



By Stephanie Camarena



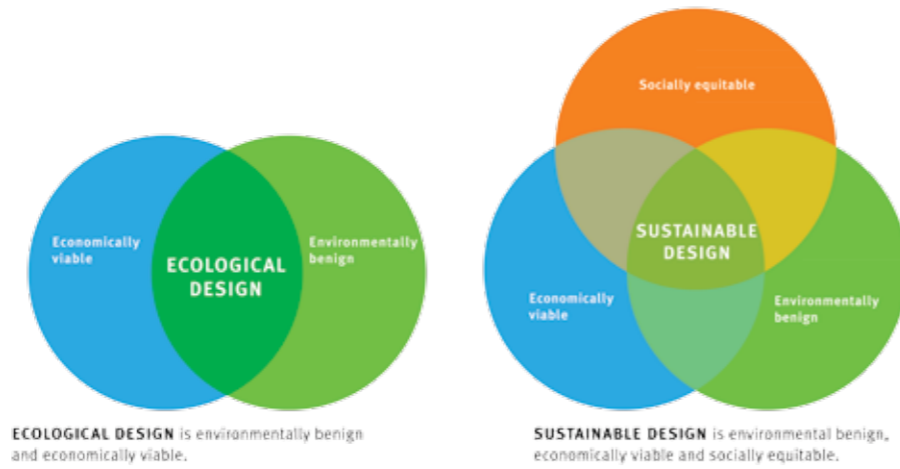
Ecodesign towards design for sustainability

HOW DOES ECODESIGN/DESIGN FOR SUSTAINABILITY (DFS) APPLY TO YOU AND YOUR BUSINESS? IS IT PART OF SUSTAINABLE INNOVATION STRATEGIES? WHAT CAN YOU DO NEXT TO INTEGRATE DFS AS PART OF YOUR DAY-TO-DAY DECISION-MAKING PROCESS?

More and more stringent legislation around the world and Australia suggests that the producer has increasing responsibility for waste disposal, pays for pollution, and owes customers transparent information on their environmental performance. This has been pushing eco-efficiency at the forefront of sustainable manufacturing.

Along with achieving great economic outcomes, eco-efficiency can be integrated with other programs such as environmental management systems, product stewardship, environmental accounting, sustainability, corporate social responsibility, and, of course, ecodesign.

Nowadays, companies need to incorporate environmental and social factors into product development throughout the life cycle of the product, throughout the supply chain, and with respect to their socio-economic surroundings. ►



Ecodesign is far from being a new concept and was already part of the conversation more than 20 years ago. However, the idea of designing with the environment in mind has evolved considerably over time to include social equity along with economical viability and environmental benefit.

Illustration 1: IDSA: Okala Guide

In the context of manufacturing, design for sustainability is not that different to your current design process. It emphasises the focus on the 'customer', their experience and satisfaction; it looks at form, function and useability, investigates or develops new technologies – and does so with the understanding that efficient, consistent and cost-effective delivery are keys to profitability.

But to be sustainable, product innovation must meet a number of challenges linked to people, planet and profit: social expectations and an equitable distribution of value along the global value chain, and the innovation must work within the carrying capacity of the supporting ecosystems.

From Ecodesign

Ecodesign brings within the design process particular attention to the environmental impact of products and services. We generally look at the following elements:

Raw material extraction and processing

This is essentially looking at resource conservation, low-impact material, and biodiversity conservation. In the context of resource depletion, it is necessary to use a minimal amount of material or use materials which are renewable. We will look at using recycled or recyclable material or waste by-products, materials with low embodied energy.

In order to avoid damage to human health and ecological health, we identify and then eliminate materials made from toxic or hazardous substances as well as ozone-depleting substances.

We minimise the use of greenhouse gases or look at means of becoming 'neutral'.

Manufacturing/packaging and distribution

In this phase, most of the work is done around cleaner production, low-impact packaging, and efficient distribution.

Minimising the variety of materials and reducing the number of components and assemblies are essential to integrating functions and simplifying assemblies. Processes are evaluated and redesigned where necessary. We also aim at easing the production quality control. Finally, we focus on minimising manufacturing waste and energy in production.

Elements regarding weight and volume of the product and the packaging will

influence the way we transport and distribute it. There is a potential to minimise the energy use during transport when we design packaging. We look at using recycled or recyclable material.

Product use

Efficiency and conservation: Energy efficiency starts by evaluating possibilities of using renewable energy and energy supplies. Programs designed to provide management power as efficiently as possible are prioritised (warm-up, stand-by, power-down).

Efficiency can be found not just in energy but in any aspect of the product usage. We look not just at conserving resources

(energy, water, paper, heat, et cetera) but also at ways that we can reuse or transfer resources for the next task. Consumer-based feedback mechanisms are crucial and will inform an efficient use of the product.

Durability: By minimising the use of disposable components in durable products, we reduce the impact of product use. We look at weak points in the design which would reduce the product lifetime (as opposed to built-in obsolescence). We investigate how we can make maintenance and repair possible and easier.

Education: The strategy is also to build in the user's desire to care for the product long term. Communication of the strategy is important and should relate the take-back programs information, possibility of upgrades, or second life.

End of life

The understanding of environmental and social impacts of products waste is critical to defining an end-of-life strategy.

When we review this phase, we evaluate methods for product collection, ease of disassembly, recycling, downcycling, or closed-loop recycling possibilities. We take into consideration the design reuse, the second life for the product or its components.

If the product has to be disposed of, we look at using biodegradable materials and provide instructions for composting and safe disposal.

To Design for Sustainability

DfS integrates key sustainability themes to ecodesign such as:

- stewardship and the ethics of safeguarding the health of resources and biodiversity
- respect for limits, the threshold of living systems threatened by waste, pollution and unsustainable resource depletion
- interdependence, ecological, economic and cultural relationships
- economic restructuring, the need to expand employment opportunities while protecting ecosystems
- fair distribution and the importance of social justice and equity
- intergenerational perspective, the ability to clarify today's decisions by placing them in the context of our children's, grandchildren's and great-grandchildren's lives
- nature as a model and teacher, observing and learning from 3.5 billion years of expertise, designing in accordance with



“HUMAN SUBTLETY WILL NEVER DEVISE AN INVENTION MORE BEAUTIFUL, MORE SIMPLE OR MORE DIRECT THAN DOES NATURE, BECAUSE IN HER INVENTIONS, NOTHING IS LACKING AND NOTHING IS SUPERFLUOUS.”
- LEONARDO DA VINCI

the needs and cycles of the landscape, with respect of the rights of non-human species.

- build in flexibility.
- Design to mimic nature.
- Use living organisms in product.

Innovating with past, present and future in mind

Set a visionary KPI for your design strategy – one that reflects what your company is trying to achieve. It's the BHAG defined as a metric (the 'big, hairy, audacious goal' as defined by Jim Collins in Built to Last) – one that drives change or helps your organisation build its culture.

Then use methods like backcasting to design or redesign products, services or even your business model. It starts with a vision; then teams work backwards to drive change.

Trendspotting, global perspective along with risk, threats and opportunities analysis are necessary to build the case for sustainable innovation within your organisation.

Once you have a clear picture, work on innovation within your design processes. Some of the possible strategies:

- Rethink how to provide the benefit.
- Provide needs supplied by associated products.
- Share product with multiple users.
- Anticipate technological change and

What benefits does it bring?

Ecodesign brings a range of benefits in economic, operational and marketing areas.

It helps reduce manufacturing and distribution costs, maintains competitiveness especially in markets demanding high levels of environmental performance. It stimulates innovative thinking, helps identify new business opportunities, strengthens brand and product image, and improves the quality and added-value of products.

Additionally, Design for Sustainability creates opportunity to meet social and equity requirements, to fit within the carrying capacity of the supporting ecosystems, and to create equitable value for customers and stakeholders along the global value chain.

Where to from here?

If you do not have an ecodesign or redesign project in place, there is a simple way to start one.

We assist companies through eight main steps either by mentoring internal staff or by driving the project. ▶

The main steps are:

- Step 1 – Project preparation, evaluation of motivations and selection of a suitable product
- Step 2 – Product analysis
- Step 3 – Selection of ecodesign solutions for a product
- Step 4 – New product concept
- Step 5 – Specification of a new ecodesigned product
- Step 6 – Ecodesign product realisation and its introduction to the market
- Step 7 – Evaluation of the ecodesign project
- Step 8 – Planning of further ecodesign activities


The approach can start at a high level, but will inevitably evolve to include in-depth life-cycle assessment and other environmental assessment tools, design workshops, and other strategies.

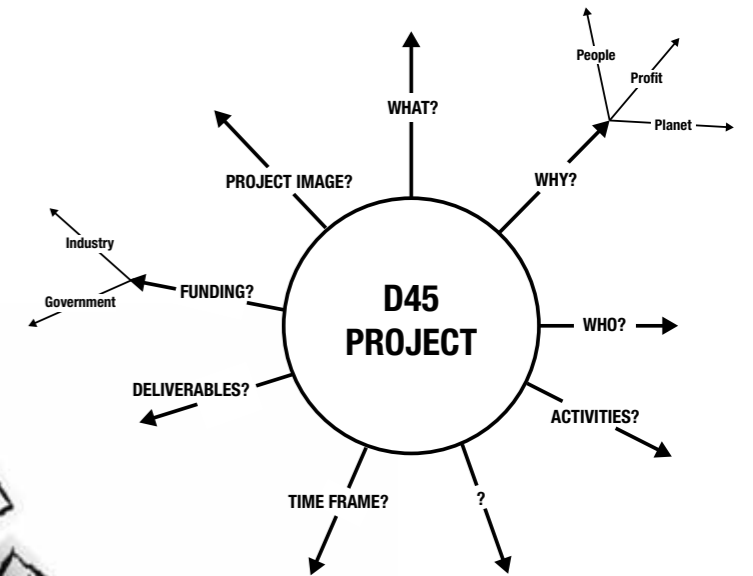
For a Design for Sustainability project, a good place where we usually start is to create a mindmap to conduct a needs assessment and define a direction.

Then we benchmark to learn from competition, get inspiration for improvements, evaluate legislative constraints, or other reasons.

Finally, we evaluate and prioritise the findings before focusing on the implementation. These are just some examples of how we approach design integration in organisations.

Focusing on improvement and efficiency is far from enough. If it was, the past 20 years experience in ecodesign, as it's been applied, should have brought significant changes in resource consumption and pollution levels.

Design for Sustainability is not a one-off attempt or a single department's responsibility; it is a culture, and as such rests on people's shoulders at every level of an organisation. It demands the support of awareness programs for all staff and recognises the value of relationships and inputs from staff, suppliers and customers. 



Bibliography

- A Guide to EcoReDesign, Gertsakis, J, Lewis, H and Ryan, C, 1997
- Design + Environment, Lewis, H, Gertsakis, J, 2001
- The Sustainability Revolution, Edwards, A, 2005
- Okala Design Guide, IDSA, 2003
- The Journal of Sustainable Product Design, Charter, M and Chick, A, April 1997