Aiming for Sustainable Product Development

Packaging

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This brochure aims to provide summary information and guidelines that can assist designers and the packaging industry more broadly, in its transition to higher levels of environmental performance and Sustainable Product Development (SPD).

Packaging plays a critical role over and above the usual negative claims that are often reported. Well designed packaging fulfils a diverse range of functions from dispensing content, through to preventing breakage, leakage, spoilage and contamination of contents. Packaging can extend the life of contents and ensure that products are safely stored while in transit. Packaging is also a key factor in marketing a product and capturing the interest of consumers in a highly competitive market place, especially when it comes to household items such as food, beverages, detergents and many other consumables. Increasingly, packaging delivers important information to consumers about issues such as specific content, nutrition and instructions for use, assembly, etc. It becomes clear that well designed packaging can perform numerous useful functions, however it is also obvious that packaging that is not supported by effective recovery and recycling systems represents an inefficient use of resources/materials and can contribute to solid waste and other impacts associated with landfilling.

One of the most significant initiatives aimed at minimising packaging waste in Australia has been the development of the National Packaging Covenant (NPC). The NPC is a self-regulatory agreement between industries in the packaging chain and all spheres of government, based on the principles of shared product responsibility and Product Stewardship, and applied throughout the chain, from raw material suppliers to retailers, and the ultimate disposal of waste packaging. More detailed information about the NPC can be found on Environment Australia’s web site <http://www.environment.gov.au/epg/covenant/index.html>. The site provides comprehensive information about all aspects of the Covenant including action plans, industry transitional funding arrangements, a list of existing signatories, fact sheets and other useful links and resources directly aimed at assisting industry and other stakeholders to become signatories.

Drivers for change

- Special events, such as the 2000 Olympics, demand that Australian companies demonstrate innovations in “green packaging”.
- The National Packaging Covenant and various State-based policies also act as incentives and drivers for industry to address environmental concerns associated with packaging.
- Australian exporters must conform to stricter overseas legislation in order to compete in foreign markets.
• Greater international concern about global warming, stricter greenhouse gas limits to be met and the growing belief by government agencies and the community that packaging companies should lead the way in Product Stewardship.

• Increased public awareness and participation in recycling food and beverage containers through kerbside recycling is also educating people about resource conservation and effective waste management.

Life cycle environmental impacts

Major impacts of the different stages in a package’s life cycle.

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<th>Air emissions</th>
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Design strategies

The strategies below will not be appropriate for every application and are by no means exhaustive. Redesign, therefore, must be approached with flexibility and openness. These strategies should be viewed as prompts for the development of design techniques appropriate to each situation.

Waste management
Recently there has been a great deal of emphasis on recycling to reduce waste, even though the waste management hierarchy favours source reduction and reuse above recycling.

The waste management hierarchy:
1. source reduction (waste avoidance)
2. reuse
3. recycling
4. safe disposal

Although the hierarchy is a generalisation and each step may not apply in every case, source reduction should be considered first because of the benefits it brings throughout a product’s life cycle. In other words:

• less material is extracted or harvested
• less raw material and energy is needed in manufacture
• less energy is used in transport because of reduced weight
• less waste for disposal or recycling

Source reduction

• Minimise the material required to contain, protect and deliver products safely to the consumer.
• Reduce package wall thickness through redesign.
• Minimise the weight of the package.
• Package products in a concentrated form.
• Package products in bulk.
• Keep the number of packaging layers to a minimum.

Financial savings from source reduction and reuse of packaging

Improved technologies and material development allows lightweighting and financial savings.

The emergence of services, information and hire industries that are less dependent on packaging.
Reuse

- Use durable materials to prevent damage during handling.
- Use in-mould labels rather than paper or plastic labels, which can be washed off.
- Establish an efficient return system, which takes advantage of existing networks and minimises the need for transport. (For example, back-loading delivery trucks with transport packaging; and returning packages to agents or retailers close to the end user rather than to original manufacturers.)
- Use incentives, such as monetary deposits for containers, to encourage correct participation in reuse systems.
- Use lightweight refill packages to enable reuse of bottles, within the home.
- Consider loaning packages to the customer rather than selling them.

In addition to the environmental benefits of reusable transport packaging (waste prevention and resource conservation), there can be cost savings in freight, labour and handling, and storage.

Reuse systems can be set up through retailers, as with the deposit and return system that supplies liquid chlorine to swimming pools. This keeps the transport of packages simple and affordable.

Reuse occurs around the home often without people being aware of the environmental benefits. Using jars for spices is an example.

Recycling

- Remember that although a material might be physically recyclable, it cannot be called recyclable if there is no infrastructure and market in place to process it.
- Try to use a single compatible material, for simple recycling.
- Avoid non-recyclable laminates or multi-material films.
- Use materials that can be economically recycled.
- Use materials that have an existing collection and recycling system.
- If a collection system does not exist, assess the feasibility of collection using the following: kerbside systems, return to stores, schools and community groups and reverse vending machines.

- Avoid using labels, adhesives, coatings and finishes which may contaminate recycling. Use in-mould labels or labels made from the same material.
- Use water-soluble adhesives for labels.
- Use integral (in-mould) finishes rather than paint or coatings.
- Ensure that inks are compatible with recycling.
- Ensure the consumer is clear about the product’s recyclability.
- Adopt the Plastics Coding System administered by the Plastics and Chemicals Industries Association. It is a voluntary system where specific numbers are used to identify different polymer types.
- Specify recycled materials in package designs where strict hygiene or purity requirements do not apply, for example, use brown cardboard box as secondary package.

The Sydney Organising Committee for the Olympic Games (SOCOG) and the Beverage Industry Environment Council (BIEC) were two organisations involved in the environmental planning for the Sydney Olympics. They experimented with litter recovery systems; researching the public’s “away from home” recycling habits; testing bin categorisation and distribution, both at sporting venues and in more open spaces and researching large-capacity bin types.

Energy efficiency

- avoid unnecessary packaging components
- use lightweight materials
- maximise energy efficiency of production processes
- avoid or minimise the need for refrigeration (for example, through the use of aseptic or vacuum packs)
- design efficient collection programs for reuse or recycling, to minimise transport impacts
- perform a life cycle energy audit through extraction, processing, transport, refrigerated storage (if required), recycling and disposal, to ascertain areas of concern.

Some products will use large amounts of energy in one stage of their life cycle but make up for it in other stages. Consider two different kinds of pea packages: a steel can and a plastic freezer bag. The steel can takes about three times more energy to produce than the plastic bag does. The can is about six times heavier to transport but, depending on how long it will be stored, it could use less energy in its lifetime than the freezer bag because of not
needing refrigeration and freezing in transport and storage.

**Safe Disposal**

- Use any source-reduction techniques appropriate.
- Minimise the incidence of toxic waste by careful selection of components.
- Use companies that will process toxic materials or recycle them.
- Label toxic material packages with instructions for safe disposal.
- Avoid use of inks, dyes, pigments, stabilisers and adhesives where possible, for example, use in-mould labelling.

Increasingly there is considerable discussion about product-service strategies and how the total volume of manufactured products might be reduced through dematerialisation and maximising materials efficiency. It’s therefore important to carefully understand the functional aspects of conventional products and explore the potential for designing new, sustainable services as opposed to simply redesigning existing products.

**Relevant publications**


- Other relevant reports (e.g. reusable transport packaging, Packaging Waste LCA) can also be downloaded from the EcoRecycle Victoria web site (see URL below).

**Web sites**

- EcoRecycle Victoria
  http://www.ecorecycle.vic.gov.au

- Centre for Design at RMIT University
  http://www.cfd.rmit.edu.au

- Independent Designers’ Network (USA)
  http://www.indes.net

- National Packaging Covenant

- Packaging Council of Australia
  http://www.packcoun.com.au
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