



## **The Role of the Bus Industry in Low Cost Abatement**

**Submission by the Bus Industry Confederation to  
the Emissions Reduction Fund Green Paper**

**February 2014**

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## **About the Bus Industry Confederation of Australia**

The Bus Industry Confederation (BIC) is the peak national body representing the interests of Australian bus and coach operators and suppliers to the industry. As the primary voice of the bus and coach industry the BIC works with all levels of Government, regulatory authorities, strategic partners, our industry and the community to:

- Encourage investment in public transport infrastructure and services.
- Coordinate and make more effective existing Federal, State and Local Government policies and programs that relate to passenger transport.
- Improve public understanding of the contribution made by the bus and coach industry to Australia's economy, society and environment.
- Ensure that the accessibility and mobility needs of Australians are met, regardless of where they live or their circumstances.
- Ensure that buses and coaches operate safely and effectively.

## **About this Submission**

This submission outlines a proposal from the BIC to make the Emissions Reduction Fund a mechanism for encouraging low emissions transport choices through the development of travel behavioural change programs and improvement of the fuel efficiency of the Australian bus fleet.

These programs, by encouraging low cost and low fuel travel choices, could reduce transport related greenhouse gas emissions, and play a leading role in improving energy security, public health and road safety.

This submission is based on the BIC Submission to the Emissions Reduction Fund terms of reference and has been updated to reflect the Emissions Reduction Fund Green Paper.

The BIC lodged a submission to the Emissions Reduction Fund Terms of Reference in late 2013 and representatives are participating in the Transport Technical Working Group that is overseeing pathways to reducing transport related emissions.

The Green Paper arising from the Emissions Reduction Fund identifies two key areas where the bus industry can contribute significantly to lowering transport related greenhouse gas emissions at a relatively low cost.

These are "shifting between transport modes" (for example, from car to bus) and "upgrading technology, by converting existing fleet to lower emission technology and/or alternative fuels and adopting more fuel-efficient driving practices".<sup>1</sup> While the BIC supports the adoption of fuel efficient driving practices in the bus industry, the quantification of their benefits and consistency of performance presents significant challenges in the context of the Emissions Reduction Fund.

The BIC believes that there are three mechanisms related to the bus and coach industry which can contribute to significant reductions in transport related greenhouse gas emissions at a relatively low cost these are:

- 1) The introduction of comprehensive road pricing.
- 2) Modal shift to public transport from passenger cars through small scale measures such as travel behaviour change programs
- 3) The use of more fuel efficient and low emission vehicles in the Australian bus fleet.

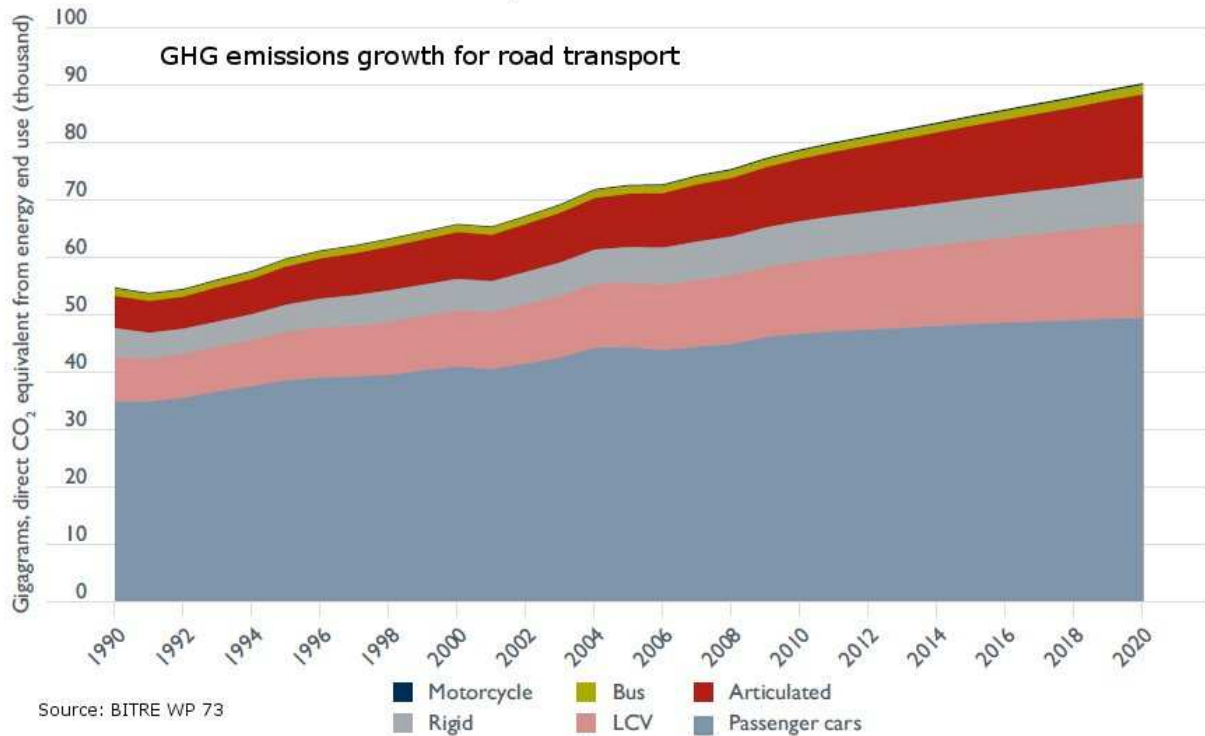
This submission addresses the latter two approaches outlined above and the overall emissions abatement value of public transport.

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<sup>1</sup> Australian Government Department of the Environment, "Emissions Reduction Fund Green Paper",

## Public and Active Transport: Reducing Emissions

Road transport contributes almost 15 per cent of total green house gas emissions in Australia. Cars contribute more than 50 per cent of road transport related emissions while buses contribute less than 2 per cent of total emissions from road transport. By 2020, allowing for some emissions reduction initiatives, greenhouse gas emissions from road transport are predicted to be more than two thirds higher than their 1990 levels with cars still accounting for the majority.



**Source: Bureau of Infrastructure Transport and Regional Economics**

Shifting from cars to public transport can deliver a 65 per cent emissions reduction during peak times and a 95 per cent reduction in emissions during off peak times from the commuters that make the shift.<sup>2</sup>

At current occupancy rates for cars a full bus load of passengers can take up to 50 cars off the road and a full passenger train can take 500 cars off the road.

This not only results in significant emissions savings, but also reduces traffic congestion (which is predicted to cost the economy \$20 billion by 2020), reduces ongoing road maintenance costs through reductions in road wear and improves road safety (buses are the safest form of land transport).

Based on 2004 occupancy figures for cars and buses, the fuel consumption of buses for every 100 passenger kilometres was 2.5 litres and the fuel consumption of cars for every 100 passenger kilometres was 7 litres.

A ten per cent shift to bus passenger transport from cars would reduce greenhouse gas emissions by more than 400,000 tonnes a year and every million passenger kilometres on public transport, instead of cars, saves 45,000 litres of fuel.<sup>3</sup>

In the long term reduced dependency on cars will lead to further reductions in emissions from road transport.

In comparison with other greenhouse gas emissions abatement measures a shift of one commuter from driving to buses for a trip from an outer suburb to the CBD in Melbourne or Sydney can deliver the same carbon abatement value of 3 households switching to energy saving light globes. (Extrapolated from Garnaut Review) Zero carbon modes of transport like walking and cycling are also highly effective in reducing transport related emissions.

<sup>2</sup> Barrett and Stanley (2008), *Moving People: Solutions for a Growing Australia*, ARA, BIC, UITP

<sup>3</sup> CRA International (2006), *Impact on the Australian economy of Increased Bus Patronage*, BIC

## **Methodology for Assessing Emissions Reduction Value from Modal Shift, Service Improvements and Fleet Improvement**

The Transport Technical Working Group for the Emissions Reduction Fund, identified a general transport method based on an emissions-intensity approach as the highest priority in the transport area.

This general method is expected to cover most activities that could reduce fleet emissions. The Group's discussion on modal shift acknowledged that developing a method for assessing the emissions reduction value from modal shift would require further background work to identify possible approaches.

The BIC believes there is scope for the development of a methodology of assessing emissions abatement from modal shift (cars to buses and rail) based on existing approaches and data available. This methodology could incorporate the impact that service and fleet improvements to existing public transport networks can have in reducing carbon emissions by both encouraging modal shift to public transport and improving the environmental performance of the vehicle fleet.

The BIC believes there is an opportunity to work with the Department of the Environment and state, territory and commonwealth departments in developing this methodology.

There is a range of existing research and data on methodologies for calculating emissions reduction from public transport service improvements and modal shift. This section touches briefly on the literature.

In their research Hook et al (2010) identified the TransMilenio II system in Bogota as the first bus rapid transit system that secured credits for CO<sub>2</sub> reduction through the UNFCC Clean Development Mechanism (CDM).

Under their methodology the projected savings of CO<sub>2</sub> from 2006 to 2012 on this system were calculated at 1.7M tons. The actual reduction of CO<sub>2</sub> emissions was in 2006 60%, in 2007 52% and in 2008 30% of the estimated reduction. The yearly average reduction was 68,000 tons.<sup>4</sup>

This is the most comprehensive analysis of the methodologies available for assessing the emissions reduction impact of Bus Rapid Transit systems and the references used in the research are included in the following footnote.<sup>5</sup> While this submission doesn't go into detail about the potential for Rapid Transit systems, with higher carrying capacities and shorter travel times to provide "like for like" performance improvements and emissions reductions along existing public transport routes this is something that could be investigated in identifying a methodology.

<sup>4</sup> Hook, W et al, 2010, "Carbon Dioxide Reduction Benefits of Bus Rapid Transit Systems Learning from Bogotá, Colombia; Mexico City, Mexico; and Jakarta", Indonesia, Accessed online at: [http://www.academia.edu/719566/Carbon\\_Dioxide\\_Reduction\\_Benefits\\_of\\_Bus\\_Rapid\\_Transit\\_Systems\\_Learning\\_from\\_Bogota\\_a\\_Colombia\\_Mexico\\_City\\_Mexico\\_and\\_Jakarta\\_Indonesia](http://www.academia.edu/719566/Carbon_Dioxide_Reduction_Benefits_of_Bus_Rapid_Transit_Systems_Learning_from_Bogota_a_Colombia_Mexico_City_Mexico_and_Jakarta_Indonesia)

<sup>5</sup> Schipper, L., and C. Marie. Transport and CO<sub>2</sub> Emissions, World Bank, Washington, D.C. [www.cleanairnet.org/lac\\_en/1415/article-41318.html](http://www.cleanairnet.org/lac_en/1415/article-41318.html), 1999.

Schipper, L., M. Cordeiro, and W-S. Ng. Measuring the Carbon Dioxide Impacts of Urban Transport Projects in Developing Countries. WorldResources Institute, Washington, D.C. <http://pdf.wri.org/measuring-co2-impacts-transport-projects-developing-countries.pdf>, 2007.

Grütter, J. Monitoring Report. CDM Project 0672. BRT Bogotá, Colombia: TransMilenio Phase II–IV, Monitoring Period 1/1/2006–12/31/2006, February 6, 2007.

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Grütter, J. The CDM in the Transport Sector: Module 5d of Sustainable Transport: A Sourcebook for Policy Makers in Developing Countries. GTZ, May 2007.

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Grütter, J., and S. Ricaurte. Monitoring Report. CDM Project 0672. BRT Bogotá, Colombia: TransMilenio Phase II–IV, Monitoring Period 1/1/2008–12/31/2008, February 5, 2009.

Grütter, J. Metrobus Insurgentes, Project Design Document, Mexico City, July 28, 2006.

Rogers, J. Project Design Document. Insurgentes Bus Rapid Transit Pilot Project, Mexico, January 4, 2006.

BRT Metrobus Insurgentes and Eje 4, Mexico. Clean Development Mechanism (CDM-PDD). Version 03, July 28, 2006.

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The methodologies investigated in this research along with research from Todd Litman at the Victoria Transport Institute can serve as useful pathways.

Litman has investigated the emissions reduction value of public transport through research in to the emissions impact of Travel Demand Management strategies (these include Travel Behaviour Change programs highlighted in this submission), analysis of the energy savings and emissions reduction benefits from public transport and research into effective emissions reductions strategies related to mobility.<sup>6</sup>

Litman cites Newman and Kenworthy's (1999) finding that there is a potential for energy savings and emissions reduction impacts from public transport related to factors including the transport impacts of the system, travel conditions, and the type of vehicles used:<sup>7</sup>

- Strategies that shift travel from automobile to transit using existing transit capacity (with minimal increase in transit vehicle-miles) reduce energy consumption and emissions.
- Strategies that improve fuel consumption or reduce emission rates of transit vehicles (for example, retrofitting older diesel buses with cleaner engines or alternative fuels) can provide energy conservation and emission reduction benefits.
- Strategies that reduce the total amount of congested driving (by either reducing vehicle mileage or the amount of congestion) tend to provide particularly large energy conservation and emission reduction benefits.
- Strategies that create more accessible land use patterns, and so reduce per capita vehicle mileage, can provide large energy conservation and emission reduction benefits.

In his work on optimal energy savings and emissions reductions from transport Litman identifies a key issue with the preference for vehicle fuel efficiency programs in that they "ignore the additional external costs that result when increased fuel efficiency stimulates additional vehicle travel, and the additional benefits (besides energy conservation and emission reductions) resulting from travel reductions."<sup>8</sup>

A comprehensive methodology for assessing the emissions reduction value of public transport would need to weigh all co benefits, potential strategies and encompass policy mechanisms such as Travel Demand Management in assessing the overall potential for low cost emissions abatement from public and active transport.

### **Recommendation**

That the White Paper recommends the investigation of a credible methodology for assessing the emissions reduction value from modal shift to public and active transport, service improvements to public transport systems and fleet improvements in the Australian bus fleet, that demonstrates additionality.

## **Travel Behaviour Change Programs**

In its impact study of the TravelSmart and Living Smart programs the Western Australian Government was able to identify the emissions reduction value of the programs. There is potential for this methodology to be modified to provide a definitive methodology for the emissions abatement value of modal shift from cars to lower emissions forms of transport such as walking, cycling and public transport.

TravelSmart programs by the Australian, State and Territory Governments aim to foster travel behaviour change by encouraging people to use other ways of getting about rather than driving alone in a car.

The Australian Government, through the National Travel Behaviour Change Project (NTBCP), partnered with South Australia, Victoria, Queensland, Western Australia and the ACT, over a five year period from 2003 to 2008 to deliver the project.

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<sup>6</sup> Strompen, F, Litman, T and Bongardt D, 2012, "Reducing Carbon Emissions Through Transport Demand Management Strategies", Federal Ministry for the Environment, Nature Conservation and Nuclear Safety.

<sup>7</sup> Litman, T, 2013, "Evaluating Public Transport Benefits and Costs", Victoria Transport Institute.

<sup>8</sup> Litman, T, 2011, "Smart Transportation Emissions Reduction Strategies", Victoria Transport Institute.

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Since the conclusion of the original project, there has been no further Australian Government involvement in TravelSmart initiatives at a State level.

Over the five years of the NTBCP, it is estimated the project, at a relatively low cost to the Commonwealth Government, resulted in 186,000 Australian households reducing distances travelled by car, resulting in significant increases in active transport and decreases in GHG emissions.

Some State Government programs continue (see case study below). The BIC believes there is an opportunity to expand and improve existing programs and develop new programs, and better capture emissions reduction data centrally through a coordinated program under the Emissions Reduction Fund.

The BIC believes there a number of options available for the implementation of travel behaviour change and travel demand management programs:

- The State Government model – Reflected in the Perth case study below. This model will be focussed on capital city residents.
- Major Councils model – This model is seen in the TravelSMART Households programs being undertaken in the City of Prospect and parts of Port Adelaide and Enfield in South Australia. Under this program TravelSMART Representatives spoke directly with householders about their car use (or how they get around more generally) and worked collaboratively with them to identify ways they could reduce their car use - in a way that aligned with their values, improved their lifestyle in some way and benefitted them at a household level.
- Regional Council model – This could involve a regional town Council working with local transport operators to identify efficiencies in service provision and encourage more walking and public transport use. A programs of this nature was undertaken by Townsville City Council, but was limited to work related travel by Council staff. There is an opportunity for a whole of community approach to be undertaken under a regional council model.

The BIC will investigate further options for the delivery of these programs as details of the Emissions Reduction Fund become clearer and following consultation with bus industry stakeholders.

**Recommendation**

That the White Paper investigates options for travel behavioural change and travel demand management programs undertaken at a State and Local Government level to be eligible for credits under the Emissions Reduction Fund.

**Case Study: Western Australia - TravelSmart and LivingSmart**

The Western Australian Travel Smart program achieved

- 10 per cent reduction in car use amongst communities in the program
- 13 per cent reduction in car km travelled across the suburbs in which it delivered an average of 69 fewer car trips per person per year
- 10 million fewer car trips
- 100 million reduction in vehicle kilometres travelled
- 30,000 tonnes reduction in CO<sub>2</sub>-e (equivalent of taking 6,000 cars off the road)
- 1.6 million extra hours of physical activity
- 1.4 million extra public transport trips.

The reductions in car trips the Western Australian Travel Smart program achieved were largely replaced by walking, bicycle and public transport trips.

Community benefits (based upon the combined results of eight projects reported to date) were projected, for the full program of 418,500 residents, to be an annual reduction of 30 million car trips, 290 million car kilometres and abating 88,000 tonnes of GHG.

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Other community benefits included increased public transport fare revenues, reduced local pollution, increased physical activity (from more walking and cycling), improved social well-being (people on the streets) and increased security (eyes on the street).

The TravelSmart program in Perth delivered a reduction of 750 car km per target person per annum. This approximates to 225 kg of CO<sub>2</sub>-e (full fuel cycle) of abatement per target person.

Each \$1 million in project investment (with 28,000 target persons) delivered 6,300 tonnes of GHG abatement per annum. The first year cost was \$159 per tonne of abatement. Based on an 80 per cent durability of behaviour changes over five years, and no behavioural maintenance costs, the abatement cost fell to \$40 per tonne over five years.

## **Improving the Australian Bus Fleet**

Significant emissions reduction beyond Business As Usual (BAU) scenarios can be achieved through achieving higher fuel efficiency for Vehicle Kilometres Travelled (VKT) in buses that are contracted for services.

In discussions in the Transport Working Group for the ERF the BIC has indicated that VKT rather than Passenger Kilometres Travelled (PKT) should be the unit measurement in calculus of emissions abatement activities related to passenger transport.

The nature of the contracted service task means that buses are required to operate regardless of passenger numbers, time of operation and location. As a consequence the only controlled approach to measuring emissions abatement through non BUA activities of the bus vehicle fleet is using VKT as a unit measurement and relating it to overall fuel use at a fleet level.

While there is scope for service efficiency, and therefore a reduction in VKT, to be achieved through better scheduling and transport planning practices, this would fall under BAU as a business and operational decision being undertaken by both operators and the State Governments who contract their services.

The BIC is in the process of developing a program for consideration under the Emissions Reduction Fund. This program would see stakeholders in bus public transport services undertake to replace older vehicles, of 10 years or more in age with vehicles that carry new low emissions and fuel efficiency technology and meet Euro 6 emissions standards. These would include diesel electric hybrids, CNG, LNG and fully electric buses.

The working title for this program is “20 by 2020” and the headline intention of this program is to see 20 per cent of the Australian made up of lower emissions and more fuel efficient vehicles by 2020.

In developing the specifics for this program the BIC will identify who these stakeholders are based on further information about how the Emissions Reduction Fund will be administered. We will also seek feedback from the Department of Environment on the feasibility of this program under the ERF and how to structure it.

### **Recommendation**

The Department of Environment provide feedback to the BIC on the proposed fleet improvement program.

## **Approaches for Undertaking Projects**

The BIC believes there are considerable economies of scale and administrative efficiencies to be achieved by collective undertakings that bring together key stakeholders in a sector to undertake emissions reductions strategies.

While there is scope for bodies to act as aggregators under the ERF the method of purchase from projects involving multiple proponents would need to be defined clearly under the White Paper.

### **Recommendation**

That the Green Paper for the Emissions Reduction Fund provides a clearer definition or set of breakdown for eligibility to receive credits under activities or programs that involve multiple proponents.



## **Conclusion**

The Government's Direction Action Plan to tackle climate change presents a unique opportunity for the Commonwealth Government to encourage alternative travel choices.

A proper recognition of the low cost abatement value of public and active transport will provide greenhouse emissions reduction, and significant economic, social and environmental co-benefits through congestion reduction, increased social mobility, and public health improvement in our cities and regions.

The Bus Industry Confederation is available to discuss our submission and can be contacted on email: [enquiries@bic.asn.au](mailto:enquiries@bic.asn.au) or via phone: (02) 247 5990.