

## Life cycle thinking – a design mindset

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This is the first in a special series of three articles on product design that covers life cycle thinking, life cycle management and life cycle assessment tools. These articles introduce these subjects from a New Zealand design perspective and provide some insight into how they can be applied practically and strategically by designers. The aim of these articles and following series of workshops (listed overleaf) is to enable you to adopt the principles of life cycle thinking and initiate change within your organisation.

### Core function

Any product, no matter how simple, exists within a system. A product system incorporates the requirements, users, material inputs and outputs over the course of its life.

'Life cycle thinking' (LCT) seeks to understand, interpret, and design the life of a product. It is system oriented rather than object oriented and provides a platform for product innovation by providing a new lens to look at the product.

A principle starting point for life cycle thinking is the concept of defining the core function of a product. An example I like to use that is appropriate for New Zealand, is the development of a new milk bottle. Instead of just designing the bottle (albeit a stylish one) we would look at the 'delivery of milk' as this is the single most vital role of the bottle whether its plastic, glass or card, delivered or picked up from the dairy or the supermarket.

This simple pivot provides us with

new viewpoints such as the supply chain – how it's distributed, retailed, used and disposed of, all of which can present opportunities for a designer to make a contribution. The emergent fields of experience and service design leverage the product system to improve how we interact and deliver the product.

### Examples

A good example of this type of thinking was an investigative design project in collaboration with Locus Research, Lightweight Medical and the British Environment Partnership (BEP) in the UK. When looking at the potential replacements for the ubiquitous hospital anti-infection screen (the curtain that separates hospital beds), the team defined the core function of the product as the 'provision of anti-infection protection for the patient over a period of seven years'. This was based off the existing cotton screen washed twice a year for seven years and then disposed of. In high risk wards the consumption is double.

The approach was to design eight different life cycles (product systems) these included smart fabrics, powered sterilisation, recycled plastic fibre. Life cycle thinking enabled the team to unshackle itself and be really creative whilst providing credible alternatives that both improved the product and had the potential to reduce its environmental impact.

With most products there are usually several customers that will have a say on the product's success.

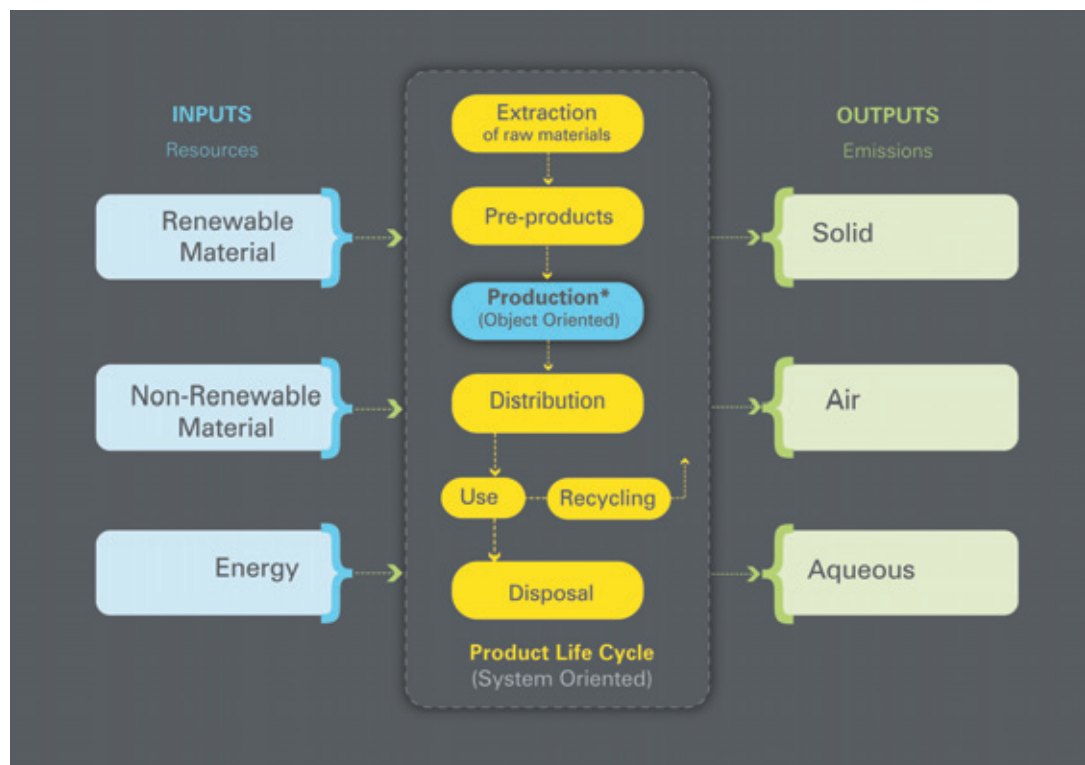
Life cycle thinking encourages a designer to look more closely at the interactions over the whole life cycle beyond the most obvious customer (the end consumer) to those that interact with it over its life.

A collaborative project with Locus Research and Scion investigated exterior cladding in the New Zealand market. The first approach was to roughly sketch a life cycle and then attribute the users to phases of the product life cycle. Architects were pre-purchase, builders were pre-purchase and installation, and end consumers had some involvement in the first two phases, along with the life of the product through to disposal.

Builders were very interested in installation factors, whereas this did not concern the end user at all; their main concern was weather-tightness and appearance. Installation became a critical product improvement for the subsequent product development as the builder was able to influence consumers through their advice (and regularly did so).

Life cycle thinking in product development provides an effective platform for integrating environmental factors. It is important to build it in so that it is not dispensable and viewed as an 'extra'. There are two predominant types of environmental assessment: 'change oriented' and 'accounting'.

As designers are generally not inclined to like accounting, change oriented assessments are better suited to our workflow and focus on areas where you can make legitimate improvements.



## Download tools

Most of the tools Locus Research uses to assess and design are amalgams of several other techniques. Software tools that offer high level all-encompassing analysis should be approached with caution, unless they have been tailored to your organisation and your production context.

Simple tools enable transparent and effective mechanisms to consider and communicate the product life cycle, whilst preparing a design team for more rigorous environmental assessment that is required downstream.

A very useful simple method we apply to initial assessments is an evolution of the \*Impacts

of Environmental Aspects (IoEA) technique used by ecologists. It outlines the routine inputs and outputs and where they occur in the life cycle of a product and is a simple way to qualitatively examine the product life cycle.

\*The MET Matrix (Materials, Energy and Toxicity) is useful for providing an overview and enables you to separate material inputs, energy inputs and emission (toxicity) out and place them into the broad phases of the product life.

\*Material and Energy Flow diagrammes are another effective means of analysing and comparing scenarios. One of the benefits of this approach is that it provides a view of the flow of energy and materials

through the product without the distortion of the life cycle and can be a useful perspective. This is also a handy preparation for a quantitative environmental assessment using LCA (which we will deal with in article three of this series).

These three techniques are simple, effective and free and they encourage a more holistic view that is not limited to creating sustainable products. There are many others which are equally useful.

Life cycle thinking creates benefit and can improve the experience users and consumers have with a product through strategic design thinking.

\*Download the free templates from [www.locusresearch.com](http://www.locusresearch.com) pdf

*Timothy Allan is the founder of Locus Research, in Tauranga. To learn more about sustainable product design processes, check out our series of three half-day workshops on Life Cycle Thinking (details opposite) at Unitec in Auckland on the following dates:*

*June 12: Life Cycle Thinking  
July 3: Life Cycle Management  
August 7: Life Cycle Tools*