

Sustainable Innovation & Design

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- A. Sustainable design methodologies
- B. Company approaches to sustainable design
- C. Quantified business benefits of sustainable design
- D. Cases
- E. New materials and technologies
- F. Future issues

A. Sustainable Design Methodologies

“Sustainable design” has many relations:

Environmentally sustainable design (ESD)

Eco-design

Design for Environment (DfE)

Environmentally conscious design

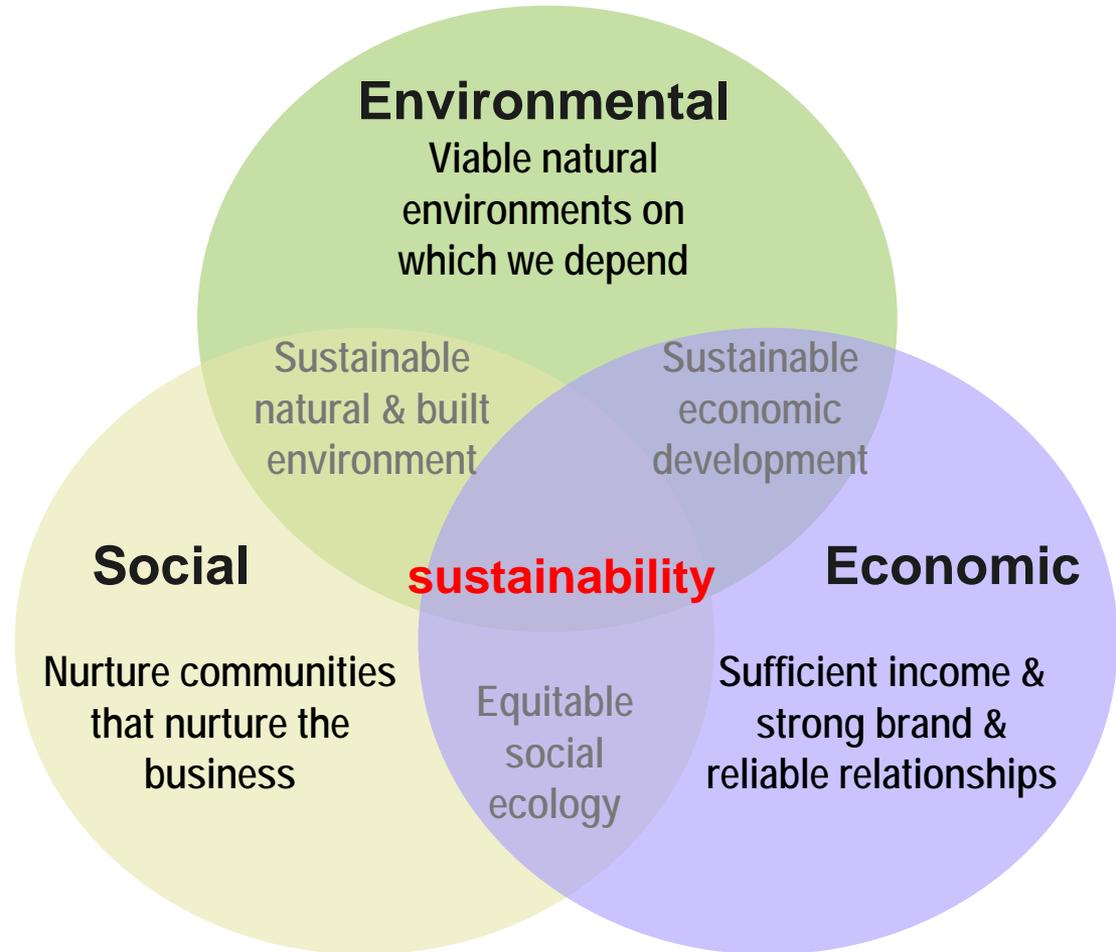
Environmental design

Green design



A. Sustainable Design Methodologies

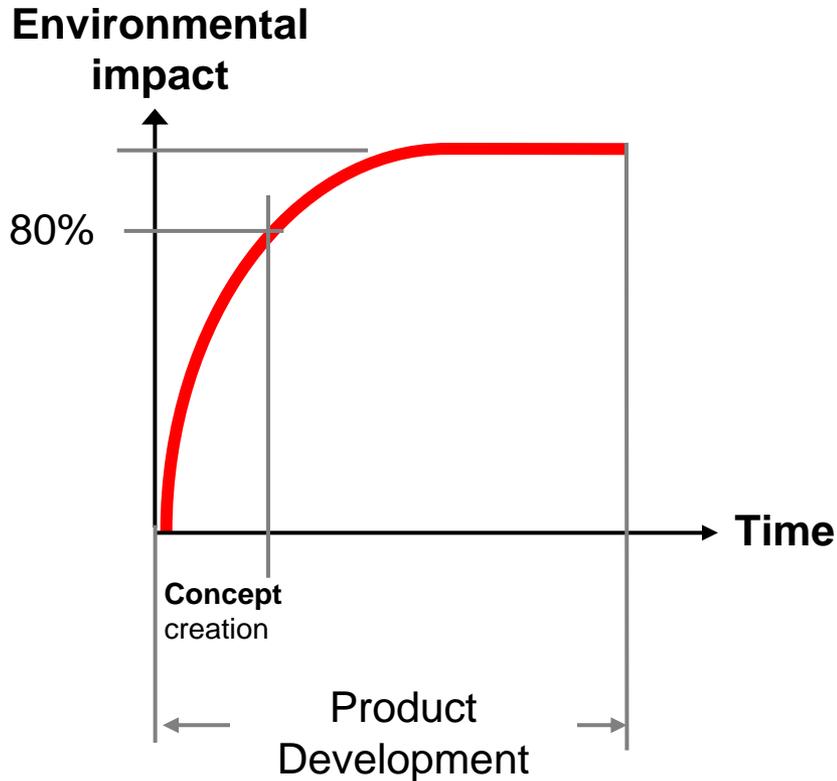
The 'Triple bottom line'





A. Sustainable Design Methodologies

The role of design



An estimated **80%** of a product's environmental impact is fixed early in product development

So take early opportunities to design-out waste

A. Sustainable Design Methodologies

‘Cradle to grave’ product life thinking



Extraction of raw materials



Manufacturing



Packaging and distribution



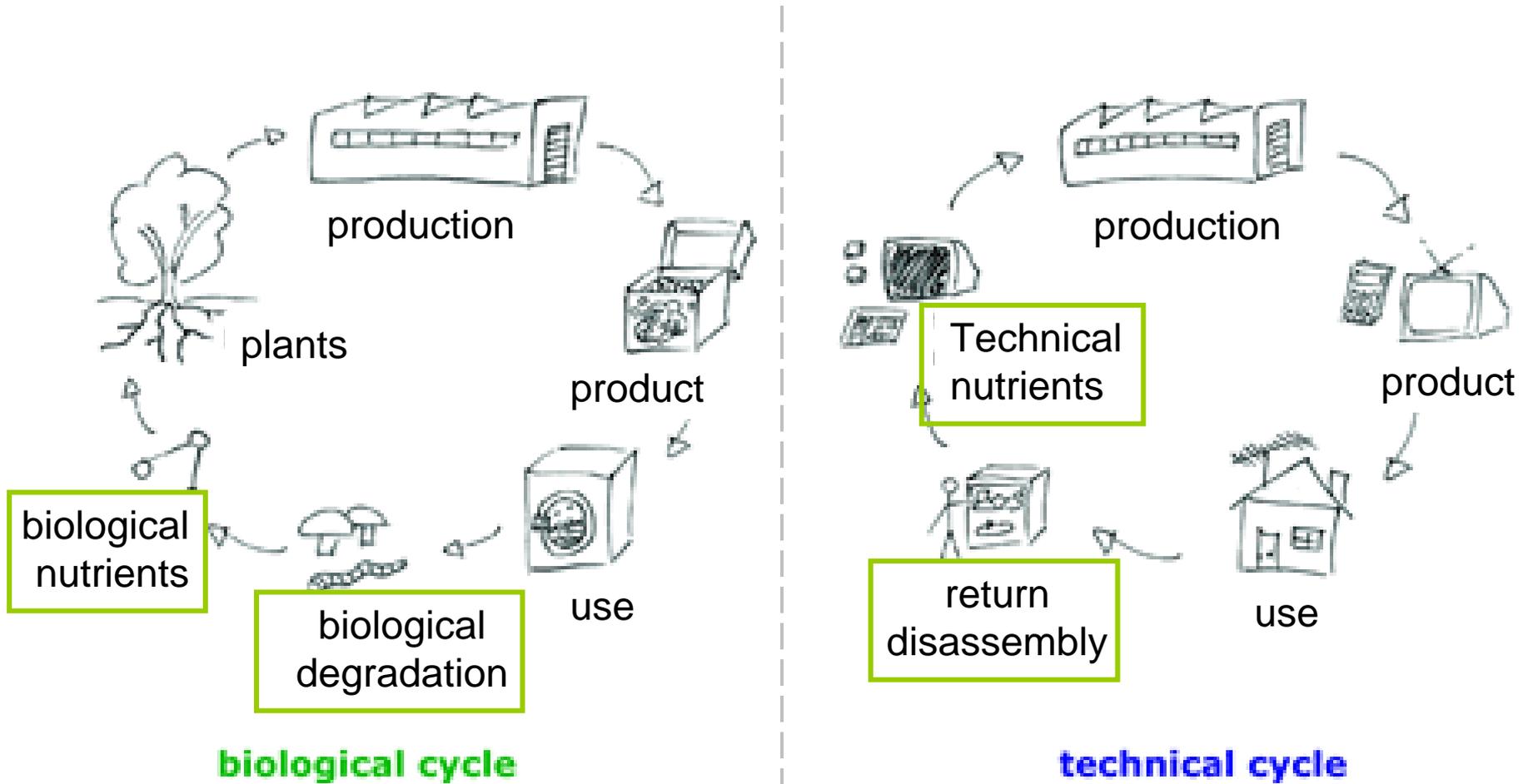
Use and maintenance



Incineration and disposal

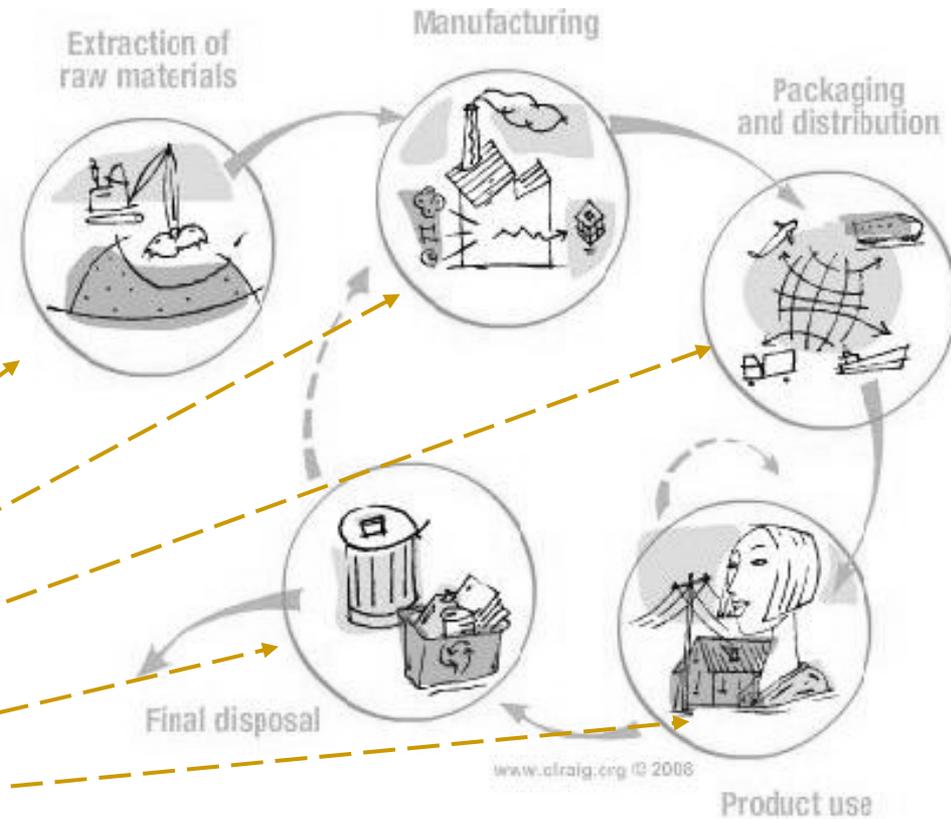
A. Sustainable Design Methodologies

‘Cradle to Cradle’ (McDonough and Braungart)



A. Sustainable Design Methodologies

So...what can designers do?





A. Sustainable Design Methodologies

Product Service System (PSS)

...combines products and services in a system to fulfil specific client demands.

Three basic PSS categories:

- (1) **Product-oriented PSS**, including services added to products, advice connected to products, e.g. milk delivery
- (2) **Use-oriented PSS**, including product lease, renting/sharing, pooling and pay-per-use, e.g. DVD rentals
- (3) **Result-oriented PSS**, including activity management and functional results, e.g. car repair

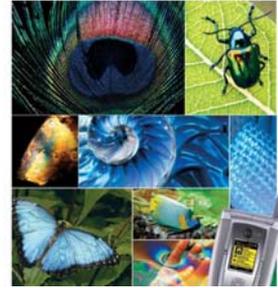


A. Sustainable Design Methodologies

Biomimicry, Biomimetics



Biomimicry = emulating nature's patterns and Strategies e.g. solar cell inspired by a leaf



Biomimetics = process of understanding and applying biological principles to human designs.

This includes biomaterials, biomechanics, biological systems composed of individuals of one species (e.g. herds, swarms), or multispecies ensembles.

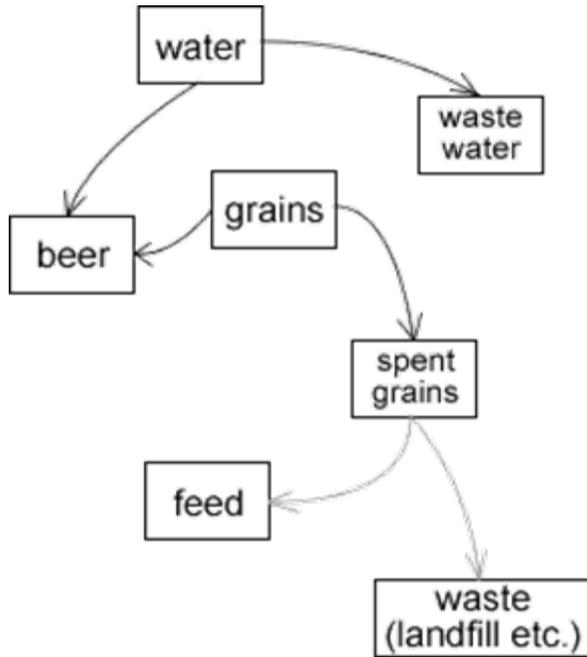
A. Sustainable Design Methodologies

Industrial symbiosis – ‘waste’ becomes resource

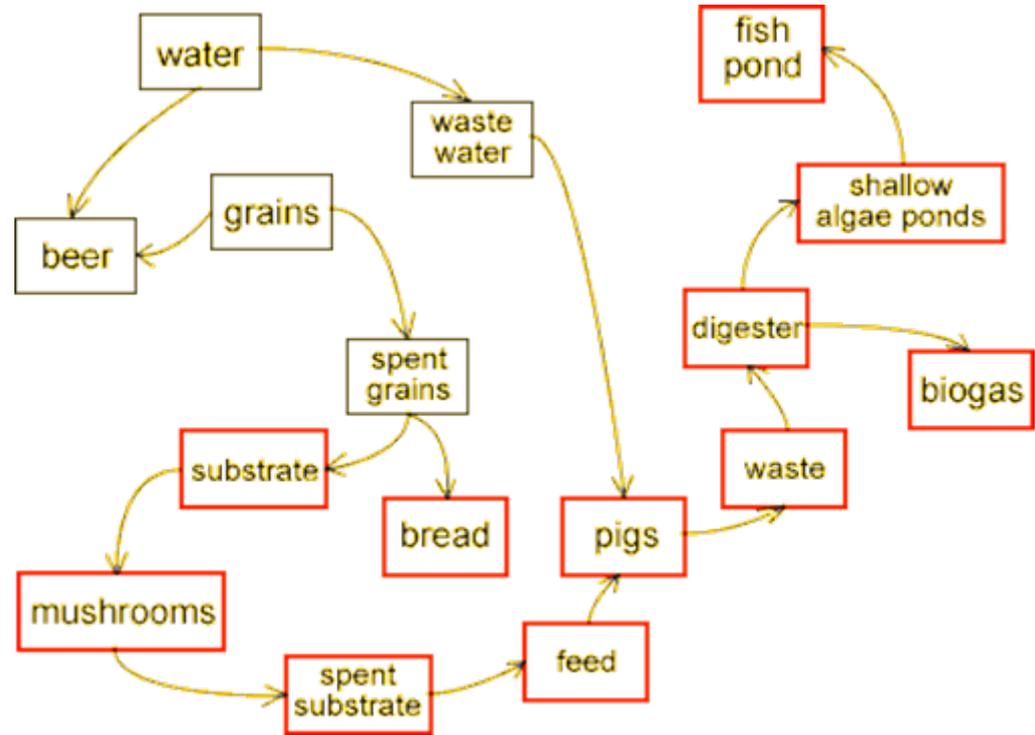
‘ZERI’ integrated biological system case: Brewery



Traditional brewery process flow



ZERI process flow



B. Company Approaches to Sustainable Design

PHILIPS

Green Flagship Products

Either;

- best environmental performance in the market, or,
- most innovative environmentally friendly product in its portfolio, or,
- best environmental solution in its application area.

Philips Green Flagships are benchmarked in six green focal areas and must perform significantly better (>10%) in at least one area:



Weight



Recycling
and disposal



Lifetime
reliability



Energy
efficiency



Packaging



Hazardous
substances

B. Company Approaches to Sustainable Design

P&G



Less water →

The new formulas save more than 500 million litres a year.

Less emission →

The new products reduce CO2 emissions by more than 100,000 metric tons a year.

Less packaging →

These smaller products save more than 15,000 metric tons a year in packaging materials.

Less shipping →

The new size results in more than 40,000 fewer truck loads a year.

Sustainable Innovation Products

Sustainable innovation products are those with a significantly reduced (>10%) environmental footprint versus previous or alternative products. For example, P&G converted their liquid laundry detergent portfolio to a “2X” concentrated formulation that delivers more active ingredients in every drop, allowing consumers to use less.



B. Company Approaches to Sustainable Design

Interface **FLOR**™

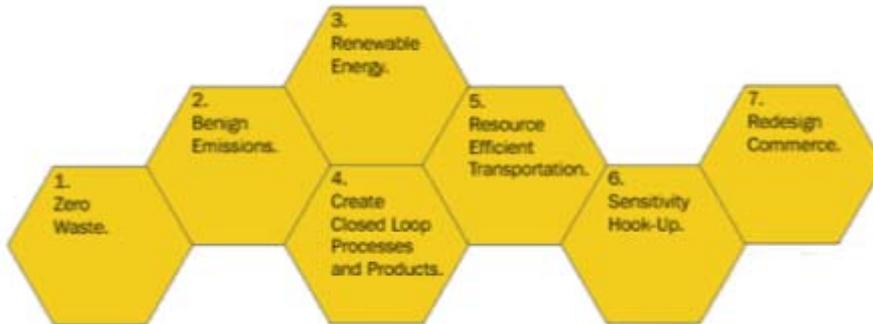


7 steps towards mission zero

Interface FLOR, the largest modular carpet manufacturer in the world, breaks the mission zero into seven steps:

1. Zero waste
2. Benign emissions
3. Renewable energy
4. Creative closed loop processes products
5. Resource efficient transportation
6. Sensitivity hook-up
7. Redesign commerce.

Each of the steps contains several innovative projects.





B. Company Approaches to Sustainable Design



MINI 1000 Mi Series



2159m Widescreen monitor



Officejet Pro 8000



Photo smart C5500

DfE-Design for the Environment Programme

HP's DfE programme, established in 1992, takes a life cycle approach to reducing the impact of HP products, improving their performance in areas such as energy efficiency, materials innovation and recyclability.

HP's product stewards and product designers identify, prioritise and recommend environmental improvements through a company-wide DfE programme. . .

B. Company Approaches to Sustainable Design



SIEL- Sustainable IT Ecosystem Lab

Sustainable IT Ecosystem Lab (SIEL), formed in 2008, aims to transform the information technology ecosystem by pioneering technologies that minimize energy and material use.

SIEL is conducting multidisciplinary research on the sustainability and growth of the IT “ecosystem”-made up of billions of handhelds and printers, millions of systems and thousands of data centres and print factories.

C. Quantified Business Benefits of Sustainable Design

PHILIPS

Ninefold increase in sales of green products in 2009.

All three sectors - Healthcare, Lighting and Consumer Lifestyle - showed an increase in sales of green products in 2007

Total Green Product sales **EUR 7.1 billion** in 2009

Green products: **31%** of total sales in 2009 (23% in 2008) – target **50%** by 2015

Green products: **800** new green products to market in 2009 (includes 700 new green products from lighting)



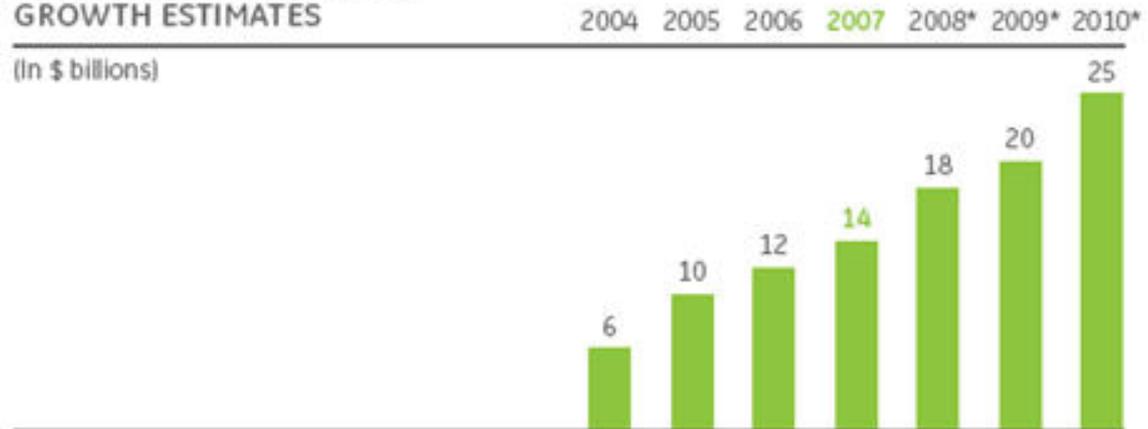
C. Quantified Business Benefits of Sustainable Design



GE has reported that revenues from its environmental portfolio topped **\$14 billion** in 2007, up more than 15% compared with 2006. (2008)

The revenue from sales of GE's ecomagination products is rising to the tune of **21%** a year, now reaching **\$17 billion** in sales. The company has boosted its portfolio of ecomagination products and services by 1/3, to 80. (2009)

ECOMAGINATION REVENUE
GROWTH ESTIMATES



*Forecast

C. Quantified Business Benefits of Sustainable Design

AkzoNobel
Tomorrow's Answers Today



Akzo Nobel, based in the Netherlands, makes and supplies a huge range of paints, coatings, and specialty chemicals, pro forma 2007 revenue totaled EUR14.4 billion.

Andre Veneman, the company's director of sustainability, says **18%** of Akzo Nobel's revenue is now made up of sustainable products. (2008)



PHILIPS

Green Flagship Product- DECT 525 telephone



- 54% less energy
- 14% less packaging
- 33% lighter in weight
- improved by 12% within the recycling field

(compared with average market competition)



Energy efficiency



Packaging



Weight



Recycling and disposal



D. Case

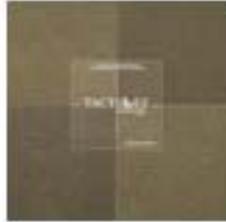
InterfaceFLOR™

Green product examples



Opening Night™

This collection is comprised of InterfaceFLOR hybrid yarn, a blend of nylon bio-based fiber of polylactic Acid (PLA). PLA fibers are derived from starch based agricultural waste materials such as non food grade corn.



TacTiles™

TacTiles contains no liquid components, using them virtually eliminated the issue of VOCs (Volatile Organic Compounds) during carpet installation.



Rawhide™

Rawhide offers 4% renewable content (fibre) and 57% total recycled content.



Chenille Warp™

Depending on the colourway, Chenille Warp offers 62-65% total recycled content.



D. Case



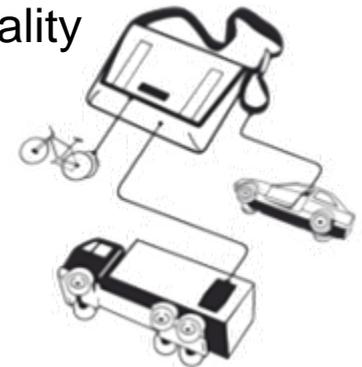
FREITAG[®]

SINCE '93

Freitag Bags



- reuses materials - used truck tarps, car seat belts, used air bags and used bicycle inner tubes
- individual and unique styling
- tough, durable, quality





D. Case



トギノン

TOGINON Knife designed by Sprout design

- PSS application produces zero waste (retaining technical cycle)
- design for recycling (metal blades and plastic handle can be disassembled and recycled respectively)



E. New Materials and Technologies

TREEPLAST®



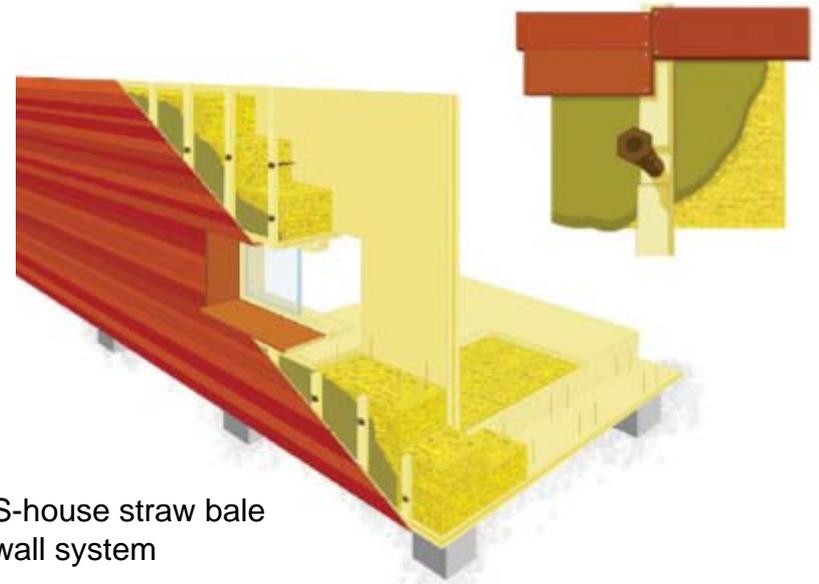
Application example: S-house



Counterlathing mounted with TREEPLAST screw at the straw bale layer

Features

- natural, renewable, and biodegradable
- made from wood chips (50%), with crushed corn and natural resins
- can be injection moulded to form products with no shape restrictions
- can be processed in traditional plastic-processing machines
- ranges of versions: fully biodegradable, water-resistant



S-house straw bale wall system



E. New Materials and Technologies

Solar Cells printed with an inkjet printer

In 2008, Konarka Technologies launched a printable solar panel film that uses a common inkjet printing process, instead of current screen printing process, to manufacture paper-thick photovoltaic cells.

Konarka's inkjet printing technique uses solar cell material as ink, and a thin flexible plastic as paper.

This improved process can cut the amount of silicon needed in half. Since silicon can account for three-quarters of the cost of conventional solar cells, the new technique can reduce the amount of other materials used and improve solar-cell performance.



The Centre for Sustainable Design is able to offer new *free* services related to sustainable innovation and design to eligible companies* through funding from the European Regional Development Fund, South East England Development Agency and INTERREG.

RAISE
AWARENESS

DIBS (Design and Innovation for Business Sustainability)

Free interactive briefings on sustainable innovation and design to eligible companies, agencies or social enterprises in the SEEDA region.

DIBS has been funded by South East England Development Agency (SEEDA) and European Regional Development Fund (ERDF) as part of the South East ERDF Competitiveness Programme 2007–2013.



EUROPEAN REGIONAL
DEVELOPMENT FUND



DEVELOP
IDEAS

GreenThinks!© through SUSCIN (Sustainable Supply Chains through Innovation)

An open ideas process using creative techniques to develop new business
Questionnaire → Analysis → GreenThink! © session → Report

"incredibly valuable" [CEO], *"great way to get the benefit of several keen minds"* [MD] *"extremely useful"* [Director]

SUSCIN has been funded by South East England Development Agency (SEEDA) and European Regional Development Fund (ERDF) as part of the South East ERDF Competitiveness Programme 2007–2013.



EUROPEAN REGIONAL
DEVELOPMENT FUND



SUPPORT &
ADVICE

EcoMind (Environmental Market and Innovation Development)

Free sustainable product innovation research & consultancy for eligible companies – translate ideas into business benefits



The Environmental Market and Innovation Development (EcoMind) project 2008-2011 funded by the INTERREG IV A 2 Seas Programme.



Investing in your future
Cross-border Cooperation Programme
2007-2013
Part-financed by the European Union
(European Regional Development Fund)

*Eligible companies are small- and medium- sized enterprises (< 250 employees) in the South East; Kent, Surrey, Hampshire, Isle of Wight, West and East Sussex.

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