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the ecodesign strategy wheel

The Okala Ecodesign Strategy Wheel clusters strategies according to the stages of the life-cycle of the product. Designers can use many of these strategies, or focus on a few. The wheel serves as a powerful brainstorming tool to explore areas of product development or improvement that have not yet been considered. Enter Here

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Ecodesign strategies help designers and system developers imagine new opportunities. These design approaches are intended to reduce the ecological impact of a product, service or system. Depending on the context, each ecodesign strategy can be applied more or less successfully. Any ecodesign strategy can be counterproductive when applied to a particular product or service; they are not universally beneficial in all situations.

The Okala Ecodesign Strategy Wheel is a modification of the wheel developed by Brezet and van Hemel.* The wheel clusters strategies according to the stages of the life-cycle of the product. Designers can use many of these strategies, or focus on a few. The wheel serves as a powerful brainstorming tool to explore areas of product development or improvement that have not yet been considered.

Ecodesign requires as much thoughtful design thinking as any other design activity. This means recognizing when an ecodesign strategy is or is not working in a project or system. The ecological effectiveness of the strategy can be best gauged by an assessment to measure the product system impacts.

*H. Brezet and C. van Hemel (1997) EcoDesign: A promising approach to sustainable production and consumption, UNEP

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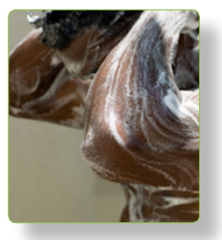
how to use this PDF effectively

1 To begin, choose a category from the wheel that corresponds to the type of strategy you are designing for.

2 You will be taken further into that category where you are presented with a selection of strategy card options for that category.

3 When you choose an option to explore further, an example of that strategy can be seen by clicking on one of the cards presented to you.



Press to return to the strategy wheel

Press to return to the category homepage

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1

Innovation

Rethink how to provide the benefit

Design flexibility for technological change

Provide product as service

Serve needs provided by associated products

Share among multiple users

Mimic biological systems

Use living organisms in product system

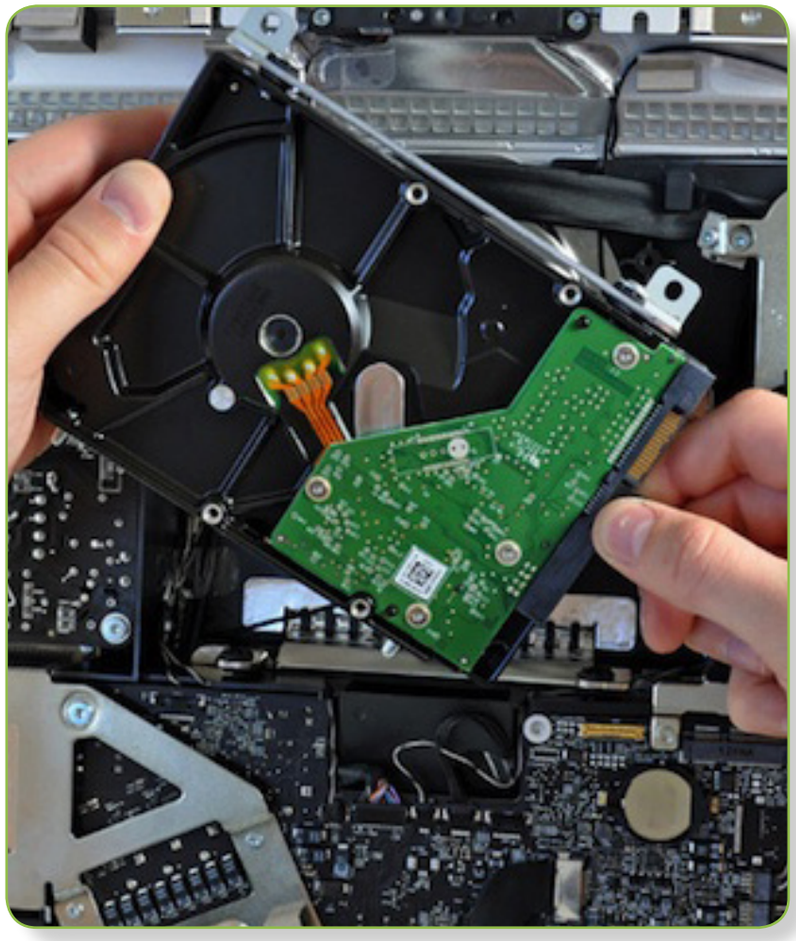
Create opportunity for local supply chain


Cozy Products Inc.

Rethink how to provide the benefit

You can conceptualize completely new ways to deliver the product benefit

Example: Instead of heating an entire building, we heat only the air around people.



Design flexibility for technological change

Components in the system that will become technically obsolete can be planned for.

Example: A computer can allow easy replacement of quickly evolving microchips.

Provide product as service

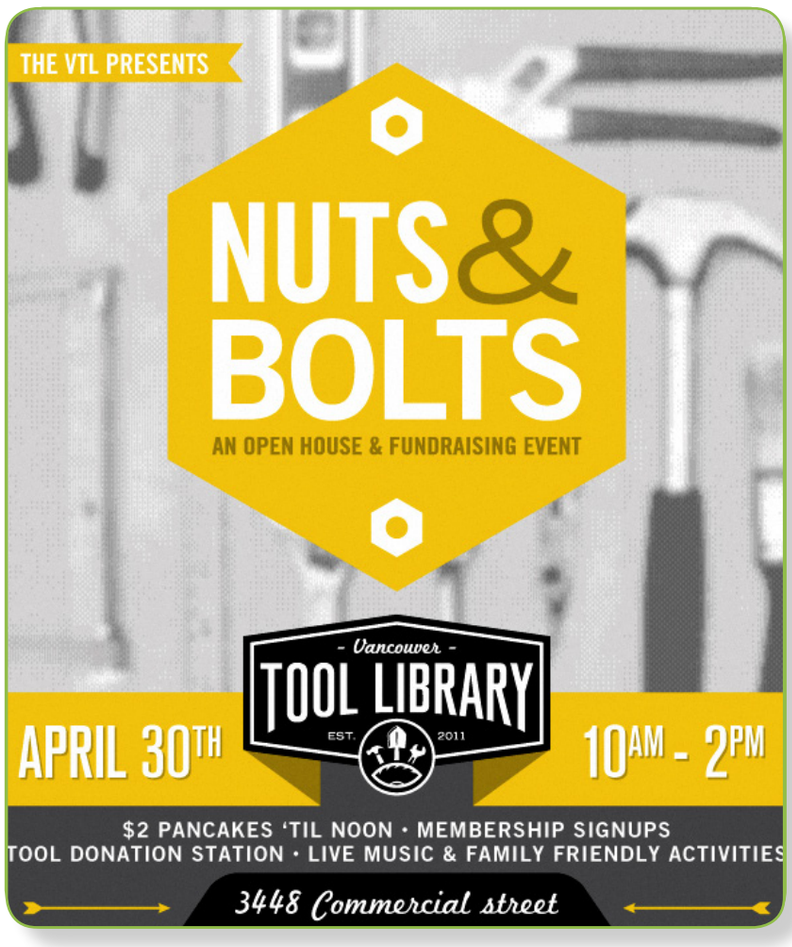
You can envision how the product can become a service.

Example: Lease a floor covering rather than selling it, such as Interface Carpet.

Serve needs provided by associated products

Multiple products can be integrated into one system.

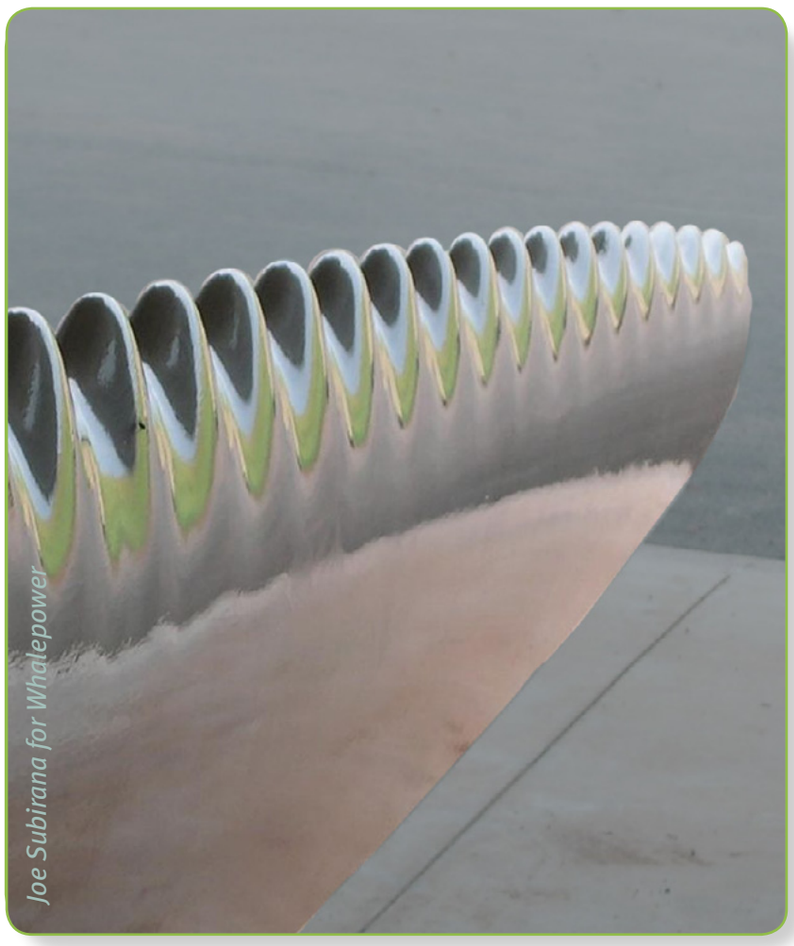
Example: The Swiss army knife provides a multitude of tools in one compact package.



Share among multiple users

A system can be designed to support group ownership rather than individual ownership.

Example: Many cities now have cooperatives for manual and power tools.


Joe Subirana for Whalepower

Mimic biological systems

Natural principles can be employed in low impact design solutions.

Example: A turbine blade designed to mimic the edge of whale fin increases efficiency.

Use living organisms in product system

You can explore ways to employ living organisms in the product system.

Example: Aquatic plants, such as cattails (typha ungustifolia) can clean waste water.

Create opportunity for local supply chain

Local material suppliers and manufacturers offer social and environmental benefits

Example: If an aluminum smelter is located in your region, you can design products or components from recycled aluminum.

Reduced Material Impacts

Avoid materials that damage human or ecological health

Avoid materials that deplete natural resources

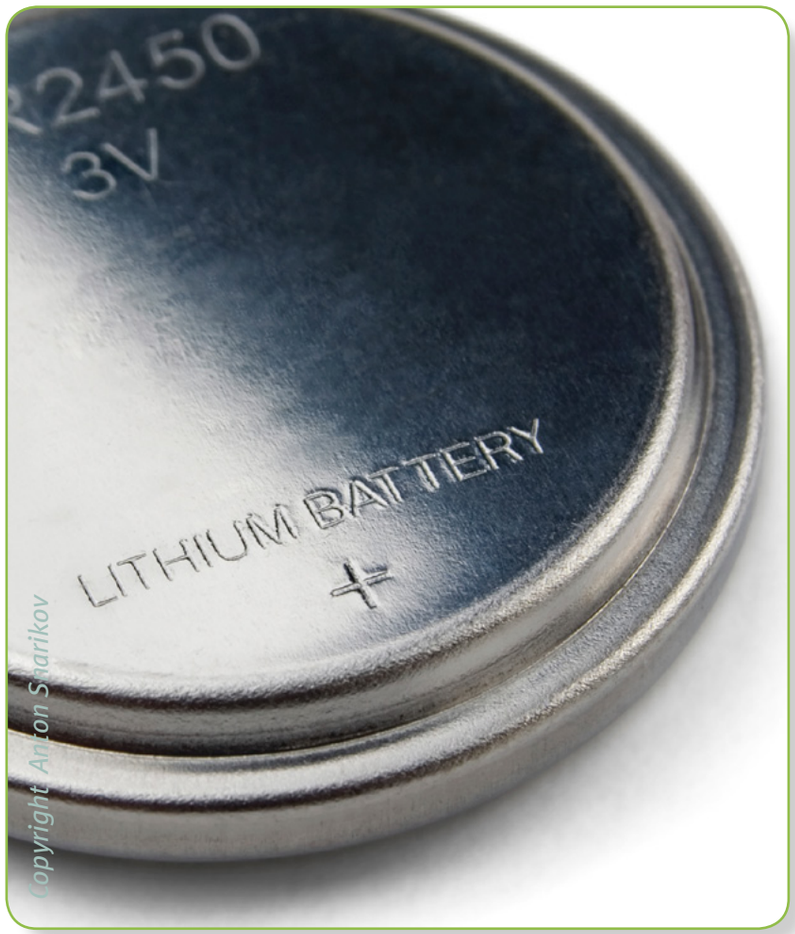
Minimize quantity of material

Use recycled or reclaimed materials

Use renewable resources

Use materials from reliable certifiers

Use waste byproducts



Avoid materials that damage human or ecological health

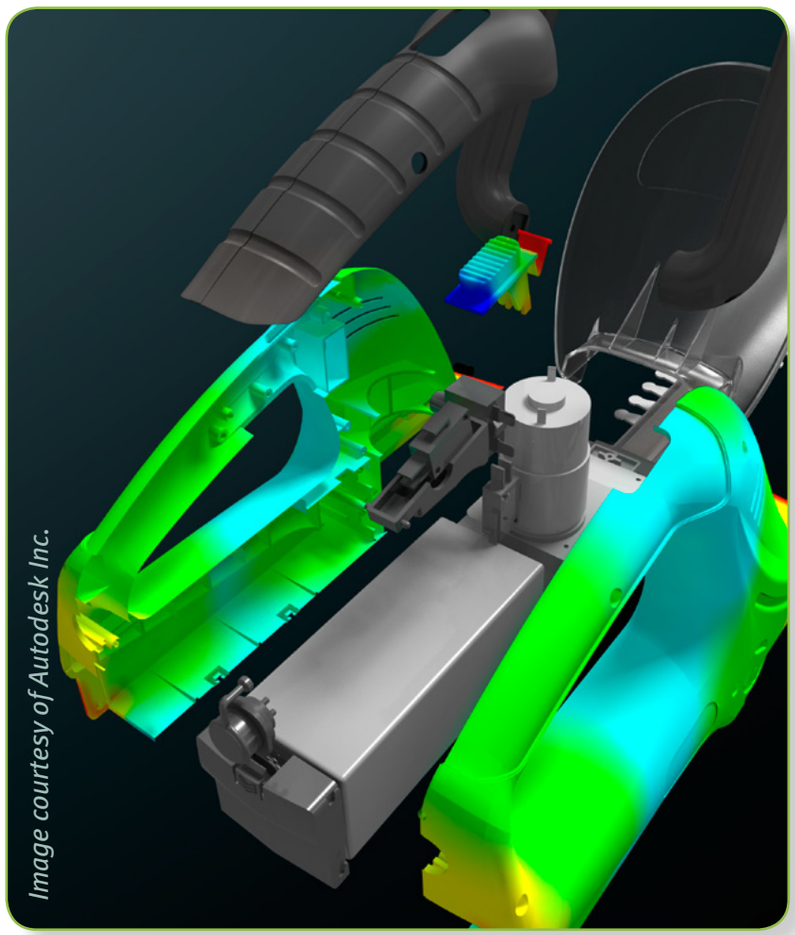
You can specify materials and finishes that do not compromise human or ecological health.

Example: Lithium batteries are much less toxic than lead or cadmium batteries.

Avoid materials that deplete natural resources

You can specify materials that do not use quickly diminishing resources.

Example: Linen, which is made from flax, consumes less fossil fuel than nylon.



Minimize quantity of materials

Light-weighting, miniaturizing or eliminating parts or packaging.

Example: Structural analysis software can identify where to remove unnecessary material in a product system.

Image courtesy of Landscape Brands

Use recycled or reclaimed materials

You can identify sources of re-used or recycled materials.

Examples: You can integrate wood from old buildings or recycled plastic from beverage containers.

Use renewable resources

Renewable materials can be grown and replenished.

Example: Bamboo can grow quickly and deliver considerable material per area-year. Bamboo panels on this building by FAO allow inhabitants to control air and light flow.

Image courtesy of Tom Raffield

Use material from reliable certifiers

Reliable certifiers are independent from the producers that they certify.

Example: FSC certified wood products insure that old growth forests are not destroyed.

Use waste byproducts

Waste byproducts are inexpensive and widely available.

Example: A garment factory can supply remnants to be converted to wall insulation.

Manufacturing Innovation

Minimize manufacturing waste

Design for production quality control

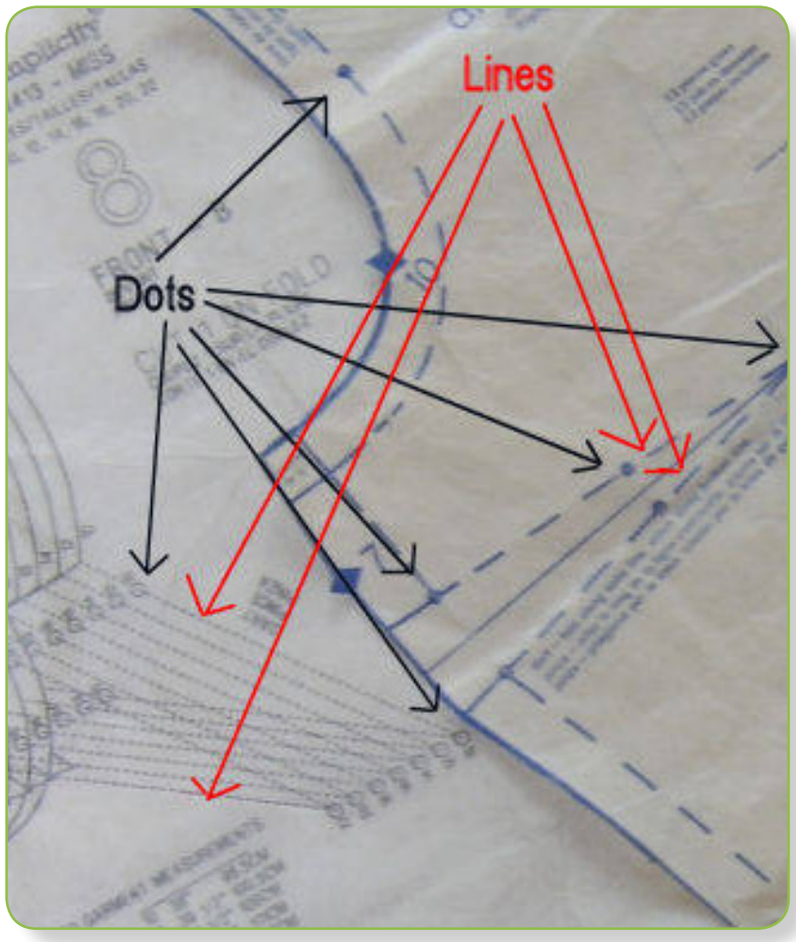
Minimize energy use in production

Use carbon-neutral or renewable energy sources

Minimize number of production steps

Minimize number of components/ materials

Seek to eliminate toxic emissions



Minimize manufacturing waste

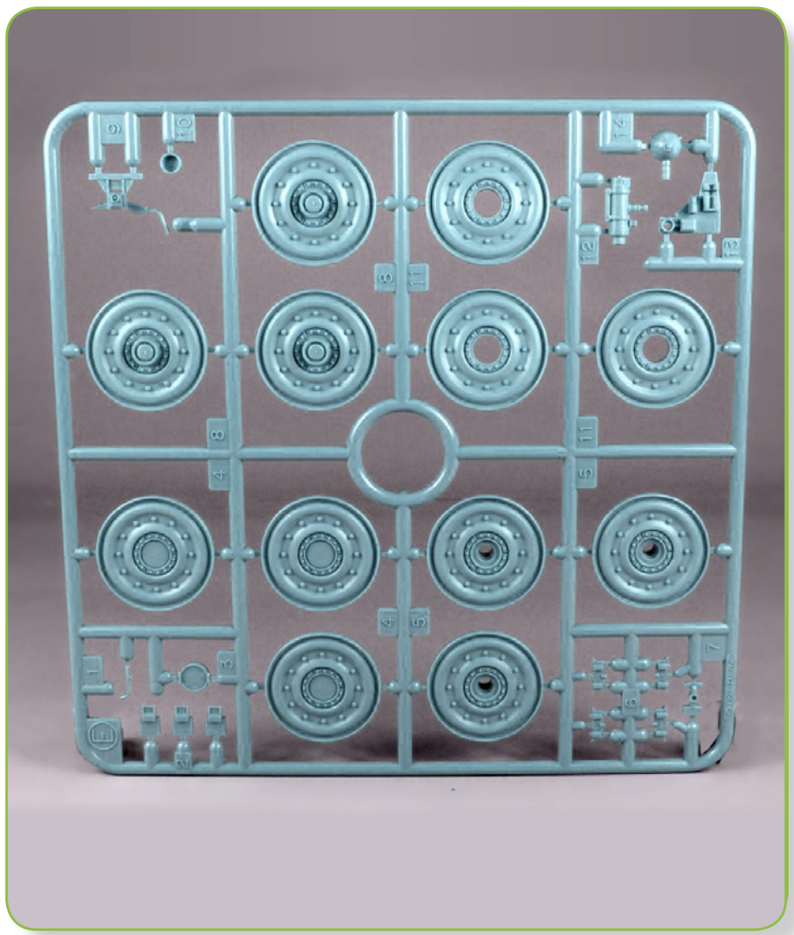
Eliminating factory waste saves material and disposal impacts.

Example: Sheet products can be dimensioned to optimize a cutting plan.

Design for production quality control

Working with engineers to implement quality control saves resources.

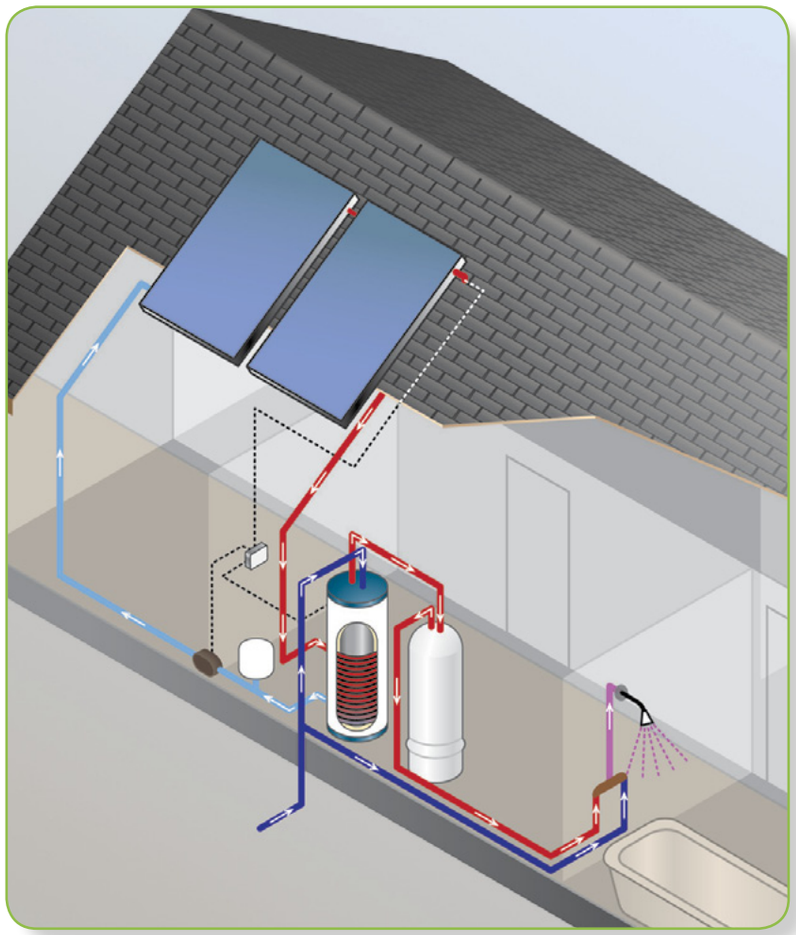
Example: Six sigma is a manufacturing quality control process.



Minimize energy use in production

You can find ways to reduce energy intensive steps in manufacturing.

Example: Multiple parts molded in one tool reduce the energy required per part.



Use carbon-neutral or renewable energy sources

Carbon-neutral energy resources have many ecological benefits.

Example: Solar water heating creates much lower impacts than fossil-fuel water heating.

Minimize number of production steps

Simplifying the production process may conserve resources.

Example: Body wash requires less energy to make than bar soap.

Minimize number of components/materials

Fewer parts are easier to assemble and may be more durable.

Example: A pack with fewer zippers can require less assembly work.

Seek to eliminate toxic emissions

Identify toxic emissions in the production process and seek alternatives.

Example: US-made products have lower coal mercury emissions than those from China.

4

Reduced Distribution Impacts

Reduce product and packaging weight

Reduce Product and packaging volume

Develop reusable packaging systems

Use lowest-impact transport system

Source or use local materials and production

Reduce product and packaging weight

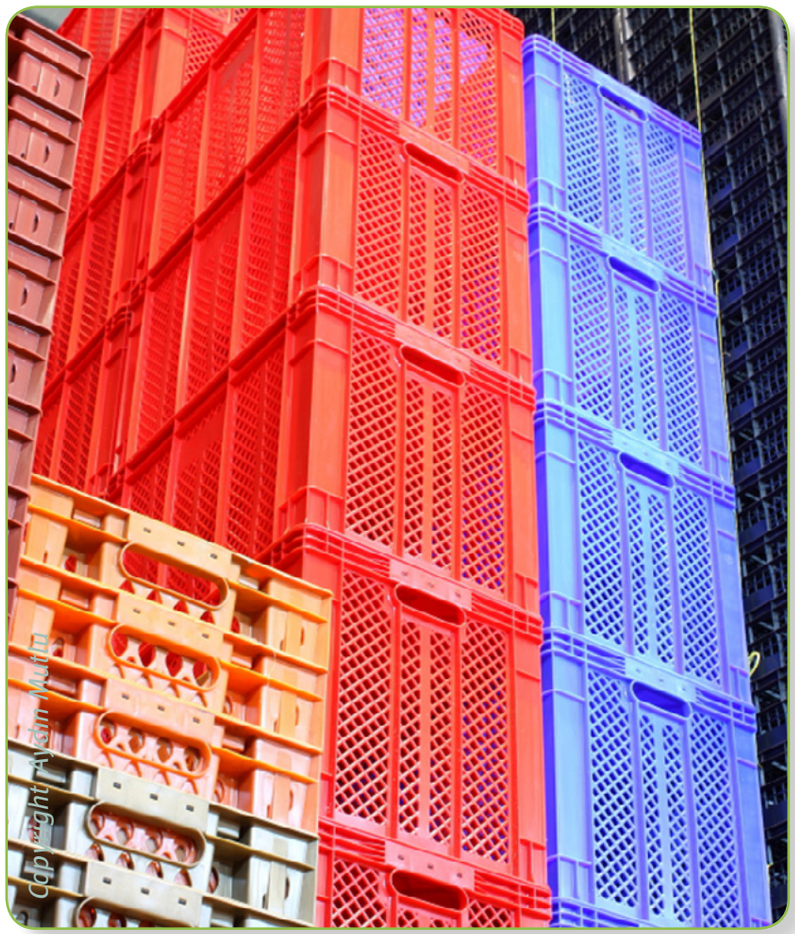
Lighter products and packages consume less energy in transport.

Example: Air-filled packing cushions weigh little.

Reduce Product and packaging volume

Fitting more products in a shipping container increases transport efficiencies

Example: Products can be designed to be disassembled for shipping, or to nest during shipping.



Develop reusable packaging systems

Reusable shipping systems can be used many times, thus reducing impacts.

Example: Polypropylene containers for shipping parts can be used hundreds of times.

Use lowest-impact transport system

Investigate all the transport and supply options.

Example: Shipping by oceanic freighter is often less intensive than shipping overland.

Source or use local materials and production

Local production and assembly may need to be developed.

Example: Local concrete furniture manufacturing creates fewer impacts than hauling concrete furniture from a distance.

Reduced Behavior and Use Impacts

Design to encourage low-consumption user behavior

Reduce energy consumption during use

Reduce material consumption during use

Reduce water consumption during use

Seek to eliminate toxic emissions during use

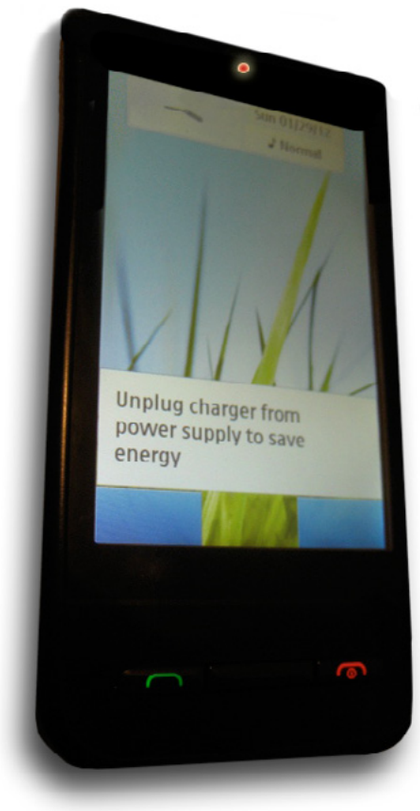
Design for carbon-neutral or renewable energy


Taken by and of Dottie Brackett

Encourage low-consumption user behavior

Design can influence behavior and choices in many ways.

Example: Well-designed bicycle clothing can make it more inviting to ride a bicycle.



Reduce energy consumption during use

A design can influence energy use.

Example: A cell phone can remind users when to unplug the charger.

Reduce material consumption during use

You can assess all materials that are consumed during use, and design to minimize.

Example: Designing a reusuable coffee filter eliminates consumption of paper filters.


Rico's Watercloset + Washbasin

Reduce water consumption during use

You can assess water consumption during use, and model alternate scenarios.

Example: A sink can divert grey water to the toilet tank.

Seek to eliminate toxic emissions during use

You can identify toxic emissions in the use phase and explore alternatives.

Example: You can specify materials that do not off-gas toxic substances when used.

Design for carbon-neutral or renewable energy

You can steer energy selection choices directly or by subtly suggesting alternatives.

Example: You can design for human-power or photovoltaic electricity.

System Longevity

Design for durability

Design for maintenance and easy repair

Design for Re-use and exchange of products

Create a timeless aesthetic

Foster emotional connection to product

Design for durability

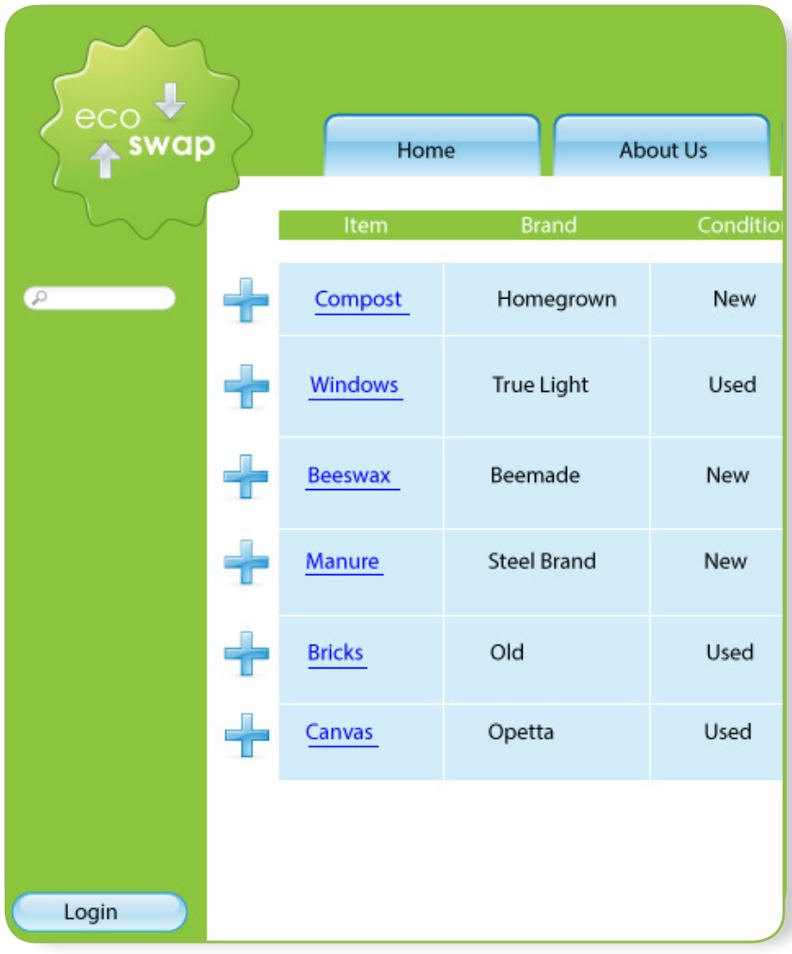
You can choose materials, finishes and details for physical durability. This strategy can be counterproductive if the product is disposed of sooner than anticipated, wasting durable materials.

Example: Cast-iron cooking pots last for generations.

Design for maintenance and easy repair

Products can be designed so that parts are physically accessible for repair, and repair instructions are available.

Example: Bicycle components can be easily accessed, replaced, and maintained.



Design for Re-use and exchange of products

Re-use and exchange can be fostered through designed systems.

Example: Online trading sites facilitate exchange.

Credit Koichi Okuwaki

Create timeless aesthetic

You can design with graceful classic materials, proportions, and lines.

Example: Braun products from the 1960's are still considered beautiful.

Foster emotional connection to product

People keep and use products longer if they have emotional connection to them.

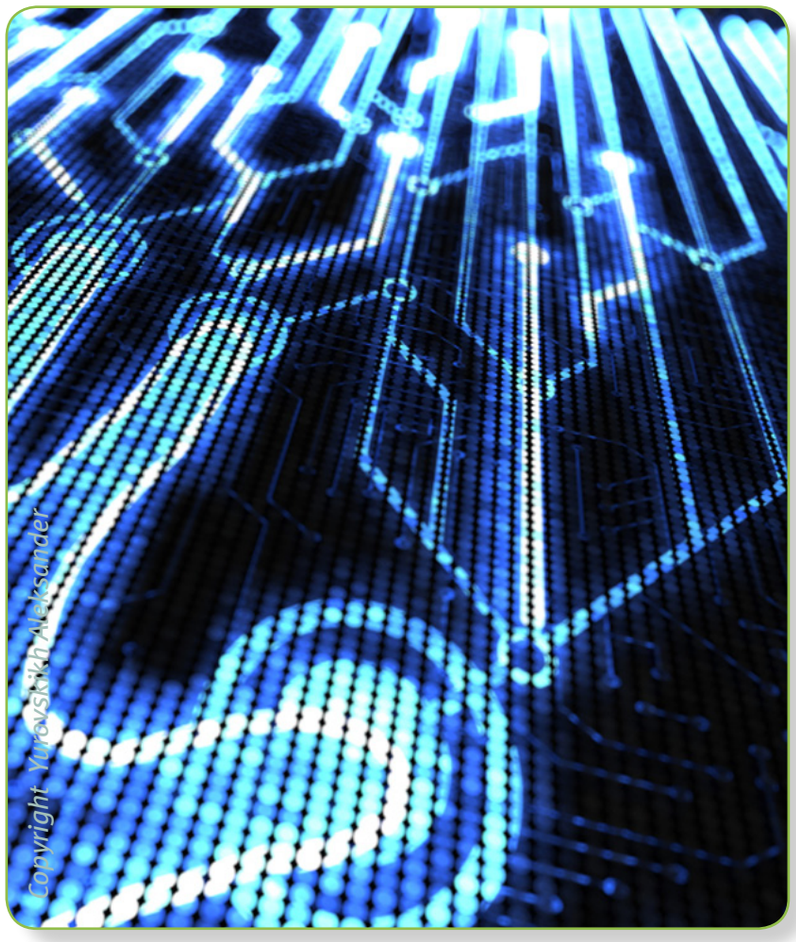
Example: A toy that requires assembly by parent and child together acquires meaning.

Transitional Systems

Design upgradeable products

Design for second life with different function

Design for reuse of components



Design upgradeable products

You can design for easy software, hardware or memory upgrade.

Example: Automatic online software updates do not require user effort.

Design for second life with different function

A product can be used in a new application, extending the useful life of the material.

Example: A jam jar can become a drinking glass.

Design for reuse of components

You can design a product system so that standardized components are re-used in another model of the same type of product.

Example: Xerox re-uses cartridges, sub-assemblies and components in new or refurbished equipment.

8

Optimized End of Life

Integrate methods for used product collection

Design for fast manual or automated disassembly

Design recycling business model

Use recyclable non-toxic materials

Provide ability to biodegrade

Design for safe disposal

Integrate methods for used product collection

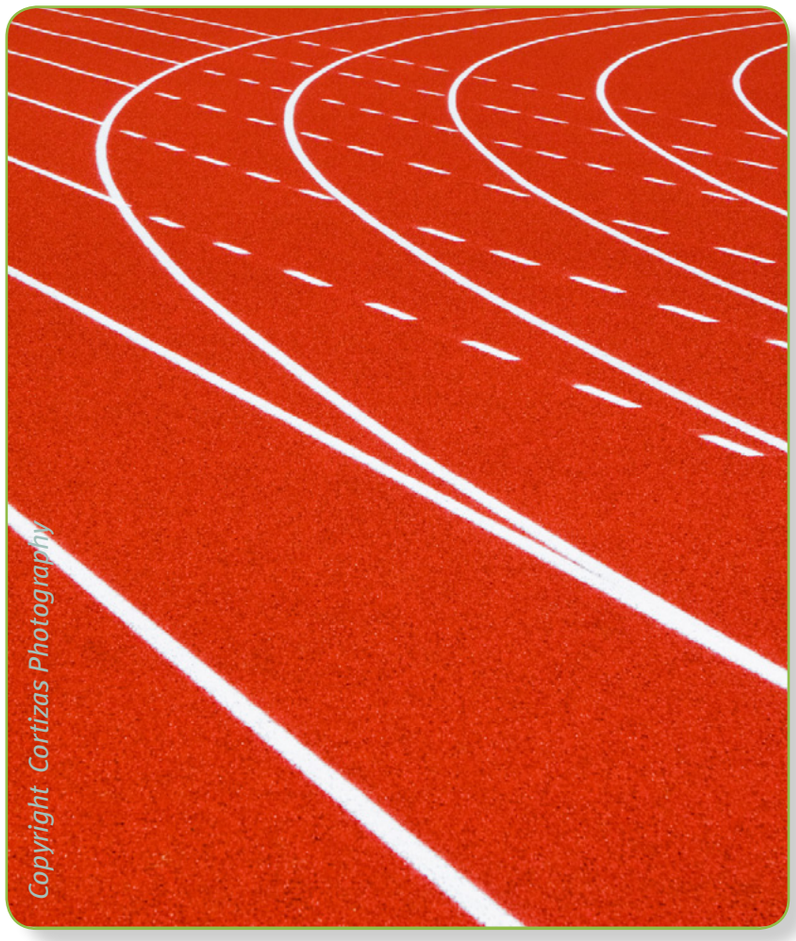
You can design the take-back function of the system to ensure it will happen.

Example: Dell computers developed return for recycling stations at office supply locations.

Design for fast manual or automated disassembly

Contemporary disassembly strategies make recycling and re-use economically viable.

Example: Click fits or snap fits are easy to disassemble.



Design recycling business model

You can propose business models that would ensure recycling follow-through.

Example: Running shoes can be collected, and the soles separated and ground up for use in track underlay.

Photo: Else Kramer

Use recyclable non-toxic materials

You can specify non-toxic materials to keep recycling below acceptable toxin thresholds.

PSB shoe insolesare stitched together from combinations of goat hair, coconut fiber, wool and cork.

Design: Damian O' Sullivan, Lisa O' Sullivan, Emmy Van Gool, Lysan Wolf

Provide ability to biodegrade

Some products or components do not have a long life and are suitable for composting.

Example: Paper-based packages with environmentally neutral binders are compostable in typical composting conditions. (Many materials claiming to be compostable are not compostable.)

Design for safe disposal

You can research a process for safe disassembly and containment of any suspect materials.

Example: Mercury from compact fluorescent bulbs needs to be safely handled at special facilities.

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The 2012 Okala Professional Guide contains the Okala Ecodesign Strategy Wheel. The Okala Professional Guide supports designers and development teams in creating more ecologically responsible products and services. It provides an introduction to ecological and sustainable design for practicing and beginning designers.

Okala is a ready reference to help working designers understand core concepts and master the tools and methods for reducing ecological impacts. This allows individual designers and design teams to conceptualize and develop products, services and systems with minimal ecological impacts.

The US EPA and the industrial Designers Society of America supported the Okala guide's inception. Over 60 design schools in North America use the Okala guide; a previous edition was translated for distribution in France.

Key attributes of Okala Professional include:

- *Ecodesign tools and methods focus on the needs and priorities of practicing designers and design teams.*

- *Fully updated and expanded ecodesign strategy wheel with detailed examples of each strategy*

- *Updated Lifecycle Impact Assessment methods that use the newest environmental impact characterization methods (2011 TRACI with USETOX) and US normalization data from the US EPA, and weighting values from the National Institute of Standards and Technology (NIST)*

- *Okala Impact Factors (incorporating the aforementioned methods) for 400 materials and processes which enable estimation of the ecological performance of any product or system Global climate change values (in CO_2 equivalents) for the same 400 materials and processes*

- *Practical methods and strategies to integrate ecological and social responsibility in business planning.*

- *Background to contextualize ecodesign practice.*

The Okala Professional Guide can be ordered at Amazon.com after 1 June 2012.

The Okala Team developed the Okala Ecodesign Strategy Wheel App

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