RARE

UNCOMMON THINKING

The economic, social and environmental challenges of for road freight in Australia *(to 2020 and beyond)*

RARE CONSULTING
ABN: 50 115 960 837

SUITE 706, LEVEL 7, 50 CLARENCE STREET
SYDNEY NSW 2000

P. 02 9017 0022
F. 02 9017 0026

WWW.RARECONSULTING.COM.AU

Presentation to ITLS Forum

April 2008

Strategic context

Road transport is about more than just 'vehicles'

It lays the foundations for how our **human settlements** function and **facilitates commerce** between markets. Road transport is intricately linked to the health, economic performance, and social fabric of our contemporary cities.

Why then, are policy discussions about emissions management almost always reduced to a simplistic discussion about (a) <u>which vehicle or fuel technology</u> should be introduced next, (b) <u>which mode should be promoted</u>, or (c) <u>what economic instrument</u> should be applied ?

Forecast growth in Australian road freight (to 2020 and beyond) is expected to create significant challenges for Australia

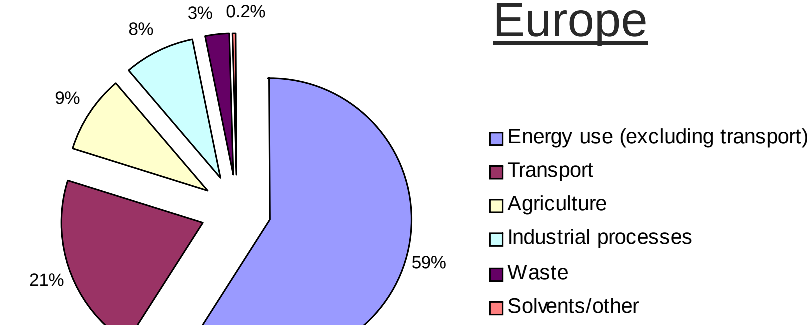
- The Australian road freight task is forecast to more than double between 2000 and 2020 (BTRE 2002). The predicted increase of 118% represents an annual increase in billion tonne kilometres of around 4%
- The forecast growth (2000-2020) is consistent with the average annual growth of 5% per annum experienced between 1980 and 2000 (TIC/CVIAQ 2004)
- Unlike the period between 1980 and 2000 (when B-doubles were introduced), the future increase in the road freight task is not expected to be accommodated by a further doubling in vehicle payloads
- Rather the increased demand is expected to result in the addition of approximately 50,000 trucks to the national fleet between 2005 and 2020 – approximately 28,000 of which are predicted to be large articulated trucks (TIC/CVIAQ 2004).

It is suggested that the most significant challenge relates to the GHG externality (followed closely by increasing urban traffic congestion).

- The international response to climate change is hardening and may even accelerate if adverse climate change impacts escalate.
- Australia recently announced its intention to ratify the Kyoto Protocol and is likely to be obliged to follow international directions with respect to post 2012 responses.
- Examination of the international policy agenda highlights an increasing propensity of governments to commit to GHG reduction targets and develop supporting legislative and regulatory measures, aided and abetted by growing community consciousness about the adverse impacts of climate change.
- It appears increasingly likely that a national long term GHG reduction target will be developed on the basis of a 60% reduction 2050 (relative to year 2000 emission levels).
- A national emissions trading scheme will be introduced into Legislation for commencement in 2010. This scheme will include transport sector emissions.

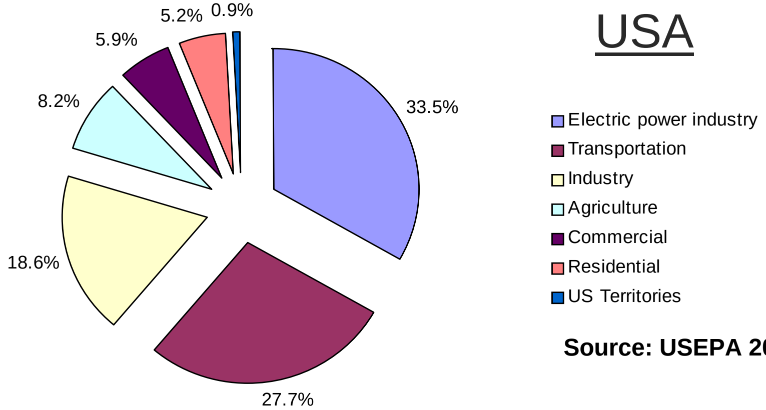
“Transport is now the worst performing sector under the Kyoto Protocol and seriously jeapardises the achievement of (Europe’s) Kyoto targets” (EFTE 2006)

Europe



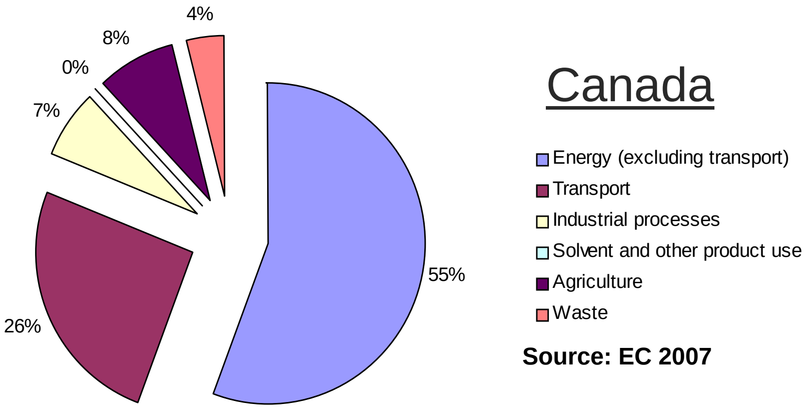
Source: EEA 2007

USA



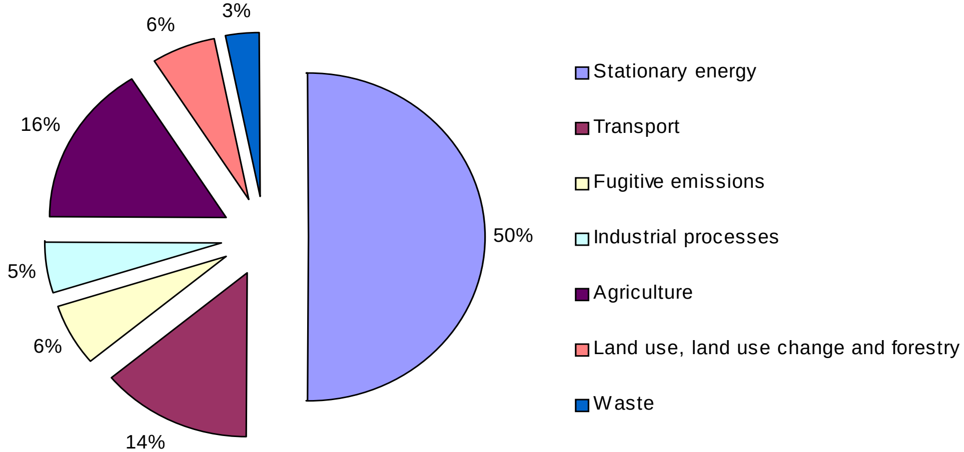
Source: USEPA 2007b

Canada



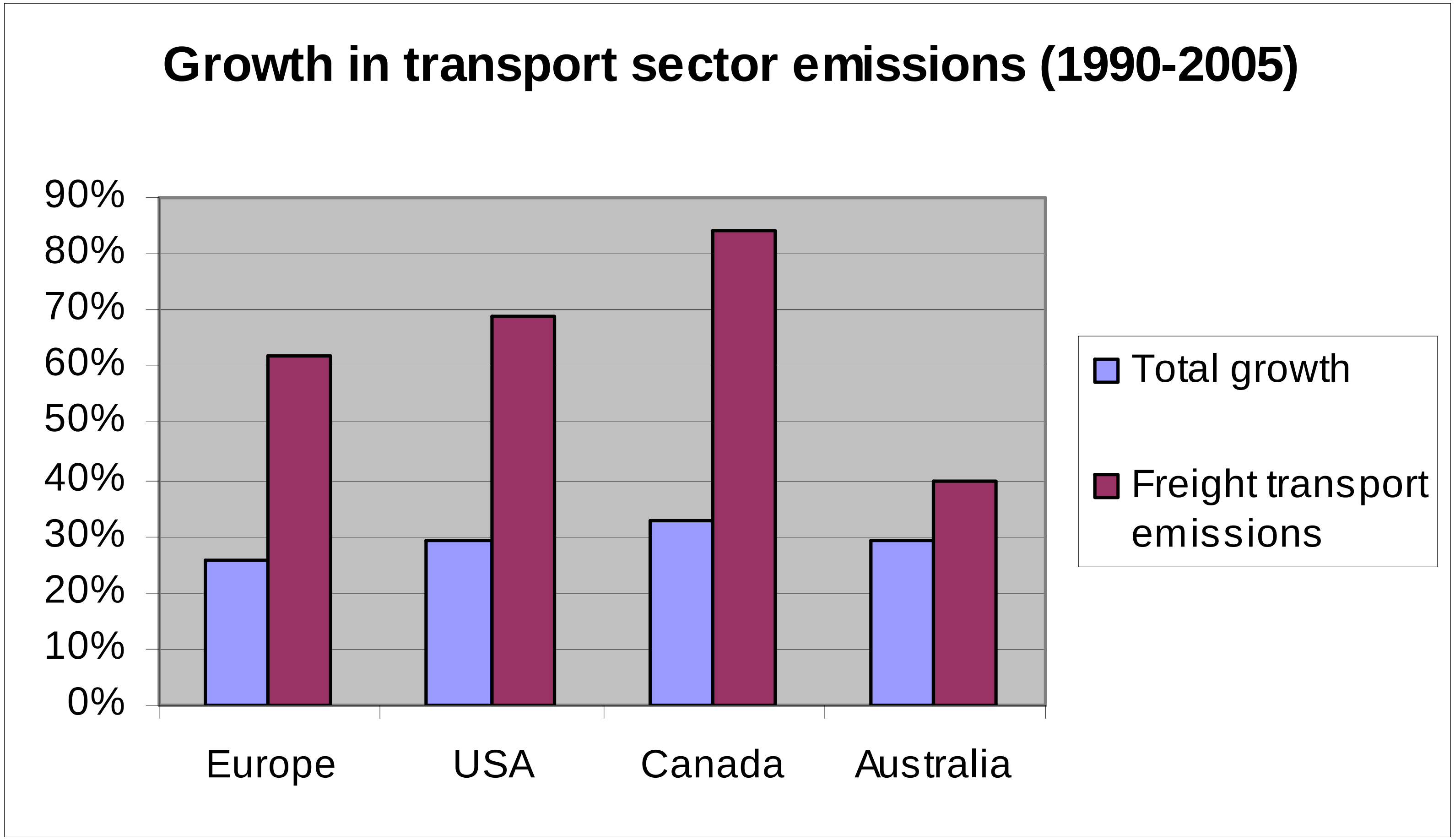
Source: EC 2007

Australia



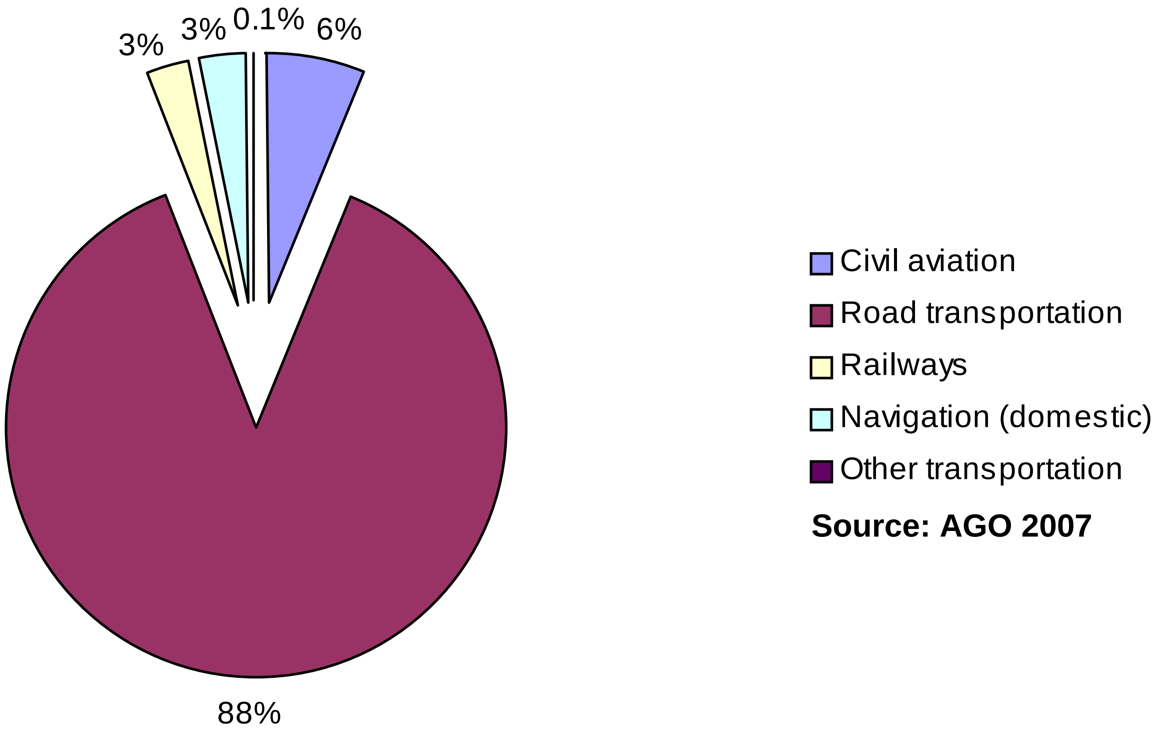
Source: AGO 2007

Growth in transport sector emissions (and the intractable link with economic growth) is the key challenge for most developed economies – but Australia fares well by comparison with other countries.



Note: European figure for freight includes all freight modes

Road transport is the major source of GHG emissions from the Australian freight sector.



Source: AGO 2007

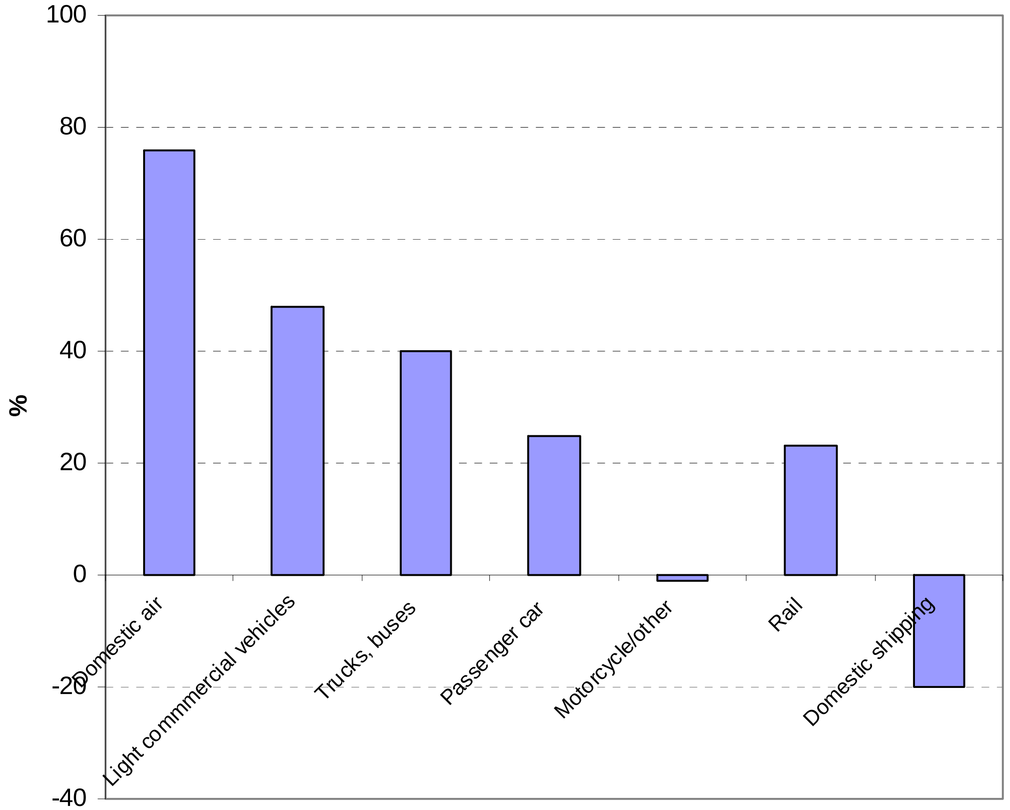
Commercial road vehicles account for a disproportionate share of road-related GHG emissions (and vehicle related air pollution in our cities)

Vehicle	% of Australian fleet *	GHG contribution †	PM contribution ‡
Passenger vehicles	77.9%	60%	48%
Commercial vehicles	**18%**	**38%**	**51%**
Other	4.1%	2%	1%

* ABS 2006b † AGO 2006b ‡ BTRE 2005

Commercial vehicle emissions have grown faster than passenger vehicle emissions (and projected to grow 3 times faster than passenger vehicles)

1990 - 2005



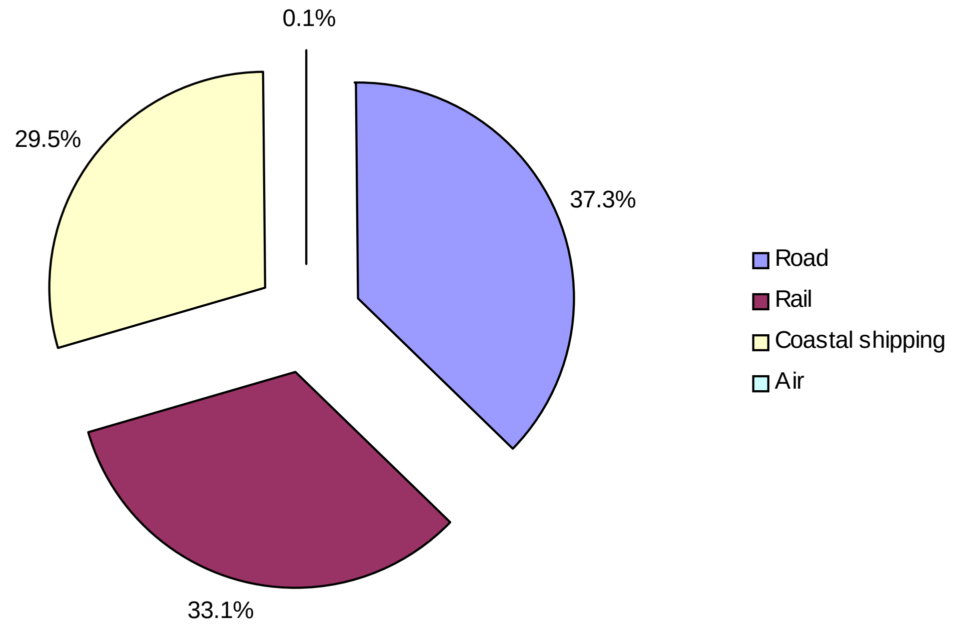
Source: AGO 2007

2010 - 2020

- Growth in GHG from commercial vehicles is forecast to grow by 27%, more than three times that of passenger vehicles at 8%.

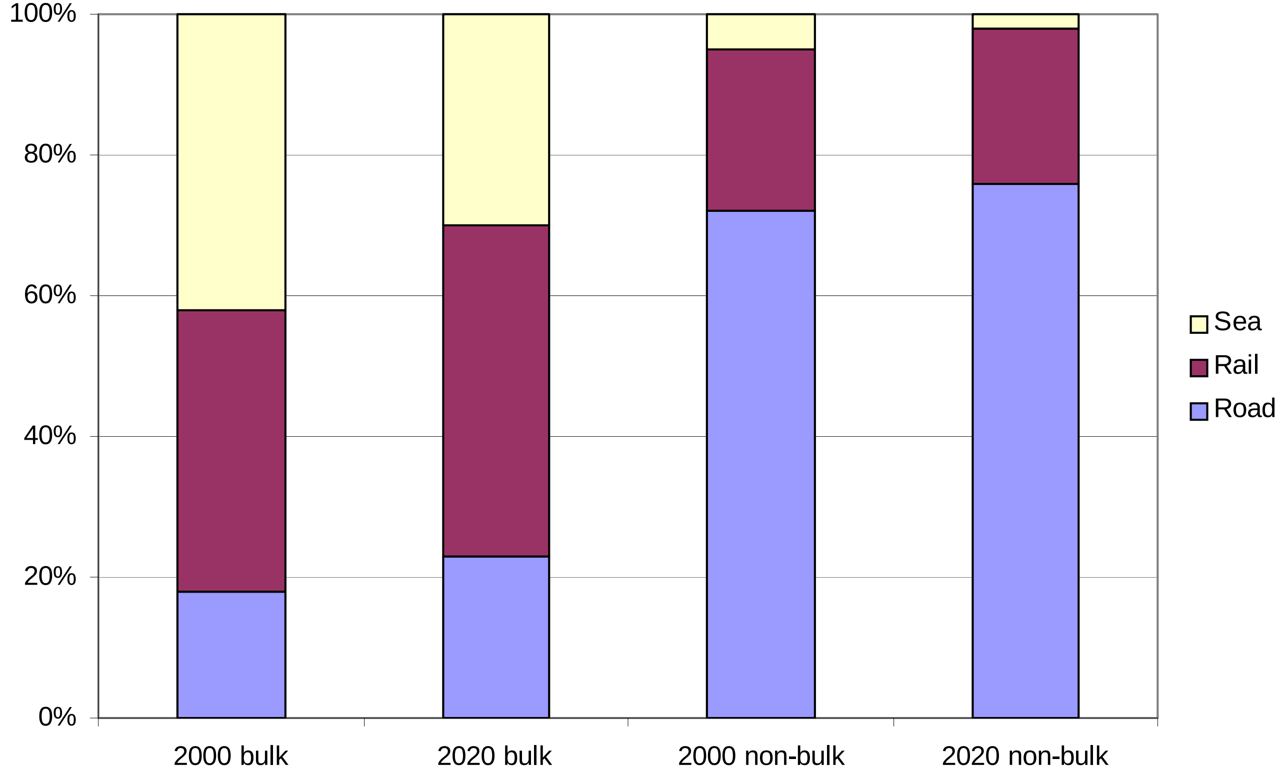
Source: AGO 2006b

The Australian freight task appears to be shared equally between road, rail and sea – GHG emissions from air freight are largely insignificant (BTKM)



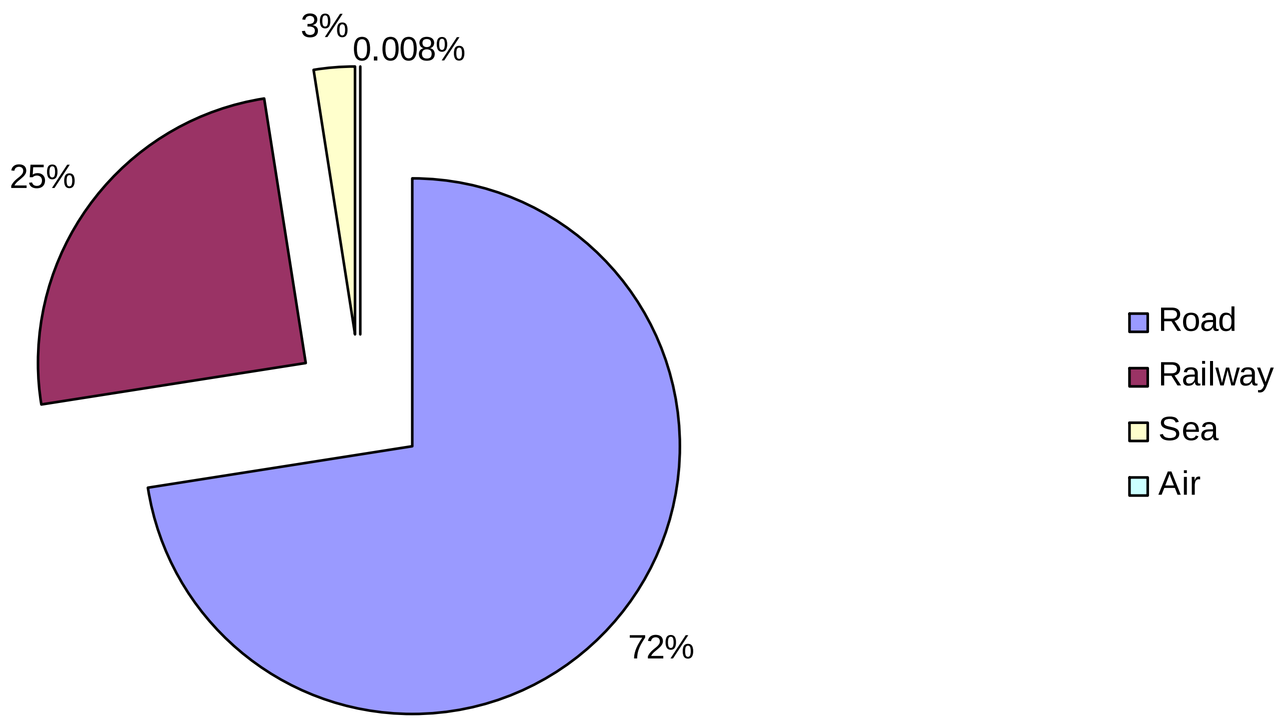
Source: BTRE 2006a

The majority of non bulk freight is moved by road (and road's share will likely increase by 2020)



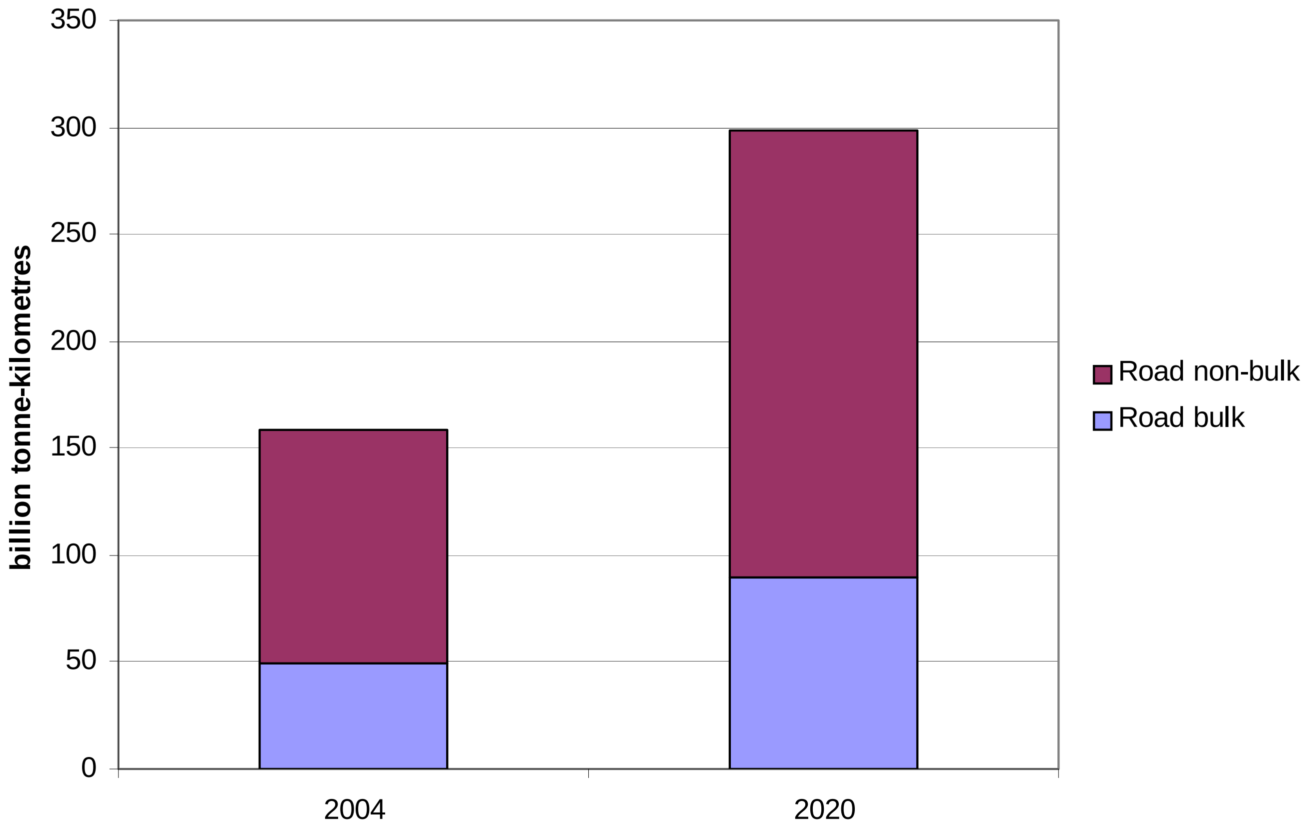
Source: BTRE 2004

In terms of total freight moved (i.e. tonnes consigned), road accounts for almost three quarters of all freight moved



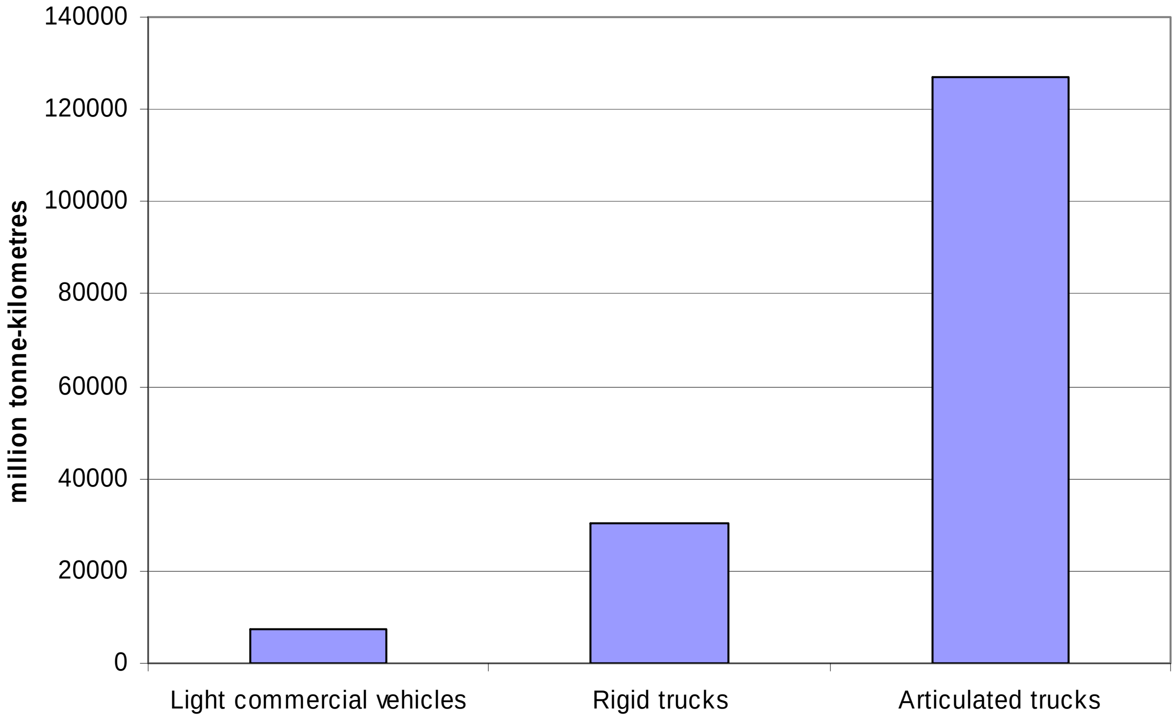
Source: BTRE 2006a

The road freight task is projected to double by 2020 – most of it occurring for non bulk freight.



Source: BTRE 2004

Within the road freight task, articulated vehicles account for the vast majority of activity (and associated GHG emissions)



Source: ABS 2006a

GHG reduction from road transport (and particularly road freight) must therefore be an essential element in Australia's GHG response

- Transport is the third largest source of GHG emissions in Australia
- Road transport accounts for 90% of GHG emissions
- Commercial road vehicles account for a disproportionate share of road vehicle GHG emissions (and emissions are projected to grow three times faster than passenger vehicles to 2020)
- Road freight accounts for the majority of freight moved in Australia (i.e. tonnes consigned) and road's total share of freight will increase by 2020
- Key challenge will be to redress the emissions from road freight given limited opportunity for mode switching
- Air freight is currently insignificant and likely to remain so for the foreseeable future

Framing the challenge

- some economic, social and environmental considerations

1. Limited opportunity for mode switching in Australian freight

- The degree to which freight can be switched from one mode to another is constrained by:
  - The nature of the freight being moved (Non-bulk freight is generally only suited to road)
  - The time value of freight
  - Current limitations in national freight infrastructure (i.e. multi-modal hubs)
- Most of the projected growth in road freight to 2020 is associated with forecast growth in non-bulk freight.
- The vast majority of bulk freight is already being moved by sea and rail, with less than 20% being supported by road freight
- Work completed by the Australian Productivity (APC 2007) suggests that less than 15% of current road freight is contestable.

2. The easy gains in road freight efficiency have largely been secured.

- Road freight efficiency (for articulated trucks) increased steadily between 1995 and 2003, peaking at just under 25 tonnes per trip in 2003 (NTC Feb 2008) but has since stagnated at this level.
- Much of this efficiency gain was likely to have been derived by the increased penetration of B-doubles in (and other multiple-trailer configurations) in the national heavy vehicle fleet .
- It is unlikely that any further gains will be realised without substantial changes in dimension and mass limits for road going heavy vehicles.
- The greenhouse benefit of any move to larger articulated vehicle combinations needs to be tempered by the fact that such combinations will require more powerful engines that will consume more fuel (and therefore increase unit greenhouse emissions).
- Opportunity for gains with introduction of higher mass limits (HML) for single and B-Double combinations

3. Freight demand is likely to be highly price inelastic.

- Numerous studies have highlighted the price inelasticity of transport demand (Taplin and Hensher 1999, Shiffer and Steivorth et al 2005, CSIRO 2008) with respect to passenger transport.
- Very little substantive research appears to be available with respect to the price elasticity of freight demand.
- Intuitively, the structure of current road freight contracts (e.g. *rise and fall* provisions) suggests that any increase in freight input costs is not borne by either the freight operator or the freight customer.
- While the demand for goods and service remains high (i.e. substantial capacity for price increases in consumer markets), increased freight prices are unlikely to result in a reduction in travel and will simply result in higher consumer costs for goods and services.
- Similarly, the previous discussion around the nature of freight movement suggests that increased freight rates for one mode are unlikely to result in freight mode switching.

4. Future pricing of the greenhouse externality should not reduce the incentive for investments in freight innovation.

- Carbon liability is likely to be owned by the fuel producer and passed on to the consumer in the form of higher fuel price (for ease of administration)

- Such an approach, while appropriate for most small fleets, removes an opportunity for fleet innovation.

- It is therefore suggested that the liability for any future carbon price be placed on the fuel producer, with provision for transport operators to opt in.

- From a point of view of maximum potential effectiveness for freight transport, however, the point of liability might best be levied on the freight services customer.

5. Future pricing approaches may need to be premised on the assumption of significant rationalization of the Australian road freight sector

- The road freight industry is facing significant financial pressures associated with:
  - The scarcity (and increasing cost) of driver and maintenance labour (up 5.5% since March 2007)
  - The flow-on economic effects of global oil prices (up 17% since March 2007)
  - The price demands of freight customers

- The road freight sector is dominated by small businesses, with many operating less than two trucks (BTRE 2006a). These operators have limited capacity to absorb higher input costs in the short to medium term.

- Market competition within the road freight sector is intense, with average gross returns below 7%.

- The above risks combine to suggest that increased input prices associated with the future management of greenhouse emissions could trigger significant levels of industry rationalization and/or freight customers bringing logistics back in-house.

6. New vehicle and fuel technologies are unlikely to deliver a significant GHG solution for road freight in the short, medium or even long term.

- **Biofuels (Biodiesel)**
  - Lack of volume and technology uncertainty suggest biofuels unlikely to be used in anything other than niche transport applications
- **LPG**
  - Past studies highlight significant additional life cycle costs (relative to conventional fuel) and no significant greenhouse benefit.
- **Natural Gas (CNG and LNG)**
  - Significant potential but greenhouse performance is variable
  - Currently constrained by lack of engine product, limited LNG production, and minimal refueling infrastructure
- **Gas-to-Liquid (GTL) and Coal-to-Liquid (CTL) technology**
  - Some potential but likely to be both expensive and greenhouse intensive production process
- **Hydrogen and fuel cells**
  - Not suited for heavy vehicle operation due to low energy density characteristic
- **Hybrid and electric engine technologies**
  - Some suitability for urban freight operations but not well suited for line haul road freight.

7. Future strategies will need to redress significant levels of historical under-investment in freight infrastructure in Australia

- Road freight
  - Development of the road network has failed to keep pace with growth in passenger vehicle and commercial vehicle growth.
  - No longer possible to ‘build’ our way out of the problem
  - Solution lies in better use of the existing network for road freight
- Rail freight
  - Historical level of underinvestment in rail freight infrastructure
  - Limited contestability for road freight suggests optimal opportunity for improvement is associated with multi-modal freight hubs
  - Some opportunities to expand inter-city rail freight infrastructure
- Sea freight
  - Significant choke points in terms of transport access (and limited capacity) at Australia’s major ports
  - Exporters are already encountering very significant demurrage costs that act as a disincentive to increased use of sea freight

8. There remain significant levels of uncertainty about the measurement of carbon intensity for transport (both pre-combustion and post-combustion)

- Carbon intensity of conventional fuels is relatively well established
- Carbon intensity of alternative transport fuels is characterized by high levels of uncertainty and variability
- Greenhouse performance of conventional fuels is highly variable, owing to varied states of development of associated engine technologies
- The US State of California has commissioned three years of research to provide the foundations for the introduction of a Low Carbon Fuel Standard
- Need to better understand carbon intensities of alternative transport fuels (i.e. research requirement)

9. Future measurement of carbon intensity for freight will need to be developed

- Two measurement methods for freight in Australia
  - Billion Tonne Kilometres travelled (BTKM)
  - Tonnes Consigned

- BTKM is a measure of exposure and was typically developed for risk purposes. Measure is not directly related to the value of freight moved or the cost of freight.

- Tonnes consigned is a direct measure of freight moved and can be directly related to the cost of freight.

- Measuring the *Carbon intensity* (by individual freight modes and bulk/non bulk)
  - **Billion Tonne Kms/tonnes of CO2 eq** has potential application for consideration (within mode) of variable effect of countermeasures within individual freight modes.

- Measuring the *carbon cost* of freight (total composite impact on freights sector – all modes)
  - **Tonnes consigned/tonne of CO2 eq** has potential application for consideration of composite impact (i.e. all modes) or between individual freight modes..

Summary

Projected future growth will create inevitable challenges in terms of the economic prosperity, environmental quality, and social cohesion.

- **Economic challenges**
  - Accommodate increased national economic production without input cost penalty
  - Preserve (and enhance) the international competitiveness of Australian business and industry
  - Minimise the community cost of related externalities in terms of increased greenhouse emissions, air pollution, road crashes, and urban traffic congestion.

- **Environmental challenges**
  - Contain the effects of increased activity on urban air pollution
  - Contribute to an overall reduction in GHG emissions from the transport sector
  - Protect the urban amenity of urban communities

- **Social challenges**
  - Minimise the risk of ‘flow-on’ economic costs to vulnerable sections of our national community
  - Ensure the connectedness and viability of regional and remote communities

Addressing these challenges will require a systems approach that delivers improvements in infrastructure, freight technologies, and freight user behaviours.