TRUCK INDUSTRY COUNCIL
SAFER GREENER ESSENTIAL

Modernising the Australian Truck Fleet

Budget Submission 2019/20

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MODERNISING THE AUSTRALIAN TRUCK FLEET BUDGET SUBMISSION KEY POINTS

- The Truck Industry Council's Budget Submission calls for the modernisation of the Australian Truck Fleet and promotes four key outcomes:
  - A safer Australian truck fleet;
  - A more energy productive Australian truck fleet;
  - A greener, cleaner, healthier Australian truck fleet; and
  - A younger Australian truck fleet

- The average age of the Australian Truck Fleet in 2018 was 14.8 years. According to the ABS January 2017 Motor Vehicle Census, almost forty-two percent (41.7%) of the nation's truck fleet was manufactured before 2003 when little, or no, exhaust emission regulation existed. This figure consists of 119,448 pre-1996 trucks (no emission standards) representing 25.8% and 73,441 trucks, or 15.9% being trucks manufactured between 1996 to pre-2003 (elementary emission control systems employed).

- The primary aim of this submission is reduce the age of the Australian Truck Fleet by accelerating the adoption of new ADR 80/03 and ADR 80/04 (Euro VI and equivalents) diesel and alternatively fuelled and powered trucks into the Australian market.

- A secondary aim is to have government consider providing an incentive to encourage pre ADR 70/00 (pre-1996) truck owners to purchase used ADR 80/02 and ADR 80/03 emission standard compliant trucks.

- By doing so the Australian population will benefit through improved health outcomes (reduced noxious air pollutants), improved environmental outcomes (greenhouse gas emission savings – up to 25 per cent for alternatively fuelled or powered vehicles), and a modern productive truck fleet that can take full advantage of the nation's record investment in road infrastructure.

- In addition for every new greener, cleaner truck replacing an older truck, that truck is designed to be a quieter truck and most importantly a safer truck than earlier models given the significant technological advances that are built into modern truck design.

- The Truck Industry Council believes the following initiatives will encourage the modernisation of the Australian truck fleet:

  Federal Government Direct Incentives:

  - To make the purchase of a new ADR 80/03 and ADR 80/04 (Euro VI and equivalents) diesel-only truck more appealing to pre ADR 70/00 (pre-1996 approx.) truck owners, consideration should be given to providing a thirty (30) per cent investment allowance for such purchases, effective for all new models sold from July 2019.

  - To make the purchase of new ADR 80/03 and ADR 80/04 (Euro VI and equivalents) alternatively fuelled and powered trucks more appealing to pre ADR 70/00 (pre-1996 approx.) truck owners, consideration should be given to providing a fifty (50) per cent investment allowance for such purchases, effective for all new models sold from July 2019.

- For ADR 70/00 and later (post-1996) truck owners to offset the costs associated with the purchase of a new ADR 80/03 and ADR 80/04 (Euro VI and equivalents) diesel-only truck, consideration should be given to providing a fifteen (15) per cent investment allowance for such vehicles that comply, effective for all new models sold from July 2019.

- For ADR 70/00 and later (post-1996) truck owners to offset the additional costs associated with the purchase of new ADR 80/03 and ADR 80/04 (Euro VI and equivalents) alternatively fuelled and powered trucks, consideration should be given to providing a twenty five (25) per cent investment allowance for such vehicles that comply, effective for all new models sold from July 2019.

- Acknowledging that some pre ADR 70/00 (pre-1996 approx.) operators will not be in a position to purchase a new vehicle, the government could consider providing a fifteen (15) per cent investment allowance towards the purchase of used ADR 80/02 and ADR 80/03 emissions controlled trucks effective July 2019.

World's best practice determines that regulatory incentives such as those listed below be offered in conjunction with the above financial incentives to ensure the desired policy outcome of a reduction in the age of the Australian truck fleet is achieved.

- COAG to work towards measures to offset the operator mass losses of a new truck (higher TARE weight due to mandated emission and safety devises fitted to new trucks) by allowing higher axle masses for new ADR 80/03 and ADR 80/04 (Euro VI and equivalents) diesel and alternatively or powered trucks.

- COAG to work towards providing green vehicle rebates, reducing uniformly federal and state taxes (registration charges and stamp duty) for low emission trucks.

- COAG to work towards a determination where the Road User Charge for operators is based upon a Mass Distance Location charge for the vehicle/freight movement and an Environmental and Safety levy for the truck.

- COAG to review current Australian heavy vehicle mass and dimensional regulations now that this issue has been added to the National Road Safety Strategy 2011–2020 with a view to aligning same with international standards.

- COAG to work towards removing regulatory barriers preventing the uptake of Higher Productivity Vehicles, for example, B-triple, A-double and PBS in combination with the uptake of specific vehicle advanced safety features.

- COAG to review methods to incentivize the transition from semi-trailer to B-double combinations, for example, reduced registration charges for B-double vehicles with advanced safety features.

- Enhance R&D funding to truck manufacturers and engine manufacturers to develop a world class alternative fuel and powered truck manufacturing industry for domestic use given Australia's competitive strength as a source of abundant natural gas and noting the nation's unique transport requirements.

- The Truck Industry Council believes the following piece of work is required for government and industry to move forward with accountable financial modelling of road transport energy productivity:

    - The Federal Government (Department of Environment) to provide funding for the development of a Government and industry accepted metric to quantify and measure energy productivity in the road freight sector.

MODERNISING THE AUSTRALIAN TRUCK FLEET

1. The Truck Industry Council

The Truck Industry Council is an independent, not-for-profit peak industry organisation representing the united views of truck manufacturers, truck importers, heavy vehicle engine companies and major component suppliers to the Federal Government, State and Territory Governments, Local Government, Industry and Business associations and the general public.

Membership of TIC is inclusive of all truck manufacturers and importers/distributors in Australia and currently consists of:

- 9 truck manufacturers/distributors representing 16 brands;
- 4 engine and component suppliers.

In 2019, the truck industry is designing, engineering, testing, developing, and manufacturing trucks at three major locations in Australia. The companies involved, and their locations, are:

- Iveco Trucks Australia, manufacturing Iveco trucks at Dandenong, Victoria;
- Paccar Australia, manufacturing Kenworth and DAF trucks at Bayswater, Victoria; and
- Volvo Group Australia, manufacturing Volvo and Mack brand trucks at Wacol, Queensland.

The three plants combined produce about 50% of all heavy duty trucks sold in Australia (TIC T-Mark Truck Market Sales Data 2017).

Complementing these Australian based truck manufacturers are truck importers who deliver the majority of new trucks sold in Australia, importing from Asia, Europe, and the United States of America (USA). In combination TIC members provide trucks that meet the specific requirements of Australian operators who work in conditions unique to anywhere else in the world ensuring the efficient transportation of the nation's growing freight task.

A key feature of the Australian truck industry is that trucks sold require a second manufacturer to fit the truck with the equipment required by the operator. The vehicle is not suitable for on-road use in the vast majority of cases until this second stage of manufacture is completed locally. Ninety-five per cent of trucks sold, upwards of 25,000 vehicles each year, require this secondary manufacturing process.

As such, there are hundreds of second-stage manufacturing companies, from major trailer manufacturers, tipper and tanker builders to the smaller companies making everything from specialist bodies, hydraulics for tippers and garbage collectors, cabins, fuel tanks, chassis frames, electrical harnesses, wheel guards and turntables.

The Australian new truck market is a $4.5B industry with ancillary activities estimated to have an economic value of a further $9B. For the three years, 2015, 2016 and 2017 yearly sales have seen steady growth with 32,003 vehicles; 32,964 vehicles and 36,825 sold respectively. Year 2018 sales were 41,625 vehicles meaning that sales have surpassed for the first time the record pre-GFC year of 2007 where 38,131 vehicles were sold.

Even at these sales levels the average age of the Australian truck fleet is not expected to decline significantly due to the ever increasing freight task that will require more trucks.

It would take ten years of year-on-year record sales for the average age of the truck fleet to return to the 2007 level of 14.4 years. When compared to significant overseas markets Australia's truck fleet is twice the age of these countries.

This is not an enviable position for Australia to find itself.

Truck manufacturers in Australia are major employers of skilled and semi-skilled people (trade, engineering, electronic and information technology) with total employment of approximately 36,000 employed in disciplines such as:

- Local Truck Manufacturing/Assembly 4,010
- Importing and Distribution of Trucks 1,300
- Suppliers/Dealers (Sales, Service and Spare Parts) 27,142
- Equipment and Body Builders (Trailer, Tanker, Tippers and Secondary Manufacturers) 3,610

In 2018, six TIC members marketed selected truck models in Australia that met Euro VI and equivalents exhaust emission regulations, well before the mandating of such standards by the Federal Government. More members will follow. There are currently four TIC members that offer hybrid and/or alternatively fuelled trucks for the Australian market. In addition, the first full scale market evaluation of light duty "plug-in" electric trucks in Australia by a TIC member commenced in 2018. Similar activities will soon be undertaken by other members. These alternatively fuelled and/or powered trucks can reduce CO_2 emissions subject to the source of charging electricity.

At a time when there is continuing concern regarding road safety and the adverse health effects to Australians from vehicular pollution and significant emphasis on the reduction of greenhouse gas and noxious emissions, the more efficient, and alternatively fuelled and powered, and higher emission standard (Euro VI) trucks that TIC members are bringing to market today represents a major step forward in improving the health of all Australians while reducing Australia's road transport carbon footprint and noxious emissions.

The reality is that the take-up rate by operators of these more advanced trucks in Australia is poor, thus significantly limiting the positive outcomes that could be achieved by these modern technologies.

2. Submission Aim

The primary aim of this submission is to advocate to Government the virtues of modernising the Australian truck fleet by implementing a financial and regulatory incentives program which accelerates the adoption of the latest emission trucks while actively promoting the take up of advanced more energy efficient, cleaner, greener and safer truck technologies.

This submission acknowledges the Federal Government's key strategic objectives and identifies initiatives the Government can pursue to deliver on these objectives by improving the health of Australians, particularly in urban areas, through a reduction in noxious emissions, while overcoming barriers that reduce the country's ability to modernise the nation's truck fleet. Initiatives to: reduce heavy vehicle fatalities by the take up of safer vehicle technologies; reduce CO_2 emissions and to improve the efficiency and effectiveness of the nation's distribution channels thus enabling the Federal Government's record road infrastructure spend to be realised are also presented in this submission.

With greenhouse gas emissions from the freight transport sector forecasted to grow strongly to 2040 (NTC Report 2016) the submission aims to reduce emission levels from trucks over the longer term and to achieve a reduction in the levels of emissions that are known to be harmful to public health. By achieving the objective of a greener, cleaner truck fleet the nation benefits by having a more energy productive distribution channel and a healthier Australian truck fleet that also markets the latest safety technologies making road travel safer for all users.

3. Australian Government Objectives

The Australian Government has clearly identified key strategic objectives it wishes to pursue. This budget submission details initiatives that can be implemented to achieve these objectives.

Road Safety: The Australian Government has committed to the National Road Safety Strategy 2011–2020. This strategy document seeks to reduce fatal and serious injury crashes on Australian roads by detailing national goals, objectives and action priorities. In addition, the Government has recently sought to identify issues and priorities for consideration in the development of a post-2020 national road safety strategy focusing on how Australia can recognise and move towards a safe road transport system which minimises harm to all users. Consideration of the policy initiatives detailed in this budget submission will assist Government to achieve these road safety objectives.

Environment: The Government ratified on the 10th November 2016 the Paris Agreement on Climate Change and the Doha Amendment to the Kyoto Protocol. Australia has set itself the target of reducing emissions by 26 to 28 per cent below 2005 levels by 2030. By these actions the Australian Government has committed itself to taking the necessary measures to secure a low carbon future. This is in addition to the Australian Government's desire to reduce harmful emissions such as Particulate Matter pollution (PM) and Nitrogen Oxide (NOx). The measures outlined in this budget submission support the Government's strategy and add to the policies that can be used by Government to reduce domestic emissions.

Energy Productivity: The National Energy Productivity Plan 2015-2030 (COAG 2015) details the potential national benefits which would accrue from investment in improving national energy productivity. The Government has established the target of a forty (40) percent improvement in Australia's energy productivity between 2015 and 2030. Improving the nation's energy productivity capability would benefit Australians, their businesses and households alike, through lower input costs and delivering a reduction in national greenhouse gas emissions. The National Energy Productivity Plan (NEPP) identifies four priority areas for energy productivity improvement. This budget submission addresses the priority area of "Industry", in particular, Freight and Commercial Transport. This sector represents the second largest opportunity for improvement and measures offered in this budget submission deliver improved energy productivity to the nation's truck fleet assisting the Government to achieve its national greenhouse gas emissions targets.

Economy: The Australian Government seeks to build a strong economy through sustained growth and job generation. To achieve this objective the Federal Government in its previous budgets has committed to record spending thus obligating itself to building and upgrading road infrastructure to improve freight productivity. Meanwhile, the enablers of this infrastructure, the truck, does so not as efficiently or effectively as it could. Initiatives outlined in this budget submission aim to bring about productivity gains maximising the Government's infrastructure spend.

4. The Problem Australia Faces

There is disconnect between the Australian Government achieving these objectives and the reality that is today's National truck fleet.

Australia has a very old truck fleet:

- 14.0 years average age (vehicles above 3.5t GVM – ABS Motor Vehicle Census Jan 2018);
- 14.8 years average age (vehicles above 4.5t GVM – ABS Motor Vehicle Census Jan 2018).

Almost forty-two percent (41.7%) of the nation's truck fleet above 4.5t GVM was manufactured before 2003 when basic, or no, exhaust emission regulation existed. This figure consists of 119,448 pre-1996 trucks (no emission standards) representing 25.8% and 73,441 trucks, or 15.9% being trucks manufactured between 1996 to pre-2003 (elementary emission control systems employed).

For purposes of comparison Appendix A details the average age of heavy vehicles in other countries.

The above objectives set by Government are in part not being achieved given the inherent problem of the fleet's average age.

Simply put Australia has an old truck fleet.

An older Australian truck fleet means that technology advances found in more modern trucks such as environmental, safety and intelligent transport systems are not being introduced into the Australian market in a timely manner. The result of which is the Australian Government's inability to meet its own strategic objectives.

5. Why is Australia's Truck Fleet So Old?

Understanding "why our truck fleet is so old" is key to modernising the nation's fleet, with the benefits of more effectively enabling the economy's road distribution channels, making it safer for all road users, more energy productive for industry, and much cleaner and more environmentally friendly for all Australians. Australia's old truck fleet cannot achieve these benefits.

The reasons for Australia's ageing truck fleet include:

1. *Freight efficiencies and a company's "bottom line" profitability.*

   New trucks are heavier than old trucks, typically a post 2008 truck is 300kg to 600kg heavier than a pre-2003 truck due to the safety and environmental standards (Australian Design Rules – ADR's) that the new truck is required to meet. This simply means that a newer truck cannot carry as much payload as an old truck, making the new truck less productive, reducing the "bottom line" profitability for the operator. Losses in this area more than offset any increased profitability that are gained from the better fuel efficiency of a new truck. Some additional mass has been given by the States in Australia for some post-2008 trucks, however typically a new truck is less productive due to its increased TARE mass. The "bottom line" profitability of an alternatively powered or low carbon emitting truck is substantially worse than that of an existing diesel powered truck. The additional weight due to batteries, or storage tanks (natural gas, hydrogen, hydraulic fluid, etc.) further reduces the effective payload of these alternatively powered and low carbon emitting trucks, reducing energy productivity and coupled with considerably higher initial purchase price, makes for a less convincing business case for an operator.

2. *Inefficient market dynamics - No second market exists for Australia's older trucks beyond Australian shores.*

   In Western Europe older trucks are sold into Eastern Europe and Africa. In the USA and Canada older trucks are sold into South America, and in Japan older trucks are sold into other less developed countries in the Asia Pacific region. Australia has no viable retirement plan (alternative second market) for older trucks. The low scrap value for such vehicles is such that the operator finds it more economically viable to run trucks for much longer in Australia.

3. *"Fix it up, Keep it going" - The Australian Culture*

   A "culture" for the continued replacement of old trucks and hence the updating of Australia's truck fleet simply does not exist in Australia. While the current culture of "fix it up", "keep it going" continues, the take-up of new more efficient diesel trucks and new low emission trucks, will remain very poor. This current heavy vehicle purchasing "culture", or "buying behaviour", must be addressed by any fleet replacement incentive scheme introduced by the Australian government.

4. *Poor take up rate of new technologies (0.12% of total new truck sales).*

   Globally the uptake of alternatively powered and fuelled vehicles, cars and trucks, runs at approximately 2 percent of new vehicle sales each year, again this was the case in 2018. There are some stand out performers such as the Netherlands who achieved over 10 percent uptake in 2018. In Australia 2018 sales of light passenger vehicles using these technologies was 1.4 percent, while in the heavy vehicle domain TIC's T-Mark new truck sales data shows the five year average, 2011 to 2015, sales of alternatively powered and fuelled trucks was just 0.3 percent per year. This number plummeted to just 0.1 percent of new truck sales in 2016 and has not significantly improved since. At year end 31st December 2018 just 51 alternatively powered or fuelled trucks had been sold across Australia, representing a 0.12 percent uptake for the year.

The complete lack of incentives by Australian governments for the uptake of low carbon emitting vehicles is a major inhibitor to the uptake of such vehicles in this country. Globally the uptake of low carbon emitting vehicles is generally proportional to the incentives put in place, or the disincentives put in place by governments for high carbon emitting vehicles (for example, carbon tax on certain fuel types, emission zones that exclude or penalise high carbon emitting vehicles within certain geographical locations, increased registration charges for older vehicles).

To overcome the inhibitors to Australia having a more modern truck fleet the Truck Industry Council calls upon the Federal Government to provide incentives to renew Australia's truck fleet.

The Federal Government's Emission Reduction Fund (ERF) is a good example of incentives aiming to reduce emissions for high carbon intensity emitters but a scheme that is not suitable for the road transport sector. There has only been one successful ERF "bid" for a road transport operator since the ERF commenced a few years ago. Although the details of the successful bid are governed by confidentiality agreements, media information released by the successful company, a refrigeration freight group, indicates that most of their planned CO_2 reduction will actually come from "modal switching", moving freight from trucks to rail and while this is a win for CO_2 emissions, it is hardly a win for reducing CO_2 emissions for trucks. Historically, modal switching has not proven to be viable for most road transport tasks for various practical reasons. There is nothing to suggest that this dynamic will change in the foreseeable future.

Although the road transport sector is collectively a large CO_2 emitter, individual vehicle CO_2 improvements are typically quite small and incentive schemes that work for industries such as power generation WON'T work for road transport.

6. Positive Global Incentive Programs – Hong Kong

TIC has undertaken research on incentive schemes operating in countries that have a significantly younger truck fleet age than Australia. The underlying conclusion to be drawn from this research was that the most effective measures involved removing older trucks from the fleet. Such measures included introducing location based Low Emission Zones, increasing operating fees and charges and charges for older vehicles. TIC acknowledges that while such measures are effective they would have considerable or significant financial impact on Australian truck operators and that the Government must provide financial incentives to compensate operators moving from the undesired state of older trucks to the desired state of a modern truck fleet.

The most important point to be made from Hong Kong's integrated fleet renewal scheme is that it represents a comprehensive and well-integrated suite of measures to reduce fleet age.

Hong Kong demonstrates perhaps the best world-wide example of a policy package response to the problem of poor air quality and older trucks. Hong Kong's air pollution problem was recognised in their 2013 "Clean Air Plan", which outlined a multifaceted and aggressive approach to tackling the challenge of roadside air quality.

The Clean Air Plan recognised that old "Diesel Commercial Vehicles" emitted a disproportionately large amount of air pollution. In December 2012, "Goods Vehicles" made up only 17% of vehicle registrations (compared with 70% for private cars); however, they were the leading emitter of PM10 and NOx, accounting for 56% and 31% respectively of the fleet's total 2011 emissions inventory. In Australia, 26 per cent of trucks operating are pre-1996. These trucks are polluting at rates sixty (60) times that of trucks complying with the current Australian regulation and one hundred and twenty (120) times that of the current European, USA and Japanese regulations.

Table 1 Hong Kong Measures for Fleet Renewal

Country	Classification	Action	Description
Hong Kong	Regulation	Age Limit	Stipulated age limit of 15 years for goods vehicles.
	Financial Instruments	Retirement Scheme	Grants are available, prior to final regulated phase out - which will ultimately ban vehicles older than Euro IV.

Table 1 details Hong Kong's response which was to undertake a new fleet renewal program targeting old diesel commercial vehicles. It included a package of incentives and disincentives, combining a retirement incentive called an "ex-gratia payment", before a retirement regulatory phase-out prohibits any further registration for trucks older than a specified age.

The ex-gratia payment rewards the operator to incentivise the retirement of older vehicles. In this budget submission TIC defines older vehicles as being pre-2003, i.e. pre ADR80/00. These vehicles either have no emission standards or basic emission standards employed. An application for the payment by the operator must be submitted while the vehicle is still registered (not after it is retired), and prior to a series of successive deadlines based on the vehicle emissions standard, after which a vehicle licence will not be issued.

Incentive: Operator Ex-Gratia Payment (Structural Adjustment Package)

The payment amount varies by age and type of truck. Newer vehicles and heavier vehicles are eligible for higher payments, topping out at nearly AUD$50,000. Table 2 details the applicable payment relative to vehicle age and category, based on an exchange rate of one Hong Kong dollar for 16 Australian cents.

Table 2 Ex-gratia payment for retired vehicles of different age (Adapted from HK EPD 2017)

		Age of retired vehicle		
	GVM (tonnes)	>16 years	13, 14, 15 years	< 13 years
Light and Medium Duty Goods Vehicles	5.5 to 10	HK$112,000 AUD$17,920	HK$124,500 AUD$19,920	HK$136,900 AUD$21,904
	10 to 13	HK$137,300 AUD$21,968	HK$152,500 AUD$24,400	HK$167,800 AUD$26,848
	13 to 16	HK$184,500 AUD$29,520	HK$205,000 AUD$32,800	HK$225,500 AUD$36,080
	16 to 24	HK$224,500 AUD$35,920	HK$249,400 AUD$39,904	HK$274,400 AUD$43,904
Heavy Goods Vehicles	Over 24	HK$252,200 AUD$40,352	HK$280,300 AUD$44,848	HK$308,300 AUD$49,328

Disincentive: Regulatory phase-out

The regulatory component of the policy package comprises a mandatory retirement date for older vehicles (a regulatory phase-out), based upon the truck's level of emissions standard, which acts as a disincentive. The nominal deadlines were/are:

- Pre-Euro vehicles on 31 December 2015;
- Euro I vehicles on 31 December 2016;
- Euro II vehicles on 31 December 2017; and
- Euro III vehicles on 31 December 2019.

The mechanism by which these trucks are progressively removed from the fleet is via simple denial of vehicle registration.

Policy Effectiveness

Information solicited from Hong Kong officials noted:

Fleet composition

As the regulation was being developed, spot audits were conducted to provide a snapshot of Hong Kong's commercial vehicle fleet. Successive surveys were collated and published to understand the trend of the fleet's composition. Projections could also be developed with confidence, because withholding registration permission provides certainty of retirement age. Figure 1 illustrates this historic trend and future projection to give a strong visualisation of fleet turnover. Combined, the measures will remove more than 82,000 pre-Euro IV vehicles by the time the final stage is implemented in December 2019.

Average age

Fleet age data received from Hong Kong authorities is shown in Figure 2. The details are rounded to the nearest whole number, but are sufficient to demonstrate the effectiveness of the policy package for the purpose of this budget submission.

The biggest impact appears to have been on the heavy goods segment, where the average age has been reduced by more than half in only 4 years (from 9 years to 4).

Program review and lessons learnt

There are some important lessons to be learnt from interim program updates received from Hong Kong authorities.

The first lesson can be found in Hong Kong's own budget review documents. The current program is not the first retirement scheme to be locally implemented. An earlier retirement scheme started in 2007, and featured a one-off grant to encourage early replacement of pre-Euro and Euro I diesel commercial vehicles. After an 18-month project, only 16,000 of a total 59,000 eligible vehicles had participated in the scheme. The government had set aside HK$3176 million (~AUD$515 million), however less than 20% of this had been used. While not a total failure, the low level of uptake in this earlier scheme was attributed to the payment being too low to be an attractive incentive to fleet owners (CAN 2012). The lesson for policy makers and regulators is that any grant or incentive offered needs to be sizable enough to motivate fleet owners – if the incentive is the only element of the program.

The second lesson arises from the interim program update in September 2015. This reviewed the first round of deadlines for pre-Euro vehicles, and found 90% of eligible diesel trucks had been phased out prior to the final deadline in December (Loh 2015). This suggests that the combination of incentive and pending prohibition (disincentives) was highly effective at phasing out vehicles, even before the prohibition date came into effect.

The take home message for the Australian Government is to design a fleet renewal program that encourages the owners of trucks to modernise their fleets by means of incentives and disincentives.

Figure 1 Projected changes in Hong Kong diesel commercial vehicle fleet

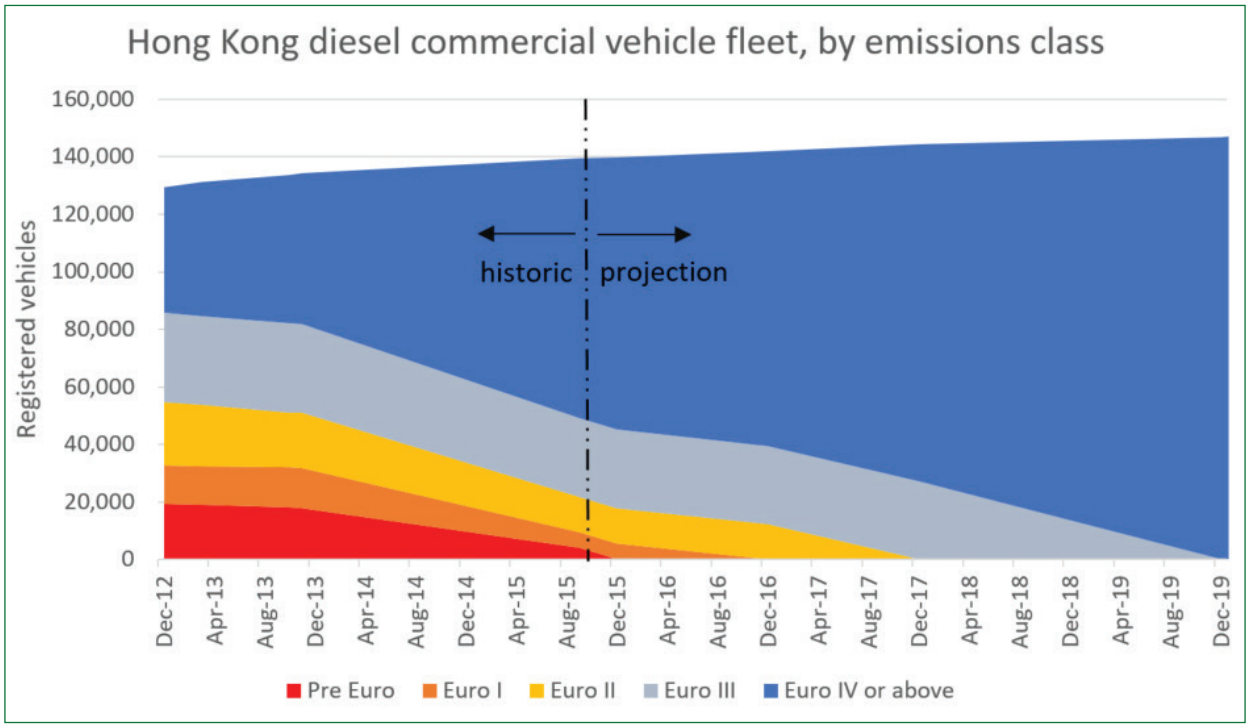
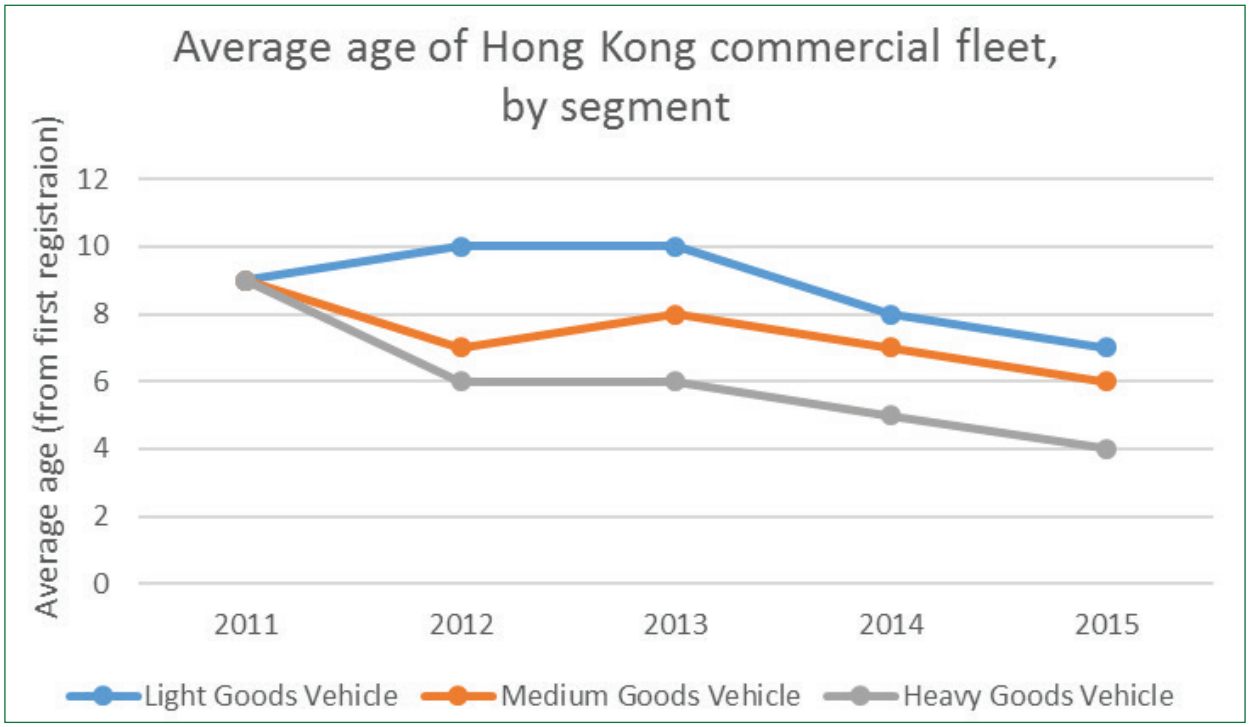


Figure 2 Hong Kong diesel commercial vehicle fleet age, by segment



7. Key Budget Considerations

7.1 Safer Trucks

The safety of trucks remains a major concern for the public and government authorities.

Truck manufacturers are committed to building safer trucks making road travel safer for all users. Advanced technologies are now available to assist truck drivers. For example, Lane Assist Systems keep trucks in a chosen lane and prevent drifting across lanes while adaptive cruise control can significantly reduce rear-end collisions, when combined with advanced emergency braking systems. Electronic Stability Control (ESC) systems reduce the possibility of skidding, jack-knifing, or overturning, whilst Electronic Braking Systems (EBS) enhance driving safety in diverse conditions. Front Underrun Protection Systems (FUPS) prevents the occupants of a car from becoming trapped underneath the truck and will ensure that the safety features of the car are correctly deployed. These technologies are available now in many truck models but due to customers choosing to not purchase their trucks with advanced safety features the uptake is low.

TIC's analysis shows the total number of lives saved for the medium scenario expectation is 60 over the eight year period. This is 3 lives saved in the first year, rising to 8 lives in the fifth year, a total of 29 lives over the five year plan. However, the ongoing benefits increase considerably in the following years due to the increased early adoption of these key safety technologies due to TIC's proposed incentive plan, with an estimated 31 lives saved over the next three years. Over the period 2020 to 2027 and using the Australian Statistical Life cost of $4.2 million, there would be a benefit of $254.4 million dollars for the medium scenario (refer Table 4).

A decision to modernise the nation's truck fleet through an investment allowance program means that safer trucks employing the latest advanced technologies will be operating on the country's road network.

7.2 Increasing Energy Productivity in Australia's Truck Fleet (and reducing CO_2 emissions)

There is no one specific "silver bullet" that can be used to reduce Australia's road freight CO_2 emissions, but rather a series of methods will need to be employed, that when combined will result in reduced CO_2 emissions for a given freight task. The process of reducing CO_2 emissions from the road freight sector by increasing the efficiency of how freight is moved can best be termed as "improved energy productivity".

TIC identified five potential strategies for the realisation of energy productivity improvements in the national truck fleet. These are:

A. Utilisation of additional axle mass for trucks above 15t GVM (ADR 80/03 Euro V and ADR 80/04 Euro VI and equivalents only).

B. Accelerated adoption of more fuel-efficient trucks.

C. Introduction of B-triples, or A-doubles, for line haulage (ADR 80/03 Euro V and ADR 80/04 Euro VI trucks and equivalents with advanced safety features only).

D. Increased use of B-double combinations for line-haul movement.

E. Performance Based Standards (PBS), (Excluding B-triples and A-doubles).

A. Utilisation of additional axle mass for trucks above 15t GVM (ADR 80/03 Euro V and ADR 80/04 Euro VI and equivalents only).

This first option proposes changes to current Dimension and Mass laws to permit the carriage of heavier loads for new trucks (i.e. ADR 80/03 Euro V and ADR 80/04 Euro VI and equivalents only). Specifically, this option proposes amendment of current national and state regulations on axle limits to support a 12% increase in allowable GVM/GCM for all truck types above 15t GVM. The analysis assumes that 65% of the fleet is currently weight constrained (as opposed to volume constrained). The assumption is also made that if this measure was to be introduced a doubling of the fleet replacement rate for all trucks over 15t GVM would occur from 2020.

B. Accelerated adoption of more fuel-efficient trucks.

This second option proposes the doubling of the historical fleet replacement rate for trucks over 4.5t GVM through the use of stamp duty and/or registration concessions and/or other financial incentives for new truck purchases where a minimum 5% reduction in fuel used can be demonstrated. Such trucks are being developed to meet mandated CO_2 reductions required in other global markets such as Europe, Japan and the USA. These developments include, diesel truck driveline improvements, heavy vehicle aerodynamic improvements and hybrid technologies.

The assumption is that this action will result in a 25% increase in the historical fleet replacement rates (all trucks over 4.5t GVM) from 2020 - and that these more fuel efficient trucks will deliver an average fuel efficiency improvement of 5% relative to baseline ADR 80/03 vehicles.

C. Introduction of B-triples, or A-doubles, for line haulage (ADR 80/03 Euro V and ADR 80/04 Euro VI trucks and equivalents with advanced safety features only).

This option proposes the introduction of laws permitting the use of B-triples, or A-doubles, for inter-capital city haulage.

It is noted that this option would result in a unit increase in payload of between 32% (versus B-double) and 95% (versus semi-trailer) and a doubling in the historical fleet replacement rate of prime movers (i.e. urban and rural) from 2020. It is assumed that this option would result in a 25% increase in the historical fleet replacement rate of line haul prime movers from 2020.

D. Increased use of B-double combinations for line-haul movement.

NSW-RMS indicative data shows that approximately 50% of HV combinations running between Sydney and Melbourne remain single trailer.

Extrapolating this to all 60% of line haul articulated vehicles in operation, this option assumes that differential vehicle charges are introduced to incentivise the replacement of older prime movers with late model prime movers. The net effect of this option is assumed to be a 50% increase in the historical fleet replacement rate. As 25 percent of line haul vehicles are single trailer, 50 percent of these could be converted to B-doubles operation using late model prime movers.

E. Performance Based Standards (PBS), excluding B-triples and A-doubles

Ensuring that the improved national truck access regime for new higher productivity vehicles (PBS) continues will allow for a considerable gain in productivity including improvements to the efficiency and effectiveness of the nation's road distribution channels. This productivity benefit arises from an overall saving in kilometres travelled that comes from the adoption of these vehicles with their higher capacity payloads (mass and/or volume). TIC's modelling highlights that kilometre savings are significant and range from 1.50 to 2.40 billion kilometres..

Fuel savings through improved PBS productivity would conservatively generate CO_2 savings from 1.40 million tonnes to 2.20 million tonnes.

As a condition of their approval process PBS Vehicles are also safer and more environmentally friendly. Table 4 presents the findings for the median scenario option for the proposed TIC incentive scheme over 5 years and the ongoing benefits for the following three years. A value of $15.86 per tonne of CO_2 has been used to convert CO_2 savings to a dollar value (ERF 2015).

There are also road safety, and public health benefits that result from the uptake of PBS vehicles. These are explored and explained in points 7.1 and 7.4 respectively.

The CO_2 and Operator Direct Savings (Ops) for the five potential strategies (A-E above) are summarised in Table 4.

Government's Role in Energy Productivity Enablers

A) Calculating Energy Productivity for Road Transport

Energy productivity has been expressed in this submission as a dollar value for Tonnes of CO_2 saved against Business As Usual (BAU). This measure is used as there is currently no specific metric that is universally accepted that captures the dollar value for energy productivity. Australian road freight is quite complex, comprising of, for example, a mix of high value items such as consumer electronics or pharmaceutical products through to low value freight such as spoil from a construction site or refuse. Some freight movements are best measured in tonnes per km, while this measurement is not suitable for light "volume" freight where cubic meters per km is a more appropriate measure.

As a key recommendation of this submission TIC believes that a suitable metric to quantify and measure energy productivity in the road freight sector needs to be developed. This metric being one that is universally accepted by both government and industry. For this issue to be progressed, TIC is offering to develop a suitable energy productivity metric, with the assistance of key industry organisations and with liaison with the Federal Government. Such a project would require funding from government.

Moving Australia's current (and future) freight task using fewer (higher efficiency) trucks, using a newer (younger) truck fleet and during periods of less traffic congestion/density will lead to increased energy productivity, operator direct savings such as reduced fuel use and in turn reduced CO_2 emissions. It will also have positive benefits for other road users and the nation's road safety and community health objectives.

B) Removing Regulatory Barriers

Global innovation in heavy vehicles and equipment has produced substantial safety, environment and productivity improvements. The pace of this innovation is expected to accelerate over the next decade. Australia has a Federal mandate to align with UN-ECE vehicle regulations (the UN 1958 Agreement) and has a long tradition of accepting equivalent alternative global heavy vehicle standards (particularly USA and Japanese standards). These measures are intended to enable Australia to capitalise on global heavy vehicle innovations and technologies.

Australian truck sales represent just 1% of global truck production. This makes Australia a technology taker of advanced heavy vehicles and associated equipment.

TIC notes that there is disconnect between the Government's intention to remove barriers for the importation of heavy vehicles and heavy vehicle technology, and the reality of the TIC member's inability to bring product into the country from global markets. Australia is aligning with UN-ECE (and equivalent global) Safety and Emission standards, however Australia is not aligning with the mass and dimensional limits of these global markets. Mass and dimension limits are fundamental to heavy vehicle design. Many trucks cannot be brought to Australia from global markets without redesign and modification, resulting in cost increases and a reduction in heavy vehicle product availability.

As a result Australia is not seeing the take up rate of new advanced safety technologies in heavy vehicles that are currently available in these global markets. Another consequence of these barriers to importation is Australia has 0.12% take up rate of alternative powered heavy vehicles, versus a global average of about 2%, one seventeenth the take-up rate of the global average. Further, aligning with international mass and dimensions would stimulate the faster adoption of the five potential strategies detailed above.

As a key recommendation of this submission TIC believes that Australia must align with international mass and dimensional regulations. This issue has recently been added to the National Road Safety Strategy 2011–2020 for Federal and State Government review and action. This review and action must be driven by COAG Ministers.

7.3 Operator Direct Savings (Ops)

The modelling undertaken by TIC and summarised in Table 4 under the heading Ops, shows the operational cost savings of newer, more efficient and/or higher productivity vehicles. The fleet mix, from which the operation benefits are generated, involves Rigid Trucks above 4.5 tonne GVM through to B-Triples.

This table highlights that over the period 2019 to 2027 $15,280.2M in accrued benefits would be realised by operators. These benefits will make Australia's road freight transport more domestically and internationally competitive.

7.4 Greener Cleaner Trucks - Improving the Health of all Australians

The Truck Industry Council has conducted research into the public's perception of trucks. One conclusion from the research was that issues surrounding the role of trucks, current safety standards and environmental impacts are of significant public interest. Of particular interest to policy makers is the conclusion that there was substantial public support for the implementation of stricter standards as they relate to trucks especially in built up areas. Almost sixty (60) per cent of respondents believe that all trucks should have to comply with strict environmental standards before being allowed into built up areas while seventy-five (75) per cent believe that a minimum standard of safety features should exist on every truck that operates within cities.

From this research it is clear that the public want to see greener, cleaner and quieter trucks operating in urban areas. Survey respondents fully accepted the need for trucks on our roads, but are no longer willing to accept trucks emitting black smoke or emitting excessive noise. It should be noted that hybrid trucks, due to their frequent use of electric power can operate in a silent mode and trucks powered by natural gas produce significantly less engine noise than those powered by an equivalent diesel engine, reducing further the impact of noise on the community. Truck manufacturers, in conjunction with Federal and State Governments have, over the past 20 years, implemented a program of reducing both exhaust emission levels and noise levels. Table 3 shows the improvement made by truck manufacturers and regulators in reducing exhaust emissions since 1996, and the minimum levels (ADR 80/03) introduced in 2010-11 that currently apply to new trucks sold in Australia.

Table 3 - Reductions in Exhaust Emissions

Year	Emission Standard	PM		NOx	
		Test Limit*	Multiple	Test Limit*	Multiple
Pre-1996	None (Euro 0)	1.2	x120	16.0	x40
Pre-2003	ADR70/00 (Euro 1)	0.4	x36	7.6	x28
Pre-2008	ADR80/00 (Euro 3)	0.1	x10	5.0	x13
Pre-2011	ADR80/02 (Euro 4)	0.02	x2	3.5	x9
2011 -	ADR80/03 (Euro 5)	0.02	x2	2.0	x5
Pending	ADR80/04 (Euro 6)	0.01	x1	0.4	x1

The above table shows the exhaust emission levels in g/kWh (grams per kilowatt hour). The data for pre-1996 vehicles is an average, and in many cases would be much higher. The data for other years assumes that the engine is built to the applicable "EURO" standard, and not one of the acceptable equivalent standards from the USA or Japan.

Whilst the above improvements are significant (it would take SIXTY of today's trucks to emit the PM emissions of ONE pre-1996 truck) Australia has not achieved the emission reductions that were forecasted by Government due to the poor take up of new trucks by Australian operators, with almost 42 per cent of the truck fleet meeting no or elementary engine exhaust emission standards (26 per cent pre-1996; 16 per cent 1996 to pre-2003).

It would take SIXTY (60) of today's trucks to emit the PM emissions of ONE pre-1996 truck. When ADR80/04 (Euro VI and equivalents) is introduced this figure will rise to ONE HUNDRED AND TWENTY (120) of these more advanced trucks to emit the PM emissions of one pre-1996 truck. Twenty six (26) percent of Australia's truck fleet are pre-1996.

Research suggests a link between common air pollutants and adverse health impacts on human beings. The manifestations of these health effects take the form of mild respiratory difficulties through to the onset of chronic asthma, increased susceptibility to infections, impaired lung function, cardiovascular conditions, loss in the quality of life (morbidity) and premature death (mortality). People with existing asthma are prone to the worsening of their condition. Further, statistics support the claim that the adverse effects of air pollutants result in increased hospital admissions, school and kindergarten absences and the increased use of asthma medications. All age profiles are represented in the cohort of people affected but in particular children and the elderly are more prone.

The existing literature shows that long term exposures have more adverse health effects and hence higher cost implications for the community (BTRE 2005). In 2005, the Bureau of Transport and Regional Economics reported that the cost of vehicle air pollution on life and illness was $2.7 Billion (central estimate). The Bureau released figures suggesting that in the year 2000 premature deaths from vehicle exhaust pollution were between 900 and 2000 people. 'More than 85 per cent of these early deaths would have occurred in the capital cities where over 80 per cent of Australians live' (BTRE 2005). A further 900 to 4500 morbidity cases were estimated. The report also stated that vehicle exhaust emissions contributed between 1400 and 2000 asthma attacks in Australia each year. A more recent study has not been commissioned by the Bureau at this stage.

Supporting the relationship between air pollution and adverse health, the Health Effects Institute (US based) released in January 2010 a landmark study into the health risks associated with exposure to traffic finding that:

- Air pollution does impact on human health and provides evidence that initiatives aimed at reducing pollution levels should be supported;
- Children living within 500 metres of a major road or freeway were at greater risk of developing asthma;
- Those children already with asthma were likely to have their condition exacerbated;
- Across all other age groups new asthma cases were likely to be triggered; and
- The adult population faced greater likelihood of lung and heart-related illness.

In Victoria alone hundreds of thousands of Victorians live within 500 metres of major roads (Gough D. 2010, www.theage.com.au) and according to the findings of the Health Effects Institute study are at a greater risk of developing adverse health conditions.

There are two main forms of air pollution that are of concern in capital cities. Emissions from vehicles, for example, particulate matter (PM or black soot) are known triggers for the onset of asthma, and can cause cancer and cardiovascular disease. Further, the World Health Organisation declared that diesel exhaust emissions are a "known carcinogen" in July 2012, with a special emphasis on the PM produced. Given that new model trucks complying with ADR 80/03 produce 98% less PM than a pre-1996 truck, it is in the government's interest to encourage the modernisation of the Australian truck fleet. Equally Nitrogen Oxides (NOx) have been shown to have a causal relationship with serious health problems such as asthma, respiratory disease and reduced lung function in children (Blackburn R., Something in the Air', 2007).

A major cause of air pollution in urban areas is motor vehicle exhaust emissions. Transport is the third largest contributor (14 per cent) of greenhouse gas emission in Australia. Road transport accounts for about 90 per cent of transport emissions, the road freight task component of this being 39 per cent with predictions that the freight transport task is expected to grow 26 per cent between 2016 and 2026. The BTRE (2005) notes in its analysis that the long life-cycle of commercial vehicles dampens the uptake of new technology vehicles, including the latest model diesel engines and predicts low 'penetration rates for hybrid fuel vehicles' (p. 46) to the year 2020. In summary, five (5) per cent of greenhouse gas emissions originate from trucks.

While trucks represent less than three (3) per cent of new vehicle sales by total units sold, they consume significantly more fuel per unit than other vehicles.

TIC has identified that a significant proportion of older model trucks (i.e. pre-1996) are working in urban areas, where health effects resulting from exhaust emissions are most severe.

The Truck Industry Council calls upon the Federal Government to develop policies designed to reduce the adverse health impacts that arise from an old Australian truck fleet.

TIC has estimated that an effective incentive package which accelerates the renewal rate of the truck fleet would save $1.54B over 5 years and $2.35B over eight years in health costs when compared with a "Business as Usual" approach.

Table 4 - Impact Assumptions for all Scenarios

		Medium (Million AU$)				
	Year	Safety	Health	CO_2	Ops	Sub Total
National Truck Plan (5 Years)	2019	0	0	0	0	**0**
	2020	14.2	107.1	38.3	1079.7	**1239.4**
	2021	21.3	218.2	57.4	1611.9	**1908.8**
	2022	24.3	333.8	75.6	2098.1	**2531.8**
	2023	29.1	430.3	75.6	2098.1	**2633.1**
	2024	34.6	446.8	75.6	2098.1	**2655.1**
	Sub Total	**123.5**	**1536.2**	**322.5**	**8985.9**	**10968.1**
Ongoing Benefits	2025	38.0	349.4	75.6	2098.1	**4586.1**
	2026	43.9	271.3	75.6	2098.1	**4514.9**
	2027	49.0	196.2	75.6	2098.1	**4445.9**
	Total	**254.4**	**2353.1**	**549.3**	**15280.2**	**18436.9**

8 Policy Options

There is no one specific "silver bullet"... a series of approaches will need to be employed. These approaches will result in reduced CO_2 and harmful (PM and NOx) emissions for a given freight task, improved safety for all road users, enhanced energy productivity and improved economic performance.

Options to modernise the nation's truck fleet making significant health, environmental, safety and productivity gains include:

- Accelerate the introduction of greener, cleaner technologies by encouraging the purchase of low emission trucks through the provision of:

  (1) A thirty (30) per cent investment allowance that offsets the costs associated with the purchase of a new ADR 80/03 (Euro V) and ADR 80/04 (Euro VI and equivalents) diesel only truck and a fifty (50) per cent investment allowance that offsets the costs associated with the purchase of a new alternatively fuelled and powered truck for pre-ADR 70/00 (i.e. pre-1996 approx.) truck owners effective July 2019; or

  (2) A fifteen (15) per cent investment allowance that offsets the costs associated with the purchase of a new ADR 80/03 (Euro V) and ADR 80/04 (Euro VI and equivalents) diesel only truck and a twenty-five (25) per cent investment allowance that offsets the costs associated with the purchase of a new alternatively fuelled and powered truck for ADR 70/00 and later (post 1996 operators) effective July 2019.

  (3) Acknowledging that some operators will not be in a position to purchase a new vehicle, the government could consider providing a fifteen (15) per cent investment allowance towards the purchase of used ADR 80/02 and ADR 80/03 emissions controlled trucks effective July 2019.

- COAG to work towards providing green vehicle rebates and reducing uniformly federal and state taxes (registration charges and stamp duty) for low emission trucks.

- COAG to work towards measures to offset the operator mass losses of a new truck (higher TARE weight due to mandated emission and safety devices fitted to new trucks) by allowing higher axle masses for new ADR 80/03 (Euro V) and ADR 80/04 (Euro VI and equivalents); and alternatively powered and fuelled trucks.

- The Department of Environment to provide funding for the development of a Government and industry accepted metric to quantify and measure energy productivity in the road freight sector.

- COAG to work towards a determination where the Road User Charge for operators is based upon a Mass Distance Location charge for the vehicle/freight movement and an Environmental and Safety levy for the truck.

- Enhance R&D funding to truck manufacturers and engine manufacturers to develop a world class alternative fuel and powered truck manufacturing industry for domestic use given Australia's competitive strength as a source of abundant natural gas and noting the nation's unique transport requirements.

- COAG to review current Australian heavy vehicle mass and dimensional regulations now that this issue has been added to the National Road Safety Strategy 2011–2020 with a view to aligning same with international standards.

- COAG to work towards removing regulatory barriers preventing the uptake of Higher Productivity Vehicles, for example, B-triple, A-double and PBS in combination with the uptake of specific vehicle advanced safety features.

- COAG to review methods to incentivize the transition from semi-trailer to B-double combinations, for example, reduced registration charges for B-double vehicles with advanced safety features.

9 Conclusion

Consideration of these policy options will increase the potential for the modernisation of the Australian truck fleet with the subsequent energy productivity improvements, health, environmental, road safety and economic benefits for all Australians. The benefits of implementing this modernisation program are identified through the avoided health costs associated with noxious emissions ($2353.2 Million Median), cost savings to the community through avoided fatalities due to safer and more productive trucks ($254.4 Million Median), reduced carbon dioxide emissions due to higher productivity rates of an increased number of modern trucks ($549.3 Million Median), and direct operator cost savings ($15,280.2 Million Median).

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Appendix A. Average Age of Heavy Vehicles above 4.5t GVM

Country			Data Source / Comments
	2014	2015	
Germany	**6.7 (Includes LCV's, <3.5t GVM)**	N/A	ACEA Vehicles in Use 2009-2014. Published 2016
Austria	**7.05 (Includes LCV's, <3.5t GVM)**	N/A	ACEA Vehicles in Use 2009-2014. Published 2016
Sweden	**7.07 (>3.5t GVM)**	N/A	ACEA Vehicles in Use 2009-2014. Published 2016
	7.3 (>3.5t GVM)	N/A	IHS Automotive
Netherlands	**7.4 (>3.5t GVM)**	N/A	ACEA Vehicles in Use 2009-2014. Published 2016
Denmark	**7.5 (>3.5t GVM)**	N/A	ACEA Vehicles in Use 2009-2014. Published 2016
Great Britain	**7.6 (>3.5t GVM)**	N/A	ACEA Vehicles in Use 2009-2014. Published 2016
South Africa	N/A	9.8 (Includes LCV's, <3.5t GVM)** **8.9 (>3.5t GVM)****	NAAMSA January 2017 2016 December data
Belgium	**9.4 (>3.5t GVM)**	N/A	ACEA Vehicles in Use 2009-2014. Published 2016
Japan	**11.8 (>3.5t GVM)**	11.9 (>3.5t GVM)	JAMA January 2017
Hungary	**12.6 (>3.5t GVM)**	N/A	ACEA Vehicles in Use 2009-2014. Published 2016
Spain	**12.8 (>3.5t GVM)**	N/A	ACEA Vehicles in Use 2009-2014. Published 2016
Finland	**13.7 (>3.5t GVM)**	N/A	ACEA Vehicles in Use 2009-2014. Published 2016
Turkey	**13.7 (>3.5t GVM)**	N/A	ACEA Vehicles in Use 2009-2014. Published 2016
Australia	**13.8 (>3.5t GVM)** **14.7 (>4.5t GVM)**	**13.9 (>3.5t GVM)** **14.8 (>4.5t GVM)**	Australian Bureau of Statistics
USA	N/A	**14.8 (>6.35t GVM)** 11.4 (2.72t to 6.35t GVM)	IHS Automotive/As at 30th June 2015
Italy	**14.6 (>3.5t GVM)**	N/A	ACEA Vehicles in Use 2009-2014. Published 2016
Portugal	**14.7 (>3.5t GVM)**	N/A	ACEA Vehicles in Use 2009-2014. Published 2016
Estonia	**17.1 (>3.5t GVM)**	N/A	ACEA Vehicles in Use 2009-2014. Published 2016
Poland	**20.7 (>3.5t GVM)**	N/A	ACEA Vehicles in Use 2009-2014. Published 2016