LIGHT VEHICLE EMISSIONS STANDARDS—SETTING THE RIGHT TARGET

4

A fleet-average light vehicle CO_2 emissions standard could deliver net benefits to consumers and Australia as a whole.

The Authority's guiding principles suggest two important considerations in setting the level of a standard—maximising the net benefits from standards and seeking to align Australia's standards with comparable markets.

The Authority has examined three standards that would start in 2018 to identify which would deliver the largest net benefits. The Authority considers the strongest of the three to be a feasible and sensible first step for Australia as it delivers the largest private benefits, both over the life of the vehicle and for its average first owner, along with substantial and cost-effective emissions reductions. It is closely aligned to the US standard (and the EU's, with a lag) and would deliver an achievable annual rate of improvement in Australia's light vehicle fleet.

Chapter 3 showed that both international experience and the principles of good policy design suggest mandatory vehicle emissions standards are a sensible policy for reducing light vehicle emissions. This chapter assesses the costs and benefits of potential Australian standards to identify the best starting point for an Australian standard. It:

- outlines how an emissions standard would work and the kinds of costs and benefits it would have
- identifies guiding considerations for choosing the level of an Australian standard
- assesses three possible standards against these considerations.

4.1 HOW WOULD AN EMISSIONS STANDARD WORK?

As outlined in Chapter 1, a fleet-average light vehicle emissions standard would set a national average target for new vehicles sold in Australia. Vehicle suppliers would have specific obligations, designed to ensure the national average target is met. The Authority has assessed the range of design options available to policy makers and identified an effective and least-cost model that would deliver net benefits with a low regulatory burden. In essence:

- The government would set a national average target for the emissions level of the new light vehicle fleet in Australia in each year in g CO_2/km. The target would relate to the average emissions intensity of the Australian fleet—not individual vehicles.
- The government would translate the national average target into an attribute-based limit curve, using a mathematical relationship between the size (footprint) of vehicles and their emissions. Larger cars would be permitted more emissions than smaller cars under the standard, reflecting the reality that larger cars, which offer different utility to consumers, are often more emissions-intensive.

- Each supplier of new light vehicles to the Australian market would have an obligation to comply with the limit curve and use it to determine the mix of vehicles it intends to supply each year.
- Standards would not ban any particular models from sale; a supplier could sell vehicles above the limit curve provided they were offset by sufficient sales of vehicles under the curve (Figure 4.1 provides a stylised example). A supplier could improve the efficiency of all vehicles in its fleet, or sell more of its highly efficient vehicles and fewer less efficient vehicles. This imposes a more equitable burden across suppliers that specialise in different market segments.
- There would be penalties for non-compliance and flexible compliance arrangements, including banking any credits from surpassing a target in one year for use in later years within the first phase (2018–25).

Chapter 5 outlines the Authority's preferred standard design in further detail.

4.2 CHOOSING THE RIGHT LEVEL FOR STANDARDS

4.2.1 WHAT ARE THE COSTS AND BENEFITS OF STANDARDS?

The principal benefits are lower fuel bills for motorists and low cost CO_2 emissions reductions for Australia.

The principal cost is the higher production cost and retail price of vehicles incorporating fuel savings technologies adopted in response to standards. Vehicle suppliers could meet standards by promoting sales of a different fleet mix, by offering lower emissions variants of current models, or both.

Standards also give rise to changes in 'transfers' between businesses, individuals and the government. In general, these transfers contribute to the impact of the standard on particular groups, but not its overall net benefits. Transfers are discussed in this chapter as they arise. Any distributional issues from standards could be considered further in any subsequent RIS. The Authority has not examined distributional impacts of the proposed standards in detail. There is no reason to expect significant adverse effects. Over time, the substantial fuel savings from standards are likely to benefit low income households, particularly as more efficient vehicles are resold into the second hand market.

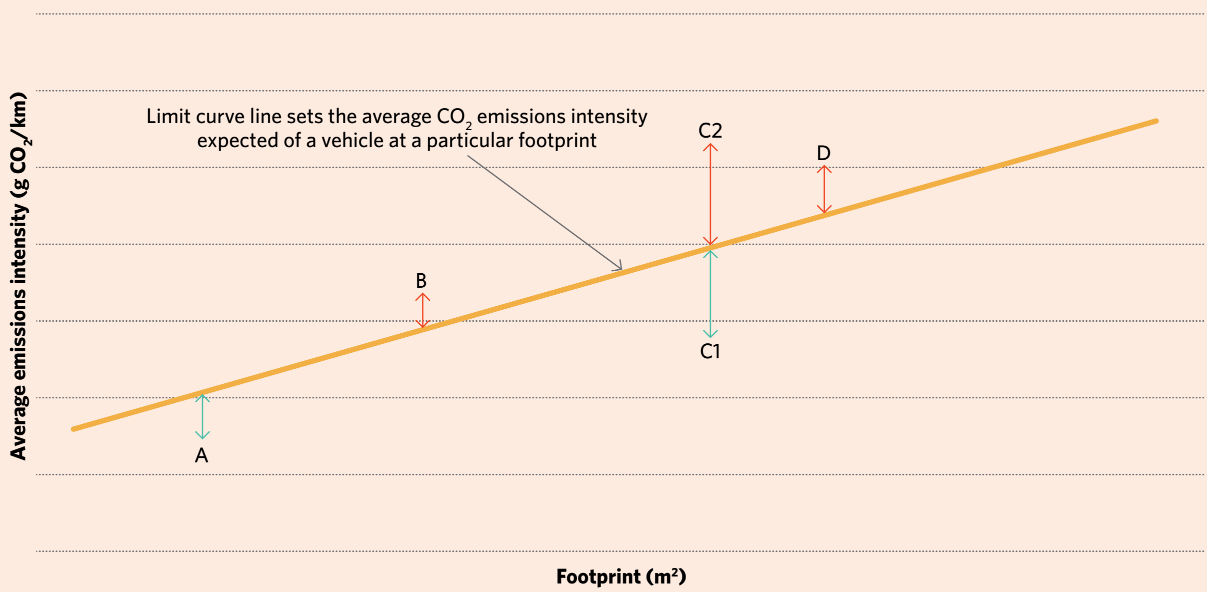
BOX 3. HOW DOES AN ATTRIBUTE-BASED FLEET-AVERAGE STANDARD WORK?

The key feature of an attribute-based fleet-average standard is that it sets a 'limit curve'. Attribute-based targets allow the target for a vehicle to vary with a vehicle attribute—for example, its size or 'footprint'. The limit curve (and underlying mathematical formula) provides the level of CO_2 emissions intensity for each vehicle footprint. It is initially derived from an analysis of the existing light vehicle fleet's CO_2 emissions (or fuel consumption) and footprint. From that analysis, the standards will specify a new limit curve (or set of curves) for each target year. While referred to as a curve, the limit curve is generally a straight line.

The overall target that a manufacturer is required to meet is the annual sales-weighted average of CO_2 emissions intensity, taking account of the footprint of the vehicles sold. This means that each manufacturer's overall target is specific to them; they determine it at the end of the target year (once sales are known). If the initial analysis is robust, the overall fleet target set by the standard will be met if all manufacturers meet their individual targets.

To provide a simplified example, Figure 4.1 shows a stylised limit curve for a footprint-based standard and a manufacturer who supplies four models to the market (with one model having two variants). Models B and D have emissions levels above the expected average for their size (as determined by the limit curve); model A is below; and model C has one variant below (C1) and one above (C2). The required fleet average for this manufacturer will be determined by the point on the limit curve associated with each model or variant, sales-weighted by the number of each supplied to the market. In order for the manufacturer to meet its required target, the total 'excess' emissions of any models above the line (indicated by the red arrows) will need to be offset by the total 'credit' emissions of those below the line (indicated by the green arrows). If these 'excess' emissions are offset, the manufacturer has met its fleet-average target even though vehicles B, C2 and D have emissions above the limit curve.

FIGURE 4.1: STYLISED EXAMPLE OF A LIMIT CURVE



Source: Climate Change Authority

Looking at the principal costs and benefits, it is useful to distinguish between the net 'individual', net 'private' and net 'social' impacts of standards (that is, net impacts for Australia as a whole).

The net individual impact on each owner of a vehicle throughout its life is the net impact of any increase in the purchase price of a vehicle attributable to standards, minus the savings from reduced fuel use over the period of ownership, compared with business-as-usual (BAU). Private benefits include avoided fuel excise. The net private impact is the sum of these impacts across all motorists. If the lifetime fuel savings exceed upfront costs, the standard has 'net private benefits'.

In broad terms, the net social impact of standards is the value of fuel savings and emissions reductions to the public, adjusted for the technology costs and other changes necessary for vehicle suppliers to meet the standards. The value of excise payments is excluded from calculations of social costs and benefits, because they represent transfers of funds between motorists and the government.

Because the Authority suggests a standard commence in 2018 (see Chapter 5), domestic manufacturers in Australia are expected to have closed when the standard starts, so there would be no domestic automotive manufacturing industry impact.

Four other costs and benefits are likely to arise, but these have a significantly smaller effect than the principal costs and benefits:

- Administrative and compliance costs of the scheme. These will depend significantly on the policy design. As discussed in Chapter 5, standards can be designed to have relatively low administration and compliance costs by using existing testing and data collection arrangements, and providing flexibility in compliance to lower costs. While the Authority has not developed detailed monetary estimates of administration and compliance costs, there are good reasons to expect these to be very small relative to technology costs. For example, because vehicle emissions are already tested, the cost of Australia's fuel consumption labelling system, which provides this information on new vehicle labels, was estimated at $7.70 per vehicle (AGO 2002, p. 15).3 Administration and compliance costs would be specifically investigated by a formal RIS, should one be conducted in future.
- Improved liquid fuel security and energy productivity. The Australian Government's Energy White Paper process is considering a range of issues including security of supply and improved energy productivity (Department of Industry 2013, p. i). Light vehicle emissions standards lower fuel demand for a given transport task. This will improve Australia's liquid fuel security and energy efficiency, if other things are equal. Within the transport sector, road transport is the largest energy user, accounting for 76 per cent of total transport liquid fuel use (BREE 2012a, p. 99). CSIRO modelling commissioned by the Authority (see Section 4.3) projects that the standards modelled would reduce Australia's 2030 petroleum demand by up to 4.1 per cent (Authority calculations based on BREE 2012b, p. 46).
- Broader macroeconomic changes. As described above, increasing vehicle efficiency means that households and businesses spend less money to achieve the same transport task. The savings can be invested or spent on other goods and services.
- Reduced adverse health impacts from air pollution. Standards would complement existing measures to reduce adverse health impacts of air pollution from light vehicles (Chapter 2). The health benefits of standards are expected to be small, given vehicle air pollution controls already in place. Current vehicle air pollution regulations specify a standard for emissions (in emissions per kilometre) that all vehicles must meet regardless of their fuel efficiency. As such, the technologies used meet the air pollution standards independently of vehicle fuel efficiency.

This chapter focuses on the principal costs and benefits; these smaller effects are not considered further.

4.2.2 DETERMINING THE LEVEL OF AN AUSTRALIAN STANDARD

While previous work on the level of standards has not discussed guiding considerations in detail, the Authority considers that this warrants specific consideration—clarifying the aims of the policy highlights the choices between possible levels of ambition. The Authority's guiding principles—requiring that measures responding to climate change should be economically efficient, environmentally effective, equitable and in the public interest—suggest two main considerations for choosing the level of a standard:

- maximising the net benefits from standards
- seeking to align Australia's standards with comparable markets if there are opportunities to do so.

Maximising the benefits helps Australia realise the available efficiency and emissions reduction opportunities, while harmonisation helps to limit costs for industry and gives confidence that the target is achievable.

CONCLUSION

C5. In the first phase of an Australian standard (2018–25), the national average target be set at a level that:

- maximises the net benefit of standards
- aligns Australia's standards with comparable major markets.

3 All monetary values in this report are in real 2012 Australian dollars unless indicated. The AGO used a cost estimate in 1995–96 Australian dollars from BTCE (1996, pp. 164–5), converted by the Authority into 2012 Australian dollars using the Reserve Bank of Australia's inflation calculator (RBA 2014).

4.3 THE AUTHORITY'S APPROACH TO THE COSTS AND BENEFITS OF STANDARDS

There is a direct relationship between the level of a standard and the size of the costs and benefits. A stronger standard delivers more fuel savings and emissions reductions, but involves higher technology costs, relative to BAU. Different standards have different net benefits because benefits and costs increase at different rates as standards become stronger. If costs increase more slowly than benefits, a stronger standard will deliver more net benefits than a weaker one.

The Authority has examined three standards in detail to identify which delivers the largest net private benefits. This analysis draws on modelling by the CSIRO (Reedman and Graham 2013b) as well as international evidence on the costs of fuel-saving technologies necessary to meet the standards (as Australia-specific estimates of the incremental costs are not readily available).

The analysis of social benefits is similar, but adjusts the estimated fuel savings for transfers between motorists and the government. The cost-effectiveness of standards as an emissions reduction policy is also considered by calculating the cost per tonne of emissions reductions achieved, and comparing it with the estimated cost per tonne of alternative emissions reductions measures.

The three standards broadly reflect:

- a lenient standard that makes a relatively small improvement relative to BAU, reaching 135 g CO_2/km in 2025
- a medium standard with a somewhat faster annual improvement rate, reaching 119 g CO_2/km in 2025
- a stronger standard that sees Australia broadly match US targets for 2020 and 2025, reaching 105 g CO_2/km in 2025. This also sees Australia match the EU's target with a lag.[4]

Table 4.1 shows the level of the standards in 2018, 2020 and 2025 relative to the projected BAU. The modelling assumes that, in the absence of standards, the average emissions intensity of new light vehicles falls to 169 g CO_2/km in 2020 and 156 g CO_2/km in 2025 (Graham 2014).This is similar to other recent estimates of emissions intensity levels for Australia.

Further details on the modelling, BAU and the approach to estimating the costs and benefits of standards are in Appendix B.

4 The EU standard is for passenger vehicles only. If Australian passenger vehicles met the EU 2020 target of 95 g CO_2/km while the Australian split between new passenger and light commercial vehicles and their relative efficiencies stayed constant at their current levels, the level of new light vehicle efficiency would be around 100 g CO_2/km. Australia is projected to reach this level just after 2025 if a strong standard prevails from 2018–25 (see Table 4.1).

TABLE 4.1: STANDARDS MODELLED—AVERAGE EMISSIONS INTENSITY LEVELS, NEW LIGHT VEHICLES, SELECTED YEARS FOR STANDARDS STARTING IN 2018

SCENARIO	2018	2020	2025
BAU (2 per cent 2013–20; 1.6 per cent 2021–25)	176	169	156
Lenient (3.5 per cent from 2018)	174	162	135
Medium (5 per cent from 2018)	171	154	119
Strong (6.5 per cent from 2018)	168	147	105

Note: Values are converted to test cycle from the modelled 'measured' emissions intensities. See Appendix B.2 for further details.
Source: Reedman and Graham 2013b; Graham 2014

BOX 4: COMPARING VEHICLE STANDARDS ACROSS COUNTRIES WITH DIFFERENT TESTS

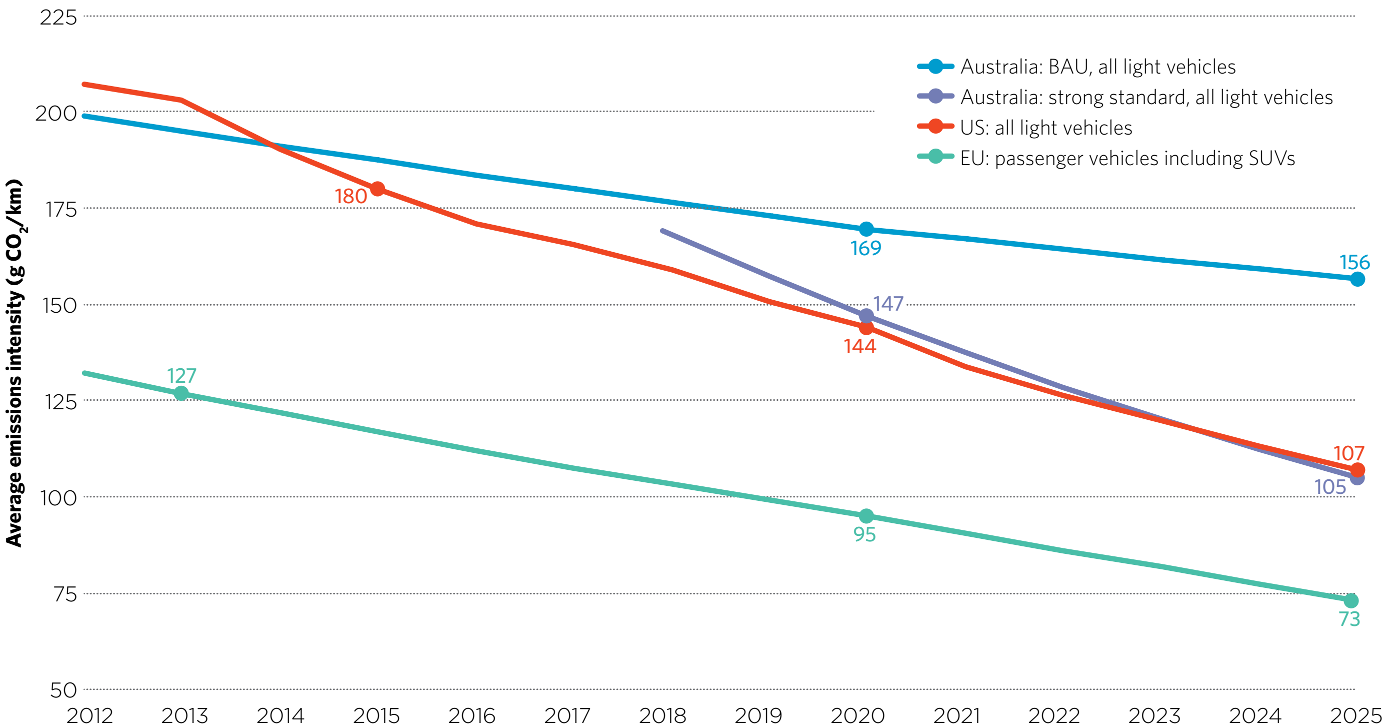
Different countries use different tests to determine vehicle emissions intensity. Nevertheless, it is still possible to compare overall fleet performance around the world.

All test cycles involve simulated urban and highway driving; conversion methodologies use simulation models to map between tests and put all countries on a common scale. Because these conversions are technical and resource-intensive, the International Council on Clean Transportation (ICCT) is the only source covering all major international test cycles. Their conversion tool is publicly available and the results are used by organisations such as the Global Fuel Economy Initiative (a partnership between the ICCT, International Energy Agency, United Nations Environment Programme, International Transport Foundation and FIA Foundation) and the Intergovernmental Panel on Climate Change. While conversions are robust at the overall fleet level, they should not be used for converting the performance of individual vehicles or for setting national regulations. This is because the conversion methodology addresses the main differences between test cycles, but not the smaller procedural differences.

Converting a standard from (say) the US into an Australian-equivalent level does not rely on the two countries having the same mix of vehicles on the road—this would affect how hard a given standard would be to achieve, but not its actual level.

The ICCT continues to refine its methodology and expects to release another update of conversion factors this year. These are not expected to result in large changes to countries' relative positions when measured on a common scale.

FIGURE 4.2: EMISSIONS INTENSITY OF NEW LIGHT VEHICLES IN AUSTRALIA UNDER BAU AND 'STRONG' STANDARD COMPARED TO US AND EU



Note: The EU met its 2015 target in 2013 so the EU trajectory shows actual 2013 new passenger vehicle emissions intensity. The EU 2025 target shown here is the mid-point of two proposed targets (68 and 78 g CO_2/km). The US has separate targets for passenger vehicles and light commercial vehicles, but also reports combined targets; the target shown has been converted to the European test cycle (NEDC) equivalent by the Authority using a conversion tool produced by the ICCT.

Source: Climate Change Authority using Reedman and Graham 2013b; Graham 2014; ICCT 2014 and EC 2014

Figure 4.2 compares the strong standard and projected BAU in Table 4.1 with US and EU standards, showing that, without policy action, Australia falls further behind over time. These comparisons are complicated by differences across jurisdictions. The EU standard is for passenger vehicles only, so would be somewhat harder to meet if it applied to light vehicles as a whole. The US standard shown covers all light vehicles, but uses a different test procedure from Australia and the EU. The comparison here draws on international analysis to put the standards in a common metric (the measure used in Australia and the EU). Further details on this comparison process are provided in Box 4.

Other standards have been proposed for Australia in recent years. For example, ClimateWorks (2014) analysed a range of standards and called on the government to introduce light vehicle standards starting in 2015–16 that matched EU levels for passenger vehicles with a four-year delay (that is, 130 g CO_2/km in 2020 and 95 g CO_2/km in 2024). In a 2011 discussion paper, the Department of Infrastructure and Transport proposed considering the impact of a range of different standards requiring average annual reductions of between 4 and 5 per cent per year from 2015 to 20; these would imply 2020 levels similar to either the medium or strong standards modelled here (DIT 2011a, p. 14).

4.4 NET BENEFITS OF STANDARDS FOR MOTORISTS

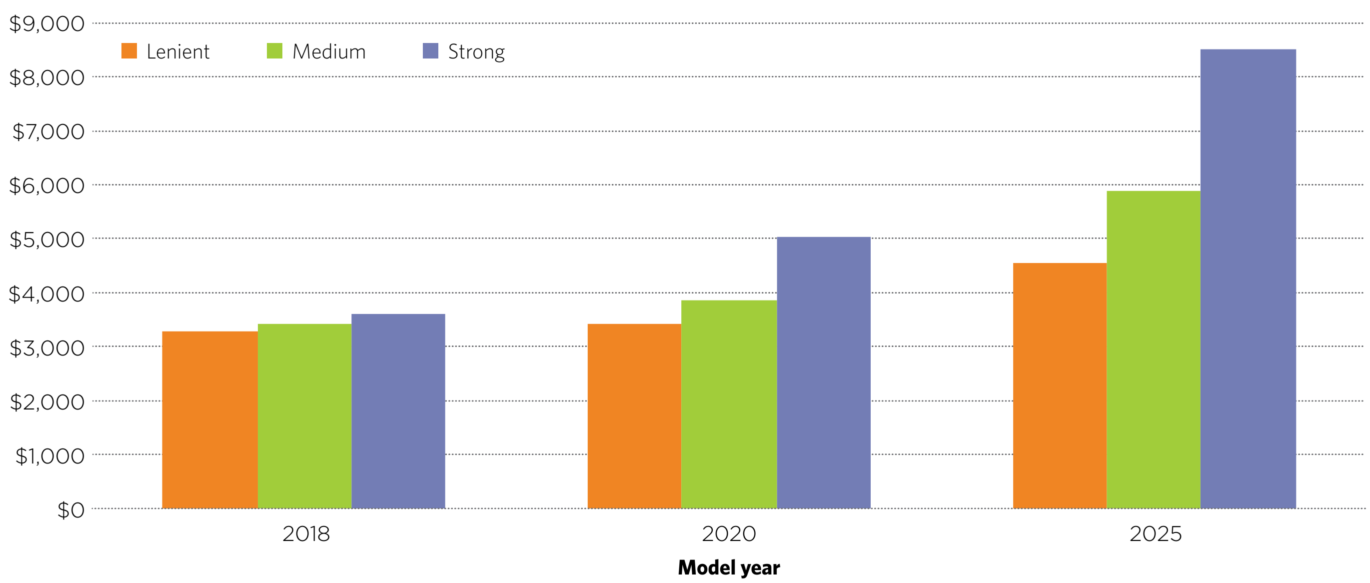
4.4.1 FUEL SAVINGS FROM LIGHT VEHICLE EMISSIONS STANDARDS

In broad terms, the value of fuel savings from standards depends on fuel prices, distances travelled and the level of the standard. Higher real fuel prices (including through any excise increases) and larger distances travelled increase the savings, if other things are equal. The Authority has calculated fuel savings over the life of an average new vehicle and to the first vehicle owner. This second measure of fuel savings helps to illustrate the likely impact on buyers of new vehicles.

The Authority has estimated both measures of fuel savings for each of the modelled standards. Figure 4.3 shows the present value of fuel savings over the life of new vehicles, relative to BAU, for model years 2018, 2020 and 2025. In 2018, the average present value of fuel savings attributable to standards is between $3,200 and $3,600 for all three possible standards. These represent the present value of fuel savings from 2018 model vehicles over their assumed average vehicle life of 15 years; they are savings to motorists so include savings from avoided excise. The savings are initially similar because in the first year the levels of the standards are quite similar (see Table 4.1). The present value of fuel savings rises with successive model years, reaching about $8,500 for a 2025 vehicle subject to the strong standard.

In the years to 2025, projected fuel savings largely come from the deployment of more efficient conventional petrol and diesel vehicles. All standards modelled see some deployment of alternative vehicles; these become more important from about 2025 onwards (Reedman and Graham 2013b, p. 16).

FIGURE 4.3: PRESENT VALUE OF FUEL SAVINGS RESULTING FROM STANDARDS RELATIVE TO BAU



Note: Assumed average vehicle life of 15 years. For further details on method see Appendix B.
Source: Climate Change Authority calculations using Reedman and Graham 2013b

About half of new vehicles purchased in Australia are for fleets and half are purchased by households (NTC 2014); anecdotal evidence suggests that the average new fleet vehicle is held for three years and the average new household vehicle for five. The present value of fuel savings over the first three or five years indicates the value captured by the first owner of the vehicle, under the conservative assumption that cars with greater fuel economy (or lower emissions intensity) will not attract a higher resale price. For the modelled standards, the present value of fuel savings in the first three years would be about $1,000 for all three standards, rising to over $2,300 for a 2025 model year vehicle under the strongest standard (Figure 4.4). For an average household buyer holding a vehicle for five years, the present value of fuel savings start at about $1,500 for a 2018 model year vehicle, and rise to about $3,700 for a 2025 model under the strongest standard (Figure 4.5).

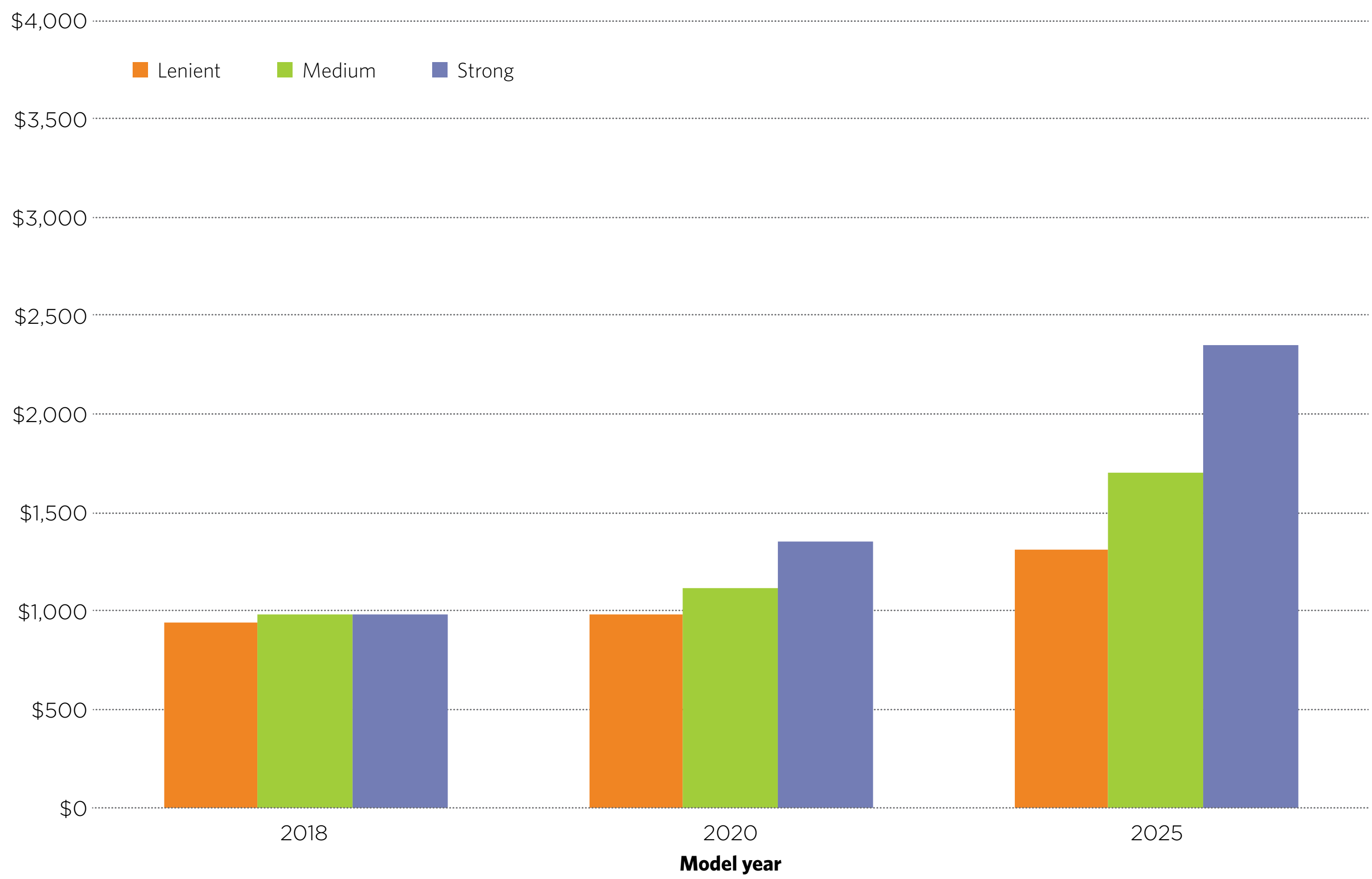
Comparing lifetime savings with the fuel savings for first buyers implies that the majority of savings accrue to later owners. This suggests that it is unlikely that standards will have a regressive effect. If greater fuel economy does not increase a vehicle's resale value, purchasers of used vehicles will capture the majority of the benefits from standards without the increase in upfront costs.

4.4.2 IMPACT OF STANDARDS ON VEHICLE COSTS

To estimate the net private benefits of standards, the estimated fuel savings need to be adjusted for the incremental vehicle costs. Estimates of incremental vehicle costs isolate the costs of additional fuel saving technologies from other vehicle features that contribute to driver utility (for example, premium seating and advanced navigation technologies).

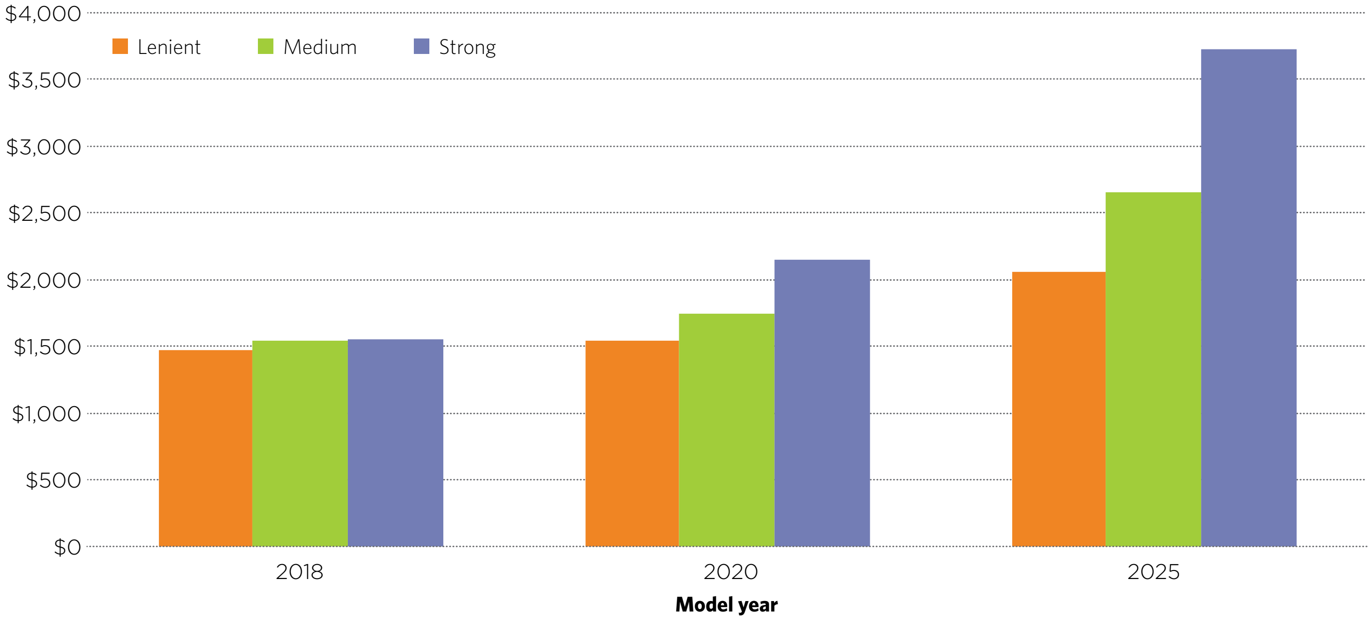
There is no published work on these costs specifically for Australia. The most relevant information on incremental technology costs is from countries that are targeting a similar level of emissions intensity and improvement over a similar time horizon as the modelled Australian standards. Reedman and Graham (2013b) drew on international costs estimates from 2007 (see Appendix B). Technology costs can fall over time and newer estimates from countries targeting similar standards are available, so the Authority has made use of these more recent estimates in this assessment. The Australian standards modelled for the Authority are weaker or similar to the US standards over the period 2020–25 (see Table 4.1 and Figure 4.2), and significantly weaker than the EU standards. This means that compliance with the EU standards will likely require more costly technologies; the US cost estimates are therefore considered the better indicator of technology costs in Australia.

FIGURE 4.4: PRESENT VALUE OF FUEL SAVINGS TO FIRST VEHICLE OWNER RESULTING FROM STANDARDS, THREE-YEAR OWNERSHIP, RELATIVE TO BAU



Source: Climate Change Authority calculations using Reedman and Graham 2013b

FIGURE 4.5: PRESENT VALUE OF FUEL SAVINGS TO FIRST VEHICLE OWNER RESULTING FROM STANDARDS, FIVE-YEAR OWNERSHIP, RELATIVE TO BAU



Source: Climate Change Authority calculations using Reedman and Graham 2013b

One reason to treat estimates of incremental costs with care is that, while the cost of individual technologies to improve efficiency can be estimated, it is harder to establish estimates of the total cost of meeting a standard. There are a number of existing and new technologies that can be used in different combinations in different vehicles. The combination will determine the overall effect on cost and vehicle fuel efficiency.

US and EU cost estimates are summarised in Table 4.2; the modelled Australian standards are included for comparison. Overall, US evidence suggests Australia could meet the strong standard modelled at an average increased retail cost of less than $1,000 per vehicle in the earlier years of the standard, rising to about $1,500 per vehicle by 2025. In addition to the increased retail price of vehicles attributable to increased production costs, there will also be some costs for suppliers of complying with the standards. Given the very modest additional reporting requirements, these costs are expected to be small (see Chapter 5). It is possible that these could be offset by lower per vehicle costs than those indicated here if pass-through of increased production costs into Australian dollar vehicle prices is somewhat less than 100 per cent (see Appendix B). For this reason, the Authority considers the increase in production costs per vehicle presented here are a reasonable estimate of the likely increase in average retail vehicle prices. A formal RIS would be needed to establish the regulatory burden of standards in more detail.

TABLE 4.2: ESTIMATES OF INCREMENTAL VEHICLE COSTS TO MEET FUTURE US AND EU VEHICLE EMISSIONS STANDARDS

JURISDICTION (SCOPE OF STANDARD IN BRACKETS)	2020 TARGET (g CO_2/km)	2025 TARGET (g CO_2/km)	ESTIMATED ADDITIONAL VEHICLE COST TO MEET 2020/2025 TARGETS (2012 AUD)
US (all light vehicles)	144	107	$810 (2020) $1,450 (2025)
EU (passenger cars including SUVs)	95	73	$1,500–$1,650 (2020)
Australia (all light vehicles)	162 (lenient) 154 (medium) 147 (strong)	135 (lenient) 119 (medium) 105 (strong)	Not assessed

Note: The US has separate targets for passenger vehicles and light commercial vehicles but also reports combined targets; the target shown has been converted to the European test cycle (NEDC) equivalent by the Authority using a conversion tool produced by the ICCT. The costs are the Authority's weighted average of the estimated incremental costs for passenger vehicles and light trucks combined using a weight of 70 per cent for passenger vehicles. The EU 2025 target is the mid-point of the current proposed 2025 target range. For further details on sources and methods see Appendix B.
Source: Climate Change Authority based on NHSTA 2012, pp. 978–9; Cambridge Economics and Ricardo-AEA 2013; ICCT 2014

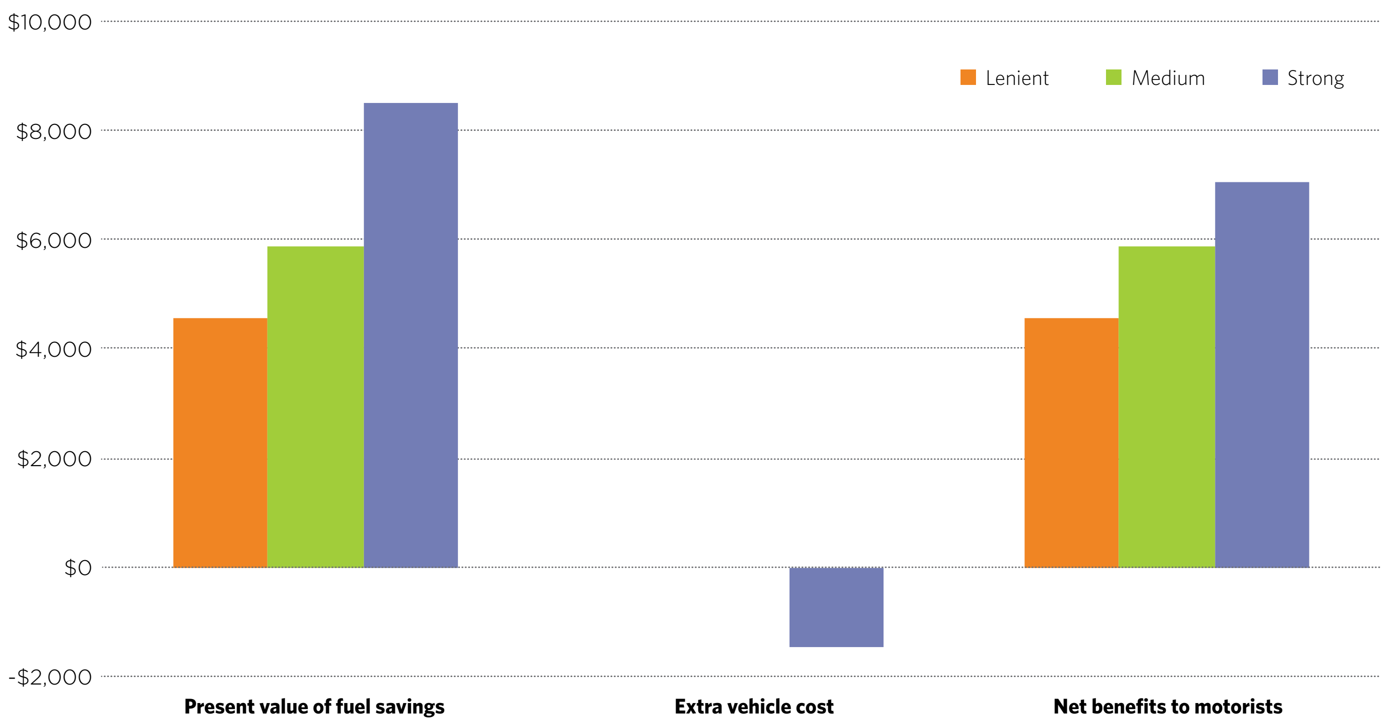
4.4.3 COMPARING THE NET BENEFITS TO MOTORISTS ACROSS THE MODELLED STANDARDS

All the standards modelled are likely to deliver net financial benefits to motorists but the strongest standard modelled is expected to have the largest private benefits. Figure 4.6 shows estimates of the net private benefits by standard for a 2025 model year vehicle. In the absence of incremental cost estimates for lenient and medium standards, they have been assigned a value of zero. This is a conservative assumption, as it will tend to overestimate the net benefits of these two standards, relative to the strong standard. The fact that, even with this assumption, the strong standard still delivers the greatest net benefits and provides more confidence that this is the best approach for Australia. Net benefits rise to at least $7,000 over the vehicle's life (assumed to be 15 years). The strongest standard is also expected to deliver the largest net benefits across earlier model years. All of these private benefits are prior to placing any value on emissions reductions (see Section 4.5).

The strongest standard modelled also gives the largest expected net benefits to first owners. Figures 4.4 and 4.5 show that first owners holding 2025 model year vehicles for three or five years accrue fuel savings of about $2,300 and $3,700, respectively. In both cases, this exceeds the estimated incremental capital cost for a 2025 model-year vehicle (about $1,500), and delivers the largest net benefit of the modelled standards.

Removing or further lowering import duties on vehicles could help reduce some of the upfront cost impact of standards for motorists. As discussed in Chapter 2, a tariff based on vehicle import prices is currently levied on vehicles imported from some countries, including the EU and Japan (levied at 5 per cent) and the Republic of Korea (4 per cent). The policy rationale for these duties would appear to end in 2017 when domestic vehicle manufacturing is expected to cease. In any case, under recent agreements cars from Japan and Korea will become exempt from tariffs (Australian Government 2014a and 2014b). The Authority estimates that the average impact of tariffs on the purchase price of vehicles in 2012 was about $1,200 per vehicle subject to tariffs (Climate Change Authority based on PC 2012, Department of Industry 2012 and NTC 2013). This is the same order of magnitude as the indicative estimates of upfront costs under strong standards. For some vehicles, removing tariffs at the same time as introducing standards could result in no net change in retail vehicle prices.

FIGURE 4.6: BENEFITS, INCREMENTAL COSTS AND NET PRIVATE BENEFITS BY STANDARD, OVER VEHICLE LIFE, 2025 MODEL YEAR



Note: In the absence of incremental cost estimates for lenient and medium standards they have been assigned a value of zero. This is conservative as it tends to overestimate the net benefits of these two standards, relative to the strong standard (see discussion in text). Assumed average vehicle life of 15 years. For further details of approach see Appendix B.
Source: Climate Change Authority based on Reedman and Graham 2013b and NHSTA 2012, pp. 978–9

4.5 SOCIAL BENEFITS OF STANDARDS

4.5.1 EMISSIONS REDUCTIONS FROM STANDARDS

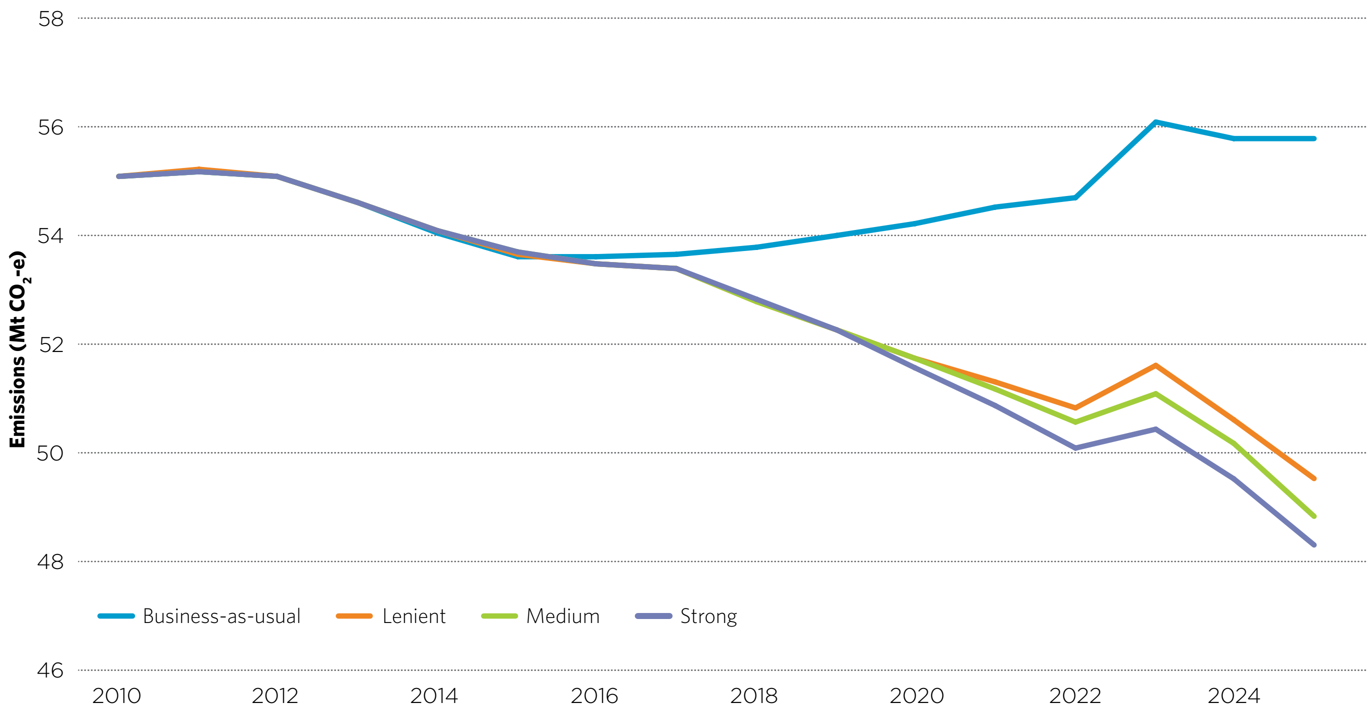
Having discussed the private costs and benefits of standards, this section discusses the social benefits, including the benefits of lower emissions, achieved at lower cost than alternative emissions reduction opportunities.

Standards can make a substantial contribution to achieving Australia's emissions reduction goals—especially over time. Figure 4.7 shows projected emissions from light vehicles with and without standards, and Figure 4.8 shows the cumulative emissions reductions from standards over the period to 2030.

They show that:

- With standards in the range modelled by the Authority, overall emissions from light vehicles fall over time. Without standards, increases in activity from population growth and rising incomes offset light vehicle efficiency improvements, so that overall emissions are projected to be roughly steady. With standards, light vehicle emissions are projected to be up to 13 per cent lower than BAU by 2025.
- Emissions reductions from standards become substantial over time. While standards starting in 2018 will not make a large contribution to meeting Australia's 2020 emissions reduction goals, by 2030 the cumulative reductions are projected to be about 59 Mt CO_2-e. This is roughly the same as Australia's entire current annual light vehicle emissions. The difference between the strong and more lenient standards also builds over time, as the gap between the different standards grows.

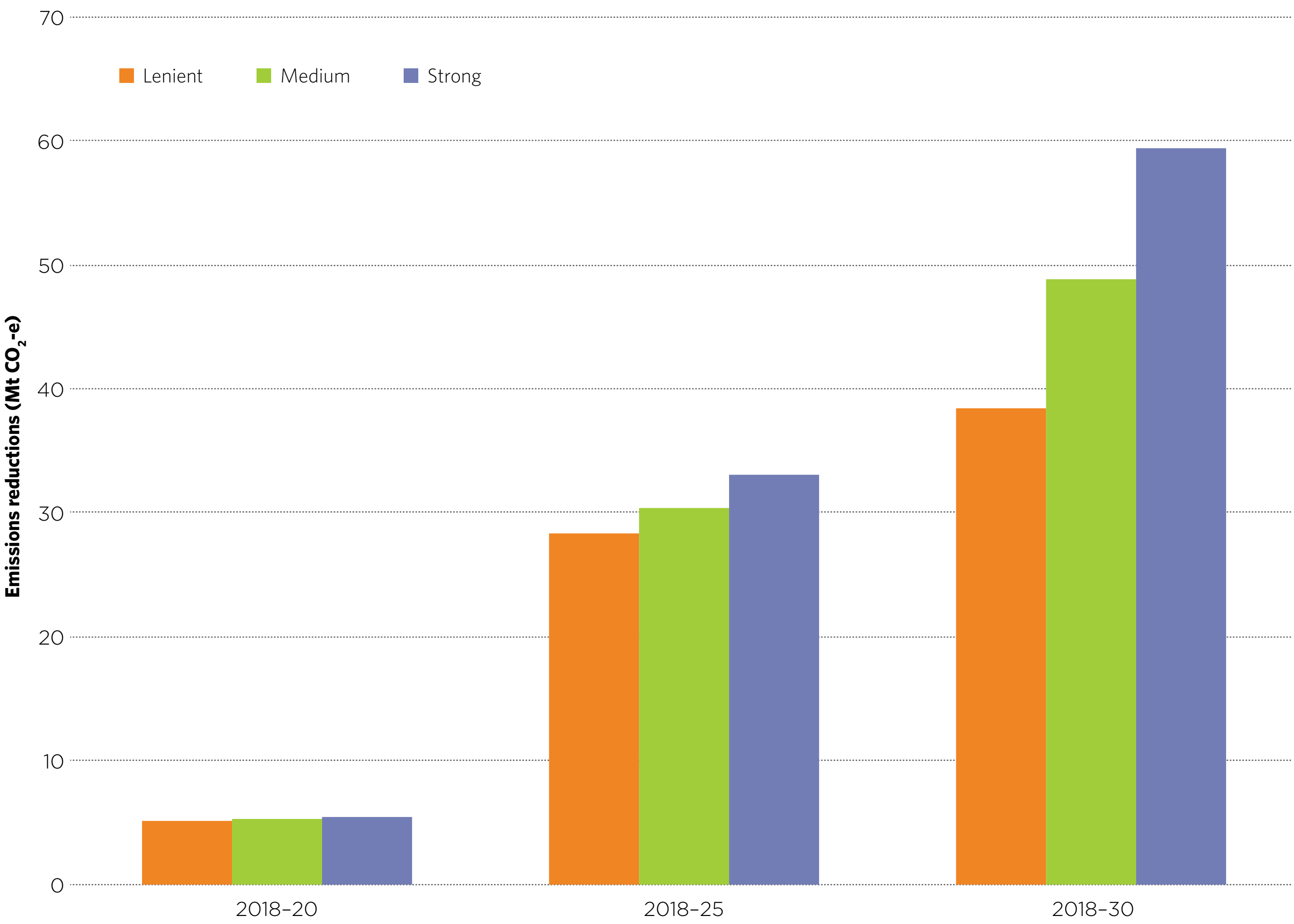
FIGURE 4.7: TOTAL EMISSIONS FROM LIGHT VEHICLES TO 2025 WITH AND WITHOUT STANDARDS



Note: The spike in emissions at 2023 in all scenarios is driven by a projected increase in the use of synthetic diesel fuels around 2023. The vast bulk of greenhouse gas emissions from light vehicles are carbon dioxide; the modelling includes other greenhouse gases from light vehicles, converted to carbon dioxide equivalent (the amount of carbon dioxide that would result in the same amount of global warming).

Source: Reedman and Graham 2013b

FIGURE 4.8: CUMULATIVE EMISSIONS REDUCTIONS FROM STANDARDS, SELECTED YEARS



Note: The vast bulk of greenhouse gas emissions from light vehicles are carbon dioxide; the modelling includes other greenhouse gases from light vehicles, converted to carbon dioxide equivalent.
Source: Climate Change Authority calculations using results from Reedman and Graham 2013b

In reality, if Australia did implement standards the emissions reductions to 2030 would almost certainly be larger than those projected here. The estimates here are for emissions reductions from the proposed first phase of standards (2018–25). If standards continued (perhaps in a stronger form) after 2025, they would deliver additional emissions reductions to 2030.

Emissions savings per vehicle grow over time. The strong standard is projected to save five tonnes of emissions per vehicle for the 2020 model year (on average, over the vehicle's life). This grows to 12 tonnes per vehicle for the 2025 model year. Over the lifetime of all 2018–25 model-year vehicles, strong standards are projected to deliver 79 Mt CO_2-e of emissions reductions, roughly the same as Australia's entire current annual transport emissions.

4.5.2 ARE EMISSIONS REDUCTIONS FROM STANDARDS COST-EFFECTIVE?

The next question is whether these substantial emissions reductions are cost-effective.

Fuel savings from more efficient vehicles are not just relevant to motorists—they create benefits for society as a whole. The net social benefit of a strong standard grows over time: it is projected to be about $2,400 for a 2020 model year vehicle and $5,300 for a 2025 model year vehicle. This represents the net present value of fuel savings over the life of each vehicle. The social value is lower than the private value of fuel savings, as it excludes fuel excise (see Appendix B.3).

Aggregating these up to the economy-wide level, strong standards would deliver net social savings of an estimated $4.2 billion for 2020 model year vehicles, and $9.5 billion for 2025 model year vehicles.

This means light vehicle standards would reduce Australia's emissions and deliver net savings at an economy-wide level.

Standards thus deliver 'negative cost' emissions reductions; Australia saves money for each tonne of emissions avoided. Overall, the cost of reducing emissions from a strong standard, averaged over model years, is around –$580 per tonne of carbon dioxide equivalent. This estimate is consistent with other Australian and international research, which shows that light vehicle efficiency is among the least-cost emissions reductions opportunities in Australia. In elaboration of this view:

- The Authority's Renewable Energy Target Review (2012) estimated the cost of emissions reductions from the Large-scale Renewable Energy Target at $40 per tonne over the period 2012–13 to 2030–31.
- The Authority's Targets and Progress Review (2014, p. 141) estimated that it would cost up to $65 per tonne to achieve Australia's minimum commitment of a 5 per cent 2020 emissions reduction target through domestic reductions alone.
- While the government has not provided detailed estimates of the cost of emissions reductions under the ERF, other research (for example, SKM MMA 2013 cited in TCI 2013; Reputex 2013) suggests a range of costs of $30–58 per tonne in 2020.
- International emissions reductions units are available for about $0.50 to $2.00 per tonne (CCA 2014a, p. 186).

The gap between these costs and the $580 per tonne saving is so large as to make standards a standout among cost-effective contributions to Australia's emissions reduction efforts.

4.6 CONCLUSION—THE TARGET LEVEL OF AN AUSTRALIAN STANDARD

The analysis in this chapter shows that, of the standards assessed, the strongest delivers the largest net benefits, and has the benefit of being closely aligned with the US standard. Having regard to the guiding considerations noted in section 4.2, this suggests that this standard would be an easy and sensible first step for Australia to take. National average targets in phase one would start at 168 grams of carbon dioxide per kilometre in 2018 and decline steadily each year to 105 grams per kilometre in 2025. This standard would require annual reductions of 6.5 per cent per year over 2018–25.

This represents a faster rate of improvement than that achieved in recent years but is considered feasible. Over this period, all new vehicles will be imported and the standard would be similar to or weaker than those prevailing in the US, the EU and Japan. Businesses supplying the Australian market would need only to adjust their selection of imported vehicles—the standards do not require that new technologies be developed in the exporting countries or that manufacturing facilities be re-tooled. With reasonable lead time prior to the introduction of standards, relatively rapid annual reductions would seem manageable. A start date of 2018 preceded by a policy decision and announcement in 2015 would provide a three-year lead time to the start of the first phase. This should be sufficient time for adequate consultation and an orderly phase-in (see Chapter 5).

CONCLUSIONS

C6. A new light vehicle emissions standard, starting at 168 grams of carbon dioxide per kilometre in 2018 and declining to 105 grams per kilometre in 2025, would deliver substantial net benefits for motorists and Australia. The standard would:

- reduce fuel bills, with average net savings of $7,000 per vehicle by 2025, after accounting for potential increases in vehicle costs
- reduce Australia's emissions by 59 Mt CO_2-e by 2030, at a net saving to Australia of about $580 per tonne of emissions reductions.

C7. Of the standards examined by the Authority, this would deliver the largest net benefits and put Australia in line with US standards. The Authority believes this would represent a good start which could be built upon with stronger standards in phase two; if it was so inclined, however, the government might wish to consider whether stronger standards in phase one would deliver even larger net social benefits.