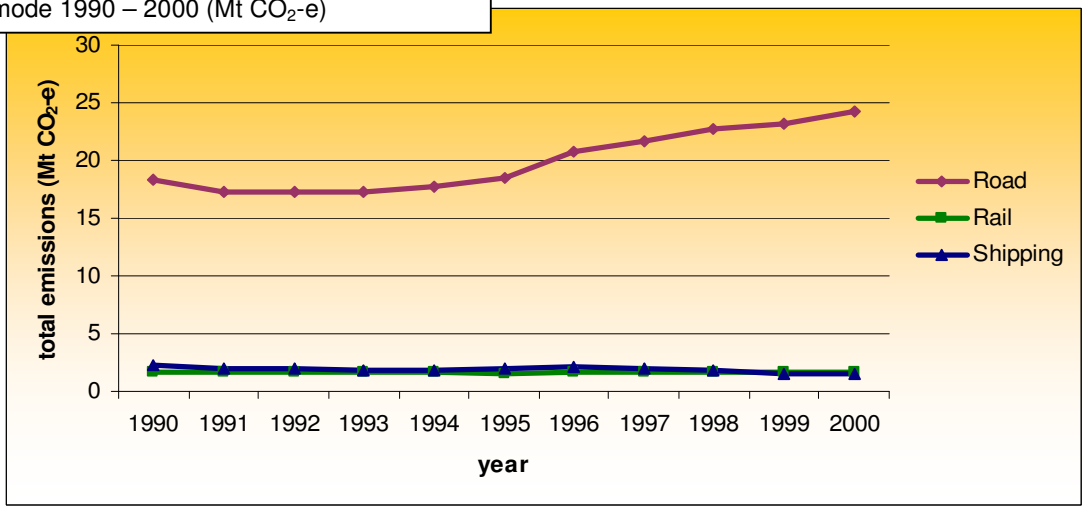
Figure 3: Market shares in the movement of no-urban domestic freight over time in tonne-kilometres



[5]

At the same time, Australian shipping has managed to achieve an annual emission reduction of 0.8 Mt CO_2-e, from 2.3 Mt CO_2-e in 1990 to 1.5 Mt CO_2-e measured in 2000. While increasing in total market share, the total yearly emissions from rail have remained constant during that time while emissions from road transport have significantly increased from 18.3 Mt CO_2-e in 1990, to 24.3 Mt CO_2-e in 2000.

Figure 4: Changes in total emissions by mode 1990 – 2000 (Mt CO_2-e)



[6]

[5] 'Australian Maritime Transport 2003', Apelbaum Consulting Group, 2004.
[6] 'Transport Sector Greenhouse Gas Emissions Projections 2003', Australian Government Interdepartmental Greenhouse Projections Group, Australian Greenhouse Office.

Government Policy – Energy Consumption and Emissions

The current Australian Government's white paper on energy reform entitled 'Securing Australia's Energy Future' discusses the application of significant public funds to encourage research into low-emission energy generation technologies to achieve long-term emission reductions.

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A glaring inconsistency on greenhouse policy becomes apparent when considering that the current focus on 'low-emission technology' policy in energy generation is absent when it comes to transport. In fact, as demonstrated in figures 3 and 4 - relating to meeting Australia's domestic freight task and the associated emissions by transport mode - the trend shows a general movement away from more energy efficient, low emission transport modes to high emission and less efficient modes.

The Government's own Australian Greenhouse Office[7] highlights modal switching as an important measure to reduce greenhouse gas emissions. In discussing modal switching the Australian Greenhouse Office specifies sea freight as being the least emission intensive freight mode, followed by rail and then road. The consistent growth in the market share of road transport in particular, as the most resource and emission intensive transport mode, appears in conflict with emission reduction commitments. The Greenhouse Office suggests that shifting freight back along this hierarchy, so as to reverse the pattern evident in Figure 3, would assist in reducing emissions.

> ***'…for every small product tanker (~ 50,000t DWT) operating around the coast, over 800 B-Train Doubles would be needed on the road to move the same amount of cargo.'***

Research undertaken by the UK Government into energy consumption by road transport, demonstrates the differences in efficiency between transport modes in the movement of bulk products. According to this research, "energy consumption of road transport by truck lies in the range of 0.7-1.2 Megaloules/tonne-kilometre". Depending on the speed and vessel type, (tanker, bulk carrier, containership), consumption at average speed of 14 to 18 knots lies between 0.3 and 0.12 Megajoules/tonne-kilometre.[8]

Further, in the case of the delivery by sea of petroleum products to cities in Northern Queensland for example, 30,000 long distance B-Double movements would be required annually to deliver the same amount of cargo as the two ships servicing those routes.

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[7] The Australian Greenhouse Office, although independent at inception, is now part of the Department of Environment and Heritage and is responsible for delivering the projects as part of the Government's $1.8 billion climate change strategy.

[8] Shipping Facts – Information about the international shipping industry, www.marisec.org/shippingfacts 2004.

One of these places alone receives seven ship visits each year. If that product came by road it would need 3,300 B-Double visits – nearly ten B-Doubles each day.

If they were carrying water, each ship would fill an Olympic-size swimming pool fifteen times while it would take forty B-Doubles to fill one pool once.

Given the differences in efficiency between road and sea freight in terms of energy consumption, GHG emissions and cargo capacity, even a ten percent modal shift is likely to have a positive impact in reducing Australia's energy consumption and contribution to greenhouse gas emissions.

Emission Reduction in shipping

Even in international terms, where sea freight is more strongly represented, shipping is a very small contributor to greenhouse gas emissions and is responsible for only 1.8%[9] of global emissions of CO_2 as calculated in 1996.

> ***'…new build engines are estimated to be able to achieve up to 30% greater efficiency than existing technology.'***

Nevertheless, in March 2000 the International Maritime Organisation (IMO) was invited by the UNFCCC secretariat to undertake a study into greenhouse gas emissions from international shipping. The study looked not only at the contribution of shipping to global emissions of greenhouse gases, but also examined the potential for achieving emission reductions from the sector through various technical, operational and market based approaches.

Market based emission reduction measures refer to measures such as environmental indexing and carbon trading. **Operational measures** refer to such things as hull and propeller maintenance, vessel speed optimisation and weather routing. **Technical measures** refer to the application of new technology, where possible in existing ships and in new ship builds.

The IMO study into greenhouse gas emissions from ships refers to shipping as being a "highly economically optimised business" with fuel costs representing one of the major operating costs of most merchant ships. It stands therefore that those operational techniques that contribute to a reduction in fuel consumption and emissions and an increase in overall operational efficiency are, to some extent, already being exploited.

In terms of technical measures, current advances in engine technology are such that new build engines are estimated to be able to achieve up to 30% greater efficiency than existing technology[10]. Further, efficiency gains in existing engines of up to an

[9] 'Study of Greenhouse Gas Emissions from Ships – Final Report to the International Maritime Organisation', Norwegian Marine Technology Institute March 2000.
[10] 'Study of Greenhouse Gas Emissions from Ships – Final Report to the International Maritime Organisation' Norwegian Marine Technology Institute March 2000.

estimated 20% can also be achieved when new technology is applied to existing ships.

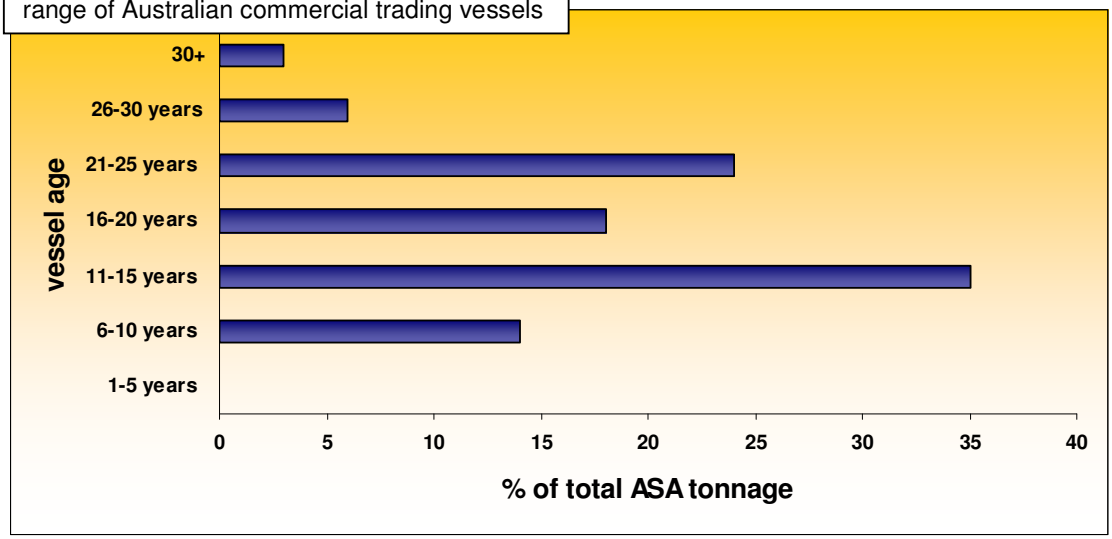
…Over 77 percent of Australian commercial trading vessels are between 11 and 25 years old…

Any technical advance, however - whether through the application of new ships to existing trade routes or the re-fitting of existing ships with new engine room technology - requires significant upfront capital investment by the shipowner.

The Australian Fleet

Figure 5 shows the approximate age spread of the Australian commercial trading fleet[11]. Over 77 percent of Australian commercial trading vessels are between 11 and 25 years old. None of these vessels are under 6 years old and some that are over 30 years old are still in operation.

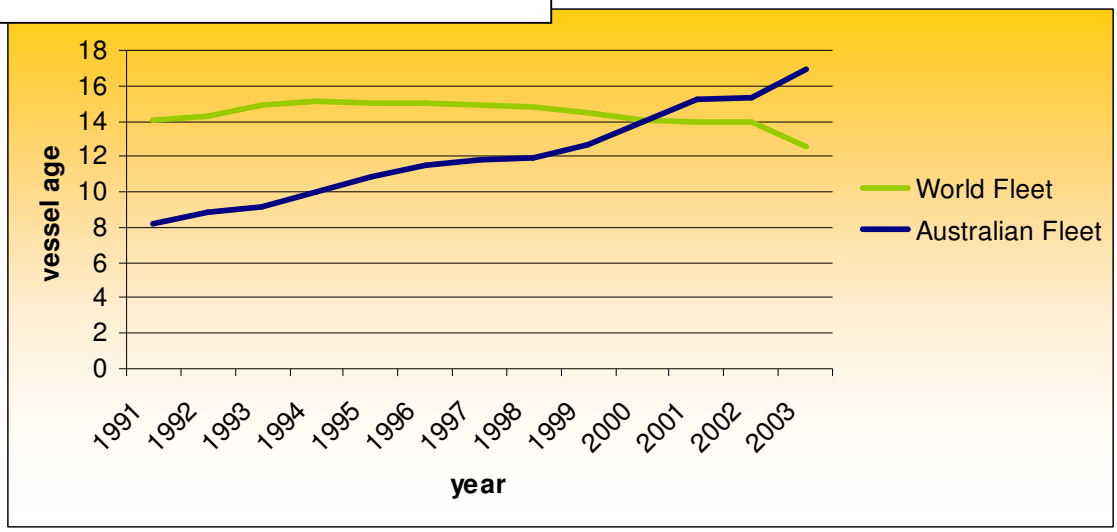
Figure 5: Approximate vessel/engine age range of Australian commercial trading vessels



How does this compare with the world fleet? The average age of the world fleet in 2003 was 12.6 years. The average age of the vessels represented in Figure 5 is 16.9 years old. Figure 6, shows the how the average age of the world fleet and the Australian fleet has changed over time.

[11] All ships included in the ASA tonnage.

Figure 6: Comparison of the average age of the world and Australian fleet's over time.



Conclusion

Australia has an obligation to reduce national greenhouse gas emissions and a policy of moving towards low emission technology in energy production. With transport being a close third in emissions of greenhouse gases behind energy and agriculture, it makes sense that a similar policy, whereby the Australian transport task is met by the least emission intensive mode, be applied.

This might be achieved by creating a government policy atmosphere where transport modes compete fairly and environmental efficiency is rewarded. However modal shift is largely being ignored.

With an aging Australian fleet, coastal shipping still only contributes to 2% of total transport emissions. With considerable capital investment by shipowners into engine upgrades and the application of new ships to existing routes, efficiency gains in fuel consumption of up to 20-30% can be achieved with associated further GHG emission reductions.

Clear government policy in relation to shipping and a serious commitment to emission reductions in the transport sector is essential in order to encourage modal shift and foster the significant private investment required to achieve further emission reduction in the Australian shipping industry.

Australian Shipowners Association - 2005.