

# *Potential impact of a carbon price on the Australian automotive industry*

May 2011



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## About this paper

The Multi-Party Climate Change Committee (MPCCC) established by the Federal Government has announced a proposed carbon price mechanism that could see a fixed carbon price introduced as early as 1 July 2012, with the price increasing annually at a pre-determined rate. The intention is that this would then transition to a market price over a period of three to five years.

There has been considerable debate on the design of a carbon market mechanism, with many aspects yet to be determined, including the carbon price path over the fixed price period and the scale and coverage of industry assistance. Since the announcement of the carbon price mechanism, the debate has focused heavily on industry assistance for primary industries such as steel, aluminium and electricity, with less focus on downstream industries.

The Federal Chamber of Automotive Industries (FCAI), as the peak industry body representing vehicle manufacturers in Australia and the Federation of Automotive Product Manufacturers (FAPM), representing automotive component manufacturers, have therefore asked PricewaterhouseCoopers Australia (PwC) to prepare a high level report on the potential impact of a carbon price on the vehicle manufacturing industry. In this paper, drawing on public data and confidential information provided by the FCAI, as well as discussions with vehicle and component manufacturers, we outline the complexity of the Australian automotive industry, which operates in highly competitive, international markets. We also identify the potential challenges that the automotive industry may face, due to the introduction of a carbon price mechanism.

## Overview of the Australian automotive industry

### **The Australian automotive industry is a significant contributor to economic activity and is exporting vehicles and components to the world market**

There are three major vehicle manufacturers in Australia, along with a number of smaller operators that manufacture engines, modify motor vehicles and build customised vehicles. The value of production of locally made passenger vehicles (and derivatives) was \$5.65bn in 2009. The value of vehicle exports in 2010 was \$2bn<sup>1</sup>.

Based on data from the Australian Government's Key Automotive Statistics 2010, the vehicle manufacturing and components industries combined to generate export revenues of \$3.6bn, down from \$5.79bn in 2008, due to the impact of the global financial crisis<sup>2</sup>.

The largest vehicle export markets are the Middle East, New Zealand, and the North American markets (North American Free Trade Agreement) which accounted for approximately 70% of automotive exports in 2010.

The vehicle components industry<sup>3</sup> generated revenue of \$5.1bn in 2010 and exports of \$1.5bn.<sup>4</sup> The US and New Zealand account for approximately 31% of total export revenue. Other major export destinations include Korea, Indonesia, Papua New Guinea, the United Arab Emirates and Japan.

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<sup>1</sup> Department of Foreign Affairs and Trade (2011), STARS Database ABS Cat No 5368.0, February 2011

<sup>2</sup> Department of Foreign Affairs and Trade (2011), STARS Database ABS Cat No 5368.0, February 2011

<sup>3</sup> This industry includes brakes and parts, exhaust systems and other parts and accessories, seats and interior components, steering and suspension parts and transmission and parts.

<sup>4</sup> Department of Foreign Affairs and Trade (2011), STARS Database ABS Cat No 5368.0, February 2011

The automotive industry overall contributed value-add of \$6.2bn in 2007-8.<sup>5</sup> The automotive and automotive components manufacturing industries combined to employ over 50,000 people in Australia.<sup>6</sup>

## **The domestic industry operates in a highly competitive international market**

Whilst the Australian industry is exporting to global markets, it also competes domestically in a highly competitive market.

In recent years, the domestic manufacturing industry has struggled to compete in the Australian market due to a number of factors, including the appreciation of the Australian dollar and the rising price of steel, which the industry has not been able to fully pass on to consumers. This is in addition to the higher costs of environmental standards and labour within Australia relative to other trading nations. The domestic manufacturing industry has also struggled to compete with imports of smaller, more fuel-efficient vehicles, which have grown in popularity with increasing fuel prices.

Automotive imports have risen from 59.8% of domestic demand in 2002 to 79.2% in 2009, with over half coming from Japan and Thailand alone.<sup>7</sup> Sales of new vehicles imported from Thailand almost doubled in two years following the establishment of the Thailand-Australia Free Trade Agreement in 2004 and elimination of import tariffs in 2005.<sup>8</sup>

Imports of automotive components have increased from 34.8% in 2005-6 to 43.6% in 2010-11, as domestic manufacturers faced increasing cost pressure and have increasingly sourced components from overseas suppliers. The US and Japan account for approximately 40% of imports, although China is rapidly assuming a larger share.<sup>9</sup>

These challenges have resulted in a reduction in the sales volume of locally manufactured vehicles and a reduction in local content of domestic manufactured vehicles as vehicle assemblers have increasingly sourced components from overseas suppliers. This has resulted in associated job losses within the Australian industry.

## **Recent investment to build new vehicles and components in Australia positions the automotive industry for the future**

Whilst the difficulties experienced by the automotive industry are widely discussed, less is known about the positive changes that are taking place within the industry and the growth opportunities which exist.

Our research has shown that over the next five years there is expected to be growth potential for the industry due to increased demand for fuel-efficient, electric and hybrid vehicles. By 2011-12, all three domestic manufacturers are expected to be manufacturing at least one-fuel efficient vehicle.<sup>10</sup> Toyota began producing the hybrid Camry in Australia at the end of 2009,

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<sup>5</sup> Australian Department of Innovation, Industry, Science and Research (2010) Key Automotive Statistics 2009. Comprising motor vehicle manufacturing (ANZSIC Code 2311), motor vehicle body and trailer manufacturing (ANZSIC Code 2312), Automotive electrical component manufacturing (ANZSIC Code 2313) and other motor vehicle parts manufacturing (ANZSIC code 2319).

<sup>6</sup> Australian Department of Innovation, Industry, Science and Research (2010) Key Automotive Statistics 2009

<sup>7</sup> Australian Department of Innovation, Industry, Science and Research (2010) Key Automotive Statistics 2009

<sup>8</sup> IBISWorld (2011) Motor Vehicle Manufacturing in Australia

<sup>9</sup> IBISWorld (2010) Automotive Parts and Accessories Manufacturing in Australia

<sup>10</sup> IBISWorld (2011) Motor Vehicle Manufacturing in Australia

with over 7,600 produced in 2010.<sup>11</sup> Ford is investing \$232 million in a sustainability initiative across their Falcon and Territory models<sup>12</sup>.

The growth in demand for more environmentally-friendly vehicles presents opportunities for the components manufacturing industry, particularly in the areas of regenerative braking, automatic and semi-automatic transmissions. In the next five years, Toyota and GM Holden both have plans to increase the local content of the hybrid Camry and Cruze, respectively. Component manufacturer, Nissan Castings will also be domestically manufacturing aluminium casting parts for the new Nissan Leaf electric car.

**Box 1: Nissan Castings local manufacture for the Nissan Leaf**

In 2010, Nissan Castings won a contract to begin production of aluminium casting parts for the Nissan Leaf electric car. This was based on their own developed technology, along with the CSIRO and the Centre for Applied Special Technology Co-operative Research Centre, which significantly cut the cost of producing the components. The contract is expected to generate up to \$160 million in export earnings over the next few years<sup>13</sup>.

The Australian Government has plans in place to support the expansion of the components sector through an Automotive Supply Chain Development Program in which it is investing \$20m over four years.

Although domestic automotive manufacturers will continue to face tough competition from overseas, domestic demand for motor vehicles in Australia is expected to increase. However, the domestic manufacturers continue to explore overseas opportunities and exports are forecast, based on information from IBISWorld, to grow annually by 2.8% over the five years to 2015-16.

Exports of automotive components are projected to rise by an estimated 1.6% annually over the five years to 2015-16.<sup>14</sup> The Australian Government is supporting export growth for parts manufacturers through the Automotive Market Access Program, which focuses on China, Thailand, India, Korea and the US. Strong demand growth is expected across Asia, including Thailand and Malaysia, and success in these markets will be important for the success of the components manufacturing industry.

However, the automotive industry is a highly competitive international market, and forecasts of future cost are critical to decisions made by parent companies on where to invest in research and production. This means that plans for industry growth are vulnerable to factors which may increase the costs of production.

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<sup>11</sup> Data provided by the Federal Chamber of Automotive Industries.

<sup>12</sup> Ford (2011) 'Auto-On-Collins' Presentation, President & CEO Ford Australia

<sup>13</sup> Park, Barry (2011) Nissan Turns New Leaf, <http://www.theage.com.au/business/nissan-turns-new-leaf-20110316-1bxbm.html>

<sup>14</sup> IBISWorld (2010) Automotive Parts and Accessories Manufacturing in Australia

## The potential cost of carbon for the vehicle manufacturing industry

### Plans for industry assistance will use the ‘emissions-intensive trade-exposed’ program as a starting point

On 21st December 2010, at its third meeting, the MPCCC agreed to adopt the 11 policy principles that will provide a consistent basis for the MPCCC’s deliberations on carbon price mechanisms.

One of these principles is:

*‘Competitiveness of Australian industries: The overall package of carbon price design and associated assistance measures should take appropriate account of impacts on the competitiveness of all Australian industries, having regard to carbon prices in other countries, while maintaining incentives to reduce pollution’. (Multi-Party Climate Change Committee December 2010 Communique)*

In February 2011 the MPCCC announced that a carbon price mechanism would be introduced in Australia, imposing a fixed carbon price as early as 1 July 2012, with the price increasing annually at a pre-determined rate. The intention is that this would then transition to a market price over a period of three to five years.

As part of the original design of the Carbon Pollution Reduction Scheme (CPRS), the Australian Government developed an assistance program for ‘emissions-intensive trade-exposed (EITE)’ industries. The EITE program was designed in recognition that Australia’s adoption of a carbon cost before other countries could have a considerable impact on its businesses that produce significant levels of emissions and are trade-exposed.

In the CPRS White Paper, the Government committed to providing assistance to these businesses to reduce the risk of them re-locating offshore and using production processes or inputs that are less carbon friendly. The Government also indicated that targeting assistance to these businesses would help smooth the transition of the economy to the introduction of a carbon cost.

Guidance issued by the Australian Government provides that, in order for an entity to be deemed trade-exposed it must be ‘somewhat constrained in its ability to pass through carbon costs because it is a price taker on world markets or face competition in domestic markets from imports that are not subject to a carbon constraint.’<sup>15</sup>

Trade-exposure is to be assessed based on one of two tests:

- a quantitative test (preferred): a trade share (defined as the ratio of the value of imports and exports to the value of total domestic production) greater than 10 per cent in any one of the years 2004–05, 2005–06, 2006–07 or 2007–08
- a qualitative test: a demonstrated lack of capacity to pass through costs due to the potential for international competition.

Under the above mentioned quantitative test, it is possible that the activity of vehicle manufacturing would be classified as trade exposed with the trade share satisfying the test

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<sup>15</sup> Australian Department of Climate Change (2011) Establishing the eligibility of emissions-intensive trade-exposed activities <http://www.climatechange.gov.au/~media/publications/eite/activity-eligibility-2011-pdf.pdf>



requirements being greater than 10 per cent in the any one of the years 2004–05, 2005–06, 2006–07 or 2007–08.

The EITE guidance also stipulated principles around the definition of an activity (e.g. aluminium smelting, petroleum refining) that was required to be met in calculating emissions intensity. Finally, in addition to these tests for trade exposure and activity definition, the CPRS also proposed an additional test for emissions intensity as follows:

*The assessment of emissions intensity for the purposes of determining eligibility of an activity will be based on either<sup>16</sup>:*

- *weighted average emissions per million dollars of revenue generated by entities conducting the activity*
- *entities may request to Government that the eligibility assessment for an activity is made on the basis of the weighted average emissions per million dollars of value added generated by entities conducting the activity, in which case, the entity and Government will need to agree on which input costs will be adjusted to calculate the proxy for value-added for the activity.*

Each time a product is transformed or undergoes value adding, the revenue created through future sale of the product increases. Therefore, the more highly engineered or transformed a product is, the less likely it will meet the above criteria for emissions intensity. This definition of emissions intensity, based upon emissions per unit of revenue, tends to favour low value-adding activities over those which involve elaborate transformed manufactured goods, such as motor vehicles.

It is considered unlikely that motor vehicle manufacturing would satisfy the definition of an ‘activity’ as defined under the EITE principles stated. Additionally, it is considered unlikely that vehicle manufacturing would have met the required thresholds of emissions intensity under either a revenue or value-added approach to calculating emissions intensity.

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<sup>16</sup> Australian Department of Climate Change (2010) Assistance to emissions-intensive trade-exposed industries

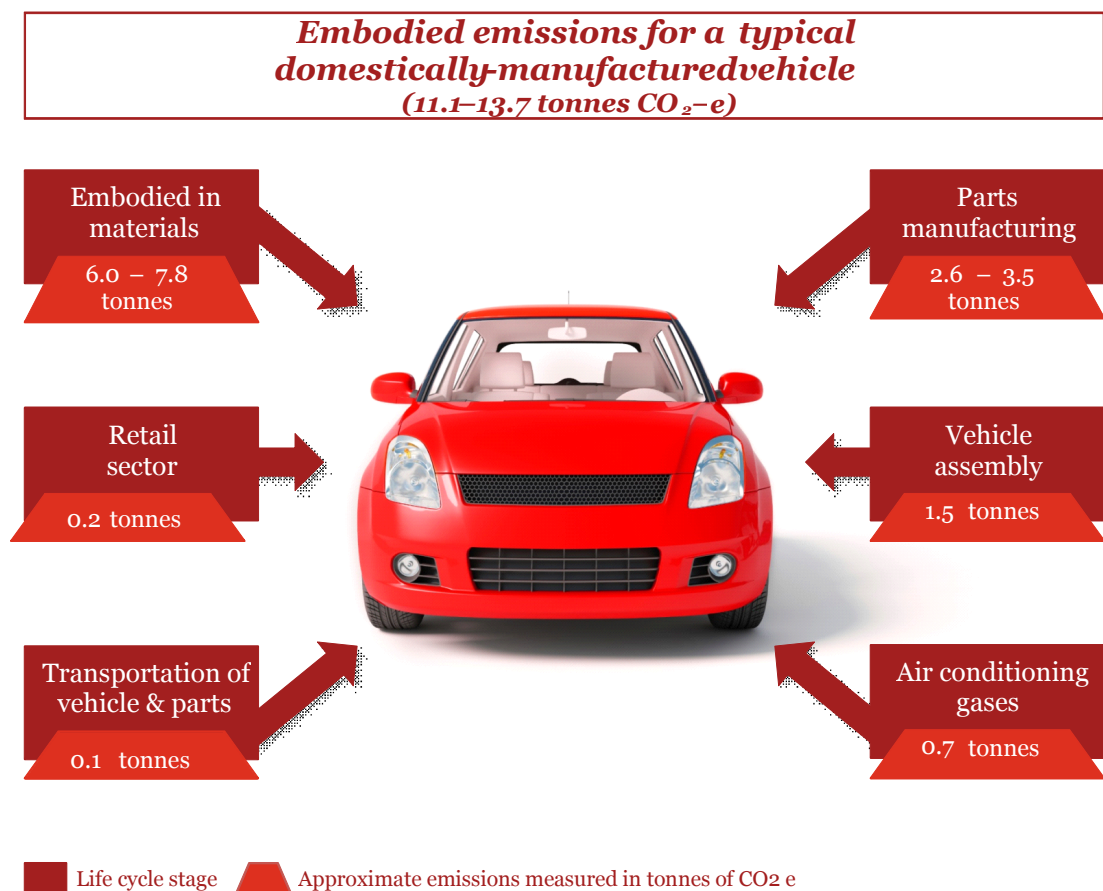
## The embodied greenhouse gas emissions within a typical passenger vehicle are in the order of 11.1 to 13.7 tonnes CO<sub>2</sub>-e

The embodied greenhouse gas (GHG) emissions of a typical Australian passenger vehicle are in the order of 11.1 and 13.7 tCO<sub>2</sub>-e (figure 1).<sup>17</sup> This includes emissions embodied in materials, parts manufacturing, vehicle assembly, synthetic gases used for air conditioning, transportation of vehicle and parts and emissions in the retail sector at the dealership.<sup>18</sup> It does not include emissions from the vehicle during use.

This estimate may vary depending on a wide range of factors, including extent of local content, vehicle configuration (e.g. sedan, wagon, ute etc), energy supply mix and mass of materials used.

The greatest contribution to emissions is from materials production and parts manufacture (in the order of 8.6 - 11.3 CO<sub>2</sub>-e in total).

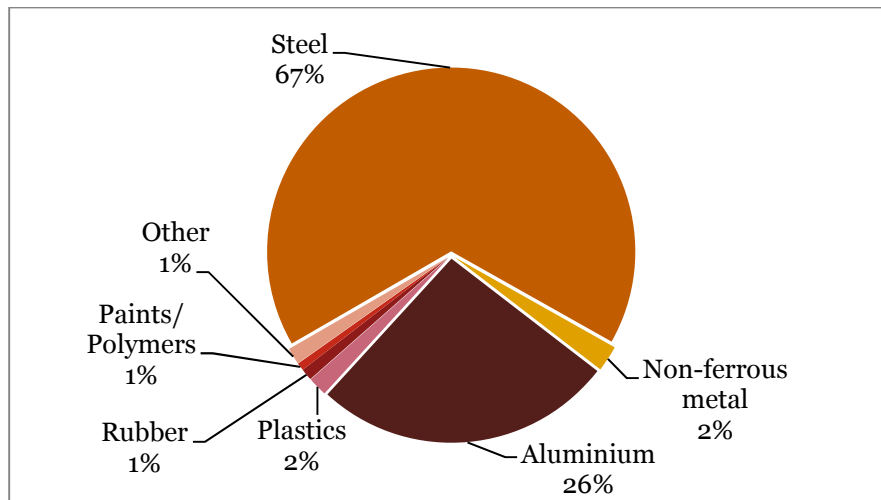
Figure 1 Embodied emissions approximated for a typical domestically-manufactured passenger vehicle



<sup>17</sup> Based on data of emissions embodied in materials and parts manufacturing, provided by the Federal Chamber of Automotive Industries, and discussions with domestic vehicle and component manufacturers. Data has been scaled based on vehicle mass based on typical vehicle models produced in Australia. This data, including the emissions boundaries has not been validated or verified.

<sup>18</sup> This is based on the rationale that the CPRS as originally designed would have applied 'obligations for direct (scope 1) emissions from facilities that trigger a threshold, and for potential emissions from certain fuels and synthetic greenhouse gases that an entity imports, manufactures or supplies'. (*Department of Climate Change CPRS Exposure Draft Legislation – Liable Entities and Covered Emissions* (Summary Paper))

The key contributors to the embodied GHG emissions within a passenger vehicle are aluminium and steel, accounting for approximately 87% of the total (figure 2).



**Figure 2 Proportion of embodied emissions by material (approx.)**

### **The cost to the domestic automotive industry is likely to be in the order of \$30m-\$84m per year depending on various factors including compensation**

We estimate the vehicle manufacturing industry faces an additional cost, without government assistance for companies in the supply chain, in the order of \$222-\$412 per vehicle produced, based on a carbon price of \$20-\$30/tCO<sub>2</sub>-e.<sup>19</sup> The projected additional annual cost to the vehicle industry, without assistance for companies in the supply chain, is therefore likely to be in the order of \$56m-\$84m, based on the same carbon price range.

With assistance arrangements, based on the EITE program under the CPRS, the cost per vehicle could be reduced to \$121-\$215 per vehicle, and the annual cost burden could be reduced to approximately \$30m-\$46m. As yet, there is uncertainty over the extent or distribution of assistance arrangements under a future carbon price, which would directly affect the size of this cost burden.

All estimated unit cost and industry-wide annual costs could vary depending on a range of factors, including models and volumes produced, extent of local versus overseas content, manufacturing methods used and energy supply mix.

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<sup>19</sup> Garnaut (2011) Update Paper 6: Carbon pricing and reducing Australia's emissions



## Challenges for the automotive industry

Based on our research and analysis, we have identified the following challenges for the Australian automotive industry:

### **The additional cost burden would reduce competitiveness for the automotive industry**

We found the additional cost burden of a carbon price, with or without government assistance to EITE industries, would reduce profitability of the domestic vehicle industry and the component manufacturers. Due to the highly competitive nature of the industry, manufacturers would have very little or no ability to pass on this additional cost to consumers, either domestically or overseas.

The automotive industry is capital intensive, with a high proportion of fixed costs, and is most profitable at a large scale. At present, there are issues of low capacity utilisation which would be exacerbated with a reduction in volumes produced and would further erode profitability.

### **A reduced ability to compete with overseas manufacturers is likely to encourage vehicle manufacturers to source components from overseas markets to avoid additional impact on cost-competitiveness**

The vehicle manufacturers and the automotive component manufacturers are strongly inter-dependent and tend to be closely located. Automotive manufacturers need timely access to components to ensure that production lines are kept running and to optimise efficiency. Component producers in Australia sell up to 81% of their output to domestic automotive manufacturers.<sup>20</sup>

However, the components manufacturing industry is comprised of numerous small players and, since the abolition of the local content rule, the bargaining power has shifted towards the motor vehicle manufacturers. As it strives to be more competitive, the automotive industry is demanding prices from domestic components manufacturers that are on a par with imported alternatives. As domestic component manufacturers find it increasingly difficult to compete, automotive manufacturers are increasingly sourcing components overseas, with manufacturers' imported content as a percentage of production value increasing from 23% in 2000 to over 55% in 2007.

The majority of the import and export markets against which domestic manufacturers compete face no carbon price (table 1). The additional cost burden of a carbon price will therefore make it increasingly difficult, in particular for components manufacturers, both to compete on the domestic market against imported components, and to compete in the international market.

The automotive industry is a highly value-adding industry, and an inability to pass on additional costs is likely to encourage component manufacturers to move offshore to lower-cost manufacturing economies in the region.

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<sup>20</sup> Bracks (2008) Review of Australia's Automotive Industry

**Table 1 Carbon pricing mechanisms in place or under development in automotive and component import or export markets<sup>21</sup>**

<b>Vehicle Market</b>	<b>Import or export market for automotive industry</b>	<b>Current carbon price mechanisms</b>
<b>Japan</b>	Imports/ Exports	A national trading scheme was to be implemented in 2013, but has been delayed. Voluntary schemes have existed in the past.
<b>USA</b>	Imports/ Exports	While there is no national scheme in place or in development, there are a number of regional trading schemes in operation. The Californian emissions trading scheme is scheduled to commence on 1 January 2012.
<b>New Zealand</b>	Exports	A national emissions trading scheme is currently in place. Industry assistance is provided for EITE industries.
<b>Korea</b>	Imports/ Exports	Korea's national trading scheme was slated to come into effect in 2013, but may be delayed due to industry group opposition.
<b>Indonesia</b>	Exports	Indonesia participates in the Clean Development Mechanism and Reducing Emissions from Deforestation and Forest Degradation (REDD). There are no stated plans to introduce a domestic Carbon Price for other sectors.
<b>Papua New Guinea</b>	Exports	Papua New Guinea participates in the Clean Development Mechanism and Reducing Emissions from Deforestation and Forest Degradation (REDD). There are no stated plans to introduce a domestic Carbon Price for other sectors.
<b>Saudi Arabia</b>	Exports	There are no stated plans to introduce a carbon price mechanism.
<b>UAE</b>	Exports	There are no stated plans to introduce a carbon price mechanism.
<b>Oman</b>	Exports	There are no stated plans to introduce a carbon price mechanism.
<b>Kuwait</b>	Exports	There are no stated plans to introduce a carbon price mechanism.
<b>Thailand</b>	Imports	Thailand participates in the Clean Development Mechanism and Reducing Emissions from Deforestation and Forest Degradation (REDD). There are no stated plans to introduce a domestic Carbon Price for other sectors.

<sup>21</sup> This does not include alternative mechanisms including 'direct action' policies.

## Ability to invest in innovation could also be impacted

Innovation and ability to invest in research and development is important for success in the longer term. This is particularly the case for the Australian automotive industry, which needs to invest in development of smaller, more fuel-efficient and electric vehicles in order to realise the growth potential from changing consumer demand patterns.

Innovation in the automotive industry is expensive. The industry is one of the largest investors in R&D and is often ranked with other technology-intensive industries, such as pharmaceuticals, information technology and electronics.<sup>22</sup> Based on data from the Australian Government's Key Automotive Statistics 2009, industry invested \$798 million in R&D in 2007/08.

Moreover, investment in innovation is required along the supply chain. The next generation of vehicles will need to be lighter and major steel producers are evaluating investments in 'dual phase steel' to support this. Local components manufacturers will need to develop a range of new components to accommodate these trends, including transmission systems with more gears for greater fuel efficiency.

Decisions to invest in R&D are based on expected longer term profitability through innovation. Further, investment in R&D requires capital, which can be more difficult to raise with lower profit margins. The introduction of a carbon price will therefore make it more difficult for companies along the supply chain to invest in the research and development required for them to secure a future for the automotive industry, based on next generation, more environmentally-friendly vehicles.

## Conclusion

Based on our research and analysis, the potential impacts of a carbon price on the Australian automotive industry are as follows:

- The additional cost burden for the domestic automotive industry could be in the order of \$30m-\$84m, depending on a range of factors, including the extent of government assistance for sub-sectors within the supply chain.
- The automotive industry operates in a highly competitive international market and is likely to have little or no ability to pass on any additional cost burden.
- Motor vehicle manufacturers are likely to increasingly source components from international markets to avoid incurring a carbon price within automotive products.
- The industry is manufacturing and investing in the development of new generation, more environmentally-friendly vehicles to take advantage of the growth potential in this market. However, it remains vulnerable and additional cost burdens could threaten the success of plans for industry growth.
- The automotive industry is a highly value-adding industry and a reduction in its competitiveness in the global automotive market could ultimately result in a loss of these value-adding activities offshore.

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<sup>22</sup> Bracks (2008) Review of Australia's Automotive Industry

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## Appendix A: Sources Used

Australian Department of Climate Change (2011) Establishing the eligibility of emissions-intensive trade-exposed activities (<http://www.climatechange.gov.au/~media/publications/eite/activity-eligibility-2011-pdf.pdf>)

Australian Department of Climate Change (2010) Assistance to emissions-intensive trade-exposed industries, <http://www.climatechange.gov.au/publications/cprs/white-paper/~media/publications/white-paper/V2012Chapter-pdf.ashx>

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## Appendix B: Assumptions and Calculations

### Introduction

A series of assumptions were made in developing the carbon model calculations used to determine the potential impact of a carbon price on the Australian automotive industry. This approach was undertaken to ensure an understanding of the approximate emissions generated from each phase of the life cycle for domestically manufactured vehicles.

Our analysis involved the application of average tare weights of each vehicle to the material composition data to determine a per vehicle weight by material calculation. A conversion factor was applied to the vehicle base weight data to determine an embodied tonne of CO<sub>2</sub>e by material calculation. Permit reduction rates were applied where appropriate for specific materials. The per vehicle tonne of CO<sub>2</sub>e from all life cycle stages was developed and scaled up to incorporate domestic production volumes. The assumptions required under EITE and thus utilised in our analysis were based on the assumptions from the CPRS.

### Vehicle weight by material calculation:

- A base weight was developed for each of our selected sample vehicles. The base weights for each vehicle was obtained using tare weights, which was sourced from redbook.com.au. An average tare weight was developed for each model sample vehicle, with the average weight used as an input into this calculation
- A material composition was based on the carbon footprint information supplied by FCAI for the Toyota Camry vehicle

### Embodied Tonne of CO<sub>2</sub>e by Material calculation:

- The conversion rate/factor was based on carbon footprint information supplied by FCAI and applied across the models.
- The conversion rate/factor was applied to the vehicle base weight by material calculation.

### Embodied Tonne of CO<sub>2</sub>e by Material, covered by CPRS permits:

- Permit reduction rates were sourced from information supplied by the FCAI
- Permit reduction rates were applied to the 'Embodied Tonne of CO<sub>2</sub>e by Material' calculation

### Per Vehicle Tonne of CO<sub>2</sub>e from all life cycle stages:

The per vehicle tonne of CO<sub>2</sub>-e from all processes (covered by permits) represented the following inputs:

- Embodied in Material (with or without associated permits)
- Material Manufacturing
- Vehicle Assembly
- Retail Sector
- Transportation of vehicle and parts.

The associated vehicle tonne of CO<sub>2</sub>-e from the material manufacturing, vehicle assembly, retail sector and transportation of vehicle and parts life cycle stages, was sourced from information supplied by the FCAI.

A per vehicle tonne of CO<sub>2</sub>e calculation was subsequently developed for both the assumptions of permits being granted and no permits allocated.

### Total tonne of CO<sub>2</sub>-e from vehicles produced in 2010 calculation:

- The per vehicle tonne of CO<sub>2</sub>-e from all life cycle stages was applied to the domestic units of vehicles produced summary data.
- Domestic units of vehicles produced were sourced from the information provided by FCAI - Local Vehicle Production 2010

### **Total annual cost to Australian Automotive industry:**

To determine the total annual cost to the Australian Automotive Industry the following carbon prices were applied being at \$20, \$25 and \$30

PwC has provided this advice solely for the benefit of FCAI and disclaims all liability and responsibility

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