

# Topic Guide

## Embedding environmental sustainability in product design

This Topic Guide is intended for Research and Development Directors within retailers, brand-owners and manufacturers. It provides guidance for product design and development teams to initiate and develop a process for embedding sustainability in product design in R&D programmes.

**Key Messages:**

- 80% of product impacts are influenced during the design process.
- Improved product performance and increased consumer awareness can be achieved through marketing of greener products
- By encouraging closed loop thinking, waste can be reduced within product life cycles, resulting in increased resource efficiency

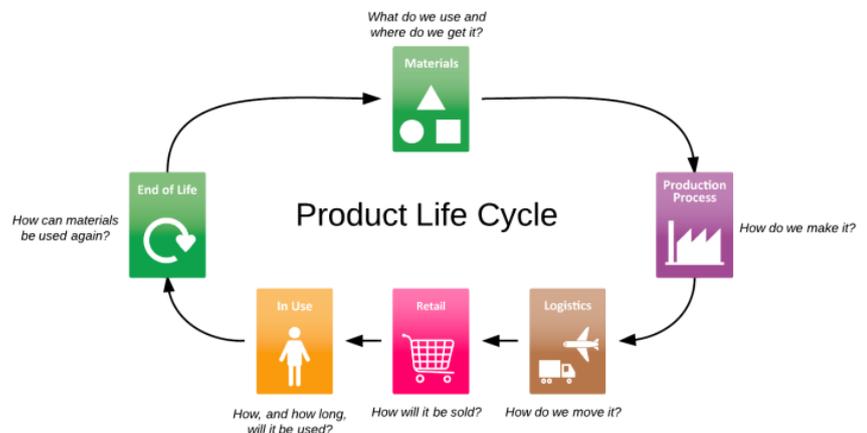
### Overview

According to [EU research](#) over 80% of all product-related environmental impacts can be influenced during the design phase. As a result, there have been increasing calls for designers and clients to adopt more sustainable practices to help business reduce the environmental impacts associated with their products and services. According to Biffa's mass balance studies from 1998 – 2006, on average for every tonne of product we consume in the UK, 10 tonnes of fuel and materials have been used, rising to 100 tonnes if we include water. Less than 2% of this material was retained in the UK economy for more than six months, with the rest going to waste ([Biffaward, 2006](#)). Resource efficiency is therefore a key principle of sustainable design; and can encourage a shift towards a closed loop or 'circular' economy. This can be achieved through design of products which reduce impact at end of life by enabling the recapture and reuse of resources.

It is important to weave sustainable design into an existing process to ensure that it becomes embedded within the organisation, rather than developing a new process or product that sits outside of mainstream design groups. This Topic Guide links to sustainability strategy, environmental management, purchasing, R&D and innovation processes, and also to collaborators downstream that influence the use of products and recapture of materials at end of life.

### Definition and principles

Sustainable design (also called Ecodesign, green design and environmental design) is the philosophy of designing physical objects, the built environment, and services to comply with the principles of sustainability (environmental, economic and social). The term used in this Topic Guide from this point forward is 'Ecodesign' for readability purposes, but your organisation may want to develop your own brand / corporate language to describe it.



Ecodesign is a strategic design activity established to conceive and develop more sustainable solutions considering all stages in the production, use and end of life of a product (life cycle stages). One of the first steps in Ecodesign is [Life cycle assessment](#) (ISO14040) of a product; this can be a screening process to highlight environmental 'hotspots' (life cycle stages with the greatest impact) within the product life cycle, which are then addressed via Ecodesign processes. Life cycle assessment can also incorporate [Life cycle costing \(LCC\)](#). Frameworks are available to integrate Ecodesign into your environmental management systems and plans (ISO 14006:2011). Consideration should also be given to the wider integration of Ecodesign into your corporate sustainability strategy, and to the potential benefits to economic savings, brand value, regulatory compliance and shifts in consumer behaviour/market demand.

## Opportunities

Ecodesign presents opportunities for your business to influence and manage the different environmental aspects associated with products throughout their life cycle. It can add brand value and promote a culture of more open collaboration across the organisation and in your downstream supply chain. Key opportunities identified in this Topic Guide include:

- Embedding ecodesign in the business and brands
- Cutting costs and realising and reporting environmental savings
- Developing an organisational level Ecodesign programme
- Cross business and supply chain collaboration

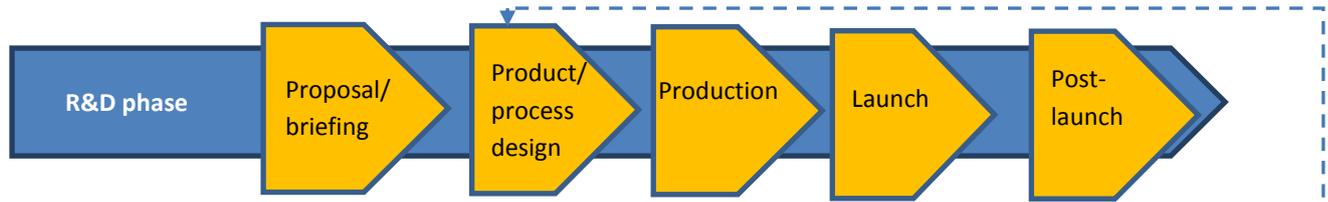
## Guidance plan on Ecodesign

The plan encompasses five main stages to develop criteria for an Ecodesign programme aimed at embedding it into the business. The conventional design process can be adapted into Ecodesign by integrating some simple changes (see diagram below). The scope of these changes depends on your company's objectives. For example, the redesign of an existing product incorporating environmental considerations may not generate as much innovation as the creation of a new line of sustainable products, where sustainability is integrated from the R&D stage.

### **Step 1 - Complete screening assessments to identify environmental hotspots in product portfolio**

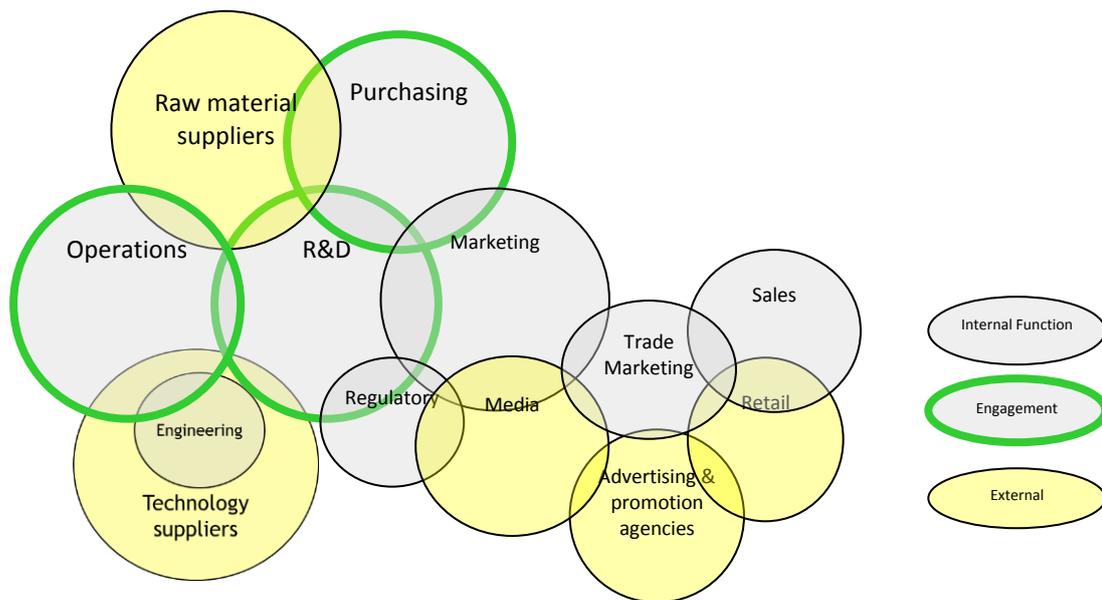
The strategy should take into account the context of the product including sales volumes and sustainability and reputational risks. Understanding your priority products and their associated environmental 'hotspots' is a key first step which will help your organisation to inform / prioritise the selection of sustainable design principles and assessment criteria; and the design solutions required to address known hotspots. The principles and criteria developed in Step 3 will relate to the results of the assessments completed – for example, where energy efficiency in the production is found to contribute a significant proportion of a product's impact, then designing a manufacturing process which is more streamlined and 'lean' will lead to higher energy efficiency. Where end of life waste is found to be a major hotspot, then designing the product for recycling and reuse will be a key part of the new design process. At this point, an environmental expert could also be appointed to the R&D team to develop environmental assessments during the selection of design strategies. This could be an engineer with Ecodesign experience, or a technologist with environmental understanding.

**Aim:** To embed an Ecodesign programme within a business.



	Step 1	Step 2	Step 3	Step 4	Step 5
	Screening assessments to highlight design improvements	Comparison of design alternatives	Ecodesign strategy setting	Environmental communication	Ecodesign process assessment and plan
<b>R&amp;D teams</b>	Review product impacts in the context of sustainability strategy and brand planning.  At this point, an environmental expert can be appointed in the R&D team.	Develop new products to address environmental hotspots, or make changes to the design of existing products – pilot with a small range	Agree Ecodesign principles aligned to your corporate strategy. Develop specific Ecodesign criteria based on hotspots identified and engage relevant stakeholders.	Communicate environmental benefits of new products to customers	Pilot and embed programme into R&D and product development. Feedback on the process to improve it, and monitoring of benefits
<b>Sustainability /environmental management</b>	Complete assessments to identify hotspots for improvement	Support R&D to make design and development recommendations	Support R&D to develop principles and checklist. Ensure relevant to product range and identified hotspots	Validate new products have a reduced impact and help marketing to communicate this effectively and honestly	Work to embed programme into EMS and sustainability strategy. Embedding will require inclusion in over-arching brand standards and policies.
<b>Marketing teams</b>	Validate concepts developed are relevant to market, get traction with customers / consumers and monitor business benefits; assess communication of Ecodesign claims made against industry standards				Develop a marketing plan and embed into the brand
<b>Procurement teams</b>	Engage suppliers to assess feasibility of Ecodesign principles and criteria including product attributes defined				Support R&D to embed into procurement systems using assessment criteria, brand standards and policies
<b>Senior management</b>	Monitor set-up of pilot project and relevance to business strategy and environmental goals			Integrate Ecodesign sustainability strategy and brand planning	

Support from sustainability teams, use of existing research and help of external experts can help to initiate this process. Commitment and support from senior management at the company is vital to ensuring that the Ecodesign is successfully embedded into R&D processes. This should include the CEO, Managing Director, R&D Director or Marketing Director. In addition, information and support will be required from many different stakeholders within the organisation, for example data from purchasing departments. Mapping product life cycles in your own supply chain can indicate where effective collaboration can take place to make changes on the procurement of raw materials, manufacturing processes, product recyclability and consumer use. In addition to collaborating with internal teams, various stakeholders up and downstream can be consulted to provide a complete view of the whole life cycle of your product. This should include businesses that are involved in the user experience and end of life of the relevant product.



## Step 2 – Comparison of design alternatives

Develop new products to address identified environmental hotspots, or make changes to the design of existing products. The following actions are recommended:

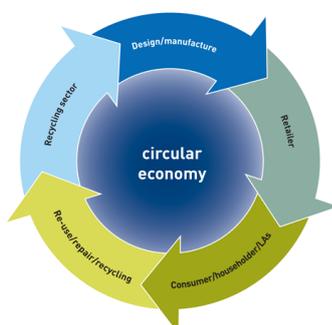
- A **pilot study** to test the approach as a first step before rolling out across all the product portfolio hotspots – pilot the approach with a small range of products with different issues / hotspots associated with them.
- The products developed should have a higher ‘score’ than previous products in the same category, based on assessment, in order to be classified as being **better** than what it is replacing. This can be measured using the **checklist** and criteria developed in Step 3.
- If there are known environmental impacts relating to particular products, then choosing to incorporate new **Ecodesign features** to reduce these impacts should start at the initial concept/ideas generation stage of the R&D cycle for new products. For example, for a cereal pack, a packaging hotspot provides an opportunity to reduce the packaging waste associated with the product and increase the sustainability of materials used, while continuing to ensure the functionality and protection of the product.
- Different design scenarios can be compared and tested using **environmental assessment tools**. Tools that apply life cycle thinking can be used, examples of which can be found in the Resources section and include life cycle assessment tools such as [Forum for the Future Streamlined LCA tool](#), and the Centre For Sustainable Design (CfSD) Ecodesign Strategy Wheel (a set of relevant questions helps to score each axes with a low, mid or high qualitative value. You can download the questionnaire from the [CfSD site](#)).
- The cost implications should be monitored and compared between scenarios – this could include a process of **life cycle costing**

### Step 3- Setting of an Ecodesign strategy linked to brand planning

Ecodesign principles need to be aligned your corporate strategy; and then specific Ecodesign criteria developed following hotspot identification. The principles are overarching and may incorporate existing targets such as a commitment to 100% sustainability certification of an important raw material, or a commitment to reduce packaging waste. Where targets are set for a product with a timeframe for delivering it, the next step is to find the design strategies and solutions to achieve this. Targets set should be realistic but challenging, and could also link to wider industry goals set within collaborative initiatives. The principles selected need to be suitable for the products in question, according to the environmental assessment results and the economic and technological feasibility of different alternatives. Guidance on Ecodesign strategies and themes is included below and further information can be found at [Eco SMEs](#).

#### Ecodesign Strategies and New Product Development – ideas to guide Ecodesign programmes

- ✓ Reduction in materials used and diversity
- ✓ Sourcing of sustainable materials
- ✓ Environmentally oriented materials selection
- ✓ Removal of toxic substances (compliance as a minimum, in line with requirements of [RoHS](#) and [REACH](#) directives)
- ✓ Reduction in production impacts
- ✓ Optimisation of distribution
- ✓ Reduction of impact of product when in use
- ✓ Integrating multiple functions within a single product (e.g. smart phone)
- ✓ Quantify multiple environmental impact criteria across the whole life of a product based on relevant hotspots
- ✓ Plan for reducing environmental impacts from the outset
- ✓ Addresses product impacts and benefits across the lifecycle
- ✓ Extending product life / durability
- ✓ Improving usability / convenience
- ✓ Enabling shared use of a product
- ✓ Waste management - design for disassembly, recyclability, re-use, remanufacture ('cradle to grave' thinking to maximise recapture, flow and reuse of resources). Extensive research has been undertaken by [WRAP](#) on new business models, which encourage innovation to contribute towards **circular economy** where resources are in use for as long as possible, extracting the maximum value from them whilst in use, then recovering and regenerating products and materials at the end of each service life.



Source: [WRAP website](#), 2013

Once overall principles are set as part of a strategy, more detailed Ecodesign criteria can be developed by your organisation using an open and collaborative manner. Existing Ecodesign checklists can also be used as guidance to facilitate further discussion. An Ecodesign Checklist (such as the one provided below) provides relevant questions or criteria that need to be addressed when redesigning products and developing an Ecodesign programme. A checklist also suggests improvement options for areas where environmental problems are identified and provides reminders of the environmental aspects / hotspots to be considered. Normally, the application of a checklist is quick and no previous experience is necessary. The criteria identified should be incorporated into design where technically feasible - with no impact on functionality - and should save money rather than increase cost. The checklist is a starting point for first steps in integrating Ecodesign.

An example of a more detailed Ecodesign checklist, specifying strategies at each step of the life cycle is available in the [Delft Design Guide](#) and detailed guidance is also available at [Eco SMEs](#). Scoring tools based on the checklist can be developed to monitor the environmental impacts of products and feed into further product assessments and redesign

following the first pilot, and to monitor the environmental impacts of all products. As the level of Ecodesign maturity of the organisation increases, more sophisticated tools may be required, for example software such as [GaBi for Design for Environment](#).

**Example of an Ecodesign checklist (to be adapted for different product types e.g. Food, non-Food)**

Life cycle stage	Criteria	Example solutions
<b>Materials</b>	<ul style="list-style-type: none"> <li>✓ Efficient use of materials to minimise material inputs and waste</li> <li>✓ Use of 'low impact' materials e.g. (recycled/recyclable/renewable/certified as sustainably sourced)</li> <li>✓ Green chemistry – product safety / no toxic components or processes</li> <li>✓ Use raw materials and ingredients which help to reduce the product's environmental impacts or realise new environmental benefits</li> <li>✓ Reduced environmental footprint</li> </ul>	<ul style="list-style-type: none"> <li>✓ Link to targets on waste minimisation and KPI – e.g. reduce the material weight of products</li> <li>✓ Link to targets on product sustainability attributes – e.g. increased use of recycled and/or FSC fibres in household paper products</li> <li>✓ Link to targets on product attributes – e.g. increased use of recycled and/or FSC fibres in household paper products</li> <li>✓ Link to targets on carbon footprint of supply chain – e.g. reduce the carbon footprint of a detergent redesign to a more concentrated formula; or one that facilitates a lower wash temperature</li> </ul>
<b>Packaging</b>	<ul style="list-style-type: none"> <li>✓ Optimisation of packaging (e.g. packaging to product ratio)</li> <li>✓ Use of 'low impact' packaging materials e.g. (recycled/recyclable/renewable), which also have a lower environmental footprint</li> <li>✓ Design packaging for recycling/reuse</li> <li>✓ Packaging system protects product from damage to extend life</li> <li>✓ Packaging includes information allow the end user to get the maximum value and utility</li> </ul>	<ul style="list-style-type: none"> <li>✓ Link to targets on waste minimisation e.g. reduction of packaging weight per kg of product, and link to industry initiatives/context to set targets</li> <li>✓ Link to targets on product sustainability attributes e.g. increased use of recycled and/or FSC fibre</li> <li>✓ Link to targets on lowering the carbon footprint of packaging (e.g. in context of the Courtauld Commitment targets on packaging waste)</li> <li>✓ Clear consumer information e.g. on the dosing requirements for a detergent / appropriate portions</li> </ul>
<b>Production</b>	<ul style="list-style-type: none"> <li>✓ Production of redesigned product is technically feasible with low/no impact on cost</li> <li>✓ Redesign delivers environmental benefits or cost savings</li> </ul>	<ul style="list-style-type: none"> <li>✓ Discussion with suppliers on redesign of product – manufacturability</li> <li>✓ Use of fewer materials/simplification of design can mean both environmental and cost savings</li> </ul>
<b>Transportation</b>	<ul style="list-style-type: none"> <li>✓ Products are transported using the most economical forms of transport available with low environmental impact</li> <li>✓ Use of 'low impact' transit packaging e.g. (recycled/recyclable/renewable), which also have a lower environmental footprint</li> <li>✓ Optimisation of transit packaging without exposing product to damage</li> </ul>	<ul style="list-style-type: none"> <li>✓ Perform an analysis of logistics and check opportunities for improvement through scenarios</li> </ul>
<b>Use</b>	<ul style="list-style-type: none"> <li>✓ Reduce energy consumption of product when in use</li> <li>✓ Design of product to reduce consumer waste</li> <li>✓ Designing for durability to extend the product life</li> </ul>	<ul style="list-style-type: none"> <li>✓ Link targets to context e.g. Ecodesign Directive, but with targets to move beyond compliance</li> <li>✓ Link to technologies available which have a lower energy consumption – e.g. can a product be microwaved with no loss of quality</li> </ul>
<b>Waste</b>	<ul style="list-style-type: none"> <li>✓ Design of product for reuse/recycling to promote a circular economy</li> <li>✓ Design of product to be part of a closed loop with supporting information</li> </ul>	<ul style="list-style-type: none"> <li>✓ Incorporate modular designs for easy disassembly and remanufacture</li> <li>✓ Incorporate closed loop thinking through take-back schemes and product remanufacture and leasing</li> <li>✓ Investment in information flow and system design for effective communication on the recovery of the material from business to user to recovery facility back to factory and business</li> </ul>

#### **Step 4 – Launch products and communication plan**

The environmental benefits of your new product or service can be communicated to consumers or clients using different tools, such as product self-declarations. Guidance and documentation on Environmental Product Declarations (EPD- ISO 14025) is available on the Swiss agency website [Environdéc](#). Further examples can be found on the French Government [Grenelle 2](#) National Experiment website, which includes 170 pilot projects on self-declarations across over 1000 products. Sustainability teams should validate that new products have a reduced impact and help to communicate this effectively and honestly. Marketing teams should confirm that the concepts developed are relevant to market, monitor business benefits and assess the communication of Ecodesign claims made against [industry standards](#).

#### **Step 5 – Review Ecodesign pilot**

Following a pilot study, progress and impacts should be reviewed with key functions across the organisation, including management, marketing, sustainability and procurement. By providing feedback on how the data gathered has been used to redesign a product can help to encourage further participation and results. In addition, suppliers should be engaged to understand challenges faced in new product design and ways these can be addressed in future projects. Following the Ecodesign process, it is important to monitor both the benefits and potential risks on product quality, performance and sales.

Key success factors to assess at this stage include:

- Impact on product quality and performance
- Impact on cost and savings
- Impact on manufacturability
- Impact on environmental savings
- Impact on brand value

## Benefits

Savings		Supply chain stage		
Environment	Cost	Manufacturer	Retailer	Consumer
<ul style="list-style-type: none"> <li>• <b>Materials and Waste</b> – Less input material and waste, closed loop</li> <li>• <b>Greenhouse Gases</b> – Less material, transport impacts, and improved energy efficiency in manufacture or use</li> <li>• <b>Water footprint</b> – lower water use through raw material substitution, and changes to product design to impact use phase, if relevant</li> </ul>	<ul style="list-style-type: none"> <li>• Increased material efficiency = lower procurement costs</li> <li>• Lower costs throughout the product life cycle</li> <li>• Reduce cost by increasing the flow of material back to the factory (circular economy)</li> </ul>	<ul style="list-style-type: none"> <li>• Lean manufacturing</li> <li>• Resource efficient products</li> <li>• Cost control</li> <li>• Supply chain resilience</li> <li>• Producer responsibility compliance</li> <li>• New business opportunities and models e.g. closed loop/circular economy</li> </ul>	<ul style="list-style-type: none"> <li>• Improved product performance</li> <li>• Market differentiation</li> <li>• Enhanced customer loyalty</li> <li>• Improved supplier relationships</li> </ul>	<ul style="list-style-type: none"> <li>• Potentially lower whole life costs</li> <li>• Enhances consumer awareness of environmental issues</li> <li>• Information flow on returning of material to recovery facility to educate on the closed loop economy</li> </ul>

## Barriers

Barrier	Description	Mitigation
<b>Convincing business to go beyond regulatory minimums</b>	Minimum standards on Ecodesign through Ecodesign Directive, currently limited improving to energy efficiency of energy using products; and improving products with have an impact on energy use such as windows insulation and shower heads.	Training on business benefits including potential sales increase, enhanced consumer loyalty and improved product performance of going beyond regulation to drive innovation
<b>Time and culture</b>	Ecodesign criteria seen as another burden and lack of time to do so	Use an Ecodesign Checklist and existing tools and proven resources. Any programme should require minimal user time to understand impacts.
<b>Lack of agreed industry criteria/expertise</b>	Development of ecodesign standards for different product ranges are in early stages and may require research and external support	Use case studies to generate ideas on product innovation. Use of simple checklists and tools that can bring about meaningful change. Build internal capacity and upskill product designers and developers to become Ecodesign experts
<b>It is not clear where your product team should focus</b>	Evidence base available for many products through existing industry, sector and government research.	Use specialists to initiate ideas generation and develop core programme criteria.
<b>Few product-specific opportunities</b>	Although there is evidence that there can be potentially large savings by implementing product design on some products, there may not be opportunities for all products	Prioritisation process using hotspot analysis of value chain

## Case studies in Ecodesign

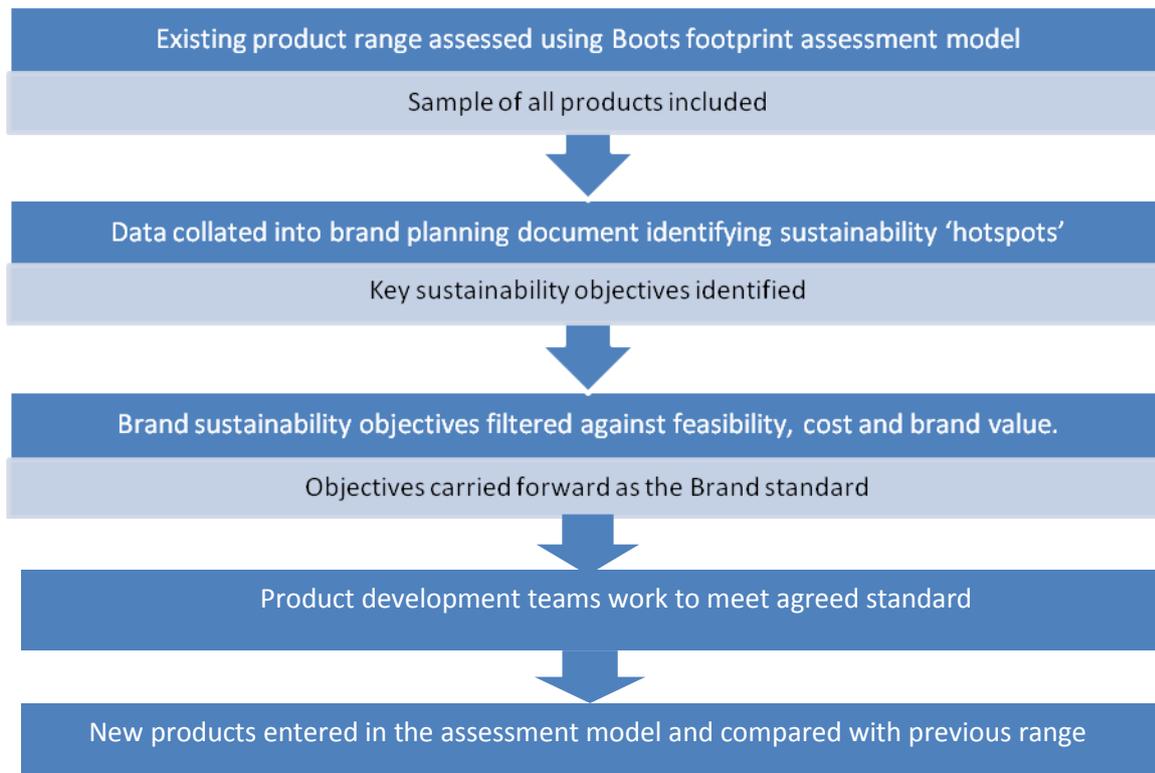
### Boots UK – Product Sustainability Assessment Model

Boots UK have successfully incorporated sustainable product development into their New Product Development programme through the use of product sustainability assessment tools. This initiative is driven by strategic themes including resource scarcity, brand protection and the need for new business models. They work with their suppliers to understand the product supply chain and reduce impact through use of sustainable materials and product re-designs. To support the process, Boots uses an in-house designed web-based tool that quickly and simply helps their product developers analyse and score 24 sustainability indicators across the life cycle of an individual product, including consumer use.

Key features of the tool include:

- It allows creation of a sustainability profile of a product to compare relative performance and identify hotspots across various metrics (e.g. biodiversity impact, water) at different stages in the product lifecycle.
- The ability to set improvement targets by product type and/or by brand
- Database management of sustainability performance results for understanding risks, opportunities, reporting and analysis, at an individual product, brand or company level

The tool is used in a simple process that uses product footprints to deliver actual improvements to the product range and introduce sustainability criteria from the outset:



Product development and technical staff at both their Nottingham support office and sourcing office in Hong Kong have been trained to use the sustainability model. They are also engaging with their suppliers in the use of this tool.

By the end of March 2012 Boots had used this process to assess products within seven Boots cosmetics and toiletries brands, and they've begun to use the insights gained to set sustainability objectives for the future development of these brands.

The relaunch of the Botanics toiletries brand in summer 2012 utilised this process to define sustainability objectives for both product and packaging. As a result the new products show a significant improvement in their footprint. This is as a result of:

- Full traceability of natural ingredients
- Removal of ingredients with the potential to be persistent in the environment
- An increase in the amount of recycled materials used in packaging

## Resources

### Tools and Resources

1. Seymour Powell design consultancy: <http://www.seymourpowell.com/casestudies/26>
2. eco3 design consultancy: [www.eco3.co.uk](http://www.eco3.co.uk)
3. Centre for Sustainable Design Ecodesign Strategy Wheel: [www.cfsd.org.uk](http://www.cfsd.org.uk)
4. Environ Ecodesign club <http://www.consumer-ecodesign.com/ecodesign-club/embedding-the-system>
5. <http://www.carbondesign.com/>
6. Forum for the Future SLCA tool: <http://www.forumforthefuture.org/project/streamlined-life-cycle-analysis/overview>
7. [http://engineering.dartmouth.edu/~d30345d/courses/engs171/EcoDesign\\_Checklist\\_DelftUniversity.pdf](http://engineering.dartmouth.edu/~d30345d/courses/engs171/EcoDesign_Checklist_DelftUniversity.pdf)
8. WRAP hotspots for grocery products [www.wrap.org.uk](http://www.wrap.org.uk)
9. DEFRA sustainable products and product roadmaps: <http://www.defra.gov.uk/environment/economy/products-consumers/>
10. Research: Loughborough university [http://www.lboro.ac.uk/research/susdesign/LTSN/Blocks/Block7/Ecodesign\\_Checklist.ppt](http://www.lboro.ac.uk/research/susdesign/LTSN/Blocks/Block7/Ecodesign_Checklist.ppt)
11. Eco SME <http://www.ecosmes.net/cm/navContents?!=EN&navID=info&subNavID=1&pagID=6>
12. LCA to go – [www.ecosmes.net](http://www.ecosmes.net)
13. Compass packaging tool - <https://www.design-compass.org/>
14. GaBi for Design for Environment <http://www.pe-international.com/services-solutions/product-sustainability/design-for-environment-ecodesign/>
15. Grenelle 2 <http://www.developpement-durable.gouv.fr/-Le-Grenelle-de-l-environnement-de-.html>
16. Environdec (Environmental Product Declarations) <http://www.environdec.com/>
17. Guidelines for Assessment of Environmental Claims [http://ec.europa.eu/consumers/cons\\_safe/news/green/guidelines\\_en.pdf](http://ec.europa.eu/consumers/cons_safe/news/green/guidelines_en.pdf)
18. The Great Recovery Project, RSA – encouraging closed loop thinking in product design <http://www.greatrecovery.org.uk/>

### Frameworks and Standards

1. IEC 62430 international standard
2. Life cycle assessment standard– [ISO 14040-44](http://www.iso.org/iso/14040) (general information/summary and resources also available at:

<http://www.ecosmes.net/cm/navContents?!=EN&navID=lcaSmesStandardReg&subNavID=1&pagID=1&flag=1>

3. Incorporating Ecodesign into EMS (BS EN ISO 14006:2011):  
<http://shop.bsigroup.com/en/ProductDetail/?pid=00000000030197202>
4. Ecodesign Directive <http://efficient-products.defra.gov.uk/>

#### Background Research

1. <http://engagebydesign.org/values/>
2. [www.theRSA.org](http://www.theRSA.org)
3. <http://www.guardian.co.uk/sustainable-business/gallery/sustainable-product-design-in-pictures>
4. The Mass Balance Movement: the definitive reference for resource flows within the UK environmental economy. (Biffaward – 2006). Available at <http://www.massbalance.org>
5. Friends of the Earth Europe, Friends of the Earth Austria and SERI (2009) Overconsumption – Our use of the world’s natural resources. Available at:  
[http://www.foeeurope.org/publications/2009/Overconsumption\\_Sep09.pdf](http://www.foeeurope.org/publications/2009/Overconsumption_Sep09.pdf)
6. Assessing the environmental impacts of consumption and production: priority products and materials (UNEP 2010) ISBN 978-92-807-3084-5.
7. Ecodesign maturity model [http://link.springer.com/chapter/10.1007/978-3-642-20183-7\\_35?no-access=true](http://link.springer.com/chapter/10.1007/978-3-642-20183-7_35?no-access=true)
8. Integrating sustainable product design and LCA:  
[http://sustainablebrands.com/news\\_and\\_views/articles/integrating-sustainable-product-design-lca-part-ii?utm\\_source=newsletter&utm\\_medium=innovation&utm\\_campaign=feb6](http://sustainablebrands.com/news_and_views/articles/integrating-sustainable-product-design-lca-part-ii?utm_source=newsletter&utm_medium=innovation&utm_campaign=feb6)
9. Circular economy <http://www.wrap.org.uk/content/wrap-and-circular-economy>
10. Lewis, H.; Gertsakis, J. 2001. Design + environment. A global guide to designing greener goods. Greenleaf Publishing.
11. Tischner, U. et al. 2000. How to do ecodesign? Edited by the German Federal Environmental Agency.
12. Fuad-Luke, A. 2002. The ecodesign handbook. Spanish edition edited by Cartago.
13. Recoup (plastics recycling information) - <http://www.recoup.org/business/default.asp>
14. IGD – sustainability information for the consumer goods industry including case studies:  
<http://www.igd.com>

#### You may also be interested in these related Action Plans/Topic Guide(s):

- How to participate in the closed loop economy through waste exchange
- Implementing a sustainable procurement process for raw materials