TIC

TRUCK INDUSTRY COUNCIL

TODAY'S TRUCKS

SAFER GREENER ESSENTIAL

National Truck Plan:

Modernising the Australian Truck Fleet

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2019

National Truck Plan:

Modernising the Australian Truck Fleet

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Modernising the Australian Truck Fleet

The primary aim of the Truck Industry Council's (TIC) National Truck Plan is to advocate to Government the virtues of modernising the Australian truck fleet.

Australia, by world standards, has an old fleet with an average age of almost 15 years.

The Truck Industry Council's National Truck Plan acknowledges the Federal Government's key strategic objectives and identifies policy options the Government can pursue to deliver on these objectives. Options are presented in this plan: to reduce heavy vehicle fatalities and serious injuries; to improve the health of Australians, particularly in urban areas, through a reduction in noxious emissions; and to improve the efficiency and effectiveness of the nation's road distribution channels thus enabling the Federal Government's record road infrastructure spend to be realised, in turn improving energy productivity and reducing heavy vehicle road transport greenhouse emissions. To enable these benefits to become a reality today and for future generations, barriers that reduce the country's ability to modernise the nation's truck fleet must be overcome.

TIC calls upon Federal and State Governments to actively pursue an agenda which accelerates the adoption of the latest heavy vehicle safety systems, emission standards and advanced fuel saving technologies that will result in a safer, cleaner, greener and more energy efficient national truck fleet.

The choice is not whether Australia uses trucks—they are essential to our standard of living – the choice for the Australian people is whether we have the most modern fleet possible. The implications are profound: Australians can have safer trucks, cleaner, greener trucks and more productive trucks on the road, or we can continue with an old Australian truck fleet and its inherent legacy of older technology.

Obtaining the support of Government in promoting a more modern truck fleet by means of financial and operational incentives for operators to upgrade their fleets will speed up the introduction of advanced truck safety, environmentally-friendly and intelligent transport technologies.

Australians want to be sure that the trucks on the nation's roads today comprise a modern truck fleet. Settling for less would be to agree that it was acceptable to go to a hospital and receive treatment from 15-year and older medical technology.

We would not settle for that and nor should we accept an old Australian truck fleet.

Anthony J McMullan PhD
CEO

Policy Options to Incentivise the Modernisation of the Australian Truck Fleet

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

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

Financial Incentives

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

  (1) A 30% depreciation allowance that offsets the costs associated with the purchase of a new Australian Design Rules (ADR) 80/03 diesel only truck and a 50% depreciation 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) operators; or

  (2) A 15% depreciation allowance that offsets the costs associated with the purchase of a new ADR 80/03 diesel only truck and a 25% depreciation 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.

  (3) Acknowledging that some operators will not be in a position to purchase new vehicles, the government could consider providing a 15% depreciation allowance towards the purchase of used ADR 80/02 and ADR 80/03 emissions controlled trucks.

Regulatory Incentives

- Council of Australian Governments (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) by allowing higher axle masses for a new ADR 80/03 and alternatively powered and fuelled truck.
- 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 by pursuing these regulations as an agenda item within the National Road Safety Strategy 2018-2020, aligning with international standards.
- COAG to work towards removing regulatory barriers preventing the uptake of Higher Productivity Vehicles, for example, B-triple, A-double, and Performance Based Standards (PBS) heavy vehicle combinations, in combination with the uptake of specific vehicle advanced safety features.
- COAG to review methods to incentivise the transition from semi-trailer to B-double combinations. For example, reduced registration charges for B-double vehicles with advanced safety features.
- State and Territory Governments to consider low emission zones or roads and/or lower toll charges for ADR 80/02 and ADR 80/03 vehicles. Alternatively, increased toll charges and/or emission zone fees for pre-2003 vehicles with poor emission performance. Such charges should be in-line with the pollutants emitted by these higher polluting vehicles.
- The National Heavy Vehicle Regulator (NHVR), State and Territory Governments to consider a mandated annual safety/roadworthiness and environmental inspection/test scheme for older heavy vehicles. For example, an annual inspection/test for 1996 to pre-2003 heavy vehicles and a six-monthly safety and environmental inspection/test for pre-1996 heavy vehicles.

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:

- Nine truck manufacturers/distributors representing 16 truck brands;
- Four engine and component suppliers.

TIC members represented 99% of all truck sales above 4.5t GVM in 2018.

In 2019, the truck industry is designing, engineering, testing, developing, and manufacturing trucks at three major locations in Australia without Federal Government assistance. 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 2018).

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.

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.

Truck manufacturers and importers in Australia are major employers of skilled and semi-skilled people (trade, engineering, electronic and information technology) with a total workforce of approximately 36,000 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

The Truck Industry Council

2018 sales eclipsed for the first time the pre-GST record high sales figure. While this is positive news for an industry struggling over the last decade it is worth noting that even at these levels, the average age of the Australian truck fleet is not expected to decline due to the ever increasing freight task that will require more trucks. In fact it would take ten years of record sales to reduce the age of the truck fleet to the pre-GST average age of 14.4 years. This is not an enviable position for Australia to find itself in.

In 2019, six TIC members market selected truck models in Australia that met Euro VI, or equivalent, 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.

The Australian new truck market is a $4 billion industry with ancillary activities estimated to have an economic value of a further $8 billion. For the past three years (2016, 2017, 2018) yearly sales have been 32,964 vehicles, 36,825 vehicles and 41,628 respectively. 2018 sales eclipsed for the first time the pre-Global Financial Crisis (GFC) 2007 Australian market peak where 38,131 vehicles were sold.

We are 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 (GHG) and noxious emissions. The more efficient, and alternatively fuelled and powered, and higher emission standard (Euro VI, and equivalents) trucks that TIC members are bringing to the 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 making the road safer for all users.

The reality is the uptake rate of these more advanced trucks in Australia is poor.

Government objectives versus today's reality

Australian Government Objectives

The Australian Government has identified key strategic objectives it wishes to pursue. TIC's National Truck Plan 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 the National Truck Plan will assist Government to achieve these road safety objectives.

Environment: The Government ratified the Paris Agreement on Climate Change and the Doha Amendment to the Kyoto Protocol on the 10th November 2016. Australia has set itself the target of reducing emissions by 26-28% 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 the National Truck Plan support the Government's strategy and add to the policies Government can use to reduce domestic emissions.

Energy Productivity: The National Energy Productivity Plan 2015–2030 (COAG 2015) details the potential national benefits that would accrue from investment in improving national energy productivity. The Government has established the target of a 40% 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 by lowering input costs and delivering a reduction in national GHG emissions. The National Energy Productivity Plan identifies four priority areas for energy productivity improvement. The National Truck Plan addresses the priority area of "Industry", in particular Freight and Commercial Transport. This sector represents the second largest opportunity for improvement. Measures offered in this document can deliver improved energy productivity to the nation's truck fleet assisting the Government to achieve its national GHG 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 budgets has committed to record spending thus obligating itself to building and upgrading road infrastructure to improve freight productivity. Trucks are the enablers of this infrastructure; however, due to the high average age of the truck fleet, the efficiency and effectiveness benefits to be derived from modern infrastructure spending are not being fully realised. Australia has twenty-first century infrastructure and, in part, twentieth century trucks transporting freight inefficiently. Initiatives proposed in the National Truck Plan aim to bring about productivity gains maximising the Government's infrastructure spend.

The Problem Australia Faces

The problem Australia faces in order to achieve the above objectives is the current age of the Australian truck fleet.

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

Almost 42% 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 (25.8%) pre-1996 trucks with no emission standards and 73,441 (15.9%) post-1996 pre-2003 trucks with elementary emission control systems

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

Simply put Australia has an old truck fleet.

An older truck fleet means that technological 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.

Figure 1 compares the average age of Australia's truck fleet with other regions and countries in the world.

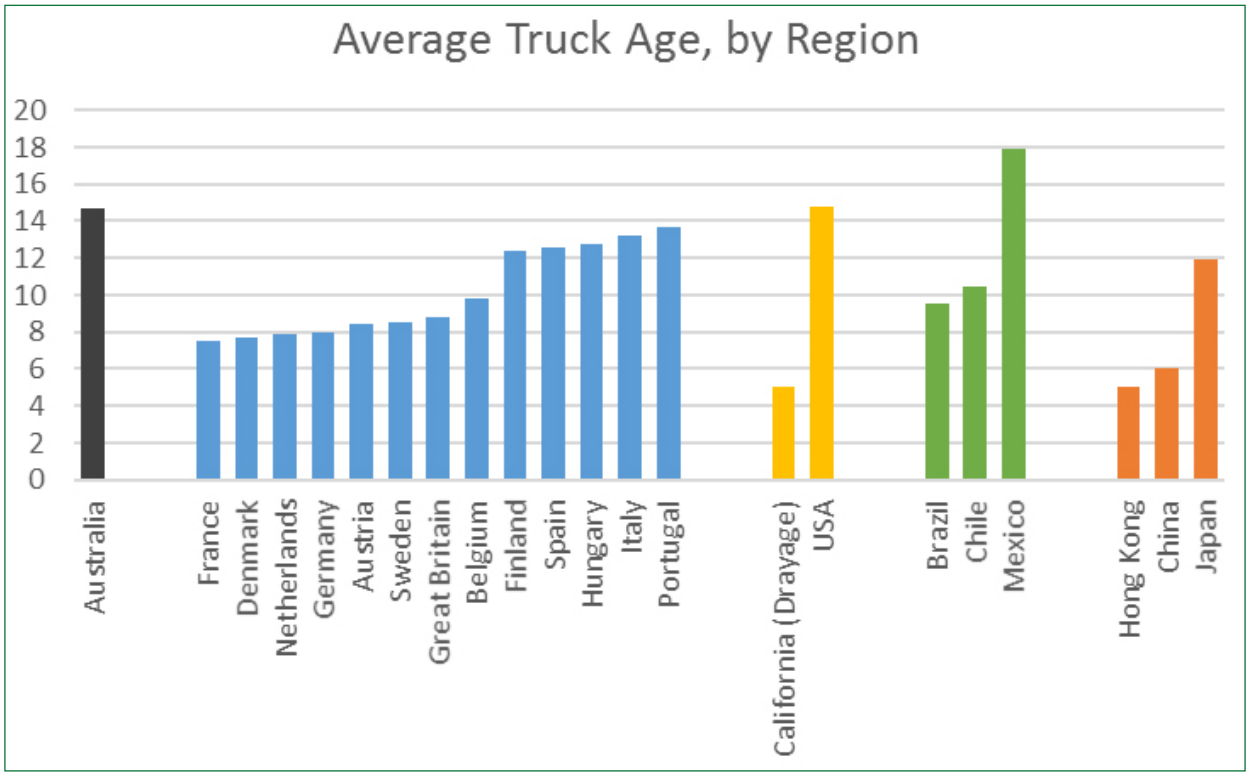


Figure 1
Source: TIC; Mov3ment Pty Ltd

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. An older 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 (ADR) that a new truck is required to meet. This simply means that a newer truck cannot carry as much payload as an old truck making a new truck less productive, and reducing the "bottom line" profitability for the operator. Losses in this area more than offset any increased profitability that is gained from the better fuel efficiency of a new truck. Some additional mass allowance is granted 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. Coupled with considerably higher initial purchase price, this makes 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 in Eastern Europe and Africa. In the USA and Canada older trucks are sold in South America, and in Japan older trucks are sold in 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 uptake 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 uptake 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% of new vehicle sales each year. There are some stand out performers such as the Netherlands, who are well above this norm (NSW-EPA December 2016). In Australia sales of light passenger vehicles using these technologies runs at about 1% per year, while in the heavy vehicle domain TIC's data shows the five-year average, 2011 to 2015, for sales of alternatively powered and fuelled trucks is just 0.3% per year. This number plummeted to just 0.12% of new truck sales in 2017. At year-end 2017, just 44 alternatively powered or fuelled trucks had been sold across Australia. To date, sales for 2018 suggest no significant change in the percentage of alternatively powered or fuelled trucks being sold in Australia. 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.

Why is Australia's Truck Fleet So Old?

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.

Globally the uptake of low carbon emitting vehicles is generally proportional to the incentives or disincentives provided by governments for high carbon emitting vehicles. Examples of such incentives include: a carbon tax on certain fuel types; emission zones that exclude or penalise high carbon emitting vehicles within certain geographical locations; and increased registration charges for older vehicles.

The Federal Government's Emission Reduction Fund (ERF) is a good example of incentives aiming to reduce emissions for high carbon intensity emitters, but this scheme 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". Their move from transporting freight by trucks to transporting freight by rail is a win for CO_2 emissions, but is hardly a win for reducing CO_2 emissions for the road transport industry. 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.

Incentives that work

Positive Global Incentive Programs—Hong Kong Case Study

TIC has undertaken research on incentive schemes in countries that have a significantly younger truck fleet age than Australia (a briefing of this more detailed work is available upon request). The underlying conclusion to be drawn from this research was that the most effective measures involved phasing out older trucks from the fleet. Such measures included introducing location-based low emission zones, and increasing operating fees and targeted charges for older vehicles. While such measures are effective they would have considerable or significant financial impact on Australian truck operators. In order to achieve its own strategic objectives, 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.

Of the countries reviewed, Hong Kong demonstrates perhaps the best example of a policy package response to the problem of poor air quality and older trucks. The most important point to be taken from Hong Kong's fleet renewal scheme is that it represents a comprehensive and well-integrated suite of measures to reduce fleet age.

Similar to Australia, 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 road side 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% of trucks operating are pre-1996. These trucks are polluting at rates at least 60 times greater than that of post-2008 trucks.

Hong Kong's response 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 (an "ex-gratia payment") before a retirement regulatory phase-out prohibits any further registration of trucks older than a specified age (refer to Table 1).

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.

The ex-gratia payment rewards the operator by incentivising the retirement of older vehicles. An application for the payment by the operator must be submitted while the vehicle is still registered, and prior to a series of successive deadlines based on the vehicle emissions standard, after which a vehicle licence will not be issued. In this National Truck Plan TIC defines older vehicles as being pre-2003 (ADR 70/00 and earlier). These vehicles either have no emission standards or basic emission standards employed

Incentives that work

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 Vehicle Phase-Outy

The regulatory component of the policy package comprises a mandatory retirement date for older vehicles (a regulatory phase-out), based upon the truck's 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;
- Euro III vehicles on 31 December 2019.

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

Incentives that work

Policy Effectiveness

Information obtained 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 were developed with confidence because withholding registration permission provides certainty of retirement age. Figure 2 illustrates this historic trend and future projection to provide a clear 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.

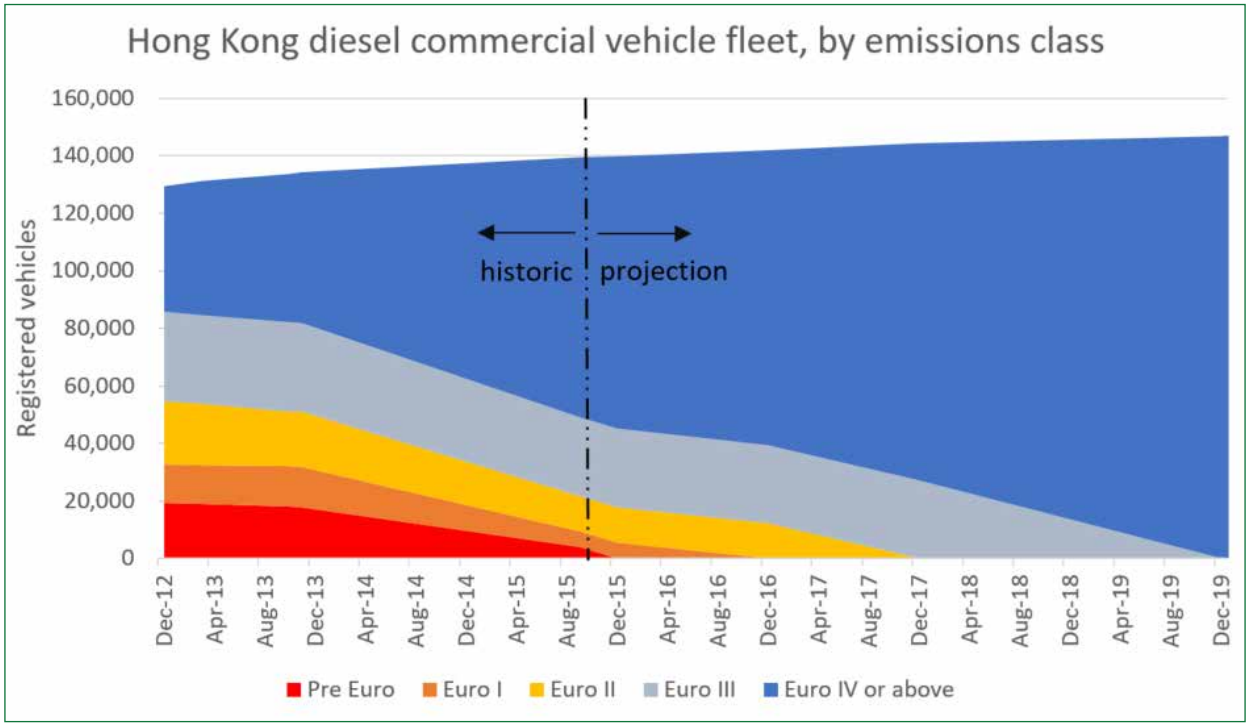


Figure 2
Projected changes in Hong Kong diesel commercial vehicle fleet

Average age

Fleet age data provided by Hong Kong authorities is shown in Figure 3 and demonstrates the effectiveness of the policy package for the purpose of this National Truck Plan.

The biggest impact has been on the heavy goods segment, where the average age has been reduced by more than half in only four years, with an age reduction from nine to four years.

Incentives that work

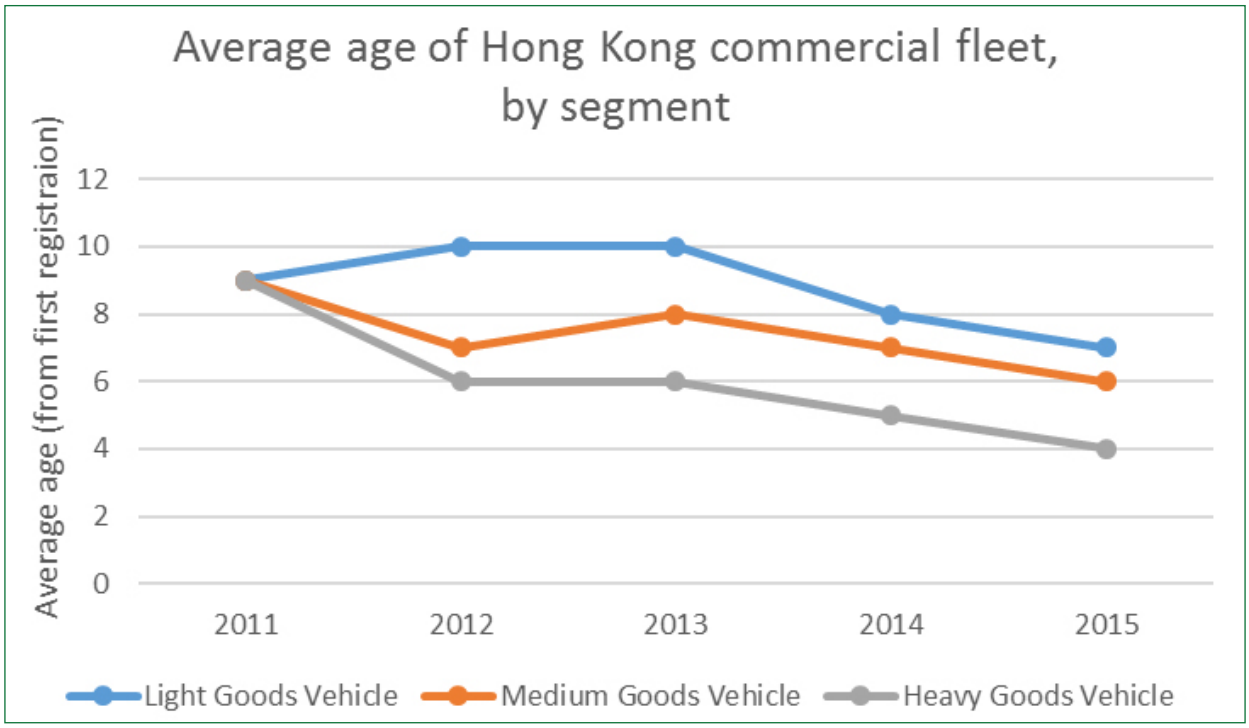


Figure 3
Hong Kong diesel commercial vehicle fleet age, by segment.
Note: Figures rounded to nearest whole number.

Program review and lessons learnt

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

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 first 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.

An interim program review was conducted in September 2015 and found 90% of eligible diesel trucks had been phased out prior to the final deadline in December (Loh 2015). This second lesson is that 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.

A Safer, Greener, Cleaner, Productive Australia Truck Fleet

A decision to modernise the nation's truck fleet through a depreciation allowance program and regulatory reform means that safer trucks employing the latest advanced technologies will be operating on the nation's roads.

1. A SAFER AUSTRALIAN TRUCK FLEET

Monash University Accident Research Centre (MUARC) suggests the need for a "safe systems" approach in order to stem road trauma. This approach comprises:

- Improved road safety management;
- Safer roads;
- Safer road users;
- Improved post-crash response systems; and
- Safer vehicles.

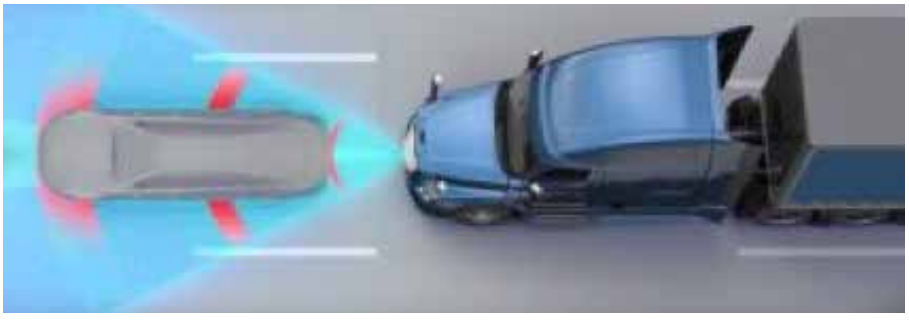
TIC has a role to play in the fifth component to this system, that of "safer vehicles".

Given Australia has an old truck fleet, the question needs to be asked: "Does Australia have the safest truck fleet possible?"

Put simply, the answer is "No". Our nation's truck fleet could be safer. The safety of trucks remains a major concern for the public and Government authorities.

Truck safety can be broadly categorised into four main areas:

1. Safety systems, technologies and vehicle types/combinations that prevent or reduce the likely incidence of crashes;
2. Safety systems or technologies that lessen the severity of a crash for some, or all, of the persons involved;
3. Safety systems or technologies that prevent or reduce the likely effects of driver fatigue and/or distraction (and hence prevent, or reduce the likely incidence of crashes); and
4. Heavy vehicle roadworthiness (ensuring that a truck is maintained in a condition as recommended by the original equipment manufacturer, such that all systems operate as intended).



A Safer, Greener, Cleaner, Productive Australia Truck Fleet

The age of the Australian truck fleet impacts on all four categories and thus measuring these four safety categories against the age of a truck provides a clearer picture of the safety performance of Australia's heavy vehicle fleet.

1. **Safety systems, technologies and vehicle types/combinations that prevent, or reduce the likely incidence of crashes:**

   Anti-Lock Brake Systems (ABS) was the most recent safety system introduced by Government in Australia, with the mandating of ADR 35/05 from November 2016. The ADR 35/05 Regulation Impact Statement (RIS) estimated that 1.9 lives per year could be saved with the fitment of ABS. ABS was offered by truck manufactures as standard fitment across most models from 2008 onward, some eight years before it was a mandated requirement. Due to the early fitment of ABS to new trucks by TIC members, it is estimated that 95% percent of the Australian truck fleet will have ABS fitted before 2035, based on current uptake rates/fleet age. This is a considerably better outcome than if ABS had only been introduced when mandated by the ADR. If this was the case, a 95% fitment rate would not be achieved until approximately 2045. This case demonstrates the importance of early, voluntary, adoption of new safety technologies.

   The voluntary adoption of new technologies is very much dependent on the availability of the technology, the cost to bring the technology to market, and any negative impacts that technology may have, such as adding weight to the truck that, in turn, reduces the vehicle's effective payload and profitability for its owner/operator. In the case of the ABS example, the technology was available having been introduced by truck manufactures in other international markets, in some cases decades earlier. The cost was not significant, only a few hundred dollars, and the weight increase was negligible, only a few kilograms. Hence the voluntary adoption of ABS was viable.

Table 3 Prescriptive vs PBS Truck Fatal Crash Rates by Truck Configuration

Truck Type	Fatal crashes per 100 million km (rate as at 2014)	Fatal crashes per 10,000 registered trucks (rate as at 2015)
Rigid Trucks	0.80	2.23
Rigid PBS Trucks	0.0	0.00
Articulated Trucks	1.30	10.53
Articulate PBS Trucks	0.49	1.07

   In contrast, Front Underrun Protection System (FUPS) added over 100kg to the front axle of a truck (an axle that was typically already loaded to the maximum statutory weight limit) and the cost of the FUPS device was typically over $1000 per truck. It took front axle mass concessions from the States and Territories and the eventual mandating of FUPS under ADR 84/00, in 2012, before significant fitment was realised. In the case of many new and emerging technologies, the technology is integrated typically in new ADR 80/04 (Euro VI and equivalent) model trucks in overseas markets. Australia is an adopter of advanced truck technologies with new truck sales in this country accounting for just 1% of global new truck sales; Australia picks up technologies developed for larger markets, primarily Europe, Japan and the USA. These markets moved to Euro VI and equivalent emission technologies up to ten years ago and have developed advanced safety technologies only to suit their Euro VI and equivalent trucks. The Australia Government is still debating the uptake of Euro VI and equivalent emission systems. The continued delay by government to mandate ADR 80/04 (Euro VI and equivalents) is stalling the voluntary adoption of many advanced safety systems and features that, in the main, cannot be adapted to our aging ADR 80/03 (Euro V and equivalent) model trucks. Australia must adopt ADR 80/04 sooner, not later, if it is to realise the full potential of the advanced safety features that have been developed for other international markets.

   Research by the National Transport Commission (NTC) into more efficient PBS heavy vehicle combinations has shown that such combinations have significant safety benefits. NTC's 2017 report, Assessing the Effectiveness of the PBS (Performance Based Standards) for Safer Vehicles, details an 86% reduction in crashes for PBS vehicles for the same distance travelled when compared to conventional "prescriptive" heavy vehicle combinations. Table 3 summarises the safety benefits in avoided fatalities of conventional versus PBS vehicles, measured against two parameters: 1) distance travelled; and 2) registered vehicles. However, despite the significantly improved safety performance of PBS vehicles, their uptake continues to be stifled by state controlled road access restrictions and a complex and, at times, expensive vehicle approval process.

Similarly, accident statistics show that the safety performance of B-double combinations per tonne of freight moved is better than semi-trailer combinations. The National Transport Insurance's (NTI) 2017 Major Accident Investigation Report details that on average over the past decade a B-double is almost 30% less likely to be involved in a major accident than a semi-trailer combination. Leading the NTI to conclude, "the B-double continues to be the best performing general vehicle from a safety perspective (for a given freight task, tonnes/km)". Despite the safety and productivity benefits of the B-double configuration, New South Wales Road Maritime Services (NSW-RMS) data shows that approximately 50% of all freight movements of articulated vehicles on the Hume highway through Marulan are completed by semi-trailers. Moving freight from semi-trailer combinations to B-double combinations is a logical step in reducing road fatalities and injuries.

2. **Safety systems or technologies that lessen the severity of a crash:**

Australian Government from January 2012. FUPS reduces the likelihood that the occupants of a light vehicle will become trapped underneath a truck, and will ensure that the safety features of the car are correctly deployed, in the event of a truck/light vehicle crash. The ADR 84/00 RIS estimated that, in 2017, 11 lives per year could be saved with the fitment of FUPS, if the entire truck fleet above 12t GVM were fitted with FUPS. TIC estimates that due to the current uptake rates/fleet age, just over 20% of the Australian truck fleet was fitted with FUPS in 2017, a saving of only two to three lives. In fact, TIC estimates that a 95% fitment rate of FUPS will not be achieved before 2039 based on current uptake rates/fleet age. This is a less than optimal safety outcome that is a direct result of Australia's aged truck fleet.

3. **Safety systems or technologies that prevent, or reduce the likely effects of driver fatigue and/or distraction:**

Truck manufacturers are committed to building safer trucks. Advanced technologies are now available to assist truck drivers making road travel safer for all users. For example, Lane Departure Warning Systems (LDWS) warn a driver when a truck is drifting out of its chosen lane. Autonomous Emergency Braking Systems (AEBS) automatically apply a truck's brake systems to prevent, or at least significantly reduce, rear-end collisions. Electronic Stability Control (ESC) systems reduce the possibility of skidding, jack-knifing, or roll-over of a truck. Emerging technologies, such as driver Fatigue Warning Systems (FWS), monitor the driver and alert them when the onset of fatigue, or distraction, is detected. In the September 2014 MUARC report, Potential Safety Benefits of Emerging Crash Avoidance Technologies in Australasian Heavy Vehicles, it was estimated that 104 lives could be saved per annum if four advanced safety features were implemented across all heavy vehicles in the Australian truck fleet.

Table 4 Advanced Truck Safety Technologies and Lives Saved

Technology	Lives saved
Autonomous Emergency Braking Systems (AEBS)	67
Lane Departure Warning Systems (LDWS):	16
Electronic Stability Control (ESC):	11
Fatigue Warning Systems (FWS):	10
TOTAL	**104**

TIC's own analysis shows close correlation with the total number of lives that could be saved nationally if these advanced safety systems were implemented. While ESC has recently been legislated for all Prime Movers and short wheelbase Rigid trucks from 2022, the other systems have no implementation plan, although both AEBS and LDWS are on the Department of Infrastructure, Regional Development and Cities Future Work Program. However, if the ESC draft ADR and RIS development timeline is applied to AEBS implementation then this safety regulation would not be finalised until 2021/2022 with an implementation date of 2024/25. In TIC's view this is two years too long. The delay primarily being due to the current RIS justification process, which is far too onerous because of Federal processes. The states and territories, through COAG, need to compel the Federal Government to simplify the RIS process for safety related vehicle regulations, in particular allowing overseas accident data and analysis to be used for the Australian RIS justification process. A target timeline for a completed ADR and RIS for AEBS should be 12 months (and not the three years that the ADR 35/06 and RIS took for Electronic Stability Control).

Even more sobering is the potential timeline for the uptake rate of these technologies in the Australian truck fleet. With current uptake rates/fleet age applied, it would take until 2049 for 95% of the fleet to be fitted with ESC and until the year 2052 for 95% of the fleet to be fitted with AEBS (assuming an ADR enforcement date of 2024). FWS are not even under consideration at present. In simple terms, the 94 lives saved per year as detailed in the MUARC Report (10 lives saved by FWS not counted) would not be realised until sometime beyond 2052, with only incremental benefits being achieved until then.

4. **Heavy vehicle roadworthiness:**

The NHVR has been tasked with improving the roadworthiness of the heavy vehicle fleet and enforcing consistency, although it does not have authority in either Western Australia or Northern Territory. From August through to November 2016, the NHVR coordinated the first ever roadworthiness check of the Australian heavy vehicle fleet, with the exception of Western Australia. Based on the Heavy Vehicle Inspection Manual, major non-conformances (defects) were found from the several thousand heavy vehicles surveyed. Figure 4 details the major defects found in the trucks (hauling units) and heavy trailers surveyed.

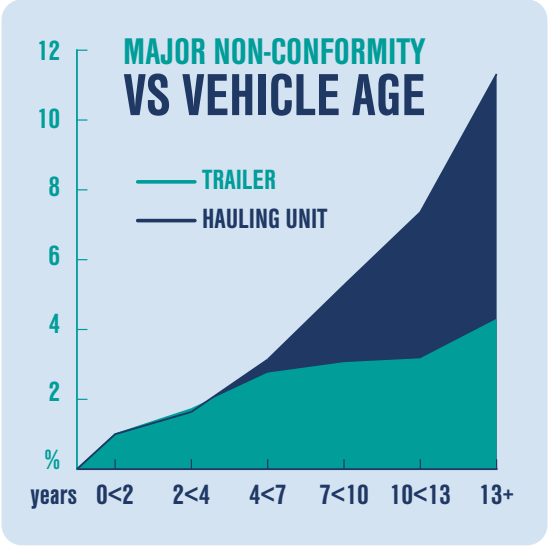


Figure 4
Relative rate of major non-conformity by vehicle age.
Source: NHVR NRBS Overview Fact Sheet 2017

The NHVR's survey data conclusively shows that truck roadworthiness major non-conformance (defects) typically rise exponentially according to the age of the vehicle; this rise becomes quite significant beyond five to six years of age (pre-2012/13 trucks). To put this into perspective, pre-2012/13 trucks account for all trucks prior to the current ADR 80/03 (Euro V and equivalents) emission standard; this is 80% of the current truck fleet that fall into the high defect rate category due to the age profile of the Australian fleet. This is a significant issue which could be largely addressed by renewing Australia's truck fleet. The impact on heavy vehicle crashes and potential lives saved due to improved heavy vehicle roadworthiness has not been evaluated as part of this plan. This remains an area of continued study by the states, territories and the NHVR. Due to the known link between roadworthiness major non-conformances (defects) and truck age, TIC calls upon the NHVR and States and Territories to implement mandatory safety and environmental assessments (checks) on older heavy vehicles. As a minimum, TIC recommends an annual safety/roadworthiness and environmental (TIC recommends the DT80 exhaust emission test) inspection/test for 1996 to pre-2003 heavy vehicles and a six-monthly safety and environmental inspection/test for pre-1996 heavy vehicles.

Table 8 (refer to Cost/Benefit Analysis section) details TIC's estimated financial benefits from avoided fatalities given the early adoption of advanced safety features, compared to the business as usual (BAU) case, as a result of the implementation of this National Truck Plan. AU$4.2 million was take as the value of a statistical life, as detailed by the 2014 Office of Best Practice Guidance Note. The analysis shows that over 3 lives can be 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 early adoption of these key safety technologies promoted by this proposed incentive plan, with an estimated 31 lives saved over the next three years. Based on the median scenario, this is an expected saving of 60 lives over eight years from the instigation of the Plan's incentives.

2. A GREENER AUSTRALIAN TRUCK FLEET—INCREASING ENERGY PRODUCTIVITY IN AUSTRALIA'S TRUCK FLEET (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 which, when combined, will result in reduced CO_2 emissions for the Australian 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". Energy productivity is the relationship between economic output and energy used, and is expressed as:

$$\text{Energy Productivity} = \frac{\text{Gross Domestic Profit}}{\text{Energy Used (PJ)}}$$

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

A. Utilisation of additional axle mass for trucks above 15t GVM (ADR 80/03 and ADR 80/04 only);
B. Accelerated adoption of more fuel-efficient trucks;
C. Introduction of night-time freight access for urban trucks;
D. Use of zero-emission metro distribution trucks;
E. Introduction of B-triples or A-doubles for line haulage (ADR 80/03 and ADR 80/04 trucks with advanced safety features only);
F. Increased use of B-double combinations replacing semi-trailers for line-haul movements; and
G. Accelerated uptake of PBS vehicles, excluding B-triples and A-doubles that have been specifically considered in Option E.

Table 5 summarises the relative benefits of the adoption of each of the seven options against four criteria, rating them on a scale of Green/Amber/Red, while also attributing predicted energy and financial savings for each of the seven scenarios.

Table 5 Relative Benefits of the Adoption of Energy Productivity Initiatives

				CRITERIA			
Improvement Option	**Energy productivity benefit vs 2030 BAU (PJ/year)**	**GHG emissions benefit vs 2030 BAU (CO_2-e/year)**	**GHG benefit (AUS/year)**	**Readily deployable technology**	**Low legislative complexity**	**Low infrastructure costs**	**Net owner/ operator benefit**
Option A: Increased axle mass for trucks over 15 tonne GVM	12.7	0.9 Mt	$14.27 MiL				
Option B: Accelerated adoption of more fuel efficient trucks	3.1	0.2 Mt	$3.17 MiL				
Option C: Night-time freight access for urban trucks	7.0	0.5 Mt	$7.93 MiL				
Option D: Use of zero-emission trucks for 'first mile-last mile' activity	0.8	0.3 Mt	$4.76 MiL				
Option E: Introduction of B-triples/A-doubles	24.1	1.7 Mt	$26.96 MiL				
Option F: Increased use of B-Doubles for line-haul activity	17.9	1.3 Mt	$20.62 MiL				
Option G: Accelerated uptake of PBS vehicles	2.2	0.17 Mt	$2.64 MiL				
TOTALS	67.8	10.7 Mt	$169.70 MiL				

KEY: Worthwhile Net Benefit/No Barriers | Modest Benefit/Some Barriers | Neglible Benefit/ Considerable Barriers

A Safer, Greener, Cleaner, Productive Australia Truck Fleet

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

This first option proposes changes to current mass laws to permit the carriage of heavier loads for new trucks (ADR 80/03 and ADR 80/04). Specifically, this option proposes the amendment of current national and state regulations for axle limits to support a one tonne increase in allowable axle masses (500kg additional mass on the front axle/s and 500kg additional mass on the rear axle/s) 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 2019.

B. Accelerated adoption of more fuel-efficient trucks

This second option proposes an increase in 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 use 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. While the mandated CO_2 reduction targets in these regions are in the order of 20% over a typical five to ten-year phase-in period, TIC has chosen to model a conservative reduction of only 5%. This acknowledges that Australia's current non-aligned and restrictive vehicle dimension regulations, particularly maximum vehicle width and length, will result in many of the aerodynamic improvements developed and deployed in overseas markets not being brought to our shores. Thus, depriving Australian operators of these fuel saving measures and Australia of the CO_2 reduction benefits.

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 2019—and that these newer trucks will deliver an average fuel efficiency improvement of 5% relative to baseline ADR 80/03 vehicles.

C. Introduction of night-time freight access for urban trucks

This option proposes that local councils in Australia's major capital cities introduce new laws allowing night-time movement of vehicles over 15t GVM, where these vehicles comply with the latest noise design rules (ADR 83/00 post-2007 trucks).

This scenario would likely deliver modest energy efficiency improvements. The low ranking of Option C was mainly due to two contributing factors, namely: (1) Australia's traffic congestion is not that acute and hence is not a major contributing factor to heavy vehicle fuel use; and (2) the annual distances travelled by metro distribution trucks is typically not large relative to the total Australian road freight task.

D. Zero-emission metro distribution trucks

This option proposes that zero-emission trucks (using currently known electric or hydrogen technologies) be used to support urban operation between distribution centre and delivery end-points in urban areas. It is envisaged that the purchase of these vehicles would be incentivised by the introduction of concessionary taxes and road user charges.

The analysis of this option was developed around the following key assumptions:

- Fully electric urban vehicles (i.e. light rigid, heavy rigid and articulated vehicles) would be available on a mass market basis in Australia from 2024;
- Compared with equivalent internal combustion vehicles, electric trucks would deliver a 15% energy benefit due to greater energy conversion efficiency (i.e. greater proportion of on-board energy converted to tractive force);
- Grid electricity sourced for the operation of these vehicles would be derived from 100% renewable sources from 2024;
- The prices of wholesale electricity and/or hydrogen would be equivalent to wholesale diesel prices on an energy equivalence basis; and
- The cost of new vehicle recharging and refuelling infrastructure would not be directly borne by the vehicle operator.

It is also assumed that the combined attraction of perceived cleaner running vehicles and financial benefit through lower taxes and charges would result in a 30% market adoption for new urban truck sales from 2024.

Australia's electricity supply in a world context is high in carbon intensity.

Of note was the relatively low ranking for the increased uptake of electric vehicles for 'first mile last mile' activity. The relatively low ranking of Option D was due to the fact that, in the foreseeable future, this technology is generally only suited for trucks between 4.5t and 15t GVM/GCM and, given that these trucks account for just 3.6% of total annual energy use within the national truck fleet, benefits are small. The likely slow implementation of electric vehicle charging and hydrogen refuelling infrastructure, increased availability of green power (low carbon intensity) and the current availability of a suitable range of vehicles are also constraining factors on the future benefits between 2019 and 2024, the target period of the National Truck Plan implementation. For these reasons, the projected CO_2 and operator savings detailed in Table 5 for Option D are not included in the Impact Assumptions (benefits) summarised in Table 8 (refer to Cost/Benefit Analysis).

TIC members and their parent organisations are actively developing zero-emission trucks for global use, including Australia. Trials and demonstrations of these technologies are under development, however, the actual uptake of such vehicles in Australia remains an operator decision.

Electric vehicles hold significant potential to deliver both energy productivity improvement (via greater conversion of stored energy to motive power) and GHG improvement (as a result of zero tailpipe emissions).

For this reason, the national governments of many advanced economies have elected to incentivise the early market adoption of electric vehicles (cars, trucks and buses) as part of their commitment to reducing GHG emissions in the future.

In Australia, however, the carbon intensity of Australia's electricity supply currently averages 0.885kg/Kwh—a figure that is 10% higher than for conventional diesel fuel (DOEE 2016).

The high average carbon intensity of Australia's electricity supply, relative to other countries (refer to Figure 5; IPCC 2014), means that there is currently no GHG benefit in a large-scale switch from conventionally fuelled vehicles to electrically powered trucks in the near term.

While the advocates of electric vehicles may argue that this issue can be redressed by truck operators investing in depot-based renewable power generation—or partnering with providers of such a service—the cost of this action coupled with the additional incremental cost of electric trucks suggests that such an approach would be cost prohibitive to most truck operators in Australia.

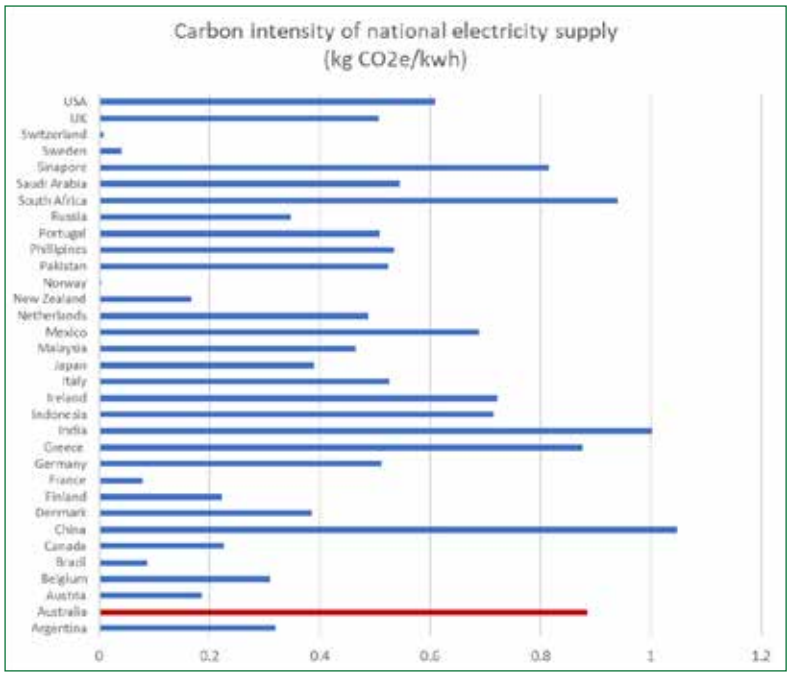


Figure 5
The high carbon intensity of Australia's electricity supply is a major barrier to the realisation of GHG benefits from switching to electric vehicles in the near term.
Source: IPCC 2014

E. Introduction of B-triples, or A-doubles, for ADR 80/03 and ADR 80/04 trucks 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. This option would result in a unit increase in payload of between 32% (versus B-double), 93% (versus semi-trailer), and assumes that 30% of line haul movements would ultimately converted to B-triple, or A-double, between 2019 and 2030. A doubling in the historical fleet replacement rate of prime movers (i.e. urban and rural) from 2019 is assumed. Finally, it is also assumed that any road and bridge infrastructure shortcomings would be resolved between the capital cities on the Australian East Coast.

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

NSW-RMS 2016 data shows that approximately 50% of heavy vehicle combinations running between Sydney and Melbourne remain single trailer. Approximately 50% of current single trailer operations (assumed to be 25% of all rural articulated vehicles) could be converted to B-double operation by the replacement of older prime movers with late model prime movers, allowing for freight to be moved on B-double combinations rather than semi-trailers, resulting in a 45% increase in effective payload. This option also assumes that differential vehicle charges are introduced to incentivise the uptake of B-doubles. The net effect of this option is assumed to be a doubling of the historical fleet replacement rate for rural (line haul) prime movers.

G. 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). Modelling assumed a Low PBS growth rate of 6.2%, a Median growth rate of 10.9%, and a High growth rate of 13.8%. TIC's modelling highlights that kilometre savings are significant and range from 134 to 214 million kilometres per year. Fuel savings through improved PBS productivity would conservatively generate CO_2 savings from 0.12 million tonnes to 0.2 million tonnes per year.

As a condition of their rigorous approval process PBS vehicles are also safer. They are also more environmentally-friendly, moving more freight with less energy. Table 8 (refer to Cost/Benefit Analysis) presents the findings for the Median scenario option for the proposed TIC incentive scheme over five 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.

GOVERNMENT'S ROLE IN ENABLING ENERGY PRODUCTIVITY

A) Calculating Energy Productivity for Road Transport

Energy productivity has been expressed in this plan as a dollar value for tonnes of CO_2 saved against business as usual. 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 kilometre, while this measurement is not suitable for light "volume" freight where cubic meters per kilometre is a more appropriate measure.

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 United Nations Economic Commission for Europe (UN ECE) vehicle regulations (the UN 1958 Agreement) and has a long tradition of accepting equivalent 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 an adopter of advanced heavy vehicle and equipment technology.

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 TIC members' inability to bring products 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 uptake 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 that Australia has a 0.12% uptake rate of alternative powered heavy vehicles versus a global average of about 2%, that is, one sixteenth the uptake rate of the global average. Further, aligning with international mass and dimension limits would stimulate the faster adoption of the seven strategies detailed above in A Greener Australian Truck Fleet—Increasing Energy Productivity in Australia's Truck Fleet (reducing CO_2 emissions).

As a key recommendation of this plan is that Australia must align with international mass and dimensional regulations, TIC requests that this issue is pursued as an agenda item within the National Road Safety Strategy 2018-2020 for Federal and State Government action.

Table 7 (refer to A Productive Australian Truck Fleet—Operator Direct Savings) details the cumulative energy productivity benefit (CO_2 savings) as a result of the implementation of the National Truck Plan.

> ***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 and 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.***

3. A CLEANER AUSTRALIAN TRUCK FLEET—IMPROVING THE HEALTH OF ALL AUSTRALIANS

TIC has conducted research into the public's perception of trucks. One conclusion from the research was that current truck safety standards and environmental impacts are of significant public interest. There was substantial public support for the implementation of stricter truck standards especially in built-up areas. Almost 60% of respondents believe that all trucks should have to comply with strict environmental standards before being allowed into built-up areas while 75% 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 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, further reducing 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 6 shows the improvement made in reducing exhaust emissions since 1996.

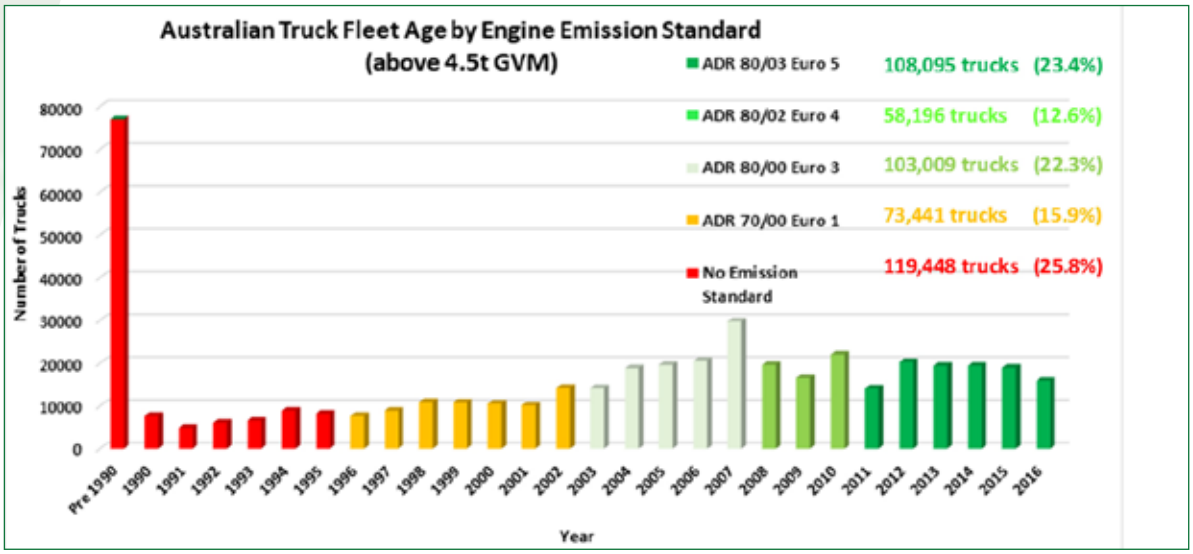
Table 6 Noxious Emission Comparison Pre-ADR 70 (Euro 0) to ADR 80/04 (Euro VI)

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 I)	0.4	x36	7.6	x28
Pre-2008	ADR80/00 (Euro III)	0.1	x10	5.0	x13
Pre-2011	ADR80/02 (Euro IV)	0.02	x2	3.5	x9
2011 -	ADR80/03 (Euro V)	0.02	x2	2.0	x5
Pending	ADR80/04 (Euro VI)	0.01	x1	0.4	x1

Table 6 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 equivalent standards from the USA or Japan.

Whilst the improvements are significant (pre-1996 trucks are polluting at rates at least 60 times greater than that of post-2008 trucks), Australia has not achieved the emission reductions that were forecast by Government due to the poor uptake of new trucks by Australian operators, with almost 42% of the truck fleet meeting no or elementary engine exhaust emission standards (refer to Figure 6).

Figure 6 Australia Truck Fleet Age by Engine Emission Standard (above 4.5t GVM)



A Safer, Greener, Cleaner, Productive Australia Truck Fleet

TIC has identified that a significant proportion of older model trucks (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.

Research suggests a link between common air pollutants and adverse health impacts. The manifestation of these health effects include 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 children and the elderly are particularly susceptible.

The existing literature shows that long term exposure has 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). 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 to between 1400 and 2000 asthma attacks in Australia each year.

Supporting the relationship between air pollution and adverse health, in January 2010 the USA-based Health Effects Institute released 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;
- Children already with asthma were likely to have their condition exacerbated;
- New asthma cases were likely to be triggered across all other age groups; 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 2010) 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 2007).

A major cause of air pollution in urban areas is motor vehicle exhaust emissions. Transport is the third largest contributor (19%) of GHG emission in Australia. Road transport accounts for about 90% of transport emissions, the road freight task component of this being 39% with predictions that the freight transport task is expected to grow 26% by 2026. The BTRE (2005) notes 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' to the year 2020. In summary, 5% of GHG emissions originate from trucks, 26% of which are pre-1996 model trucks with no emission controls.

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

Table 8 (refer to Cost/Benefit Analysis) details the accumulative avoided health savings by retiring older emission vehicles.

4. A PRODUCTIVE AUSTRALIAN TRUCK FLEET—OPERATOR DIRECT SAVINGS (OPS)

Modernising the national truck fleet will bring considerable operational savings for truck owners/operators and fleets alike. Increasing the energy productivity of the nation's truck fleet (moving a given amount of freight with greater energy efficiency) leads to operational savings in areas such as reduced fuel consumed, reduced tyre wear and service costs, and decreased driver hours. The modelling undertaken by TIC and summarised below, shows the operational cost savings from newer, more efficient and/or higher productivity vehicles. The fleet mix from which the operational benefits are generated consists of rigid trucks above 4.5t GVM through to B-Triples and other PBS combinations.

Seven operational scenarios were modelled (refer to A Greener Australian Truck Fleet—Increasing Energy Productivity in Australia's Truck Fleet (reducing CO_2 emissions)). The savings of each operational improvement is summarised in Table 7. The final column details the projected operator savings for options for each year of the implementation of the National Truck Plan. The total operator benefits are summarised in Table 8 (refer to Cost/Benefit Analysis).

Table 7 Projected Operator Benefits of Implementation of the National Truck Plan

Improvement Option	Energy productivity benefit vs 2030 BAU (PJ/year)	Operational Benefit - fuel saving (Million Litres/year)	Operational Benefit - fuel saving (Million AU$/year)	Operational Benefit - driver savings (Million km/year)	Operational Benefit - fuel saving (Million AU$/year)	TOTAL Operational Benefit - driver saving (Million AU$/year)
Option A: Increased axle mass for trucks over 15 tonne GVM	12.7	335	$352	81	$39	$390
Option B: Accelerated adoption of more fuel efficient trucks	3.1	74	$78	N/A	N/A	$78
Option C: Night-time freight access for urban trucks	7.0	186	$195	N/A	N/A	$195
Option D: Use of zero-emission trucks for 'first mile-last mile' activity (from 2024 on)	0.8	112	$117	N/A	N/A	$117
Option E: Introduction of B-triples/A-doubles	24.1	632	$664	124	$63.10	$727
Option F: Increased use of B-Doubles for line-haul activity	17.9	484	$508	92	$45.88	$554
Option G: Accelerated uptake of PBS vehicles (excluding B-triples and A-doubles)	2.4	62	$65	182	$88.43	$154

Cost/Benefit Analysis

The principle mechanism advocated in the National Truck Plan to modernise Australia's old truck fleet is that of tax incentives taking the form of accelerated depreciation. TIC projects a cost to Government of $1.19 billion over the plan's five-year timeline. TIC believes this investment combined with other policy options detailed above in Policy Options to Incentivise the Modernisation of the Australian Truck Fleet, will enable the Government to modernise the Australian truck fleet and achieve its own strategic objectives, with a projected accrued savings of $10.97 billion over five years when compared with a business as usual approach.

Adoption by Federal Government of the policy options outlined in this National Truck Plan will modernise the Australian truck fleet with 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 cost savings to the community through avoided fatalities due to safer and more productive trucks ($123.5 Million Median), avoided health costs associated with noxious emissions ($1536.2 Million Median), reduced carbon dioxide emissions due to higher productivity rates of modern trucks ($322.5 Million Median), and direct operator cost savings ($8,985.9 Million Median).

Table 8 Impact Assumptions for all Scenarios/NTP Projected Costs

	Medium (Million AU$)					Cost of NTP Depreciation Allowance (Million AU$)
Year	Safety	Health	CO_2	Ops	Sub Total	
2018	0	0	0	0	**0**	**0.0**
2019	14.2	107.1	38.3	1079.7	**1239.4**	**204.7**
2020	21.3	218.2	57.4	1611.9	**1908.8**	**226.9**
2021	24.3	333.8	75.6	2098.1	**2531.8**	**243.6**
2022	29.1	430.3	75.6	2098.1	**2633.1**	**252.8**
2023	34.6	446.8	75.6	2098.1	**2655.1**	**262.5**
Sub Total	**123.5**	**1536.2**	**322.5**	**8985.9**	**10968.1**	**1,190.5**

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