

# VEHICLE RECYCLING AND SUSTAINABILITY



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Fellowship supported by The Pratt Foundation



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Published by International Specialised Skills Institute, Melbourne.

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101/685 Burke Road  
Camberwell 3124  
AUSTRALIA

October 2009

Also extract published on [www.issinstitute.org.au](http://www.issinstitute.org.au)

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# Executive Summary

APRAA (Auto Parts Recyclers Association of Australia) estimates that over 500,000 end-of-life vehicles (ELVs) currently enter the waste stream in Australia each year.<sup>1</sup> It is estimated that by 2010 this number may exceed 750,000.<sup>2</sup>

In Australia, the current recycling practises are such that the ELV passes from the last owner to an automobile dismantler either directly or via insurance companies, used car dealers or car repairers. The useful parts that have commercial value are removed to be used in the second hand car market. The residual vehicles, particularly older vehicles, are taken directly to the metal shredders or intermediary scrap metal merchants. The parts are removed and the ELV shredded. The non-metal residual exits the shredder as waste residue, known as shredder 'fluff' or 'flock'. This fluff is mostly disposed as landfill.<sup>3</sup>

At present, there is no legislation for ELVs in Australia.

The most relevant legislated directive for ELVs, which pertains to the automotive industry worldwide, is the Directive 2000/53/EC of the European Parliament and of the Council.<sup>4</sup>

The legislation has been sanctioned as a framework directive addressing the 27 European member states after a consultative process to transpose it to national law. As stated, although there is presently no equivalent legislation in Australia, the issues face the automotive industry worldwide. Other directives include the Japanese Automobile Recycling Law established in 2002<sup>5</sup> and a regulation for South Korea which was implemented on 1st January 2008 for re-use, recycling and recovery rates for hazardous substances.<sup>6</sup> Taiwan has an end-of-life vehicles voluntary agreement that came into effect 1st January 2008, and China has announced a technical standard that is a mixture of the European and Japanese legislations and will become effective from 1st January 2010.<sup>7</sup>

The other aspect to ensuring that vehicles are sustainable is not only for vehicles to be designed with sustainable materials and disposed of correctly, but also to be designed in such a way the vehicle is posing minimal environmental impact while the vehicle is on the road.

At present, the European Union has implemented a new legislation to reduce CO<sub>2</sub> emissions from cars. The new guidelines propose that new vehicles must limit CO<sub>2</sub> emissions to an average of 130g/km for passenger cars by 2012, with 120g/km reached by vehicle motor technology and an additional 10g/km reached through complementary measures.

A specific benefit to having access to this knowledge in Australia is that Australian automotive companies are designing vehicles to be sold in regions affected by the European or similar legislation. Therefore, it is imperative that the Australian companies are aware of the impacts in these regions and apply the appropriate standards in a self-regulated manner.

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<sup>1</sup> Environment Australia, 'Environmental Impact of End-of-life Vehicles: An information paper.' Pg 3:12.

<sup>2</sup> Environment Australia, 'Environmental Impact of End-of-life Vehicles: An information paper.' Pg 3:14.

<sup>3</sup> Environment Australia, 'Environmental Impact of End-of-life Vehicles: An information paper.' Pg 4:15, 4:16.

<sup>4</sup> Directive 2000/53/EC of the European Parliament and of the Council of September 18, 2000 on end-of-life vehicles as amended by the commission decision 2002/525/EC, 2005/438/EC and 2005/673/EC.

<sup>5</sup> JAIA/JAMA, Japan Recyclability Legislation

<sup>6</sup> Kaida, South Korea – Legislation of Recycling of End-of-Life Vehicles

<sup>7</sup> MC VRD 06A-014 dated 9 March 2006 (Announcement No. 9 of 2006 – Technical Policy for Recovery of Automotive Products.

# Executive Summary

It is also beneficial to the Australian automotive industry to be aware of the legislative requirements and trends that are emerging worldwide so that care can be taken in the vehicle design process which facilitates 'design for environment' strategies for all vehicle lines. Although there is no ELV legislation in Australia at present, it is likely that it may emerge in the future.

There have been a number of skills deficiencies determined in the Australian Automotive Industry. They can be outlined as follows:

1. End-of-life type approval preparation, in line with the European Directive 2000/53/EC on ELVs
2. International Material Database System (IMDS), used by suppliers worldwide to conform with recyclability requirements, substance use restrictions and parts marking conformance for end-of-life recycling and environmental measures
3. Experience with introducing recycled and renewable materials content into motor vehicles
4. View of vehicle teardown facilities to support recycling activities
5. Design for environmental and sustainability methodology
6. Understanding of the CO<sub>2</sub> impending legislation affecting European vehicles and understanding CO<sub>2</sub> reduction strategies.

The Fellowship involved a three week overseas research program to Germany, Brussels and the UK.

The key findings, as a result of the Fellowship, can be outlined as follows:

## **Key findings regarding the European 'end-of-life' legislation:**

- It is cheaper to put the shredder light fractions into landfill than to use them for energy recovery, or to use separation techniques to sort the materials. In the interests of environmental benefit, it would be better to ban sending the light fractions to landfill in order to make an impact.
- Different member states are at different stages, causing difficulties in implementing a standardised framework in Europe.
- Consultation with Original Equipment Manufacturers (OEMs) does occur when updating the addendums, however the European Commission Director General (DG) Environment does not take into account costing implications to OEMs.
- If a supplier comes forward to the European Commission and DG Environment with a new technology in favour of the environment, an addendum can be amended which does not take into account global supply solutions.
- When amending an addendum, the lack of infrastructure of other nations that are importing to Europe is not taken into consideration.

# Executive Summary

## **Key findings regarding the use of recycled material:**

- In Europe, there is adequate infrastructure in place to support the use of recycled content in motor vehicles.
- Recycled content is predominantly used in B-surface<sup>8</sup> components.
- Recycled content can be Post Consumer Recyclate (PCR) or Post Industrial Recyclate (PIR)
- Polypropylene and nylon are the most common materials using recycled content. Typical examples include wheel arch liners, fan shrouds and insulators.

## **Key findings regarding the use of renewable material:**

- There is a growing trend to utilise renewable materials in Europe in an effort to improve sustainability.
- Renewable materials are materials that can be naturally regenerated such as paper, hemp, sisal, cotton, soy, etc.
- Renewable fibres can be used in polymer materials to reduce weight ie replacing glass fibres.
- Studies have indicated that renewable fibre polymer composites have equivalent strength characteristics.
- Polypropylene and nylon are the most common polymer materials that can utilise renewable content.

## **Key finding regarding the International Dismantling Information System (IDIS) dismantling manual:**

- An interesting insight was that the use of IDIS system and recycling strategies are considered to be non-competitive issues in Europe.

## **Key findings regarding the site visits to recycling facilities:**

- The economic crisis is definitely affecting the recycling industry.
- China has declined all of its contracts to another recycling company known as TSR GmbH and sent 50,000 tonnes of steel and 70,000 cables back to Germany.
- Steel works in Belgium will be closing down for two months due to the economic crisis. It is anticipated that things will be back on track in 2009.
- There is a catalytic converter black market which has created challenges for the industry. In some instances, fake catalytic converters are sold as end-of-life goods to genuine recycling facilities. The core of the shell has had all precious metals already removed and replaced with fake weights.

## **Key findings regarding the CO<sub>2</sub> legislation:**

- Passenger vehicles target: 130g/km CO<sub>2</sub> homologated.
- Commercial vehicles target: 175g/km initially and 160g/km at some stage later.

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<sup>8</sup> B-surface definition: A component surface that is not visible to the consumer

# Executive Summary

In addition, complementary measures may deliver 10g/km of the 130g/km homologated target:

- Biofuels – low blend
- Efficient mobile air conditioning system – no details available yet
- Low rolling resistance tyres
- Mandatory Tyre Pressure Monitoring System (TPMS)
- Mandatory Shift Indicator Light (SIL)

Australia does not currently possess legislation in the ELV or CO<sub>2</sub> areas, however a series of actions can be taken by the OEMs to develop self-regulated strategies. These recommendations are included as result of the Fellowship trip for the following reasons:

- Some Australian OEMs and suppliers are supplying to regions which have legislation or pending legislation in the ELV and CO<sub>2</sub> area.
- Landfill is a global issue and alternatives to reduce it such as the use of recycled material should be investigated.
- Climate change is having significant effects on the earth and reduction in this area is likely to have more focus moving forwards.
- The demand for the use of renewable resources is likely to increase, providing manufacturers with alternatives.
- In the absence of any legislation in Australia there is an opportunity to develop self-regulated strategies within the Australian industry and a model that is appropriate to the Australian region.
- There are opportunities to develop systems within the end-of-life dismantling industry with a vision to create a closed loop recycling structure in Australia.