



**EPA Victoria, EcoRecycle and DIIRD**

**Product and Business  
Improvement Through the  
Application of Life Cycle  
Management and Approaches**

April 2005  
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## **Disclaimer**

### ***Inherent Limitations***

This report has been prepared as outlined in Sections 2 and 4 of this report. The procedures outlined in Sections 2 and 4 constitute neither an audit nor a comprehensive review of operations.

The findings in this report are based on a qualitative study and the reported results reflect a perception of businesses we have interviewed, but only to the extent of the representative sample surveyed, approved by EPA Victoria, DIIRD and EcoRecycle Victoria. Any projection to a wider stakeholder group is subject to the level of bias in the method of sample selection.

No warranty of completeness, accuracy or reliability is given in relation to the statements and representations made by, and the information and documentation provided by, EPA Victoria, DIIRD and EcoRecycle Victoria and businesses consulted as part of the process.

KPMG has indicated within this report the sources of the information provided. We have not sought to independently verify those sources unless otherwise noted within the report.

KPMG is under no obligation in any circumstance to update this report, in either oral or written form, for events occurring after the report has been issued in final form.

The findings in this report have been formed on the above basis.

### ***Third Party Reliance***

This report is solely for the purpose set out in Section 2 of this report and for EPA Victoria, DIIRD and EcoRecycle information, and is not to be used for any other purpose or distributed to any other party without KPMG's prior written consent.

This report has been prepared at the request of EPA Victoria, DIIRD and EcoRecycle in accordance with the terms of the contract dated 10 December 2004. Other than our responsibility to EPA Victoria, DIIRD and EcoRecycle, neither KPMG nor any member or employee of KPMG undertakes responsibility arising in any way from reliance placed by a third party on this report. Any reliance placed is that party's sole responsibility.

# 1 Executive Summary

EPA Victoria, EcoRecycle Victoria (EcoRecycle) and the Department of Innovation, Industry and Regional Development (DIIRD) (the Agencies) are key Victorian Government agencies responsible for facilitating sustainable development. These agencies have engaged KPMG to undertake an analysis of the business benefits of Life Cycle Management.

An objective of the work that led to this report was to understand among other things, the barriers to more widespread adoption of Life Cycle Management by businesses in Victoria. Our consultations indicated that businesses predominantly regard Life Cycle Management (or Life Cycle Thinking) as:

- chiefly an environmental management approach rather than something that businesses might do purely for business reasons; and
- a specific tool rather than a general approach. Life Cycle Management or Thinking, and “Life Cycle Assessment” were thought of as synonymous or interchangeable. However, at the regional workshops conducted for this report the presentations on Life Cycle Thinking did tend to focus on Life Cycle Assessments as a principal example of Life Cycle Management. Nonetheless we found that businesses’ understanding of Life Cycle Management is narrower than that envisioned by government.

In this report we describe a generic framework of return and risk incentives that are likely to motivate the great majority of businesses. We suggest that if businesses are to adopt Life Cycle Management more widely, any changes to their actions or behaviours would nonetheless still need to be consistent with this framework.

These conclusions appear congruent with Dr Paul Tebo, a leading US implementer and proponent of sustainable development in industry. At a recent seminar sponsored by the Commissioner for Environmental Sustainability and EPA Victoria, Dr Tebo suggested that for businesses, sustainable development must also be economically sustainable. He suggested that opportunities for sustainable behaviour in business can be classified according to whether they are economically and/or environmentally beneficial, as follows:

<b>Environmentally beneficial?</b>	<b>Yes</b>	<i>“Charity”</i>	<i>“Sweet spot”</i>
	<b>No</b>	<i>“Disaster”</i>	<i>“Principally driven by profit”</i>
		<b>No</b>	<b>Yes</b>

***Economically beneficial?***

Source: Dr Paul Tebo

The findings of our report indicate that businesses are unlikely to adopt Life Cycle Management unless it improves economic returns and/or reduces business risks. In other words Victorian business has indicated to us Life Cycle Management must fall within the right-hand column in the above diagram.

What follows from this is that Victorian business is unlikely to adopt the full range of possible life cycle approaches or other behaviours that may provide environmental beneficial outcomes, where these approaches do not provide economically sustainable outcomes.

We suggest that the foregoing discussion implies that in communicating the benefits encouraging the adoption of Life Cycle Management, Victorian Government may need to:

- explain the context of what it means by Life Cycle Management and how it anticipates it might appeal and apply to commercial enterprises;
- focus more on the outcomes of Life Cycle Management rather than on specific input tools;
- encourage business to adopt Life Cycle Management approaches where the underlying (economic) incentives for their adoption may already exist, but may not be apparent to all businesses;
- focus on those tools and approaches that deliver reductions in resources to the businesses that bear the economic costs of those resources (in other words deliver cost savings or efficiency gains); and
- establish reasons why Life Cycle Management approaches that might be propagated by Victoria’s government can be distinguished from existing cost or management accounting

approaches that also seek to minimise resource consumption and costs. We would suggest that these distinguishing factors could include:

- achieving the double benefit of hitting the “sweet spot” of Dr Tebo’s diagram above, by reducing risks, improving perceptions, thinking ahead of the market and potentially gaining competitive advantage, as well as gaining economic benefits; and
- providing a source of information that may provide competitive advantage, that is unlikely to be as readily available from other sources.

The body of this report expands on the issues summarised above and in particular Sections 6 and 7 provide suggestions and examples of how the sweet-spot benefits might be achieved. For example, we recommend in Section 7 that future communications (mainly via a dedicated website) between EPA Victoria, DIIRD and EcoRecycle and Victorian businesses focus on:

- demonstrating how the Victorian Government’s interested in Life Cycle Management are congruent with business’ interests; and
- demonstrating how businesses might maximise the benefits and overcome the barriers to adopting life cycle management approaches.

In relation to the first point above, it is important that the Agencies indicate to the business community they are seeking alignment between economically and environmentally beneficial initiatives. For example, when identifying resource-use efficiencies there is the potential to derive economic efficiencies and environmental benefits will also result.

When providing information to businesses on how they might maximise the balance between financial return and risk management by adopting life cycle approaches, the Agencies might focus on:

- The benefits life cycle approaches might offer business in terms of new market and product opportunities. One example we illustrate is a carpet business selling floor-covering solutions, moving to the use of carpet tiles in preference to broadloom carpets. It offers a more efficient means of providing floor coverings, replacing the need to replace unworn and still serviceable areas of carpet. Maximising the use of an asset such as carpet has both economic benefits, shared between the carpet supplier and its customer, and environmental benefits.
- How businesses can realise cost savings by implementing life cycle approaches. In principle, both economic and environmental benefits can be gained where the consumption of inputs (e.g. energy, raw materials) can be reduced and there are economic costs attached to the inputs; and generation of wastes (output of waste heat, solid waste) can be reduced and there are economic costs attached to those outputs. We suggest the website might provide case studies explaining the causal relationship between economic and environmental benefits.

- Opportunities for businesses to improve their risk management processes. Businesses can potentially reduce their risk of future liabilities, with life cycle approaches assisting to minimise environmental, health and safety problems associated with the production, use, servicing and disposal of products.
- The benefits life cycle approaches might offer business in terms of improved workplace culture. Anecdotal evidence suggests that environmentally aware companies can attract and retain good quality staff members. The benefit to business is two fold – they can secure productive staff members in an increasingly competitive labour market, and reduce their costs associated with recruitment, training and discontinuity.
- The opportunity for businesses to identify economic efficiencies and consequent environmental benefits faster than their competitors by working together with suppliers and customers. By working collaboratively, opportunities open for innovative solutions in the supply of raw materials and production components that achieve both improved economic outcomes for all businesses involved in the collaboration and associated environmental outcomes. We suggest the Agencies might facilitate increased business collaboration through targeted forums.

The website will be a focus point for the Victorian Government's future communications on the economic and environmental benefits of Life Cycle Management. By focusing on the right key messages, the opportunity exists to facilitate more widespread adoption of Life Cycle Management by the Victorian business community.

## 2 Introduction

EPA Victoria, EcoRecycle Victoria (EcoRecycle) and Department of Innovation, Industry and Regional Development (DIIRD) (the Agencies) are key Victorian Government agencies responsible for facilitating the sustainable development of Victoria's business community. These agencies have engaged KPMG to undertake an analysis of the business benefits of Life Cycle Management and the barriers to achieving these benefits.

EPA Victoria recognises in its project brief the application of Life Cycle Management (LCM) and approaches as fundamental in moving towards sustainable business practices. EPA Victoria has also committed, in its Strategic Plan, to driving resource efficiency for sustainability and developing life-cycle approaches for the greatest environmental gain.

With the overall aim of facilitating the uptake of life-cycle approaches by Victorian businesses and industry, the objectives of this project are to:

- engage with Victorian businesses to gain an understanding of:
  - how business currently develops product strategy and product design;
  - how the inclusion of life cycle approaches can drive business decision making processes; and
  - the barriers to the uptake of life cycle considerations in product innovation;
- to increase awareness of the potential to drive improved business profitability and resource efficiency through the application of life cycle approaches and innovation in the design of products and services; and
- to provide practical guidance and approaches on the application of life cycle approaches to drive innovation in product and service development.

This report represents the findings of the first stage of work in this project and it deals primarily with the barriers and opportunities for adoption of Life Cycle Management by business. In Section 3 of this report we provide some background on the definition of Life Cycle Management and the three agency's strategic directions. Section 4 describes the approach taken to engage with business via both workshop sessions and one-on-one interviews. In Section 5 of this report we discuss the key findings from the workshops and interviews. Section 6 discusses our conclusions, with Section 7 providing suggestions on what EPA Victoria and its Victorian Government partners can do to increase the awareness of Life Cycle Management in business and facilitate greater uptake of life-cycle approaches.

The findings detailed in this report will be used in the second stage of this project which involves the development of communications materials including:



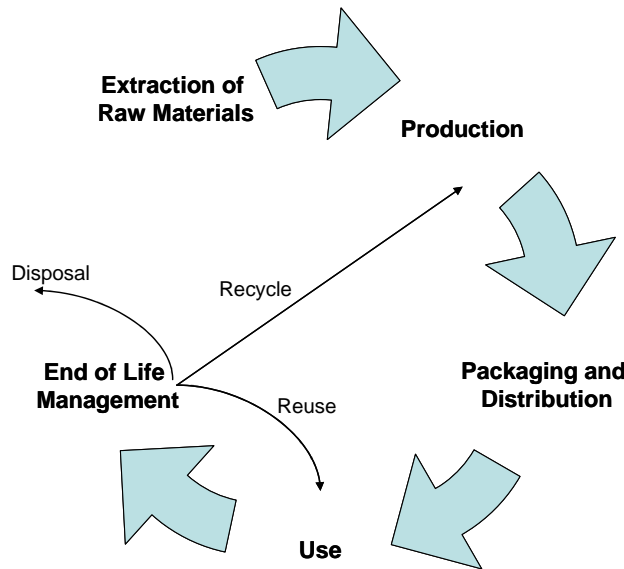
- an interactive website that provides information and strategic direction to apply Life Cycle Management in the design of corporate strategy products and services;
- written materials that summarise the key messages of the website, provides and outline of the key tools and information available on the web, and a number of key examples;
- articles for publication in various industry newsletters promoting adoption of Life Cycle Management by Victorian businesses; and
- industry workshops to promote the benefits of Life Cycle Management.

### 3 Background

#### 3.1 What is Life Cycle Management?

The New Shorter Oxford English Dictionary defines life-cycle in the human or cultural context as “existence from beginning through development and productivity to decay and ending”. A product’s life-cycle can, therefore, be thought to span from the extraction of raw materials right through to the management of its residue at the end of its productive life. This approach has also been described as managing from “cradle to grave”. The diagram below shows a typical product life cycle, and was used at each of the workshops to describe product life-cycles.

Figure 3-1: Typical product life cycle

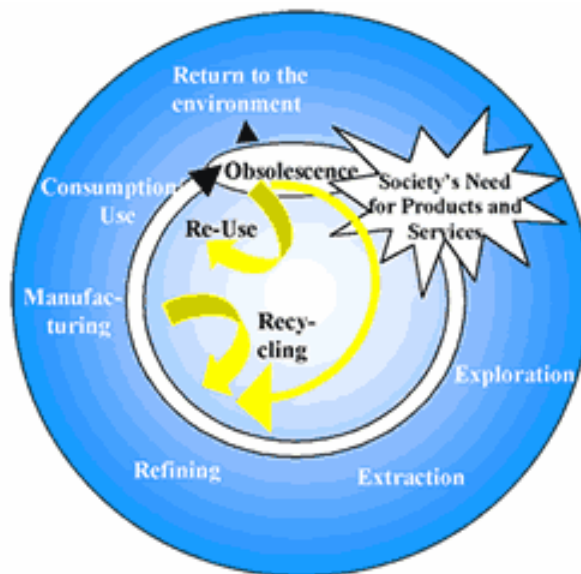


Life cycle approaches are being developed by governments around the world and also adopted by a number of well-regarded multinational companies. For example, the United Nations Environment Program’s (UNEP) Life Cycle Initiative is designed to promote sustainable consumption and production patterns. UNEP suggests that “the concept of Life Cycle Thinking integrates existing consumption and production strategies, preventing a piece-meal approach. Life cycle approaches avoid problem shifting from one life cycle stage to another, from one geographic area to another and from one environmental medium to another. Human needs should be met by providing functions of products and services, such as food, shelter and mobility, through optimised consumption and production systems that are contained within the capacity of the ecosystem.”<sup>1</sup>

<sup>1</sup> See [www.unep.org/pc/sustain/lcinitiative/background.htm](http://www.unep.org/pc/sustain/lcinitiative/background.htm)

Klaus Toepfer, Executive Director, UNEP is quoted - "consumers are increasingly interested in the world behind the product they buy. Life cycle thinking implies that everyone in the whole chain of a product's life cycle, from cradle to grave, has a responsibility and a role to play, taking into account all the relevant external effects. The impacts of all life cycle stages need to be considered comprehensively when taking informed decisions on production and consumption patterns, policies and management strategies."

Figure 3-2: UNEP Diagram describing the life cycle consumption



Life cycle management is a concept, where the desired outcomes can be achieved in a number of different ways. As such, the term Life Cycle Management does not have a universally accepted definition. Some descriptions of Life Cycle Management are provided below:

- Life Cycle Management has been developed as an integrated concept for managing the total life cycle of products and services towards more sustainable consumption and production patterns. (Source: UNEP)
- Life Cycle Management is about minimising environmental burdens throughout the life cycle of a product or service. The life cycle includes all activities that go into making, using and disposing of a product. (Source: Environment Canada)
- Life Cycle Management consists of three views: (1) the management view – integrating environmental issues into the decision-making of the company; (2) the engineering view – optimising the environmental impact caused by the product during its life cycle; and (3) the leadership view – creating new organisational culture. (Source: Seuring (2004) *Business Strategy and the Environment* 13, 306-319)

- Life Cycle Management is an integrated framework of concepts and techniques to address environmental, economic, technological and social aspects of products, services and organisations. LCM, as any other management pattern, is applied on a voluntary basis and can be adapted to the specific needs and characteristics of individual organisations. (Source: Seuring (2004) *Business Strategy and the Environment* 13, 306-319)

The three Victorian Government agencies see Life Cycle Management as a strategic paradigm that when adopted by business provides the opportunity to achieve lower costs; improve risk assessment and risk management; improve strategic decision-making; design better products; identify new business opportunities and markets; and/or improve public relations and communications.

### **3.2 Why is the Victorian Government interested in LCM?**

The *Growing Victoria Together* policy statement outlines the Victorian Government's vision for the State's future. It provides a direction that balances economic growth, social cohesion and environmental wellbeing, and provides a basis for Victorians to work together to build a fair, sustainable and prosperous future. The Government's vision for Victoria is that by 2010 we will be a State where protecting the environment for future generations is built into everything that the Victorian Government, industry and community does.

EPA Victoria, EcoRecycle and DIIRD are responsible for promoting sustainable outcomes. Together they seek to: limit environmental impact/risk; grow Victorian industry; promote business efficiency; and promote waste avoidance, reuse and recycling. The three agencies promote Life Cycle Management as fundamental in moving towards more sustainable business practices.

## **4 Approach**

KPMG has engaged with business to discuss the benefits and barriers to adopting LCM in both workshops and one-on-one interviews. The following sections outline the process that we followed at each stage of consultation with business.

### **4.1 Workshops**

During November 2004, five workshops were held in Wangaratta, Traralgon, Geelong, Bendigo and Melbourne. Sixty seven people representing 55 individual businesses participated in the five workshops. Workshop attendees were provided with an information brochure (a copy of which is attached at Appendix A) prior to each workshop.

At each workshop, participants (listed in Appendix B) were asked to consider, for each life cycle phase:

- What environmental benefits might a business be able to achieve by adopting life cycle thinking?
- What might be some of the barriers to achieving these benefits?
- What economic benefits might a business be able to achieve by adopting life cycle thinking?
- What economic costs might a business incur by adopting life cycle thinking?

Participants were also asked to consider:

- How might an increase in consumer demand for products designed using life cycle thinking effect your business?
- What is the cost of environmental risk to your business?

[Note that during the workshops, life cycle approaches were discussed in terms of life cycle thinking, rather than life cycle management.]

### **4.2 Interviews**

During January 2005, seven companies with operations in Victoria participated in one-on-one interviews. These companies included Bendigo Bank; Chemsal; Origin Energy; Orica – Consumer Products Division (Dulux Paints); Bluescope Steel; Australia Post and National Can Industries. Interview participants are listed at Appendix B.

In selecting companies for interview KPMG and the Agencies considered a balance of companies across a range of life cycle phases (i.e. suppliers, producers, services providers, retail, distribution and packaging) and looked for businesses that were of varying sizes and at varying stages of implementing life cycle management.

We invited businesses to involve personnel from environmental management, marketing, procurement and finance units to participate in the interviews. At the actual interviews, the number of business participants ranged from one to six company employees.

The purpose of the interviews was to explore in further detail some of the themes and key issues arising from the workshops. Discussions with the companies participating in the interviews were focused around four key themes:

1. General drivers for adopting life cycle approaches.
2. Marketing and consumer demand.
3. Financial considerations.
4. Suppliers

## **5 Findings**

At our meetings and workshops, Victorian businesses revealed that seeking environmentally superior outcomes across their operations was generally a good thing for business to do. There are a range of drivers and benefits that can arise from adopting environmentally conscious frameworks such as LCM, but balanced against these and at times working against good intentions and concepts, are a number of challenges and barriers. In the sections below we identify the key drivers and benefits of adopting LCM in business and discuss the main barriers to more widespread uptake of this concept.

Business appears to currently have a more narrow view of what LCM is than what the three government agencies see its potential to have. Business readily associated our discussions on LCM with specific tools and approaches such as LCA and Product Stewardship with the result of adopting these tools as being to develop 'green' products. As such there is a gap between where business is currently at and where the three government agencies see the future of LCM. This chapter describes the drivers, benefits and barriers to business adopting LCM. Subsequent chapters address the strategies that the three government agencies might adopt to reduce the gap and encourage, greater uptake of LCM.

### **5.1 Key drivers and benefits of adopting LCM in business**

#### **5.1.1 Market differentiation**

Companies have told us that the inclusion of 'green' products as part of overall product range can act as a point of differentiation from other competitors in the market place – i.e. "company differentiator". This may create a perception in the market that a company has sound environmental credentials and overall concern for the environment. The product development process did not, however, always involve a life-cycle approach or specific tool such as LCA.

In the examples discussed during our interviews, the overall sales of the 'green' products were generally below other product lines either because the product's functionality/performance was below that of the non-green alternative, or the product was more expensive than the non-green alternative. These companies were, however, continuing with the 'green' product line because of the overall benefit that market differentiation provided to the business (and presumably the product does not present a significant financial loss to the company).

In the workshops, discussions indicated that marketing of life cycle approaches could act as a "product differentiator", providing the consumer with the option of selecting a more environmentally sound alternative to other similar products or substitutable products available in the market. Workshop participants did, however, express doubt about the value of LCM as a differentiator where prices were not identical. In other words, very few participants expressed a view that consumers would be willing to "pay a premium" for products designed and manufactured using LCM approaches.

Some companies also identified that adopting concepts such as LCM, can also facilitate greater innovation in product design and/or process improvement within the business. Specifically, Bluescope commented on and has published<sup>2</sup> information on the value of LCAs to improving both the steelmaking processes and products, and encouraging an innovative attitude in the company.

### **5.1.2 Corporate culture**

A number of companies during our interviews mentioned that overall corporate culture and desire to operate within stated corporate values were a key driver for adopting LCM within individual business units. The box below provides some extracts from corporate value statements as they appear on each company's Internet homepage.

In those companies where respect for the environment has executive management level commitment that cascades throughout the organisation, individual business units may be in a better position to present new projects and products backed by concepts such as LCM to management knowing that the approach will be openly accepted, but still need to be approved on its financial merits.

At the Melbourne workshop event, the opposite sentiment was also discussed, in that a potential barrier to adopting LCM was resistance to change in workplace culture from within a business.

#### *Extracts from corporate value statements referencing the environment*

##### **BlueScope's Corporate Bond:**

"Our communities are our homes – our success relies on communities supporting our business and products. In turn, we care for the environment, create wealth, respect local values and encourage involvement. Our strength is in choosing to do what is right."

##### **Orica's Four Key Principles:**

"Safety, health and environment – ensuring our future.

- no injuries to anyone, ever
- value people and the environment"

##### **Origin Energy's Corporate Values:**

"We care about the impact our operations and actions have on shareholders, customers, fellow employees, the community and the environment."

Source: [www.bluescopesteel.com](http://www.bluescopesteel.com), [www.orica.com.au](http://www.orica.com.au), and [www.originenergy.com.au](http://www.originenergy.com.au).

<sup>2</sup> See "Life cycle analysis" at [www.bluescopesteel.com](http://www.bluescopesteel.com) follow links to 'About Bluescope Steel' and 'student information'.



A key benefit arising within companies whose corporate culture encourages care for the environment was the ability to attract and retain excellent people. While these comments were acknowledged as being largely anecdotal there was a genuine sentiment that companies with this corporate attitude provided a better place to work.

### **5.1.3 Risk management**

Life cycle approaches were described by workshop participants as potential environmental risk management tools. In particular it was suggested that it could assist in:

- early identification and management of environmental liabilities thereby reducing the risk of future litigation or penalties;
- ensuring optimal application of resources to manage environmental risks; and
- reducing insurance premiums.

Workshop participants also suggested that LCM might assist during the evaluation of investment decisions to ensure they that associated environmental implications are considered.

During the interviews, tools such as LCA, were identified as being useful to predict where environmental problems/risks may arise. Many companies are today taking the attitude to deal with environmental issues upfront rather than have them become legacies to resolve in the future (as has happened in the past – with James Hardie cited frequently and Orica’s issues at Botany also mentioned). There appears to be a perception across business that companies that have greater regard for the environment are likely to have done their risk assessments better.

### **5.1.4 Access to markets**

Each of the workshops identified that companies supplying goods to environmentally sensitive markets (such as the European Union and Japan) were likely to need to demonstrate their environmental credentials when negotiating contracts where they supply to those markets. Workshop participants considered that life cycle approaches may provide a means for demonstrating these environmental credentials.

During the interviews some companies also discussed the issue of access to markets, specifically mentioning access to Europe. European markets were discussed as generally being more environmentally aware with consumers demanding more ‘green’ products.

In Australia, the more commonly mentioned market where business approaches such as LCM were an enabler was government at all levels, Commonwealth, State and local government. Legislation such as the *Environment Protection and Biodiversity Conservation Act 1999* obliges

Commonwealth agencies to contribute to ecologically sustainability development, which in turn creates a significant market in Australia for 'green' products.

The companies we interviewed also identified other potential markets, but they were essentially niche markets, for example:

- community organisations;
- residents in regional/rural areas where there was a strong community regard for the environment (e.g. northern NSW/southern Queensland);
- price-insensitive customers with high disposable income (e.g. DINKs<sup>3</sup>) for products carrying a premium price; and
- low-income earners or retirees for products (such as solar hot water) that have minimal ongoing operating costs (this potential market probably only applies where there are specific incentives available to the customer to reduce the initial cost of the appliance – e.g. government rebates or reduced interest rates, such as that offered by Bendigo Bank's Green Loan).

### **5.1.5 Response to regulatory requirements**

There are few examples in Australia of regulations requiring businesses to adopt frameworks such as LCM. However, during our interviews and workshops, self-regulation initiatives such as the National Packaging Covenant, were cited as important triggers for altered business behaviour and to some extent seen as an indicator of what government might do if industry was unable to implement its own workable solutions.

Another example of where regulation in Australia was a driver for business to adopt environmentally conscious frameworks was with a government business enterprise (GBE). GBE's are bound to adopted the provisions of the *Environment Protection and Biodiversity Conservation Act 1999* and implement ecologically sustainable development. In the one case that we discussed at interview, the GBE had used the LCA tool for product design and development in one instance, but had no specific plans to use the tool more widely. This GBE had, however, adopted at Board level broad sustainability principles, backed by actions, targets and specific performance measures across the organisation.

Multinational companies are also paying close attention to the regulatory requirements of other jurisdictions. As mentioned above in the discussion on access to markets, the European Union not only has more environmentally aware customers, but it has introduced more extensive legislation and regulation of environmental issues. Companies either with operations in these markets or wanting to import into these markets must abide by these regulatory requirements

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<sup>3</sup> "double income no kids"

(eg. the EU directives on: Waste Electrical and Electronic Equipment, WEEE; Restriction of Hazardous Substances, ROHS; Regulation Evaluation and Authorisation of Chemicals, REACH; and End of Life Vehicles, ELV).

There were three further issues mentioned in regard to regulatory requirements that are probably outside of scope of discussing benefits and barriers to business adopting LCM, but probably useful background nonetheless for the Victorian government agencies:

*1 Inconsistency of regulatory requirements across jurisdictions.*

Companies provided examples where there may be a desire to recycle water, install solar panels, refurbish homes to 5-star requirements, but find that at a local government level building/planning approval are difficult to obtain due to planning scheme restrictions. Companies also provided examples of where different standards are set between the Australian states, for example the approach taken by EPA in Victoria and Queensland to licensing certain ovens taking different approaches to assessing the performance of the ovens for both energy consumption and flu emissions, with the result being that two different standards for flu emissions apply.

The implications of all the examples are that companies have to invest considerable effort in understanding the regulatory requirements of all jurisdictions they operate in (local government, across the Australian states and internationally), but it can also place them in a less competitive position where companies operating in less rigorous environments can deliver products and services to market using older, unclean technologies.

*2 Little control over imports*

Somewhat related to the above comment, there are implications for Victorian businesses where other jurisdictions do not impose as rigorous environmental standards. Some companies during our interviews expressed concern that there was little control over imports into Australia and that while Australian companies may be taking proactive, voluntary steps to improve certain products, less environmentally friendly alternatives that are manufactured offshore were still available to consumers (presumably these import continue because consumers continue to purchase these products for reasons of price or quality and are perhaps ignorant to the environmental issues). One specific example was measures taken by the Australian paint industry to remove lead from paint, but that paint containing lead was still available in hardware stores.

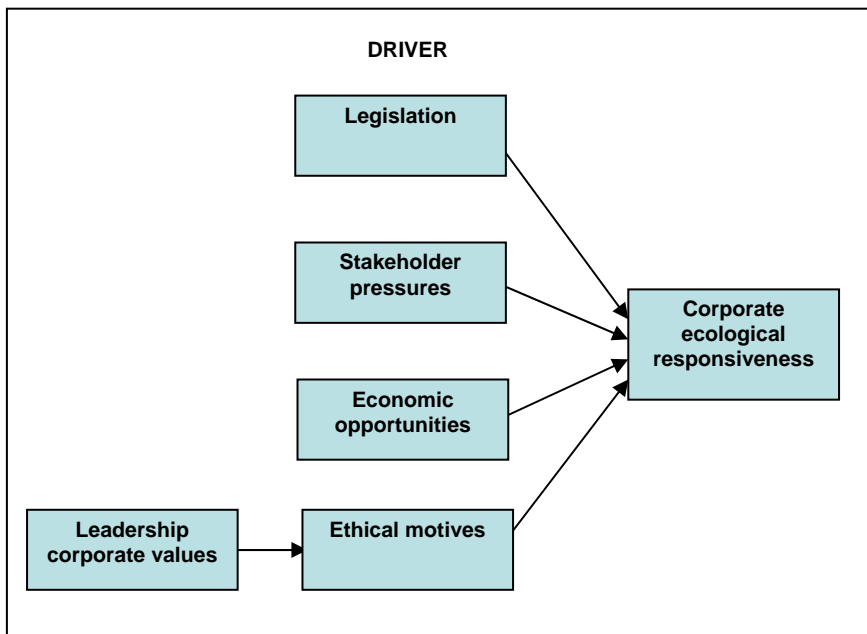
These comments imply that all participants in the supply-chain (manufacturers, logistics companies, wholesalers, retailers and consumers) should all adopt life cycle concepts in order to achieve widespread success.

### 3 *Balancing resources*

Identified particularly at the workshops, but also in a couple of instances during the interviews, companies apply resources to meeting their existing obligations under environmental regulatory frameworks and more proactive environmental initiatives tend to occur on the balance of resources that are available. As such when the regulatory requirements for site licensing increase, less work can be done on other initiatives such as the application of LCM frameworks.

In summary we have categorised key drivers of adopting life cycle approaches as companies seeking market differentiation, companies seeking market access, companies responding to regulatory pressure, companies adopting sound risk management practices and those with overall leadership and corporate values that encourage ethical actions. These same drivers were also summarised by Bansal and Roth (2000) as illustrated in Figure 5-1.

*Figure 5-1: A preliminary Model of Corporate Ecological Responsiveness*



Source: Bansal, P., Roth, K. (2000) Why companies go green: a model of ecological responsiveness, *Academy of Management Journal*, 43(4) pp 717-736

## **5.2 Primary barriers to adopting LCM**

### **5.2.1 Limited consumer demand**

Overwhelmingly in both the workshop session and one-on-one interviews companies cited the lack of consumer demand as being a primary barrier to investing in delivering environmentally sound products and services.

Companies will invest in influencing consumer behaviour if there is a reasonable chance that consumers will adopt the product/service they have on offer. Companies have done some consumer research on the demand for environmentally friendly products with relatively inconclusive results. The feedback we received was that consumers would like to do something for the environment, but generally will not follow-up this sentiment by changing their purchasing behaviour (e.g. going to a different store) and will not pay more for 'green' products. Consumers tend to base product/service selections on cost, quality, functionality and performance.

Market research done by the companies we interviewed also revealed that a number of consumers are relatively poorly educated on environmental issues. For example:

- an organisation that has a significant number of motorbikes, cars, vans and trucks on the road was seen as environmentally benign by its customers;
- one organisation found a large percentage of Victorian residents believed that electricity was sourced from the Snowy Hydro Scheme, with little connection made to coal-fired generation in the Latrobe Valley; and
- there is a perception of greater value in products containing virgin extracted materials, and both consumers and producers expect a discount when purchasing goods with recycled materials.

Companies also discussed the relatively high level of consumer confusion around eco-labelling and other green labelling initiatives. Without any rigor or criteria behind the eco-labels it is difficult for consumers to know the benefit of particular products and there is the potential for consumers to become distrustful of labels used by companies or other claims made by companies that their products are environmentally friendly. When we had this particular discussion with companies, their suggestion was that government had an important role to play in either introducing labelling standards or endorsing particular labels so as to build consumer trust in these marketing approaches.

For those companies who are successfully selling environmentally conscious products on the market, they are finding the marketing efforts are relatively expensive and need to be proactive. As mentioned above, while consumers are generally happy to do something for the environment, they rarely go out of their way to secure the more environmentally friendly

product – for example purchasing the ‘green’ product may mean going to a different retail outlet or contacting the supplier directly to arrange for different deliveries. Companies with success with ‘green’ products have made them available at all retail outlets along-side other product lines and have engaged in very proactive sales approaches making it very easy for customers to purchase the alternative product.

### **5.2.2 Business’ ability to influence across complex supply chains**

During our interviews and workshops, companies indicated there were a number of challenges in influencing the behaviour of other organisations both upstream and downstream in their supply chains.

Supply chains are complex and there are relatively few examples globally where a single company is vertically integrated to the extent they control the entire life-cycle from point of raw material extraction, through product design, production, packaging, transport, and retail to the consumer. Fully vertically integrated companies are today the exception rather than the norm, given the financial and economic challenges to sustain this business model. Consequently, companies today tend to rely on outsourcing and collaboration with local suppliers and institutions rather than on vertical integration<sup>4</sup>. Companies today tend to focus on their areas of specialisation and there is some evidence to suggest that vertical integration discourages competition. Recent examples of disaggregation include the separation of electricity corporations into companies managing generation, transmission and retailing separately. The competition authorities, such as the ACCC, closely monitor mergers and acquisitions and have paid close attention to transactions that increase vertical integration such as where suppliers and retailers come together.

Looking upstream in the supply chain, a number of manufacturers in Australia essentially assemble products with the raw materials and components being sourced from a number of suppliers, both local and international. We have had companies tell us of the impracticality of adopting life-cycle approaches across the whole supply chain as they manufacturing hundreds (sometimes thousands) of products and source thousands of components.

At the workshops, small to medium enterprises (SMEs) indicated that their ability to influence suppliers was limited, hampered by their lack of scale. Companies also want to work to create long-term relationships in their supply chain as this is crucial to the long term sustainability of a business. Companies indicated that relationship management with suppliers was important to ensure that raw materials and components were delivered on-time and at the right quality. Seeking additional information from suppliers about their environmental performance adds to the complexity of maintaining these relationships.

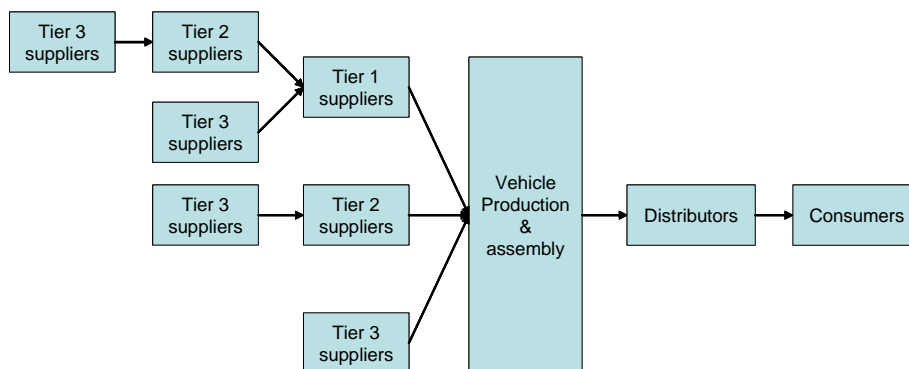
Companies also indicated that their sphere of influence probably only extended one level within the supply chain, and that it is difficult for many companies to influence how suppliers in turn

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<sup>4</sup> Michael Porter (Dec 2002), The Competitive Advantage of Corporate Philanthropy, *Harvard Business Review*, p.56

interact with their suppliers. The automotive industry was given as an example of probably one of the best influencers across the supply chain and it was starting to take the charge in seeking information on suppliers' environmental credentials, such as whether companies are ISO14000 registered. Despite being one of the leaders in this regard, the automotive supply chain is complex (as illustrated below) and a number of challenges remain to implementing LCM across all facets of their supply.

Figure 5-2: Diagrammatic representation of a typical automotive supply-chain



Looking downstream from the point of manufacture to the point of use/consumption of a product or service, a number of our discussions focused on a company's limited ability to again influence participants in the downstream supply chain. For example manufacturers of building materials and other consumables such as paint, do not always have direct access to the consumer, with architects, builders, tradesmen and retailers all playing a role in delivering products to their end use and potentially influencing consumer purchases. While some manufacturers do engage in direct marketing to consumers to achieve product pull-through, they also find they need to work with others in the downstream supply chain.

Similar to the above comments, the companies we spoke with also indicated they had little power to influence how consumers and other companies used their products, disposed of packaging and disposed of the product at its end of life.

### 5.2.3 Application of the tools

One of the main tools mentioned by business as being available to them to implement a life cycle approach was life cycle assessment (LCA). The companies we consulted with have made the following comments in respect of these tools:

- there are a number of different LCA models and the level of detail incorporated in each model differs. The people/organisations who developed the models also own the intellectual property within each model;
- organisations can use models to their best advantage, seeking to optimise their product's result when it is either compared with other similar products manufactured by competitors, or when it is compared with substitutable products (e.g. steel, wood, plastics in the building industry);
- keeping the databases up-to-date to run these models is also expensive;
- the models require a lot of data and the data sources are generally not peer reviewed;
- the software tools are proprietary and expensive to develop;
- LCA appears complex and time consuming to undertake; and
- it can be difficult to draw boundaries around the assessment.

These comments suggest that the complexities associated with tools such as LCA, are a barrier to widespread application and ongoing use of such tools in business. Some companies that we spoke with had used LCA once and while they had recognised benefits from doing so (such as greater general awareness of environmental issues), the ongoing use of the tool was unlikely because of a number of the reasons mentioned above.

Similar comments on the LCA tools have been given in scientific literature, for example:

- *“In principle, a LCA evaluates the entire environmental impact of a product through its life cycle, including manufacturing use, and disposal. In practice, LCA has proven to be contentious, inefficient, and expensive.”*<sup>5</sup>
- *“In the context of design, it is important to consider that a detailed LCA assessment is so time consuming that it doesn't lend itself to the dynamic nature of product evolution in the design process. In addition LCA is not a suitable tool for designers because interpretation of its core results required high levels of environmental knowledge that design engineers usually don't have.”*<sup>6</sup>
- *“Tools have to be developed which do not lead to more work and more obstructive organisation but help fulfil daily tasks. Eco-design projects will only be successful if the tools and information are integrated into existing management structures and procedures of*

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<sup>5</sup> Valerie Thomas and T.E. Gradel (2003) Research Issues in Sustainable Consumption: Toward and Analytical Framework for Materials and the Environment, *Environ. Sci. Technol.*, Vol 37, pp 5383 – 5388.

<sup>6</sup> Bhandar et al., (2003) Implementing Life Cycle Assessment in Product Development, *Environmental Progress*, Vol. 22, No. 4, p 265.



*the company. This application of LCA as a method, and different LCA software tools brought the project team to the conclusion that it is not a valuable approach in practice and will not be used regularly in the company.”<sup>7</sup>*

The above-mentioned examples represent a snap-shot from literature and some of the comments made during our workshops and interviews and we should not lose sight of the number of equally compelling positive stores about the use of LCA tools. However, we cannot ignore that business has raised these issues about its complexity. As discussed later in this document, providing business with support and assistance to find the most appropriate way for that business to adopt a life-cycle approach is an important role for the Victorian government agencies to play.

In summary, business has identified the following benefits and barriers to adopting life cycle management:

Drivers & benefits	Barriers
<ul style="list-style-type: none"> <li>• Market differentiation</li> <li>• Corporate culture</li> <li>• Risk management</li> <li>• Access to market</li> <li>• Response to regulation</li> </ul>	<ul style="list-style-type: none"> <li>• Limited consumer demand</li> <li>• Complex supply chain management issues</li> <li>• Complexity with tools such as LCA</li> </ul>

We discuss our conclusions and recommendations based on these findings in the next section.

<sup>7</sup> Ursula Tischner and Regina Nickel (2003), Eco-design in the printing industry – Life cycle thinking: Implementation of Eco-design concepts and tools into the routine procedures of companies, *The Journal of Sustainable Product Design*, Vol. 3, pp 19-27.

## 6 Conclusions

The previous section of this report highlights the feedback we received during interviews and workshops on the benefits and barriers to adopting LCM in business in Victoria. Companies have provided examples on what has worked and where they have encountered limitations. Our discussions frequently ended up being about broader implementation of environmental/sustainability initiatives within the company's immediate sphere of influence rather than being focused on LCM's potential business strategy implications.

Overall the Victorian Government's aim is to facilitate the greater uptake of life cycle approaches by Victorian businesses and industry. We looked earlier in this report at the definition of LCM and now need to place this in a business context. Relevant questions are what is business? and what drives business behaviour?

*A business is an organisation operated with the primary objective of making a profit from the sale of goods and services*

Managing risk and providing a correspondingly appropriate financial return are the key things that drive business, as such we have framed our conclusions around the question of whether LCM can assist business meet their objectives.

### 6.1 Shareholder and investor needs

Shareholders and investors are essentially the owners of a business. The needs of those organisations and individuals who are the shareholders and investors generally take precedence over the needs of all other stakeholders in a business (e.g. employees, government, consumers). Shareholders and investors provide the capital enabling a business to operate and influence decisions on what is an appropriate level of return from the business.

#### 6.1.1 Shareholder requirements filter into all business decision-making behaviour

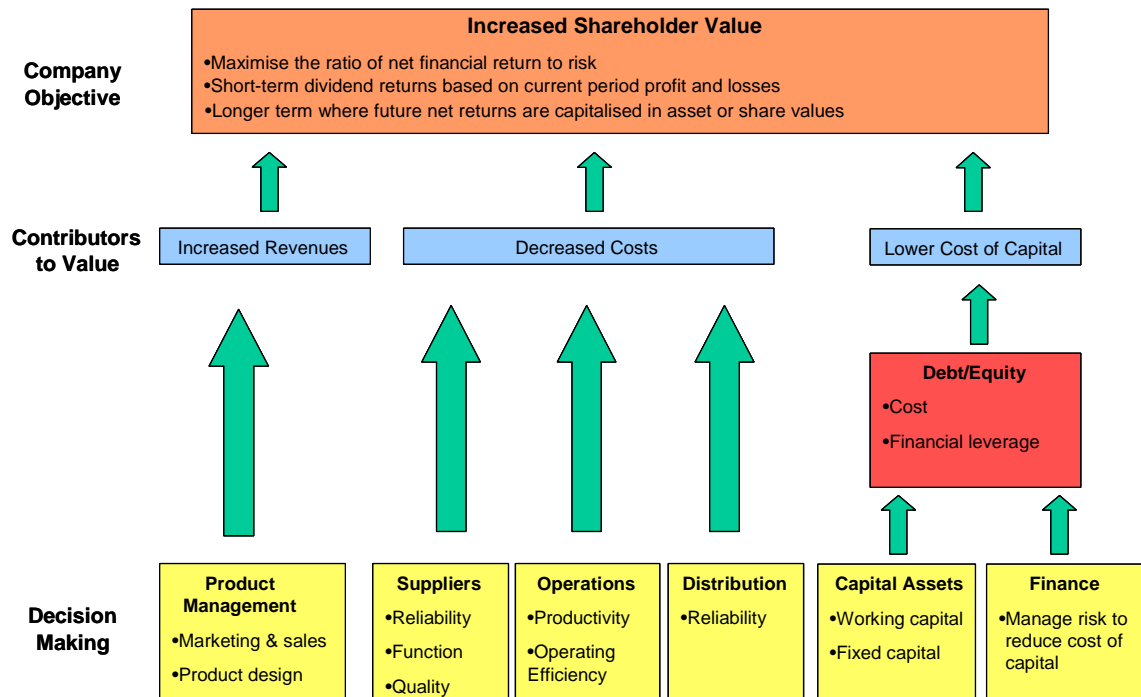
Driven by commercial objectives, businesses seek to meet the (largely financial) needs of their shareholders and investors. Shareholders and investors are seeking a return on investment that is commensurate with the risk that shareholders and investors perceive to be associated with each investment (i.e. high risks will lead to requirements for greater returns).

Shareholder base their perceptions of an acceptable return around the returns available from relatively low risk investments, for example the interest rate available on long-term government bonds is used to benchmark the return on low risk investment. Consequently shareholders and investors anticipate higher returns from investments where higher risks are involved.

On this basis, businesses will make a series of decisions to deliver increased shareholder or investor value. The following diagram summarises how business decisions seek to deliver this

broad objective. The diagram has been adapted for the purposes of this report from the “Shareholder Value Creation Model” presented by Labatt and White in “Environmental Finance: A Guide to Environmental Risk Assessment and Financial Products”, 2002.

Figure 6-1: Shareholder Value Creation Model



The above diagram shows, from an economic standpoint, how business decisions relating to product management; choice of suppliers; efficiency of operations; efficiency of distribution; raising of capital; and financing can deliver value to shareholders.

In working to meet the needs of its shareholders, businesses will also hold other values, such as providing customer satisfaction; ensuring a safe workplace and caring for the environment. Business will uphold these values to the extent that key risks are managed (e.g. workplace injuries and deaths, as well as products that are obviously harmful to the environment are socially unacceptable), but they will inevitably be secondary to their primary objective. For example, if the environment requirements of a particular product result in a business not being able to meet its primary objectives, a business will have every incentive to cease production of that product. Accordingly, activities and spending on non-priority areas will come under increased scrutiny from management and shareholders if business performance declines.

### **6.1.2 Risk management**

Reducing and managing risk<sup>8</sup> is important to business and it is generally reflected in business' net asset values and share value/ cost of capital, again contributing to overall financial returns to shareholders and investors.

Business will evaluate the likelihood of certain events occurring and the severity of the consequence of the risk event. Business will make efforts to manage and minimise the impact of risk events which may include situations such as threats to their supplies or markets; litigation; changes in regulations; altered tax liabilities; damage to public image and reputation; and production inefficiencies.

Figure 2 illustrates that business will always balance risk-reward ratios for each decision-making area. Given the frequency of comments made with respect to consumer demand for environmentally friendly products, we focus in this section on marketing and product development risks.

From a consumer perspective, it might seem that business bombards consumers with sales campaigns and the constant advertising push to buy the latest widgets and gadgets. In business, these advertising and promotion campaigns result from marketing efforts whose primary objectives are to discover what consumers want. Assuming these marketing efforts have discovered what consumers want, this drives the creation of products and services that meet customer's needs (sometimes fulfilling latent needs), with advertising and promotional campaigns seeking to ensure revenue growth for the new product/service is achieved.

Advertising is prominent because companies are at risk throughout product development, and poor sales results would be unacceptable to investors and managers. Most new products do not generate money – Andrew & Sirkin (2003)<sup>9</sup> report that according to several studies, between five, and as many as nine, out of ten new products end up being financial failures. Andrew & Sirkin (2003) described some of the key risks in product development as:

- Can the new product actually deliver the improved performance it promises?
- Customers may not buy the new product even if it works, the incremental improvement or the breakthrough may not be exciting enough for customers, and they may not bite.
- What is the level of substitutes available and how long will it take for competitors to bring an alternative to the market?
- What is the level of capital investment required to commercialise the new product (some products are more expensive to bring to market than others)?

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<sup>8</sup> Risk in the business context is the threat that an event or action (whether it actually happens or not) will adversely affect the business in achieving its objectives.

<sup>9</sup> J.P Andrew and H. Sirkin (Sept 2003) Innovating for Cash, *Harvard Business Review*, p.76

During this project, business has told us that marketing efforts to determine customer reactions to environmentally friendly products have been largely inconclusive. If business is to adopt LCM in its product development activities, the framework needs to help business take better quality, or higher performing products to market that consumers see as attractive or holding real value. Alternatively, LCM needs to help business reduce its marginal cost of production, thereby improving financial returns and potentially enabling a business to invest in further growth and/or research and development.

## **6.2 How LCM can help...**

### **6.2.1 The benefits of LCM are aligned with overall business drivers**

In the previous chapter we described some of the benefits to business of LCM. These include providing market differentiation; contributing to effective risk management; and providing access to markets. Each of these benefits can work ultimately to reduce business costs and increase its revenue-earning potential.

During our interviews and workshops there were few instances where companies identified where LCM provides means that would not otherwise be available to reduce operating cost or improve resource efficiency. Business programs designed to achieve these objectives are congruent with the fundamental economic drivers for business and a wide range of tools are available to do this. Business uses these programs for the purpose of realising greater financial value from their operations, and any resulting benefit to the environment is a welcome additional outcome, but not the primary influence behind the desire to improve resource use or initiatives to improve overall efficiency (However, this does not necessarily mean that businesses have no regard for environmental outcomes as it implements these tools, it is just that it is not the primary driver). Business is only likely to adopt LCM over other programs and tools where it can demonstrate a risk-return ratio that is at least as attractive as that available from implementing another program.

Further in any of these programs, business continues to cost a number of resources, such as energy, water and waste disposal according to market price, and as such is not required to account for the overall cost of these resources to the environment. While such externalities remain, businesses will only go so far to improving resource efficiency before the cost-benefit analysis suggests there is insufficient return within an appropriate pay-back time to justify the new procedure or new equipment.

### **6.2.2 LCM can assist business in managing risk**

During the workshops and interviews, businesses told us that:

- Environmental risk assessment was part of good governance and there is a perception that where companies evaluate environmental risks they are likely to have very sound overall

risk assessment procedures. Where there are environmental risks these might impact a company in different ways, for example:

- potential for future litigation where a business may be judged or perceived to be responsible for a detrimental environmental outcome (an example mentioned during our interviews was the current asbestos case with James Hardie);
  - reputation risk, again where a business may be perceived to be responsible for a detrimental environmental outcome and the market avoids dealing with that company or boycotts purchases (an example mentioned during our interviews was Shell's plans to 'sink' a north sea drilling rig, with widespread product boycotts resulting in Europe); and
  - the imposition of penalties (e.g. fines, or rebuke of operating licence) from regulatory authorities for breaching or failing to maintain appropriate operating licences.
- The companies we consulted with identified LCA as one tool that is useful in identifying and managing environmental risk. However, companies also identified a number of other tools that can achieve similar objectives.
  - The companies we consulted with generally spoke of environmental risk in the context of those areas where they have an immediate sphere of influence. A number of companies suggested that consumers (also shareholders and investors) were unlikely to make a tangible connection between the poor environmental performance of a supplier and their own company (e.g. many consumers would be unaware that titanium dioxide was a key component in paint). We found that companies were more likely to evaluate their own "environmental footprint" in terms of energy consumption, water usage and waste disposal as part of understanding their environmental impact rather than thinking of the entire life-cycle aspects of all the products/services they provide.

### **6.3 Using LCM to achieve the Agencies' objectives**

Victorian businesses have identified a number of drivers for adopting LCM and described to us the consequential benefits. Business has told us about improved access to markets, the ability to differentiate a company from its competitors and positive influences on corporate culture. We observe that these benefits are congruent with businesses' generic primary objectives. Overall, from the Victorian Government Agencies' perspective, future investment into promoting LCM and assisting business to adopt life cycle approaches appears to have merit, and should assist with their objectives for more sustainable business practices.

While we have talked to a small sample of companies, it may be reasonable to conclude that LCM frameworks are more readily adopted in those businesses with a more mature attitude towards the environment, where corporate strategy recognises environmental values and sustainability report are probably already in production or on the agenda.

As illustrated in the diagram below, businesses will have varying levels of interest and awareness to environmental issues and where each business sits on this quadrant will influence the way in which the Victorian Government can interact with that business.

Figure 6-2: Interest in and awareness of environmental issues

<b>Interest</b>	<b>High</b>	<u>Easy targets</u> Government response: How can we help?	<u>Success stories</u> Government response: Encourage & Support
	<b>Low</b>	<u>Hard work</u> Government response: Compliance with existing regulatory measures a priority	<u>Think otherwise</u> Government response: Little interaction as will be hard to alter views. Invite to information sessions.
		<b>Low</b>	<b>High</b>
		<b>Awareness</b>	

LCM takes most business beyond their own backyard, requiring a different level and more complex interactions with suppliers and consumers. The Victorian Government can only achieve greater uptake of LCM in Victorian business by demonstrating that the benefits of this approach outweigh and justify the complexity and risk associated with dealing with suppliers and customers; and in applying the tools.

Our interviews with business for this project lead us to believe that in the first instance, business will look to implement environmental initiatives within their own sphere of influence or “own-backyard” (and in some instances this means site-specific initiatives), and those initiatives must have a reasonable business case and pay-back time attached to them. This suggests that the Victorian Government needs to promote LCM as a strategic paradigm not limited by any specific tools that might be used to achieve the desired outcomes. The Agencies also need to recognise that not all businesses are ready to adopt LCM or will ever find benefit in adopting LCM.

We also suggest that there are broader challenges to achieving widespread uptake of LCM, which are outside the scope of this engagement. Ongoing work is required to understand household consumption and modify behaviours towards the use of more sustainable products. Business will also only improve its resource efficiency to a point until there is no longer an economic argument to do so. This means that business will likely stop short of what the Agencies might like to achieve. For example business will be driven by economic pressure to consume less resources, but not necessarily focus on the environmental quality of what is consumed. An extreme example is that where businesses were using asbestos, there would have

been an economic imperative to less asbestos, however, it was not until the human health consequences were known that alternative products were adopted – those businesses now will have the economic imperative to consume less of the alternative. Further, while business is not required to internalise the “environmental” cost of CO<sub>2</sub> emissions; the cost of water; and while landfill remains available and relatively cheap they will probably continue to stop short of what the Victorian Government might want to achieve in relation to LCM.

Overall, the Agencies need to communicate with business in a language that it understands, highlighting the economic benefits of life cycle approaches and discussing positive environmental outcomes as advantageous consequences. There are a myriad of concepts and tools available, which to the environmentally uninitiated can look complex .confusing and focused on different objectives to primary business drivers. While the Victorian Government might consider providing definitions, explaining the different concepts, frameworks and tools, fundamentally it needs to communicate what it wants to achieve by business adopting these concepts.



## 7 LCM communication materials

The next steps in this project involve developing communications materials that EPA Victoria and its Victorian Government partners can use to promote LCM and work towards achieving a greater uptake of Life Cycle Management in Victorian businesses and industry.

A website probably hosted by EPA Victoria, is likely to be central to these communications materials. The following sections describe some of the ideas put forward by businesses for this website and other communications issues we believe arise from our workshops and interviews.

The overall communications plan and detailed website development is, however, the subject of the next phase of this project.

### 7.1 The website

The objectives of the website should be to:

- explain how the Victorian government's *interests in LCM are congruent* with businesses' interests;
- demonstrate how business might *maximise the benefits* of adopting LCM; and
- help business *overcome the barriers* to adopting LCM.

We suggest on the basis of the discussion in Section 6, that the website is more likely to help businesses overcome the barriers to updating LCM by informing businesses how they might maximise the benefits of adopting LCM.

These objectives should enable Victorian government agencies to work towards their overall aim to facilitate uptake of life-cycle approaches in Victorian business.

As discussed in Chapter 6, business is likely to be interested in strategies to increase their returns; reduce and manage risk; and to overcome fragmentation in the market, within businesses and across the supply chain.

We also note that during our interviews, companies were also keen to point out that they need to be advised that the website exists, and that EPA Victoria needs to commit resources to ensuring the website remains up to date (i.e. all the links work and material is current and factually correct).

## 7.2 Strategies to explain how LCM is congruent with business objectives

We suggest that the website needs to communicate:

- what Victorian government’s interest is in LCM; and
- how that interest may be congruent with business interests.

A key finding from our work was that business has a perception that LCM or LCT comprises a range of tools that produce environmental benefits but may not necessarily provide business benefits and hence are unlikely to be cost-effective to implement. While there may well be environmental benefits that would not be cost effective for businesses to implement<sup>10</sup>, we understand that overall, the Victorian government is interested in promoting economically sustainable and beneficial LCM solutions.

LCM solutions that do not meet this criterion are simply unlikely to be viable in the eyes of business, except as an altruistic exercise. While businesses may adopt altruistic approaches, almost by definition they are likely to only ever be marginal business activities.

We suggest that this is a fundamental point that needs to be clarified to avoid misconception and to secure businesses’ attention.

Communicating this point might follow the description provided by Dr Paul Tebo, a leading US implementer and proponent of sustainable development in industry, who suggested that opportunities for sustainable behaviour in business can be classified according to whether they are economically and/or environmentally beneficial, as follows:

<b>Environmentally beneficial?</b>	<b>Yes</b>	“Charity”	“Sweet spot”
	<b>No</b>	“Disaster”	“Principally driven by profit”
		<b>No</b>	<b>Yes</b>
		<b>Economically beneficial?</b>	

Source: Dr Paul Tebo

<sup>10</sup> However, what is cost effective for one business may not be cost effective for others. Therefore, it may be unwise to make global assumptions about the cost effectiveness of particular approaches.

However, having established the Government is promoting economically sustainable and beneficial LCM solutions, the website would then need to explain in broad terms how LCM can deliver benefits which other economic tools and approaches do not. We suggest that this too is vitally important because otherwise:

- it would seem unlikely that it would occur to business to refer to what it appears to consider a largely environmental tool for business efficiency improvement techniques; and
- even if business did understand that the website provided business efficiency tools, there would still need to be compelling reason for business to access this source of information in preference or in addition to the myriad of other and well established sources of information on business efficiency improvements.

We suggest that the Unique Selling Proposition for the website might be that it provides business with information and guidance to improve economic performance with the additional benefits of the potential to realise on certain opportunities and reduce certain business risks that other techniques may not consider or be able to offer.

Section 7.3 provides more detailed examples of these opportunities and risks.

## **7.3 Strategies to maximise the benefits and overcome barriers**

In this section, we describe ways in which the Victorian Government might promote the benefits to business in adopting life-cycle approaches, including maximising market access; cost savings; improved risk management; improved workplace culture; more efficient transactions with suppliers; and increased consumer awareness of environmentally sustainable products

### **7.3.1 Developing market strategies**

Marketing can give businesses significant advantages when it is able to predict with good probability what customers may want in the future, even where that demand may not yet be present.

However, even this information alone may not be sufficient to deliver economic benefits to businesses. Businesses often have to invest in product and market development to be positioned to reap significant advantage when that latent demand emerges later.

We suggest that the website could:

- provide sources for “long term” thought pieces or papers on how environmental issues may impact on societal attitudes in future;

- explain what the implications these potential changes might hold for how businesses think ahead in terms of product development. For example, which products may fall out of favour, and for which products or kinds of new products might demand increase; and
- providing examples of where companies are investing in new products; redefining existing products; and accessing new markets.

This information would help to identify competitive business opportunities for those willing to take the risk in investing. However, businesses are all about risk taking where it is adequately rewarded by the market.

### **7.3.1.1 *New product development – example of hybrid cars***

In his seminar in Melbourne on 24 March, Paul Tebo cited Toyota as an example of a leading successful manufacturer investing heavily in a product for which there is currently limited demand – the Prius, a hybrid car. Dr Tebo suggested that the reason Toyota is doing this is to position itself as the brand and technical leader in what it anticipates will be a very large, international market in the future for hybrid vehicles. We observe that Toyota's choice of a small car may or may not be driven by environmental concerns but there is other evidence that a purely economic case exists for developing a market in such a vehicle.

For example at the recent Detroit motor show a leading executive of General Motors opined that the demand for hybrid vehicles is likely to increase significantly in the United States because of increasing oil prices and reduced security of supply, in a market that has yet to display any significant reaction to environmental concerns.<sup>11</sup> Also, General Motors pointed out that demand is likely to be greatest for smaller hybrid vehicles (such as the Prius or Honda Insight) because the segment of the market least likely to afford increased fuel prices is also least likely to afford the premium costs of large or high performance high fuel consumption vehicles. If true, this analysis would provide evidence that economic forces can result in manufacturers investing in environmentally beneficial outcomes. However, we also comment that this may not occur where there is a less strong economic price attached to the consumption of resources. (We expand on this in section 7.3.2 below.)

We also suggest that the examples above could provide thought structure for industry to consider further market or product development opportunities. For example automotive fuel is only one use of oil. It is also a vital base to a wide range of petro-chemical and plastic products that much of industry depends on. Could rising oil prices lead to similar opportunities to the Toyota example but in other industries?

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<sup>11</sup> Source: "Car" – March 2005

### 7.3.1.2 Redefining products – example of floor-covering solutions

A traditional but less sophisticated approach to selling is to sell the materials or tangible products rather than the economic benefits those products may provide to the user. For example some companies have been quite successful at moving from being a provider of products to being a benefit or service. This is often illustrated by technological obsolescence. For example, to stay in business, a fax machine manufacturer or retailer would now have to ask itself whether it is in business to sell fax machines (an input for which demand is diminishing) or sell the outcomes or services of customer communication solutions, using current and changing technology.

This line of thinking does not of itself necessarily also deliver improved environmental outcomes. However, we suggest that thinking of this kind could be used to identify marketing or selling opportunities that may combine business sustainability with environmental sustainability.

The website could include examples, such as Interface, the carpet company that has transformed itself from a company that sells and fits carpets to one that provides floor covering solutions. See [www.interfaceap.com](http://www.interfaceap.com).

*“The company has realised that clients want to walk on and look at carpets – but not necessarily to own them. Traditionally, broadloom carpets in office buildings are replaced every decade because some portions look worn out. When that happens, companies suffer the disruption of shutting down their offices and removing their furniture. Billions of pounds of carpets are removed each year and sent to landfills, where they will last up to 20,000 years. To escape this unproductive and wasteful cycle, Interface is transforming itself from a company that sells and fits carpets into one that provides floor-covering services.*

*Under its Evergreen Lease, Interface no longer sells carpets but rather leases a floor-covering service for a monthly fee, accepting responsibility for keeping the carpet fresh and clean. Monthly inspections detect and replace worn carpet tiles. Since at most 20% of an area typically shows at least 80% of the wear, replacing only the worn parts reduces the consumption of carpeting material by about 80%.”<sup>12</sup>*

Interface reports a win-win for itself, its customers and the environment by taking this approach. For Interface, it receives ongoing and regular cash flow and builds long-term relationships with its customers, rather than supplying carpet once every 10 years. We comment that the key characteristic of this service is that it appears to offer a more efficient means of providing floor coverings, because it reduces the need to replace unworn and still serviceable areas of carpet. This reduction in resource consumption has an environmental benefit, and because the consumption of resources (ie. carpet) has an economic cost, more efficient consumption provides both environmental and economic benefits. The business is able to gain a competitive advantage by sharing those economic benefits with customers. Interface has also been able to

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<sup>12</sup> Harvard Business Review (June 99), A Road Map for Natural Capitalism, p.154.

secure more customers as demand for this approach has grown.<sup>13</sup> For Interface's customers, they are sharing in a more efficient transaction, avoiding a relatively infrequent and large cost associated with total carpet replacement and office disruption.

We also comment that leasing rather than purchasing capital assets that tend to wear out relatively quickly, is not a new idea. For example, it is a common means of financing computer equipment, commercial vehicles and aircraft to commercial customers, to match their revenues and cash expenditures. The innovative presented above appears, however, to be the extension of the idea to a new area where the environment wins along with the producer and consumer.

### **7.3.1.3 Accessing new markets – the European example**

Societal attitudes in some markets are different to those experienced in Australia. As such, in order to access or maintain market share in other geographic regions, companies might find life-cycle approaches advantageous. Throughout our interviews, Europe was cited as a region where consumer preferences were 'greener' than other locations. The European market is also influenced by its regulatory environment.

The website might consider providing details of regulatory and other market developments occurring particularly in Europe and Japan, which are increasingly requiring suppliers to those markets to demonstrate environmental credentials. For example there are published EU directives on:

- Waste Electrical and Electronic Equipment (see [http://europa.eu.int/comm/environment/waste/weee\\_index.htm](http://europa.eu.int/comm/environment/waste/weee_index.htm));
- Restriction on Hazardous substances (see [http://europa.eu.int/eur-lex/pri/en/oj/dat/2003/l\\_037/l\\_03720030213en00190023.pdf](http://europa.eu.int/eur-lex/pri/en/oj/dat/2003/l_037/l_03720030213en00190023.pdf));
- Regulation, Evaluation and Authorisation of Chemicals (see <http://europa.eu.int/comm/enterprise/reach/index.htm>); and
- End of Life Vehicles (see [http://europa.eu.int/comm/environment/waste/elv\\_index.htm](http://europa.eu.int/comm/environment/waste/elv_index.htm)).

As mentioned earlier in this section, we suggest that the Victorian Government will need to remain abreast of similar developments in other geographic markets and any new developments. By signalling future potential market directions it may be able to assist Victorian-based companies to assess market strategies and risk profiles.

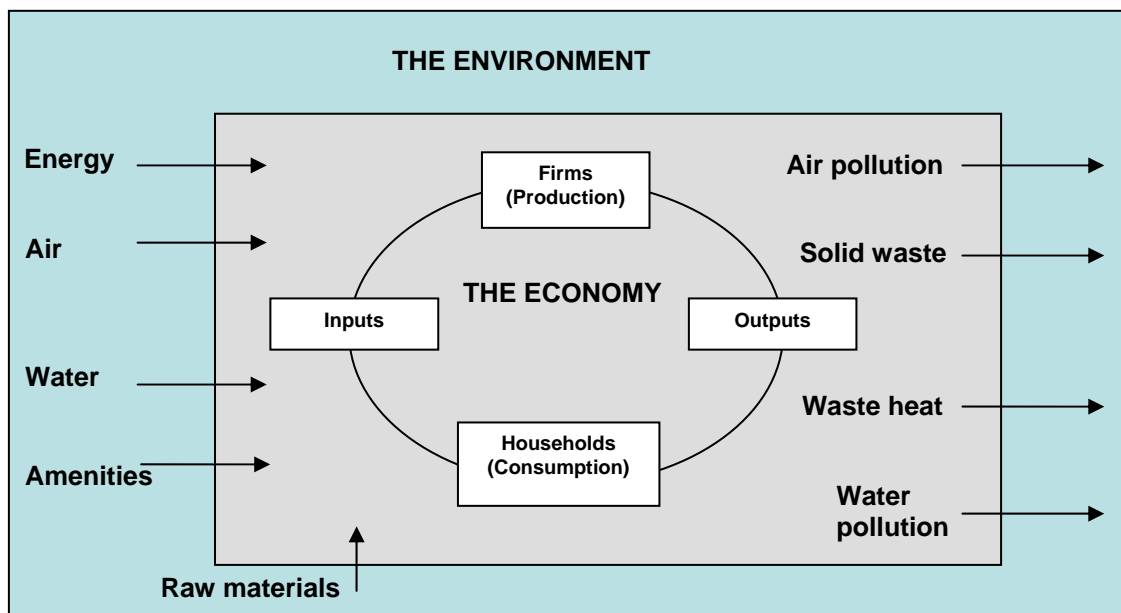
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<sup>13</sup> Competition in this market will eventually increase and Interface will likely need to continue to innovate its product and marketing strategy to maintain market share.

### 7.3.2 Using LCM to implement cost savings

We suggest that an understanding of business inputs and outputs and their consequential interactions with the surrounding environment is key to understanding LCM. By adopting life-cycle approaches, business can access various tools that might better enable them to understand the range of inputs utilised in their operations and outputs both consumed by customers and released to the environment. This interaction between the economic system and the environment is summarised in the diagram below.

Figure 7-1: Interactions between the economy and the environment



Source: From Tietenberg, T. (2003) *Environmental & Natural Resource Economics*, 6<sup>th</sup> Edition, p. 17

In principle, both economic and environmental benefits can be gained where:

- the consumption of inputs on the left hand side of the diagram can be reduced and there are economic costs attached to the inputs; and
- the undesirable environmental outputs on the right hand side of the diagram can be reduced and there are economic costs attached to those outputs.

Environment Canada indicates:

*“Cost savings can result from design and process changes that reduce material consumption, emissions and wastes. Lower quantities and reduced toxicity of wastes and emissions also mean less risk of fines and penalties for non-compliance with health and environmental regulations.”<sup>14</sup>*

The website might provide a case study describing a business’ success in implementing LCM approaches to improve resource efficiency and realise a financial gain<sup>15</sup> and explaining the causal relationship between economic and environmental benefits.

One example might be Origin Energy’s efforts to understand electricity consumption at each of its office locations with a view to identify best practice and implement energy-efficient improvements at all locations.

Origin Energy is in the business of selling energy and on the face of it, it has incentives to *maximise* consumers’ energy consumption. However undertaking “demand management” studies to help customers reduce energy consumption can help a retailer such as Origin, to improve its economic position. This is because the reforms in the National Electricity Market (and increasingly in the gas market) have led to energy pricing becoming more reflective of costs and available supply and demand. This means that energy retailers are exposed to significant pricing risk because the market energy costs to a retailer can be highly volatile (eg. between \$25 per MWh and well in excess of \$1,000 per MWh over the course of a day when demand is high). Competition in the retail market obliges retailers to contract with customers to sell energy at fixed prices. Therefore, the retailers add value or earn profit from managing the risk between volatile input prices and fixed output prices. If by working with a customer a retailer can reduce demand at times when wholesale market prices are very high, or establish reasonable certainty about customers’ patterns of usage, then the retailer is in a far better position to manage that risk and hence improve its economic returns. It may reduce revenue by selling less energy but at the same time it would expect to reduce its costs by an even greater amount by reducing the need to procure energy at times when it is highly priced.

While this example shows how a well-developed market can provide incentives for efficient resource consumption, we observe that there are not yet well-developed economic markets across all of the inputs and outputs that may hold the potential for environmental harm, illustrated in Figure 7.1.

Accordingly, we suggest that the website could inform businesses of:

- where economic opportunities might lie in developing markets for environmental consumption and waste outputs; and

<sup>14</sup> Environment Canada (1997), *Environmental Life Cycle Management: a guide for better business decisions*.

<sup>15</sup> Some case studies will be developed as part of the communications phase and potential examples will be discussed with the EPA, DIIRD and EcoRecycle.



- the current state of development of those markets and future likely developments, that may help businesses to gain market advantage.

The water market would be an example.

### 7.3.3 Strategies to reduce and manage risks

As discussed throughout this report, firms will take decisions that seek to balance exposure to risk and potential financial gain. In a constantly changing economic environment, firms are becoming increasingly exposed to different events and situations that might impact their market position (e.g. globalisation, Kyoto Protocol). By adopting life-cycle approaches, firms can better understand their inputs, outputs and interactions with the surrounding environment, providing them with essential information in the risk identification and risk management process.

As suggested by Environment Canada:

*“The risk of future liabilities may also be diminished, because LCM can help minimise environmental, health and safety problems associated with the production, use, servicing and disposal of the product.”<sup>16</sup>*

The website might include a case study, demonstrating where a business has implemented life-cycle approaches to help reduce future liabilities. Such a case study would need to highlight the risk exposures experienced by the company and tangible ways in which LCM is being adopted in the risk management process.

An example of a potentially suitable case study might be Orica, and its Consumer Products Division – Dulux. Orica has in the past manufactured chemicals with particularly toxic by-products that are now stored at Botany and represent a significant liability. In order to avoid similar circumstances occurring in the future, Orica has implemented life-cycle approaches across its business lines. For example: Dulux Paints has used life cycle analysis to determine that the greatest environmental impacts of its products are the release of volatile organic compounds (VOC) and the mining and production processes for titanium dioxide (TiO<sub>2</sub>). Dulux is now working with its research and development team to reduce VOCs, while still maintaining paint performance. It is also working closely with its TiO<sub>2</sub> suppliers encouraging their use of LCA to reduce the environmental impacts of mining and production.

We also suggest that the website could include an overview of:

- community-wide awareness of environmental risks;
- their implications for litigation, legislation and regulation; and

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<sup>16</sup>Environment Canada, *Environmental Life Cycle Management: a guide for better business decisions*.

- a forward view of emerging litigation, legislation and regulatory risks associated with environmental issues orientated to assist businesses to take a strategic, forward looking position, to reduce associated economic risks.



### 7.3.4 Strategies to improve workplace culture

We were provided with anecdotal evidence during our company interviews that companies who have high levels of environmental awareness and implement initiatives such as LCM have improved workplace culture which provides them with the ability to attract and retain good quality staff members.

The website might consider identifying research supporting these anecdotal comments, for example:

- Forbes<sup>17</sup> reported a study done by Students for Responsible business which found that more than half of the 2,100 MBA student respondents indicated they would accept a lower salary to work for a socially responsible company. A more recent study by Albinger and Freeman (2000)<sup>18</sup> provide empirical evidence that the companies which are rated highly in the area of corporate social performance are more attractive to the most highly qualified employees.
- Information provided by the Department of Environment and Heritage at [www.deh.gov.au](http://www.deh.gov.au) states: “research shows that corporate responsibility and environmental commitment actually strengthens an organisation’s bottom line, primarily by aiding in recruiting and retaining employees.”
- KPMG’s 2002 International Survey of Corporate Sustainability Reporting suggested one of the main business drivers (1700 firms surveyed) for adopting environmental policies and sustainability reporting at #3 behind enhancing corporate reputation and reducing risk, was “establishing the company as employer of choice”.

The website might potentially combine these examples with an illustration of the costs of staff turnover, by including for example illustrations of benchmarks for the costs of recruitment, training and discontinuity.

<sup>17</sup> Dolan, K.A. (1997) ‘Kinder, Gentler MBAs’, *Forbes*, June 2, p 39-40

<sup>18</sup> Albinger, H. and Freeman, S. (2000) Corporate Social Performance and Attractiveness as an Employer to Different Job Seeking Populations, *Journal of Business Ethics*, 28:243-253

### **7.3.5 Strategies to improve resource and economic efficiency by businesses working together**

In section 5.2.2 we discussed how companies felt that an active involvement and promotion of life-cycle approaches across the entire product lifecycle was complex given the relatively large number of players in the supply chain. Companies feel more able to influence behaviour within their own sphere of influence or specific site(s), and less able to influence the behaviour of a number of suppliers, both upstream and downstream of their operations.

Business told us that they are, however, receptive to working collaboratively with suppliers to find solutions to environmental issues and often during our interviews suggested they would like to do more with suppliers in this regard.

We suggest that a key incentive for this would be if by working together:

- businesses may be able to identify opportunities for resource and consumption efficiency, ahead of the market; and
- producers and suppliers are able to share in the economic benefit of that efficiency.

We recently heard an anecdotal example of a manufacturer who after receiving materials from a key supplier needed to resize the material. This involved expending energy and effort as well as the production of waste material. However, by working more closely with the supplier, the manufacturer found that the supplier was able to supply the material at the desired sizes. This proved cheaper for the supplier and also introduced cost savings for the manufacturer. It also reduced waste and energy consumption across the product life cycle. The manufacturer and the supplier struck a price where they both benefited over their prior arrangement.

We observe that this will not work in all cases. It is unlikely that a supplier would be able to efficiently customise its products for all customers. However, if the customer is large enough it may be able to do so. We also comment that in principle, in time a competitor may have put (or in future will put) an alternative offer to supply the manufacturer at a more efficient price that will erode the efficiency gains currently enjoyed by the supplier. This is not unusual. In time, markets as a whole tend to 'catch up' on efficiencies enjoyed by individual participants. However, the key point would seem to be that by cooperating in this way the supplier and manufacturer were able to capture economic and environmental benefits ahead of the market, which would give them both an advantage over their competitors, albeit not necessarily a permanent one.

We reported in section 5.2.2 that companies today tend to rely on outsourcing and collaboration with suppliers rather than on vertical integration. Given this reality, businesses can only go so far to improve efficiency in the use of raw-material and intermediary inputs for their own economic gain. However if closer relationships are developed with suppliers, it is possible that life-cycle driven solutions might enable both parties to share in the economic gain.

We suggest that the EPA's LCM website could do the following things to improve collaborations between companies to achieve improved economic and environmental outcomes:

- Invite companies to forums, seminars and conferences that discuss LCM. These events can facilitate networking across the supply chain. A number of companies interviewed suggested that external speakers with international renown were a potential drawcard. The website should contain links to information on upcoming events.
- Create and facilitate participation in an online discussion forum where business can discuss and hopefully find solutions collective issues and problems with LCM.
- Provide toolkits similar to *Tool #4 – Engaging your suppliers* described by Environment Canada in its LCM brochure.
- Provide examples and case studies where other companies have successfully engaged with their suppliers and what initiatives were implemented in that process. Examples include Nokia's Supplier Network Management program (see [www.nokia.com/nokia/0,6771,27475,00.html](http://www.nokia.com/nokia/0,6771,27475,00.html)) and Ericsson's Full Circle Plans that see "supplier's onboard" (view at [www.ericsson.com/sustainability/full\\_circle\\_plans.shtml](http://www.ericsson.com/sustainability/full_circle_plans.shtml)).

### **7.3.6 Influence consumer markets**

In Section 5.2.1 we discussed absence of consumer demand as being a barrier to businesses adopting life cycle approaches in product development where customers are not willing to pay for environmental benefits. Consumers will not necessarily accept products with reduced performance or functionality; pay more for products that are more environmentally sound; or go out of their way to secure the environmentally sound alternative.

Each of these circumstances implies that business may need to invest more in product research and development to improve its performance; invest more in marketing to identify niche markets; or sell a product at a lower price, in order to be competitive. However, this expenditure could make the product economically unsustainable.

Business suggested during our interviews and workshops there is a role for government to educate consumers about the potential environmental impacts associated with product use (e.g energy consumption) and disposal. For example, campaigns such as the recent water advertisements can focus consumer attention to purchasing more environmentally sustainable products.

We suggested that there is probably a role for both the public and private sectors to promote the consumer's role in life cycle management. Businesses' own marketing and product promotion activities remain important in overall consumer education, and there are actions the government might take to support business in their marketing efforts.

As suggested in the Canadian Government's document on LCM, the website might "inform consumers that their use of a product is an important part of the lifecycle and focus on ways for consumer behaviour to help minimize environmental burdens (e.g. by increasing produce life, minimising energy and materials consumption associated with the product's use etc)." The website could also provide tips to business and examples of how other companies are incorporating this type of consumer education in their advertising, product labelling, etc resulting in improved sales performance, brand strengthening or increased market share.

Where available, the website could provide links to market research or other research demonstrating increasing public awareness of environmental issues. This type of information lets business know about potential changes in market demand and new and emerging customer needs and demands.

Outside of the scope of this project, the Victorian Government might also consider further investigation of the need for direct consumer education activities by Government and what form this might take. There is some anecdotal evidence arising from this project, suggesting that consumers are not well educated or informed about the environmental consequences of product and energy consumption (e.g. Origin Energy's suggestions that Victorian consumers thought most power came from Hydro schemes and not the La Trobe Valley) and businesses have limited incentives to undertake basic education programs. We also observe that changing household consumption patterns is an important part of ensuring that all participants in the product lifecycle have shared responsibility in improving overall sustainability. For example, the OECD in its July 2002 policy brief on sustainable household consumption:

*"Changing unsustainable household consumption patterns is crucial for achieving the goal of sustainable development in OECD countries. Households affect the environment through their energy and water consumption, waste generation, transport patterns and food choices. For many years, environmental policies were focused on the production side, mainly through pollution control and eco-efficiency. Household consumption patterns, and the drivers behind them were poorly understood. This has made it difficult in the past to identify the appropriate role of governments in promoting more sustainable consumption patterns, and for the choice and implementation of different policy instruments."*<sup>19</sup>

### **7.3.7 Access to information and support**

During the interviews and workshops, some companies indicated that it is often difficult to know where to start if they are considering that adopting a life-cycle approach might be beneficial for their business.

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<sup>19</sup> OECD (July 2002) *Towards Sustainable Household Consumption? Trends and Policies in OECD Countries*.

The website might also provide simple tool kits and information on what other tools can assist business in identifying their resource use and ways to improve resource efficiency. The table below includes some potential examples:

#### **Toolkits examples and information on specific tools**

- Environment Canada's LCM brochure includes simple tools for businesses getting started with LCM, such as:
  - Tool #1 - Product life cycle mapping; and
  - Tool #2 - Identifying inputs and outputs for each unit in the life cycle map.
- Specific product design tools, such as :
  - Links to information on "Design for Environment", e.g. See *Product Innovation The Green Advantage: an introduction to Design for Environment for Australian Business* at [www.deh.gov.au/industry/finance/publications/producer.html](http://www.deh.gov.au/industry/finance/publications/producer.html)
  - Links to information on Life Cycle Assessment (LCA). E.g. ISO, RMIT, University of Newcastle.
- Process change tools, e.g:
  - Links to information on "Eco footprint".

### 7.3.8 Summary of website content ideas

Content ideas and rationale is presented in the table below.

Vision	Objectives	Strategies	Actions
<p style="text-align: center;">Greater uptake of life cycle management by Victorian business and industry</p>	<p>1. Ensure understanding that the Victorian Government's interests in LCM are congruent with business' interests</p>	<p>1.1 Explain government's interest in LCM</p>	<p>1.1 Communicate alignment between economically and environmentally beneficial initiatives (see Section 7.2)</p>
		<p>1.2 Identify a Unique Selling Proposition</p>	<p>1.2 Communicate what LCM offers beyond other concepts and tools (see Section 7.2)</p>
	<p>2. Demonstrate how business might maximise the benefits and overcome the barriers of adopting LCM</p>	<p>2.1 Market opportunities</p>	<p>2.1 Provide information and examples of new products, redefined products and new markets (see Section 7.3.1)</p>
		<p>2.2 Cost savings</p>	<p>2.2 Provide targeted case studies demonstrating cost savings (see 7.3.2)</p>
		<p>2.3 Risk management</p>	<p>2.3 Provide targeted case studies demonstrating risk management (see Section 7.3.3)</p>
		<p>2.4 Improved workplace culture</p>	<p>2.4 Provide information and examples on being employer of choice (see Section 7.3.4)</p>
		<p>2.5 Businesses working together</p>	<p>3.1 Provide targeted case studies and ideas/forums for engaging with stakeholders (see Section 7.3.5)</p>
		<p>3.6 Consumer demand</p>	<p>3.2 Communicate consumer trends and provide consumer advice (see Section 7.3.6)</p>
		<p>2.7 Advice on concepts and tools</p>	<p>3.3 Provide background and support details for various tools (see Section 7.3.7)</p>

## **A Appendix: Workshop information brochure**

### **A.1 Listening to business: A workshop to explore life cycle thinking and approaches in Victoria**

#### **A.1.1 An invitation.....**

Is your business seeking to:

- Improve profitability?
- More effectively manage its risks?
- Contribute to a more sustainable environment?

If so, you are invited to attend a workshop to explore the potential benefits of adopting life cycle thinking and help EPA Victoria, EcoRecycle Victoria and Department of Innovation, Industry and Regional Development to understand how the obstacles to achieving those benefits might be overcome.

#### **A.1.2 Who should attend?**

At these workshops we would like to hear from business people involved in:

- Strategic business decision making;
- Product or service design, including industrial design;
- Supply of goods and services;
- Manufacturing processes and process engineering;
- Distribution of goods and services;
- Packaging of goods;
- Product sourcing and purchasing; and
- Investment and risk management.

All of these people can play a significant role in the adoption of life cycle thinking and approaches to improve business performance and contribute to a more sustainable future.



### A.1.3 Introduction

In summary this paper:

- outlines the potential business benefits of life cycle thinking;
- briefly describes what life cycle thinking is and how it can be implemented;
- announces the times and dates of workshops to discuss the benefits of and barriers to life cycle thinking ; and
- tells you how to register to attend a workshop.

### A.1.4 What are the potential benefits of life cycle thinking?

Life cycle thinking has been adopted by large and small companies, in Europe, Japan and increasingly in Australia. Examples including Toyota, Unilever, BASF, Ericsson and Nokia, Cannon, Fuji Xerox, Orica, Bluescope Steel, Yalumba, Schiavello, Plantic, and Electrolux, Reasons given for adopting life cycle thinking include:

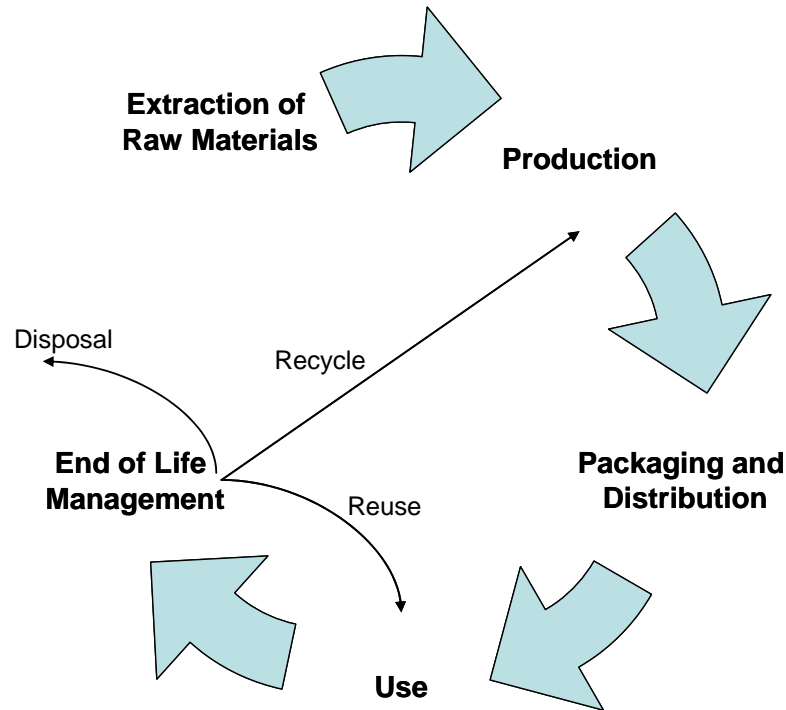
- Delivering **cost savings** through increased efficiencies;
- Gaining **market advantage** through eco labelling programs;
- **Risk reduction**, resulting in improved ability to raise capital;
- Enabling **efficient investment** decisions;
- **Improved corporate image**; and
- Response to **consumer demand**.

Klaus Toepfer of the United Nations Environment Program (UNEP) has described the drivers for adopting life cycle approaches in the following terms.

*"Consumers are increasingly interested in the world behind the product they buy. Life cycle thinking implies that everyone in the whole chain of a product's life cycle, from cradle to grave, has a responsibility and a role to play, taking into account all the relevant external effects. The impacts of all life cycle stages need to be considered comprehensively when taking informed decisions on production and consumption patterns, policies and management strategies."*

### A.1.5 What is life cycle thinking?

A product's "life cycle" spans from the extraction of raw materials right through to the management of its residue at the end of its productive life. The diagram below shows a typical product life cycle.



Life cycle thinking seeks to optimise the way in which products and services are delivered to consumers so that:

- Resources are used efficiently; and
- Ecological impacts (and hence environmental and associated business risks) are minimised.

Appendix A provides links to a range of websites that provide further information.

### A.1.6 How can I implement life cycle thinking in my business?

To give effect to the adoption of life cycle thinking, a range of qualitative and quantitative implementation tools have been developed. These tools are designed to inform business decision-making processes. They include:

- **Life cycle assessment (LCA)** – Through the ISO 14040 standard, LCA is an internationally recognised approach to evaluating and quantifying the potential environmental impacts of a product or service through all stages of its life cycle. LCA is a powerful tool used for assessing the environmental impact of a range of business decisions. In particular, it has been very successfully used to instruct decision-making in product design.

- **Life cycle costing (LCC)** – LCC seeks to determine the cost-effectiveness of alternative investments and business decisions. This approach can be used in conjunction with LCA, to assist business decision makers in balancing optimal economic and environmental outcomes.
- **Design for the environment (DfE)** – DfE involves the comparison of the performance, costs, and environmental and human health impacts of competing technologies. It seeks to encourage innovation through redesign of products rather than relying on end-of-pipe controls to manage environmental risks.
- **Product Stewardship** – Product stewardship involves taking an active interest your materials and products after they enter the market. This helps to manage risks associated with use and disposal of you product and opens opportunities to generate value and customer connections though beneficial use or appropriate treatment of you products at the end of its initial life.

#### **A.1.7 What are the life cycle thinking workshops?**

Between 19 and 30 November 2004, workshops will be held across Victoria's major regional centres to engage Victoria's business community in a discussion on the economic, social and environmental implications of adopting life cycle thinking and approaches.

The objectives of the workshops are to:

- understand how Victorian businesses can unlock the potential **profitability, efficiency, risk reduction** and **environmental** benefits of life cycle thinking; and
- provide businesses with the opportunity to contribute to this understanding so that the Government's subsequent facilitation of outcomes is relevant to actual business needs.
- The workshops will appeal to senior business managers who are seeking to enhance profitability, manage business risks and contribute to a more sustainable environment.
- The workshops are a joint initiative of key Victorian Government agencies charged with promoting sustainable development - EPA Victoria, EcoRecycle Victoria and Department of Industry, Innovation and Regional Development.

The findings of the workshops will be used to develop strategies and approaches that seek to assist the Victorian business community to adopt life cycle thinking. These strategies and approaches will be made available to businesses by a variety of means including a dedicated website.

KPMG, the CreativeFive Group and RMIT's Centre for Design have been appointed as advisers to this project.

### **A.1.8 When and where are the workshops to be held?**

<b>Date</b>	<b>Time</b>	<b>Location</b>
Friday 19 November 2004	8:30 am – 12:30 pm	Parkview Motor Inn Conference Centre 56 Ryley Street, Wangaratta
Thursday 25 November 2004	8:30 am – 12:30 pm	Century Inn Princes Hwy (Cnr Airfield Rd), Traralgon
Friday 26 November 2004	8:30 am – 12:30 pm	National Wool Museum 26 Moorabool St, Geelong
Monday 29 November 2004	8:30 am – 12:30 pm	National Hotel 182 High St Bendigo
Tuesday 30 November 2004	8:30 am – 12:30 pm	Centre for Adult Education (CAE) Flinders Lane, Melbourne City

### **A.1.9 What will the workshops cover, how can I prepare?**

The workshops will comprise a number of facilitated group activities which will discuss:

- The potential business benefits of adopting life cycle thinking;
- The barriers faced in adopting life cycle thinking;
- How you see consumer demand (including the demands businesses place on their supply chain) influencing the adoption of life cycle thinking;
- How risk management influences the adoption of life cycle thinking; and
- The synergies between existing systems, such as Environment Management Systems, and the adoption of life cycle thinking.

The workshops offer an opportunity for the Victorian business community to provide input into the development of strategies and approaches to increase the uptake of life cycle thinking. To help understand the benefits that life cycle thinking may be able to bring to your business you may like to review the pro forma worksheet attached at Appendix B. This will help to focus the workshop discussion on the benefits and obstacles faced by your business.

### **A.1.10 How do I register?**

Please register your interest in attending one of the workshops by Tuesday 23 November 2004 by contacting Susan Moldrich of EPA Victoria via email at [susan.moldrich@epa.vic.gov.au](mailto:susan.moldrich@epa.vic.gov.au) or by phone on (03) 9695 2544 with:

- the names and contact of the representatives from your business who will be attending;
- your business name and industry sector; and
- which workshop you would like to attend.

It would also assist if you could provide an approximate indication of the size of your business, by indicating, for example turnover or employee numbers.

### A.1.11 How can I find out more about life cycle thinking?

Victorian Government Links

<http://www.environment.vic.gov.au/envgate/index.htm>  
[www.epa.vic.gov.au/sustainability](http://www.epa.vic.gov.au/sustainability)

General links

[http://www.cfd.rmit.edu.au/programs/life\\_cycle\\_assessment](http://www.cfd.rmit.edu.au/programs/life_cycle_assessment)  
<http://www.uneptie.org/pc/sustain/lcinitiative/training.htm>  
[http://www.polymtl.ca/ciraig/ciraig\\_eng\\_content\\_01.html](http://www.polymtl.ca/ciraig/ciraig_eng_content_01.html)  
<http://www.alcas.asn.au/>  
<http://www.natlogic.com/resources/nbl/v05/n03.html>

Corporate links

<http://www.nokia.com/nokia/0.8764.27473.00.html>  
[http://www.ericsson.com/sustainability/full\\_circle\\_plans.shtml](http://www.ericsson.com/sustainability/full_circle_plans.shtml)  
[http://www.corporate.basf.com/en/sustainability/oekoeffizienz/?id=V00-RNe945m\\_6bcp-ho](http://www.corporate.basf.com/en/sustainability/oekoeffizienz/?id=V00-RNe945m_6bcp-ho)  
<http://www.toyota.com/about/environment/news/enviroreport.html>  
<http://www.unilever.com/environmentsociety/environmentalmanagement/lifecycleassessment/>  
<http://www.bluescopesteel.com/corp/navajo/display.cfm?objectID=9AB7BF14-6B30-4AE0-A8BB9A737533095F>  
<http://www.schiavello.com.au/company/env.htm>

### A.1.12 Life cycle thinking worksheet

This worksheet is designed as a thought starter for the life cycle thinking workshop. It takes the form of a set of short questions focussing on the life cycle of a product or service offered by your business and seeks to answer the question

*“What barriers does your business face in adopting life cycle thinking?”*

It does this by asking a range of targeted questions focussed on understanding each element of the life cycle of a product or a service. Please answer the questions set out in the pro forma for only **one** major product or service offered by your business and bring to the workshop.

#### ***A.1.12.1 Design of products and services***

- What process do I follow to design my products and services?
- In designing a product or service, do I consider the costs and/or environmental impacts at each stage of the life cycle?
- If not, what are the barriers to considering these costs and/or environmental impacts at the design stage?

#### ***A.1.12.2 Supply of bought in goods and services***

- What are my bought in goods and services (eg energy, water, raw materials)?
- Where do these goods and services come from?
- Are there alternative suppliers who could provide these goods and services with a lesser environmental impact?
- If so, what are some of the barriers to purchase these alternative goods and services?

#### ***A.1.12.3 Production of goods or Provision of a service***

- What is my product/service?
- Are there wastes associated with the production of goods or provision of a service (eg solid liquid and gaseous wastes)?
- How are these wastes managed (eg reused, recycled disposed)?
- Are there alternative ways of managing these wastes that could result in a reduced environmental impact?
- If so, what are some of the barriers to uptake of these alternative waste management practices?

#### ***A.1.12.4 Distribution and packaging***

- How do I distribute my product/service?
- How do I package my product/service?
- Are there alternatives to my distribution and/or packaging approach that could result in a lesser environmental impact?
- If so, what are some of the barriers to changing my distribution and/or packaging approach?

***A.1.12.5 Use of goods and services***

- Are there materials consumed in using my product/service (eg energy, water for cleaning)?
- Can these consumables be reduced?
- Can my product be designed to be more durable?
- If so, what are some of the barriers to reducing consumption resulting from use of my product/service?

***A.1.12.6 End of life management***

- How is your product managed at the end of its life (eg reused, recycled, disposed)?
- Are there alternative ways of managing these wastes that could result in a reduced environmental impact?
- If so, what are some of the barriers to uptake of alternative waste management practices?

## **B Appendix: Workshop and interview attendees**

### **B.1 Workshop attendees**

The workshops were attended by 67 industry participants representing 55 Victorian businesses. Attendees names are recorded in the table below.

<b>Name</b>	<b>Organisation</b>	<b>Workshop attended</b>
Steven Sinclair	Alpine Industries Pty Ltd	Wangaratta
Terry McKenna	Oztek Holdings Pty Ltd	Wangaratta
John McMaster	Yea Sand & Gravel Pty Ltd	Wangaratta
Gary Cameron	Brown Brothers Milawa Vineyard Pty Ltd	Wangaratta
Paul Matuschka	Masterfoods Petcare	Wangaratta
John Rogalski	Masterfoods Petcare	Wangaratta
Julian Clark	Masterfoods Petcare	Wangaratta
Randolph Sidoo	Riverland Oilseed Processors Pty Ltd	Wangaratta
Jodie Membury	Murray Goulburn Co-Op Co Ltd	Wangaratta
John West	Australian Country Spinners	Wangaratta
Malcolm Andison	Australian Country Spinners	Wangaratta
Justin Peace	Meiji-MGC Dairy Co Pty Ltd	Wangaratta
Paul Wilson	Kraft Foods Ltd	Wangaratta
Frank Nogore	Mecrus Pty Ltd	Wangaratta
Scott Crutchfield	Mecrus Pty Ltd	Wangaratta
Tony Williams	D & R Henderson	Wangaratta
Kim Daldy	SPC Ardmona Operations Ltd	Wangaratta
Mike Edwards	Carter Holt Harvey Wood Products Pty Ltd	Wangaratta
Ray Fleming	Unilever Australia Ltd	Wangaratta
Michael Makin	ADI Munitions Pty Ltd	Wangaratta
Len Tricarico	Campbells Soups (Aust) Pty Ltd	Wangaratta
Neville Hirth	[not indicated]	Traralgon
Brian Hamer	Murray Goulburn Maffra	Traralgon
Kirsten Schliephake	Australian Sustainable Industry Research Centre	Traralgon
Steve Shiners	Gippsland Water	Traralgon
Dr Geoff Perry	Humates Australia	Traralgon
Garry Gooding	Latrobe Regional Hospital	Traralgon
Graham Denney	Burra Foods Australia	Traralgon
Lloyd Perryman	Nylex Corporation	Traralgon
Chris Buckingham	Go To... Pty Ltd	Traralgon



<b>Name</b>	<b>Organisation</b>	<b>Workshop attended</b>
Alec Zurrer	Jindi Cheese	Traralgon
Brian Bartlett	Onesteel Wire Pty Ltd	Geelong
Chris Quadroy	Nestle Australia Ltd	Geelong
David Peart	Geelong Manufacturing Council	Geelong
Peter Aberle	Shell Refining (Aust) Pty Ltd	Geelong
Carnie Doyle	Ford Motor Co Of Australia Ltd	Geelong
Bill Reynolds	Selkirk Brick Pty Ltd	Geelong
Tony Overman	Sinclair Knight Mertz	Geelong
Katherine Simmons	Basell Australia	Geelong
Damian Bassett	Rohm & Haas Australia Pty Ltd	Geelong
Karen Harding	Tatura Milk Industries Ltd	Bendigo
Colin Ingwerson	H J Heinz Co Australia Ltd	Bendigo
Lester Gilmore	H J Heinz Co Australia Ltd	Bendigo
Roger Knight	Murry Goulburn Co-Op Co Ltd	Bendigo
Clinton Perry	HW Greenham & Sons	Bendigo
[Not indicated]	Central Victorian Greenhouse Alliance	Bendigo
Peter Glazebrook	Rio Tinto Technical Services	Melbourne
Darren Buller	Toyo Tyres	Melbourne
Leigh Watkins	Bendigo Bank	Melbourne
Susan O'Toole	Carter Holt Harvey Wood Products Pty Ltd	Melbourne
Claire Mouser	Adidem Group	Melbourne
Jacinta Spoterswood	Amcor Packaging	Melbourne
Nigel Cann	Australian Vinyls	Melbourne
Trish Kerin	Australian Vinyls	Melbourne
Steven Clarke	Bluescope Steel	Melbourne
Sue Brown	BP	Melbourne
Beatrix Fisher	City West Water Ltd	Melbourne
Erin Musk	City West Water Ltd	Melbourne
Kelvin Genn	Compass Group	Melbourne
Rob Lowe	Norvic Food Processing	Melbourne
Dave Elkington	Norvic Food Processing	Melbourne
Richard Gerardi	Nufarm Australia	Melbourne
Maree Lang	PACIA	Melbourne
Joanna Richards	PMP Print	Melbourne
Duncan Thompson	Toyota	Melbourne
Kate Vinot	Visy	Melbourne

## B.2 Interview attendees

Interviews were held with seven companies during January 2005. Individuals who attended each interview are listed in the table below.

Name	Organisation	Date	Location
Chris Stapleton <i>Special Project</i>	Chemsal	10 Jan 05	Laverton North
Simon Vandestadt <i>Environnement Manager</i> Chrissie <i>Finance</i> Rob & Elizabeth <i>R&amp;D</i> Rod <i>Purchasing</i>	Orica Consumer Products (Dulux)	17 Jan 05	Clayton
Leigh Watkins <i>Manager Community Banking</i>	Bendigo Bank	19 Jan 05	Bendigo
Steve Harris <i>National Manager Environmental Markets</i> Mark Latham <i>Retail HSE advisor</i>	Origin Energy	20 Jan 05	Melbourne City
Andy Trott <i>Manager Environment</i>	Australia Post	21 Jan 05	Melbourne City
Dennis Mason <i>Works Power Systems Engineer</i> Steve Clarke <i>Principal Environmental Engineer</i> Robin Borger <i>Business Systems Manager</i> Catherine Clancy <i>Manager Product Stewardship &amp; Sustainability</i> Kevin Williams <i>Chief Technologist Polymer Products</i> Glenn MacMillan <i>Electrical Engineer</i>	BlueScope Steel	21 Jan 05	Hastings
Michael Tyrrell <i>Managing Director</i> Adam Lawrence <i>Sales Manager</i>	National Can Industries	25 Jan 05	Clifton Hill