Textiles
Environment
Design

# Sustainable
# Design Inspiration for H&M

100 great ideas,
presented by Professor Rebecca Earley

TED's TEN are:

1. Design to Minimise Waste
2. Design for Cyclability
3. Design to Reduce Chemical Impacts
4. Design to Reduce Water and Energy Use
5. Design That Explores New Technologies
6. Design that Takes Models from Nature & History
7. Design for Ethical Production
8. Design to Reduce the Need to Consume
9. Design to Dematerialise and Develop Systems & Services
10. Design Activism

www.tedresearch.net

Textile Toolbox

# 1
# Design to Minimise Waste

## 1.1 Reduce Material Usage

**1 Muji, Product Fitness, 2012**
Muji Product Fitness 80 was an exhibition of adapted products displayed at London's Design Museum in Spring 2012. The idea behind the exhibition was the belief that to live a balanced and healthy life, we must only use what is adequate and reduce our need for excessive consumption. The company wanted to create a collection of objects that showed their care for craftsmanship working in harmony with a minimalist approach. One of the questions they explored was: Do cotton buds need to be as long as they are? A small change makes a huge difference when adopted by society as whole in minimising wasted materials.

→ www.muji.eu/pages/comp-fitness.asp?

**2 Puma, Clever Little Bag, 2012**
The clever little bag is made through a new construction method to replace Puma's traditional shoebox. It uses 65% less cardboard than the standard shoebox and has no laminated printing, no tissue paper or stuffing, takes up less space and is lighter for shipping. The bag is made of a non-woven material, which is stitched with heat, resulting in less waste and a recyclable product. Puma claims that there is 'approximately 8,500 tons less paper consumed, 20 million Mega joules of electricity saved, 1 million litres less fuel oil used and 1 million litters of water conserved.'

→ www.puma.com/cleverlittlebag

**Brooks® Sport Ink, Green Silence, 2010**
Green Silence is a flat running shoe featuring sustainable design in most of its components. The shoe is mainly made out of recycled materials and has approximately 48% fewer components in its construction than similar running shoes from other brands, resulting in 41% energy saving. The midsole, insole and collar foam are made out of biodegradable material. All dyes and colorants used are non-toxic and labels are sown on to further reduce energy consumption. Sustainable, alternative materials are used instead of petroleum-based materials lowering VOC emissions by 65%.

→ brooksrunning.com.au/tech_greensilence.php

## 1.2 Zero Waste: Cutting

**3 Research: Mark Liu, Zero Waste Cutting, 2009**
This zero waste cutting technique saves 15% of material per garment. The method benefits both the environment and business operation through saving material and therefore minimising costs. The London based designer has created a method of cutting a jigsaw pattern from a single piece of fabric in order to create all of the components to be assembled in one garment. In the collection negative space becoming positive, something that ordinarily would be considered scrap fabric to be discarded by other designers becomes a luxurious embellishment that adds value to the garment.

→ www.stique.com/about.html

**4 Research: David Telfer Minimal Seam Construction, 2010**
The designer explores production processes through minimal seam construction to lower costs and increase efficiency. The investigation focuses on design techniques that could lead to increased construction efficiency throughout different sectors of the clothing industry. The main technique explored was the use of minimal seam construction; this involved manufacturing garments with the fewest seams possible. The investigation concluded with a project that considers the potential use of Rapid Manufacturing to create textiles, possibly leading to the development of seamless garments.

→ davidtelfer.co.uk/page17.htm

## Zero Waste: Digital Printing

**5 Research: Precarious Cut: Reverse Engineered, 2009**
Precarious Cut is an Edwardian riding coat inspired by Governess Maria from the movie ' The Sound of Music', and her attempt to make clothes out of the family's unwanted, second hand curtains. The designer used a large piece of discarded, second-hand fabric with a bold tartan pattern. Before producing the real size toile the designer made a small paper figure of her pattern to see if there were any adjustments that needed to be made. Through the use of a CAD Pattern cutting program called Gerber, the hand drawn sketches are turned into a real size pattern.

→ hollymcquillan.com/design-practice/precarious-cut

## Zero Waste: Knitting

**6. APOC, Issey Miyake, 1999–2007**
A-POC stands for A Piece of Cloth and refers to the idea of epoch. The garments are manufactured with a computer technology, which uses one single piece of thread in a single process. The method requires no sewing. One thread goes into the loom and results in a flat tube of material, which can be transformed by cutting it into a shirt, skirt, or pants. The garment can be snipped anywhere without unraveling, allowing complete customisation. The development began in 1997 and the first results included in the S/S collection 'A-POC King & Queen, A-POC Le Feu' presented in Paris in 1999.

→ mds.isseymiyake.com/mds/en/collection

**7. Hohenstein Institute & Pro Feet Functional Wear, Seamless Underwear, 2012**
The Hohenstein Institute and underwear brand Pro Feet Functional Wear are collaborating to develop more functional underwear for the business and fashion sector by investigating the advantages of seamless underwear. First layer textiles must appear invisible yet at the same time be pleasant to wear and secondly ensure that the wearer feels fresh and odour-free throughout the whole working day. The project is still in its research phase looking at the need of the consumer, suitable materials and construction methods.

→ www.innovationintextiles.com/medical-health-hygiene/scientists-investigate-functionality-of-seamless-underwear

## Zero Waste: Weaving

**8. Research: Siddhartha Upadhyaya, Made to Measure, 2010**
Indian fashion designer and technologist Siddhartha Upadhyaya has invented an on loom finishing which enables to weave made-to-fit garment sections. No fabric waste is created; the woven pieces can be sewn together as they come off the loom. The computer-simulated process saves yarn, dyes and chemicals, and reduces lead-time by almost 50%. The final product has no shade variation and is difficult to copy. It also conserves natural resources: According to the London Science Museum DPOL (Direct Panel on Loom) saves 70–80% of water compared to standard methods of garment manufacturing.

→ antenna.sciencemuseum.org.uk/trashfashion/home/wearwithoutwaste/cut-it-out/madetomeasure

# 1.3 Designing Durability

**9. Teijin, High-Strength Polyester Nanofiber, 2012**
Nanofront is high-strength polyester nanofibre with a diameter of 400 nanometres, which is 22,500 times smaller than the cross-sectional area of a strand of hair. According to the company, nano-sized bumps on the fiber surface give the material outstanding slip resistance. The ultra-fine fiber is also said to be soft, stretchable, fits body contours comfortably,

promotes cooling and boasts excellent absorbency and opaqueness. The fiber is used in a wide variety of clothing and industrial applications, ranging from inner-wear, golf gloves and skin care products to abrasive cloth and filters.

→ www.innovationintextiles.com/smart-textiles-nanotechnology/new-polyester-nanofibre-is-400-nanometres-in-diameter

**10. Howies, 'Hand Me Down', 2008**

The Wales based active clothing company's collection "hand me down" is a limited line of clothes and accessories made with the principles of durable design. The collection is made to last longer than the average garment, which potentially can cost less to the consumer in the long term. As well as using low impact fabrics such as organic cotton, products from the hand me down collection have a 10-year guarantee.  In 2012 the company maintained that all their clothing and accessories lines are high quality, sustainably made, with the view to last a long time.

→ www.psfk.com/2009/01/clothes-guaranteed-to-last-for-10-years.html

Textile Toolbox

# 2
# Design for Cyclability

## 2.1 Reuse

**11. Beyond Retro, Vintage and Retro Retailer, 2012**
Beyond Retro sells a combination of vintage, retro and mock vintage clothes. In recent years wearing vintage and retro has become increasingly fashionable. The first shop opened in a disused factory in East London in 2002. By bringing second hand products back into the market by purchasing them through charitable organisations, Beyond Retro increases the life span of garments and prevents early recycling or landfill. In 2011, Beyond Retro introduced their own range called the 'Beyond Retro Label'; this project is a custom-made reinterpretation of vintage items and fabrics. The retro revolution has also increased the popularity for charity shop shopping.

→ www.beyondretro.com/en

**12. Filippa K, Second Hand Shop & Eileen Fisher, Green Eileen**
In 2008 Swedish brand Filippa K opened its very own Second Hand store in central Stockholm. Based on the fact that customers get tired of the garment before it is worn out the company encourages their customers to buy less and to reuse instead. To add a bit of excitement the shop also sells parts of the brands sample-collection. Filippa K is proud of the outstanding quality of their garments, which make this concept possible. The store is part of a wider program of environmental work and is run on a not-for-profit basis by the company.

The American women's wear company Eileen Fisher has recently launched their new recycling program under the name Green Eileen. This project relies on donations of kindly worn Eileen Fisher clothing from loyal customers and employees. Garments are accepted in selected stores and each donation is rewarded with $5 vouchers which can be redeemed at any store or on their website. Clothes that cannot be resold are upcycled and turned into rugs, blankets, scarves etc. All donations to Green Eileen support programs that improve the lives of women and girls in local, national and global communities.

→ filippaksecondhand.se
→ www.greeneileen.org/donate

## 2.2 Remanufacture

**13. Topshop, Reclaim to Wear, 2012**
This collection was made entirely from discarded materials, such as surplus stock and production off-cuts sourced from previous Topshop collections and their jersey factory. Topshop worked in collaboration with Reclaim to Wear's designers Orsola de Castro and Filippo Ricci. The new collection aimed to create a solution to designing with waste. Orsola de Castro described it as the first step towards a 'zero waste collection'. The eight-piece collection includes ombré denim shorts, paneled jersey dresses and sweatshirts. The 'Reclaim To Wear' collection, which was

launched in June 2012, was sold out within days.

→ www.topshop.com/webapp/wcs/stores/servlet/CatalogNavigationSearchResultCmd?catalogId=33057&storeId=12556&langId=-1&viewAllFlag=false&categoryId=572491&interstitial=true&geoip=noredirect

## 2.3 Downcycling

**Shoddy**
There has been a huge increase in the percentage of mixed-fibre textile waste created through blending and finishing processes, driven by the ever-increasing demand for performance and functionality. This instills a legacy of waste and prevents inclusion in high-value reclamation. 'Shoddy' materials cannot be upcycled through repolymerisation nor biodegraded, and often end up 'downcycled' as lowgrade fibre products such as underlay for carpet, insulation materials or other 'unseen' and low value applications. Existing recycling systems are enabling some synthetic textiles to be recycled over numerous life cycles, however these require a pure feedstock in order to be recycled appropriately.

→ www.tedresearch.net/media/files/TED_Making_Theory_into_Textiles_2010.pdf

### Recycling Cotton

**14. American Apparel,**
**Recycled Accessories, 2012**
Some of American Apparel's products such as scrunchies, hair bows and bow ties have been made from recycled fabrics collected from their factory waste with new additions added regularly. Products such as their Unisex Cotton Bow Tie are described as 'a classic bow tie made of some of our favorite fabrics from around the factory.' They also try to minimise waste between pattern pieces during the garment cutting process, cutting different styles together to reduce the amount of waste generated. The company claims that sustainability is an inherent part of their business from production methods to the materials used.

→ store.americanapparel.netproduct/?productId=csv0514

### Recycling Polyester

**H&M Recycled Fabrics –**
**Conscious Collection, 2011**
H&M use a range of recycled materials, such as recycled wool and polyester, to make clothes. The recycled polyester is often made of PET plastic bottles. In 2012, the equivalent of about 7.9 million bottles was used. The majority of the company's own waste is generated either by or sent to our distribution centres, where it is handled in accordance with our long-term goal of sending zero waste to landfill. This is also in line with our ambition to close the loop on all our waste. In 2012, 92 percent of the waste handled in H&M's distribution centres was recycled. The target for 2013 is a recycling rate of 95 percent. The company is also working to find good waste management solutions for all their stores and offices. This challenge is the variety of different standards and practices on recycling, depending on the location. However, H&M will have particular focus on store waste in 2013. This includes continuing to find the best possible waste management routines for their construction waste.

→ about.hm.com/content/dam/hm/about/documents/en/CSR/reports/Conscious%20Actions%20Sustainability%20Report%202012_en.pdf

**15a. Issey Miyake, 132.5 Collection, 2012**
Issey Miyake's 132.5 Collection is a line of pleated and folded garments made from recycled PET. Each piece is made from a single piece of fabric and designed to expand from a two-dimensional geometric shape into a structured three-dimensional garment. The collection consists of ten abstract geometric origami shaped forms, which can be turned into dresses, jackets or bags. The name, 132.5 has been described to symbolise the process, 'figure "1"' reflects a single piece of fabric, the "3" evokes the final result in 3D and the "2" the flat folding. Finally, the "5" symbolises the transformation of the garment.'

→ www.isseymiyake.com/en/brands/132_5.html#news_section

**15b. Teijin, High Comfort,**
**High Performance Polyester, 2013**
Tejin's new polyester range features four different high performance, high comfort fabrics, one of them the sustainable Eco Storm fabric. This lightweight, high-performance material has

waterproof and breathable qualities, featuring recycled polyester laminated with a thin but highly durable polyester film. The collection of new fabrics can all be recycled in Tejin's 'ECO CIRCLE', which is the world's first closed loop polyester recycling system. The Japanese fibre converting company is showcasing their new high performance polyester range at textiles fairs in the USA and Europe this spring.

→ www.teijin.com/news/2013/ebd130121_39.html

## Recycling: In The Mix

**16. Adidas, Grun, Collection 2009**
The Adidas Grun collection incorporates a range of clothing and footwear using traditional Adidas silhouettes for men and women. Adidas aims to minimise their environmental impact by using recycled fabrics and natural materials such as hemp, bamboo and cork. Each shoe and garment has a clear labeling system explaining the materials used, their environmental credentials and the processes used in production. The collection splits into three categories: The Reground, The Recycled and The Made From. The Reground line is made from materials such as recycled rice husks and chrome-free leather, while the Recycled line utilises recycled cotton scraps and polyester.

→ www.adidas-group.com/en/ser2007/e/e_5.asp

**16b. Adidas & Stella McCartney, London Olympic Games, 2012**
The recycled polyester Adidas Grun collection was also utilised by Adidas in the London 2012 Olympic Games. Adidas created the London uniforms for staff and alongside Stella McCartney collaborated on the Athletes Uniforms. London Games Volunteers wore jackets made from 100% recycled materials and trainers which were made from 50% recycled materials and 30% from materials of their Reground collections. 70% of competitive wear worn on field by athletes had sustainable content, including high performance recycled polyester made from recycled water bottles.

→ www.stellamccartney.com/experience/en/our-greatest-team

## Upcycling

**17. Research: Michelle Baggerman, Precious Waste, 2011**
'Precious Waste' is a textile made entirely out of used plastic shopping bags, which have been spun into yarns and then woven. The designer finds the short life and recycling recovery of plastic shopping bags too wasteful and environmentally demanding. Through pure handy work the designer transformed the discarded plastic bags into a 'new', beautiful and strong material, suitable for a wide range of purposes. When this textile is eventually worn out it can still be recycled in the conventional way, as it is monomaterial and suitable for further recycling. Baggerman aims to feed people's imagination by turning a plastic bag that has many negative connotations into a strong and beautiful product.

→ bureaubaggerman.nl/precious-waste-english

**18. From Somewhere and Speedo, Unity Dress, 2011**
Since early 2011 From Somewhere and Speedo have been working together on a range of garments made from unused Speedo swimwear. The project initially started when in 2010 FINA, swimming's governing body, changed the rules regarding full body swimsuits. Speedo was left with surplus stock of its Speedo LZR Racer, which From Somewhere turned into one-off dresses. From Somewhere has also created a one-off elegant ball gown called the 'unity dress' from off-cuts of Speedo's 'fastskin3 super elite swimsuit'. The multi-coloured dress symbolises the unity between all the different countries that Speedo sponsored at the Olympics.

→ www.designboom.com/weblog/cat/8/view/22821/offcut-speedo-swimsuit-dress-unity-by-from-somewhere.html

## Continuous Loops

**19. Research: Dr Kate Goldsworthy, Monofinishing (2009–)**
In this project the designer is developing new tools and finishing techniques for designing recyclable, aesthetic 'surfaces' within the context of a closed loop polyester production. Current processing and finishing methods such as chemical coatings or lamination are driven by the industry's desire for performance and functionality creating complex,

non-recyclable hybrid materials. If polyester instead was kept as a monomaterial during its production it could be repeatedly recycled back to virgin quality. Through experimenting with laser technology, so far only used in medical applications, the designer formulates a bespoke version for production, which is now being further developed in collaboration with industry partners.

→ www.kategoldsworthy.co.uk

**20. Research: Professor Kay Politowicz, Short Life (2012)**
The 'Short Life' collection was born from an increasing interest in the potential for design to affect the environmentally damaging effects of 'fast fashion' throwaway culture. 'Short Life' products address increasing raw material shortages by designing a system to 'recover' material in a loop of recycling for continuous use, whilst designing out laundry altogether and its associated environmental impact. The collection proposes new industrial alliances between the unrelated industries of fashion fabrics, paper manufacturing and recycling, as part of a closed-loop system of production, disposal and renewal.

→ www.tfrc.org.uk/research/short-life

**21. PUMA, InCycle, 2013**
The shoes, apparel and accessories of Puma's InCycle collection are completely biodegradable and recyclable. The biodegradable components of the InCycle line include materials that microorganisms brake down into biological nutrients. The recyclable products, in turn, are made with metals, textiles and plastic than can be reused to make other products. This process is explained in a clever short film, which can be viewed online. According to Puma an InCycle basket sneaker has 31% less environmental impact than their conventional counterparts. All items in the InCycle collection can be one hundred percent restored into new products through Puma's 'Bring Me Back' program.

→ www.youtube.com/watch?v=j9zfkYHtuMc

## Design For Your Consumer Take Back

**H&M's i Collect partnership**
H&M do not think that extracting natural resources for the manufacture of garments and letting them end up in landfill after use make business sense. They encourage recourse-efficiency. Turning worn clothes into something usable again could be one way to achieve this. H&M are aware that there is still a long way to go to close the resource loop on a large scale. The company is however working towards closing the loop by teaming up with iCollect in 2011 to initiate a pilot project in 17 H&M stores in Switzerland to collect used garments from customers to be recycled. (H&M Sustainability Report 2011, Page, 17).

→ about.hm.com/content/dam/hm/about/documents/en/CSR/reports/Conscious%20Actions%20Sustainability%20Report%202011_en.pdf

Today *I Collect* is available in all UK stores and in selected stores worldwide, you can check the H&M store locator online. They will accept all kinds of clothing from any brand and up to two bags of clothing per costumer a day. As a reward the costumer receives a £5 voucher on there next above £30 H&M purchase. H&M does not make any concrete profit but donate any money to local charity's and innovative textile recycling development.

Textile Toolbox

# 3

# Design to Reduce Chemical Impacts

## Material Selection:
## Decide what is the most 'appropriate' material for the intended use, and then source the best that is currently available.

### a) Better Naturals

**22. Woodland, Nettle Yarn, 2012**
Woodland is part of the Verde Collection of environmentally conscious yarns, which is a combination of wool and environmentally friendly nettles. Each of these fibers takes the dye differently, giving both the neutral and vibrant colours of Woodland a heathered look. Nettles are a perennial and require low levels of water and little or no pesticides. Nettle fibres are similar to linen and hemp but produce a softer, silkier fabric. Nettle fibre shows colour well and when mixed with wool it becomes a light, shrinkage resistant fibre blend with excellent breathable qualities.

→ www.classiceliteyarns.com/product_page_detail.php?category_id=5&item_id=31

**H&M Organic Hemp Initiative, 2011**
'Organic hemp is the latest addition to H&M's constantly growing range of conscious materials. Organically grown, it uses less water than cotton or linen does not need pesticides or fertilizers and can thrive in all sorts of soils and climates. What used to be used in ropes, nets and sacking, can now be used in the latest fashion. In autumn 2011, H&M Conscious Collection featured our first organic hemp garments, alongside clothes made from a range of other sustainable materials.' (H&M Sustainability Report 2011 page. 16)

→ about.hm.com/content/dam/hm/about/documents/en/CSR/reports/Conscious%20Actions%20Sustainability%20Report%202011_en.pdf

### b) Improved Synthetics

**23. NatureWorks, Ingeo, 2003**
The American company NatureWorks produces a bio plastic called Ingeo. This 100% renewable resource is made out of plant sugar. Producing Ingeo produces 60% less greenhouse gasses than other similar materials. The multifunction material can be turned into clothes, home textiles, bottles, food packaging, and personal care products. Because of its natural content the products have more end-of-life options then other manmade materials. Ingeo products can be composted, turne8d into feedstock recovery, recycled (by recovery or sortation) incinerated (with energy recovery) or go to landfill without doing any harm.

→ www.natureworksllc.com

**24. The North Face, Venture Jacket, 2011 / Castor-oil based material**
The North Face® specialises in outdoor apparel, equipment and footwear. During 2011 the company increased the use of organic cotton in their entire collection to 12.9% compared to 3.8% the year before. In 2011, the company was able to cut down the use of synthetic materials

in their eco-friendly Venture jacket by 50% by using a castor oil-based "HyVent DT EC" material instead. The jacket features an eco-friendly shell fabric, which is breathable, waterproof and fully seam sealed. The company states that this material eliminated 50,000 lbs of petroleum-based materials from their collection in 2011.

→ www.pitchengine.com/thenorthface/the-north-face-venture-jacket-reduces-synthetic-components-in-membrane-50-percent/78549

**25. Verdezyne, Bio Based Nylon 6.6, 2012 / Bio Nylon**

This new fine denier nylon yarn is part polymer and part made with renewable bio-based materials and applicable for apparel purposes. The bio-based material is called adipic acid and is provided by renewable chemicals producer Verdezyne. Adipic acid is derived from nonfood-based vegetable oils using a cost-effective engineered yeast-based fermentation process. Verdezyne supplied its bio-based adipic acid to Premiere Fibers for use in its 'EcoInnovation' range of sustainable nylon 6,6 filament yarns. Premiere Fibres believe that microorganisms can be the chemical producers of the future in an industry that will be less reliant on oil.

→ www.verdezyne.com/verdezyne/Products/index.cfm

### c) New Generation Cellulosics

**26. Loomstate, 321 Collection, 2012 / Tencel / Eucaplytus**

Loomstate have launched their sustainable '321 Collection', which is produced in America and made of Tencel and Lycra. The cellulose of wood pulp used in Tencel is harvested from sustainably and organically farmed eucalyptus trees, making the material all-natural and 100% biodegradable. Eucalyptus can grow quickly without relying on artificial irrigation and this reduces the amount of water used. 99.8% of any solvents used in Tencel's manufacturing process are recovered for continual reuse in future production.

→ www.loomstate.org/321

**27. Research: CelluNova / ForTex**

FortTex is a continuation of the CelluNova project started in 2010. The project aims to create a new cellulose fibre for textiles made in a demonstration plant of a Swedish pulp mill. Through utilising the equipment and capacity already existing in Swedish pulp mills ForTex aims to develop a cost and eco sufficient new fibre. Each step of the process undergoes a thorough investigation and evaluation of the chemicals that are used and recycled in regards to energy requirements, expenses and sustainability. The project includes an industrial consortium of Södra Cell, Kiram AB, H&M, IKEA, SP, Swerea, Innventia and Vinnova.

→ www.bwz.se/sp/b.aspx?vi=12&vid=592&ucrc=60CE8D1D

## Dyeing: Start by asking what colour? Then how to achieve this colour?

### a) Natural Colour

**28. Research: Hyun Jin Jeong, Earth Dyeing, 2011**

Earth Dye consists of 45 different types of soils, which have been collected by MA Textile Futures Graduate Jeong across South Korea and United Kingdom. The designer was able to categorize them into seven different colour families, creating a range of vivid hues to draw from. Through experimentation she managed to apply soil-based paint directly to fabric, resulting in delicate washes of ochre, rust, sienna, and granite. Jeong saw her efforts as only the beginning, she believes that there are many different natural materials that were once used and now are forgotten. Rediscovering these materials and using them wisely could be essential for a sustainable future.

→ www.ecouterre.com/soil-as-fabric-dye-earth-dyeing-hits-pay-dirt/hyun-jin-jeong-earth-dyeing-3

**29. Ploughboy Organics, Organic Dye, 2012**

Ploughboy Organics is a new technology, transforming the tobacco plant into a renewable source of dyes and fibers for the apparel and home goods. This discovery allows non-toxic dyeing to be completed on a large-scale commercial level yielding beautiful and striking colors. The dye process requires less water and lower temperatures in comparison to other natural dye techniques. Fibre sourced from the tobacco stalk and once considered field waste is now transformed into a spinnable antimicrobial material, which blends beautifully and naturally with traditional organic fibers.

→ ploughboyorganics.com/ploughboy-organics

**30. Fox Fiber, Colorganic, 2011**
Fox Fiber is organically grown cotton, which unlike the conventional fibre is naturally dyed form the soil it is grown in. The fibre grows in different shades of green and brown and the intensity increases with each wash. The obvious advantage for naturally dyed cotton is the vast cutback in water and energy usage and most likely the impact of toxic dye pigment. The cotton is known to be highly breathable, good at preventing odors, exceptional in moisture absorbance and highly comfortable. Fox fibre was founded by Sally Fox over twenty years ago, she was as researcher in a lab in California when she came across the ancient, unusual seed.

→ www.foxfibrecolorganic.com/en/fox-fibre-cotton

### b) Improved Synthetic Dyes

**31. Trigema, Biodegradable T-shirt, 2006**
The Germany clothing manufacturer Trigema partnered with Dr. Michael Braungart of the Environmental Research Institute in Hamburg and dye manufacturer Ciba-Geigy to develop a biodegradable T-shirt. This Cradle to Cradle T-shirt goes one step further than meeting the organic criteria, the garment is solely made out of components which can be fully biodegraded to substances which are part of the known biological cycle. The T-shirt is made out of 100% cotton produced in USA and Pakistan. This cotton is free of pesticides and fertiliser residues and spun with natural paraffin. The dyes that have been specially developed to be biodegradable are longer-lasting and truer than standard dyes.

→ www.treehugger.com/sustainable-fashion/trigema-develops-biodegradable-t-shirt.html

### c) Removing Colour

**32. Merrell, NADA Dye-less Fabric, 2010**
NADA (Not Any Dye Applied) reduces the impact of chemical fabric dyes used for aesthetics, not function. Left is a pure, dye-free, waterproof/ breathable shell with good technical performance and not a bit of dye in any of its fabric or trims. 2010 outdoor clothing company Merrell made the decision to replace synthetic fabrics within their collection that would usually have been dyed white with the dye-less fabric. Merrell claims that through the purchase of a single small woman's NADA jacket a consumer would save 1.6 kg of carbon dioxide from being emitted, 115.2 liters of water, 0.18 kg of chemicals and 2.47 kilowatt-hours of energy.

→ blog.airdye.com/goodforbusiness/wp-content/uploads/2009/09/F09-and-SP10-NADA-sheets.pdf

**33. DuPont, PrimaGreen®, OxyGone, 2012**
This process catalyzes enzymes in an effective peroxide removal technique, which results in a more consistent dyeing outcome. The new method breaks down the compound into its natural components water and oxygen, and simplifies the bleaching process providing a consistent and complete peroxide removal. The technique is different to conventional processes, which involve multiple water rinses or chemicals like bisulfite. OxyGone® is part of Dupont's innovative enzymatic solutions for textile processes, including fabric desizing, scouring, bleaching, and finishing.

→ primagreen.dupont.com

## Print & Embellish  Comment about printing – design, inks, solvents.

**34. Research: Shaun Samson, Needle punch, 2011 [No Solvents Or Adhesives]**
Needle punch is a collection made using a special felting technique. Woolrich plaids, chunky Aran knits and tailored denim are stitched together through needle punch felting. The technique essentially pricks multiple holes in the contrasting fabrics, which enable them to become enmeshed in each other and thereby producing the 'bleeding' effect that you can see in the final garment. The felting process is all done by hand and takes around three to four hours per garment. This process could possibly be imitated in a factory but would most likely jeopardise the accuracy of matching the two fabrics.

→ www.disneyrollergirl.net/shaun-samson-peroni-collaborazioni

## Functional Finishes  Comment on finishes – heavily chemical

**H&M, Perfluorinated Compound Ban, 2012**
H&M has announced a ban on Perfluorinated compounds that repel water and oil primarily in outerwear. Current research suggest that the chemicals that make Perflourinated compounds

heat resistant and highly water repellent are potential damaging to human health and the environment. The company claims to have developed an environmentally friendly alternative that diminishes the need for the old chemical.

→ about.hm.com/AboutSection/en/news/newsroom/news.html/content/hm/NewsroomSection/en_gb/NewsRoom/NewsroomDetails/HM-bans-Perflourinated-Compounds.html

Textile Toolbox

# 4

# Design to Reduce Water and Energy Use

## Material Selection

**35. Crailar partnership - Target, 2012 / Flax**
Crailar flax fibre is an environmentally friendly alternative to conventionally grown cotton. One kg of flax fibre requires 99.4% less water in the production stage than the same amount of finished cotton. Flax is not a new crop to be used to create fibres, but its previous applications have been limited by its inability to be knitted in the same way of cotton. The Crailar process is a soft flax fibre that can be both woven and knitted in the same way as cotton. American retailer Target aimed to introduce Crailar fibres into its range of home wear by Spring 2013.

→ www.crailar.com/partners

**36. RadiciGroup & Ritex SpA – Sustainable intimate wear using IngeoTM, 2012**
Italian lingerie producer Ritex SpA is introducing an innovative lace fabric made of Corn Leaf yarn from IngeoTM. The manufacturing of IngeoTM produces 60% less greenhouse gases, 40% less water usage and 50% less non-renewable energy consumption compared to traditional polymers such as polyester. CornLeaf is a solution dyed yarn made from IngeoTM PLA. The solution dyeing of the material is carried out at the spinning stage, which reduces the amount of water and energy required compared to traditional dyeing methods. The fibre is 100% natural, which makes the fabric safe to use on the skin.

→ www.radicigroup.com/En/News/IntroDetail.aspx?IDMaster=31801

**37. Poole Company, New co-polymer polyester – ComFortrel**
This new polyester fibre is dyed atmospherically at 100°C, which means that the dye process will require less energy, water and potentially fewer chemicals. The material does not shrink, fade or wrinkle, it has superb shape retention when worn and washed, and dries quickly. The polyester is ideal for apparel such as hosiery, activewear, childrenswear and sportswear. The fibre includes technical properties and softness similar to the previous ComFortrel. Poole Company is an American leading manufacturer and distributor of textile fibers and specialist in virgin polyester fibre, recycled fibres, heavy denier and nonwovens.

→ Poole_Co_Offers_ComFortrel_Copolymer_Polyester_Fiber.html

## Processing (Dye / Print / Embellish / Functional Finish)

### a) Pre Dye

**38. ColorZen LLC – ColorZen Cotton Pre-treatment, 2012**
This technology is a pre-treatment process for cellulosic fibres that makes the dyeing procedure more efficient and environmentally friendly. The main difference with this dyeing process is that the fibre, which has been harvested and prepared

with this treatment, is more receptive to the dyeing process. After the pre-treatment, fibres are dyed requiring half the amount of dyestuff usually needed and no salt or alkali. The treated fibres dye three times faster using 75% less energy, 90% less water, 95% less chemicals and 50% less dye than traditional methods.

→ www.colorzen.com/how-it-works

## b) Water Saving Dye Processes

### 39. DyeCat, 2012

Without using a single drop of water, DyeCat locks dyes into textile fibers on a molecular level, creating colours that won't run, leach, or fade. In other words, the colour becomes part of the material, leaving no dye runoff to contaminate drinking sources. The process uses only as much dye as necessary to colour the fabric, meaning less energy and little waste. The technology uses a bio-based polymer called PLA, or polylactic acid, which is an alternative to oil-based polymers. PLA is derived from 100% renewable sources such as maize and is biodegradable. Scientists at Leeds University developed the technology.

→ www.leeds.ac.uk/info/125081/commercialisation/1535/dyecat_technology

### 40. DyeCoo CO2 Water-free Dyeing Process, 2008

DyeCoo Textile Systems is a Netherlands-based company that built the first commercial waterless textile-dyeing machine. The H2O-free technology imbues a pressurised form of carbon dioxide with liquid-like properties, allowing it to penetrate textile fibers and disperse preloaded dyes without extra chemical agents. Once the dyeing cycle is complete, the CO2 is gasified to recover the excess dye before cycling back into the dyeing vessel for reuse with far less energy than conventional methods. Adidas by Stella McCartney (DryDye) is one among the brands using the technology.

→ www.dyecoo.com/company

### Nike and DyeCoo, 2012

Nike is now working with Dyecoo to dye its garments in a process using pressurised CO2 instead of water. Conventional dying methods use on average, 100 to 150 litres of water to process a kilogram of fibre. Dyecoo waterless technology eliminates the need for water in the dying process.

→ nikeinc.com/news/kenyan-marathon-champion-to-wear-nike-uniform-of-innovative-sustainable-materials#/inline/13382

### Huntsman and Dyecoo collaboration, Oct 2012

Huntsman Textile Effects and DyeCoo Textile Systems are collaborating to further develop Dyecoo's CO2 textile processing technology. DyeCoo's innovative technology completely eliminates the use of water in the textile dyeing process by using recycled carbon dioxide as the application medium. The Huntsman will strengthen the technology's dye and chemical products to improve the color fastness and performance of the fabric.

→ www.ecotextile.com/2012101011713/dyes-chemicals-news/huntsman-collaborates-on-waterless-dyeing.html

### AirDye, Waterless Saving Dying Technology 2010

AirDye® technology applies colour to textiles without the use of water, being a sustainable alternative to traditional dyeing and printing processes. The technique penetrates the filaments in each piece of yarn resulting in rich, radiant colours and because the dye is in the fiber rather than on top of it, bleach and cleaning agents can't get to it resulting in longer lasting dye. The technology also reduces detrimental impacts on the environment by using 90% less water than conventional methods as well as an 85% energy saving because extreme heat is not necessary to dry the fabrics

→ airdye.com/about/how

### Lacoste – Huntsman Textiles – AVITERA™ SE Reactive Dye, 2010

AVITERA™SE is a reactive textile dye, which drastically reduces the water consumption in the dyeing process. According to Huntsman only 15 to 20 litres of water are required to dye a kilogram of cotton fabric in comparison to traditional methods that uses up to 100 litres for the same quantity of material. The reduced water usage primarily stems from the high percentage of dye fixing which through industrial practise has shown nearly 90% of the pigment is fixed during the dyeing process, in conventional dyes the fixation is 60 to 80%. Lacoste and Marks & Spencer are among the brands that are using Huntsman's Avitera.

→ www.huntsman.com/corporate/a/Innovation/Avitera_TMSE

## c) Better Printing

**Research: Exhaust Printing, B.Earley, 1999, and Top 100 Shirt Project, 1999–**
Based on exhaust dyeing, exhaust printing uses all the inks up in the printing process, witch each print becoming paler and paler as the transfer paper gets reused. Top 100 is a slow fashion project which explores different design-led upcycling approaches for polyester.

→ www.upcyclingtextiles.net

**Stork Print BV, Stork Print, 2012**
This screen printing company are using a drying system with a radial extraction technique capable of removing moisture while retaining some of the heat within the drying chamber. With this technology the reduction in drying times results in 25% energy saving. High-pressure water is used in the screen cleaning process as opposed to acids or chemicals that may have a negative environmental impact. To save water the company cleans their backing cloth and pumps with recycled water, leading to a 65% reduction in water use.

→ www.spgprints.com/textile+printing/areas+of+expertise

## d) Advanced Denim – Why So Many Developments In Denim? Premium…

**Levi's, Water<less, 2012**
Levi's Water<less is a water saving initiative taken up by the brand. To save water the company has introduced a number of changes within its production process in order to achieve these reductions. The number of machine-wash cycles has been reduced by performing multiple wet finishing processes within one cycle. The conventional stone washing process has had water entirely eliminated from it, with dry stone providing the abrasion to create a worn effect. Water<less jeans have an average water saving in the production process of 28%, with certain products seeing a water use reduction of up to 96%.

→ www.levi.com/gb/en_GB/category/men/jeans/collections/levi-collections-waterless

**Jeanologia, E-Soft, 2012**
E-Soft is an eco-friendly fabric finishing method. The technique transforms air in the atmosphere into 'nano bubbles' to smoothen and soften the surface of a fabric. Compared to conventional processes E-soft is supposed to save up to 98% water, 79% energy and 80% chemicals. The technology is used by Levis for its "Waterless Jean", by Jack & Jones for its "Less impact Denim" and by Pepe Jeans for its water-free line "True Blue". The Spanish producer, which specialises in garment finishing, also uses ozone rather than multiple washes to fade its denim, saving nearly 4 million gallons of water daily across its facilities worldwide.

→ www.jeanologia.com/en/technology/e-soft_

**Pepe Jeans, TrueBlue, 2011**
Pepe Jeans London has developed a sustainable jeans collection called Tru-Blu® The denim collection uses zero chemicals in the wash process by reducing water consumption across the range. The company has revolutionized its manufacturing processes in a bid to subtract the use of chemicals and minimize the use of water in the wash process when creating jeans. These include natural ozone gas treatments and the introduction of sophisticated new three-dimensional lasers, the combination of which can now create astonishing depths of indigo contrast on jeans.

→ www.sportswearnet.com/fashionnews/pages/protected/PEPE-JEANS-LONDON-LAUNCHES-TRU-BLU_4763.html

**Candiani Denim, N-Denim, 2012**
The Italian denim mill Candiani has started using a sustainable nitrogen-dyeing technique. This delays the oxidation process and speeds up the penetration of indigo into the yarns. The system also allows for savings of up to 33% in water consumption and the avoidance of hydrosulfites and fixation agent usage. Candiani calls their new range N-denim. The company also launched a few new laser and ozone treated denim called 100% Indigo and 100% Sulfur. These two processes reduce chemicals and water use. The company also recycles most of their dying and weaving fabric waste into new recycled cotton weft.

→ us.zeereport.com/breaking_news/2942-Green_Ideas__Ethnic_Patterns_at_Denim_by_PV.html

**Clariant – Advanced Denim, 2012**
This denim dyeing technology uses a high concentration of liquid sulphur dyes, which have a

high affinity to cotton. This affinity means that the dyeing is carried out in a single vat and therefore reduces chemical and water usage drastically. The reducing factor is the bond between a sugar based and a sulphur based indigo dye molecule, which when treated forms a much stronger bond to the fibres than in the conventional process. This increases the fibres' colourfastness and resilience to wear and abrasion. The process saves up to 92% water usage, 30% energy consumption, 87% less cotton waste and generates no wastewater.

→ www.clariant.com/corpnew/internet.nsf/04fa7deb65dc84f9c1256a6200552c10/0fd98e91ec520c9cc12579ec002cac6a?OpenDocument

**Gn.theraphy, Eco-Aging™, 2013**
Eco-Aging™ by gn-theraphy is a completely natural denim finishing technique. Each season the gn-team chooses a different location where the denim will be buried, the denim is then kept there underground until it is appropriately aged. Before the denim is buried, it is placed in a custom handcrafted aging bed, filled with the soil from that specific location. After the process is completed, the result is a nature made, one-of-a-kind denim wash with unique marks and color. Even though the end finishing is quite rough and very natural looking the process has been most welcomed by the industry.

→ www.gntherapy.com/pages/about-us

**Watt Wash' Denim, Marithé and François Girbaud, 2012**
The French ready to wear brand Marithé François Girbaud uses a laser light technique to impart particular treatments and give their denim a vintage feel. The laser technique follows the brand's eco-friendly ethos: whereas a regular stonewashing requires around 150 liters of water pair jeans the "Wattwash" laser treatment only require 5 liters of water. The brand has always focused on creating functional and sustainable high-tech clothing.

→ www.vogue.it/en/magazine/daily-news/2010/04/marithe

**Replay – Laserblast™, 2012**
Laserblast is a denim finishing technology that creates effects such as abrasion, fading, bleaching, whiskering and seam pooling with reduced amounts of water and chemicals. The company claims that Laserblast uses 85% less water than conventional finishing techniques. Additionally, Ozone drying washing machines are used to further decrease water and energy consumption in the finishing process. Ozone is completely biodegradable and at the end of a wash cycle it rapidly reverts back to oxygen leaving no chemical residues behind. Overall there are reductions in the washing and drying cycle times, meaning that there are savings in both energy and water use.

→ www.replay.it/laserblast

## Transportation

**56. Vertical Integration, American Apparel**
Vertical integration reduces a company's carbon footprint by manufacturing its products more locally and therefore cutting back on shipping. Most products are not made this way and are knitted in one place, dyed in another, cut and sewn somewhere else to finally be sold in a different part of the world. All American Apparel's clothing is made in the United States in one of the countries biggest apparel factories. The average factory worker makes $12–$14 dollars an hour, which is the highest pay worldwide for manufacturing basic apparel.

→ www.americanapparel.net/aboutus/verticalint

## Consumer Laundry

**58. Research: Daniel Larsson, Prolonged Wear, 2012**
In his design process Larsson is researching function and sustainability to develop a new kind of work wear. He is looking at present life and history while working towards something that he calls the new 'ecological age'. Larsson focuses on how to improve work-wear by looking at construction methods to achieve greater movement and to have garments with fewer stretch points. Second hand materials, organic cotton and hemp are dyed with bio-organic natural indigo dyes, natural dyes such as madder, brazil wood and acorns on cellulose based material, and coated with beeswax, flax and paraffin oil.

→ www.exit2012.se/student?student=25&md=1

## b) Helping The Consumer

**H&M Introduce Climate-Smart Washing and Care Instructions**

To save energy H&M encourages their costumers to:

- Not to wash clothes unnecessarily
- Lower washing temperature
- Fill your washing machine
- Choose an eco-friendly laundry detergent.
- Avoid dry cleaning
- Leave your washing out to dry

→ https://www.hm.com/gb/customer-service/garment-guide/conscious-washing

**59. Xeros Ltd, (Almost) waterless washing machine, 2012**

Xeros Ltd has produced an almost waterless washing machine. This technology is using a polymer based cleaning system, which saves up to 90% of fresh water in comparison with conventional washing machines. This new technology could save 1.2 billion tons of water a year in domestic washing in the States alone. The technology also has a 40% smaller carbon footprint. The reason being the reduced need of tumble-drying, which results in less electricity and detergent consumption. The calculation also includes the environment cost of the recyclable Xeros nylon beads.

→ www.xeroscleaning.com/polymer-bead-cleaning

## b) Helping The Consumer – a design approach

**60. Research: No Wash, Earley & Fletcher, 2003**

The 5ways project used design-led approaches to create prototype garments – in this case a jumper that would not have to be washed very often. 'Dirty Diaries' were kept by the researchers, and the design concept evolved from the observations made – such as a wider neck, arm holes cut away, laminated sleeves and front, and merino wool with natural anti bacterial qualities.

→ core.kmi.open.ac.uk/display/6202029

**61. Research: Seb Oddi, Stain Table Cloth, 2006**

This tablecloth reveals a pattern with the unavoidable accidents that happen through everyday use. The concept explored transferable ideas on how use and wear can enhance a product, capture and embed stories, and a history that extends the life of the product and its relationship with its owner. Oddi also designed an edible picnic container for two. By manipulating the gaseous structure of bread the designer has designed a wholly edible container that results in near zero waste. The set has been produced in 8 different flavours.

→ arts.brighton.ac.uk/study/design-craft/3d-design-craft-degree/student-work-in-design-and-craft/sebestiano-oddi

**62. Research: Emma Whiting, Evolving Narrative Experience, 2012**

Emma Whiting is a second-year student at University of Brighton who designed a pair of shoes, which reveal a hidden pattern when they fade with age and pick up dirt and grime. The more you wear the shoes the more they evolve. In early 2012 Whiting and her fellow students on the Design and Craft BA and MA Sustainable Design course from Brighton University where featured in an interview on BBC Radio. The students are working on the concept of 'emotionally durable design: How do you design a desire to keep products into material objects?'

→ www.brighton.ac.uk/news/2013/130121emotional_durability.php

Textile Toolbox

# 5
# Design That Explores New Technologies

## Making Materials

**63. Research: Fabrican Ltd, Spray on Fabric, 2012**
Spray On Fabric bonds and liquefies fibres so that they can be sprayed out of a can or spray gun straight onto a body or dress form. The solvent evaporates, and the fibres bond, forming a snug-fitting garment. Spanish fashion designer Dr. Manel Torres used spray on fabric when he created the catwalk collection 'instant flowers' for his spring/summer collection 2012. The spray was used over a frame structure as well as directly on the body. This technology could possibly be applied to household, industrial, personal and health care applications. When kept in a sterile, the spray-can could be used as a spray on bandage, without applying any pressure on sour skin.

→ www.fabricanltd.com/about-us.php

**64. Monforts, Eco Applicator, 2012**
The German dyeing and finishing producer Monforts has successfully developed a more effective and low energy demanding coating technique called Eco Applicator. The soft coating process is supposed to provide significant energy savings with reduced liquor application, eliminating the need for a traditional wet-on-wet padder. By using a trough and roller techniques the machine only applies the required amount of liquid/coating to the fabric via contact with the roller. The coating also dries significantly faster then other coatings. The machine is suitable for felt finishes, coated materials and medical textiles and applications, which include nano-coating, water repellants, softeners, flame-retardants and insect repellants.

→ www.innovationintextiles.com/coating-laminating-bonding/monforts-eco-applicator-makes-an-impact

## Processes

**65. 3-D PRINTING**

**65a. Janne Kyttanen & Alan Nguyen for Freedom Of Creation, Mash-up Shoe, 2012**
This 3D Printed Mash-up Shoe is one of the most successful iPhone cases from Freshfiber. The shoe is made with 3D printing technology, a process commonly known as 'Additive Manufacture' being a form of rapid prototyping where models are made layer by layer without the use of moulds. 3D printed products are designed in a computer CAD program, and when the design is completed it can be transferred to any 3D printer in the world and manufactured there. The technology also reduces waste since the product is printed in a ready-made shape and eliminates both waste and transport.

→ alan-nguyen.com/?portfolio=iphone-mashup-shoe

**65b. Iris Van Harpen, 3D Printing, 2012**
Fashion designer Iris Van Harpen has applied 3D printing intensively over the course of two seasons in her Collections "Micro" and "Crystallization."

With high profile names such as Lady Gaga and Bjork wearing her creations, 3D printing is becoming increasingly glamorous. This technology is already being used in aerospace industries and is gradually accumulating a higher profile amongst apparel companies; it allows shapes that are impossible in nature and impossible to craft by hand. 3D printing minimises waste using only the materials you need, rather than older rapid prototyping techniques that carve away from a solid block.

→ www.irisvanherpen.com/about?PHPSESSID=b349cdf44bf7e71cb39729e154ac1966#collections

**65c. Shapeways, 3D Printing Community and Service, 2012**
Shapeways is an online community and marketplace for 3D printed fashion, design and DIY Spares. The company is providing a platform for community members to share ideas, gain access to their technology and sell their own designs. 3D models can be made in a variety of materials and be completely personalised, and everything is printed on-demand without any waste. Their manifesto is to democratize creation by making production more accessible, personal, and inspiring. The Company Continuum, 3D printed their Bikini 'N12' at Shapeways, this highly customised bikini is made of waterproof nylon and is the first bikini to be more comfortable when wet.

→ www.shapeways.com

**65d. Research: David Telfer, RM Fixings, 2010**
These mono-material fixings are designed and made by accessory designer David Telfer. All fixtures for the collection were created using rapid manufacturing, using Fused Deposition Modeling (FDM) made out of hardwearing ABS plastic. Rapid manufacturing is a preservative fabrication technique for manufacturing solid objects by the sequential delivery of energy and/or material to specified points in space to produce that part. When preformed in a parallel batch the production technique can provide a large advantage in speed and cost compared to alternative manufacturing techniques such as plastic injection molding or die-casting.

→ davidtelfer.co.uk/page20.htm

## End Of Life

**66. Textiles 4 Textiles, Sorting Fabrics by Type and Colour, 2012**
A Dutch consortium known as Textiles 4 Textiles has unveiled a new fabric sorting machine that uses sensors to detect and divide fibres by chemical composition and colour and if necessary by structure, coating and finish. The machine uses infrared light to identify specific fabric types before channeling air-stream technology to 'blow' each item into separate bins for wool, cotton, polyester, acrylic, and common fiber mixtures. This sorting machine is costly but the maker says that it will it will pay for itself quickly, as fabrics are more easily recycled and the value of textile waste increases when the composition of the fabric is known.

→ www.textiles4textiles.eu/?p=what-is-t4t

**67. Re:newcell, Textile Recycling Facility, 2012**
The pilot textile recycling facility in Vargön, Sweden, will turn worn-out textiles into fibers good enough for spinning and re-use in textile manufacturing. Textiles from all over Sweden will be fed into the plant where they are sorted and thereafter ripped into threads. The threads are treated in a chemical step where they are dissolved into a liquid and fibres other than cotton and viscose are extracted. The clean liquid is thereafter treated in a second chemical stage and finally spun into a new viscose fibre through the traditional viscose process. Scientist at the Royal Institute of Technology, Stockholm, developed the mill.

→ renewcell.se

**68. NFC-Tagging, ('near field communication') 2011**
A new kind of NFC (Near Filed Communication) tag can be integrated into textiles during the manufacturing phase. The new tag uses standard NFC RFID chips that are attached to an antenna made from thin copper wire. The antenna is integrated into the fabric during the textile production process, while the NFC chip needs to be attached by hand. New textile tags could be used 'anywhere where it makes sense to save information in the clothes,' potential uses include storing information about a finished garment within the item of clothing.

→ kimtag.com/s/nfc_tags

## 69. And Don't Forget The Internet – The Future Is Social Media…

**Refashioner, Collaborative Consumption, 2012**
This online company calls itself an eco-mmunity that buys, sells and trades designer and vintage clothes, shoes & accessories. Its mission is to revamp the customer's closet and style, and prevents unnecessary production through swapping or reselling unwanted garments. Members can sell their unwanted and unworn clothes through uploading photos. People might also choose to share their personal stories about the clothes and the wearer. The community promotes sharing through quality and understands that clothes can have a huge emotional significance that can be as important as the clothes themselves.

→ www.refashioner.com/about-us

Textile Toolbox

# 6

# Design that Takes Models from Nature & History

**70. Patagonia & Yulex Corporation, Plant based Wetsuit, 2013**
Outdoor brand Patagonia and clean technology Yulex Corporation have introduced the first alternative to the traditional neoprene wetsuit. The companies have come together to launch a plant-based wetsuit that is 30% more stretchy, dries instantly and boasts high thermal value. Yulex's bio-rubber material is made from guayule, which is a renewable, non-food crop that requires very little water and is grown domestically in the US without any pesticides. In comparison to traditional neoprene production the manufacturing process is very clean. The wetsuit will be on the market in Spring 2013.

→ www.yulex.com/press/details/?tx_news_pi1%5Bcontroller%5D=News&tx_news_pi1%5Baction%5D=detail&tx_news_pi1%5Bnews%5D=19&cHash=6604c4abbd82cb66ed7ae86578fabbac

## Nature – Creating New Models

**Burdock, Velcro hooks, 1940**
Swiss inventor George de Mestral discovered Velcro when he was taking his dog for a walk in the 1940's. He became curious about the seeds of the burdock plant that had attached themselves to his own clothes and to the dog's fur. Under a microscope, he looked closely at the hook-and-loop system that the seeds use to hitchhike on passing animals aiding seed dispersal, and he realised that the same approach could be used to join other things together. The result was Velcro.

→ www.todayifoundout.com/index.php/2011/09/velcro-was-modeled-after-burrs-of-the-burdock-plant-that-stuck-to-velcros-inventors-pants-after-a-hunting-trip

**71. Speedo, Fastskin® FSII , 2012**
Using biomimetics, Speedo has created a wetsuit inspired by sharkskin that reduces drag for the wearer in the pool. The suit is well engineered, with super body hugging fabric and seams that are carefully positioned to streamline the wearer. The stretch in the main fabric and the seams of the suit also allow freedom of movement during swimming. The suit was banned after the 2008 Beijing Olympics where it helped breaking many records. However, some scientists claim that Fastskin® is nothing like the sharp scales that affect the flow of water to reduce drag and increase thrust as found on a shark, and that the suit has other properties that help performance in the pool.

→ www.speedo.com/aqualab_technologies/aqualab/racing_suits_fastskin_fsii/index.html

**72. X-Bionic, Xitanit, 2012**
Xitanit is a high-tech performance fabric inspired by the properties of a desert fox. This animal has adapted to extreme heat and hostile conditions, and its special structure and bright silver colour of its coat allows it to reflect the heat of the desert sun. The fox's large ears also dissipate a great deal of heat. Xitanit™ spreads excess body heat and moisture providing effective cooling while the silvery surface reflects heat away from the body as

if running in the shade. X-BIONIC® products are produced in Northern Italy, where the high art of yarns and textiles has dominated for generations.

→ www.x-bionic.com/labs/materials/xitanit/1935

**73. Ecovative Design , Ecocradle® , 2012**
Ecocradle® is a packaging made from a blend of non-edible agricultural waste inoculated with mushroom tissue called mycelium. The material is grown in moulds and within 5 to 7 days it allows the mushroom glue to form. The material is fireproof, strong and 100% biodegradable and home compostable. It is also a suitable replacement for StyrofoamTM and toxic adhesive that contains formaldehyde. Next to packaging solutions, Ecovative Design is pushing this material further, looking at applications in aerospace, apparel and interiors. Currently they are working with 3M to broaden the company's mycelium technology platform and reach new markets.

→ www.ecovativedesign.com/about-our-materials/how-its-made

## Bio-Facture

**74. Research: Suzanne Lee, BioCouture, 2011**
Fashion designer Suzanne Lee has developed a material made by the bacteria that are usually used to turn green tea into the fermented beverage kombucha. As they digest sugar, the bacteria produce a mat of cellulose, which the designer discovered could be harvested and dried. The fabric has a vaguely skin like texture that can be moulded and sewn into garments. The process is still in development: if the material gets wet, it absorbs up to 98% of its weight and become heavy and gooey. Today BioCouture has developed into a design consultancy focusing on grown material from minimal renewable or waste resources.

→ antenna.sciencemuseum.org.uk/trashfashion/home/wearwithoutwaste/material-desires/biocouture-jacket

**75. Research: Carole Collet, BioLace, 2012**
'BioLace' is a speculative design-led research project that investigates the intersection of synthetic biology and textile design to propose future fabrication processes for textiles. The motivation behind the research lied in the hypothesis that living technology can foster a new approach to address some of the key sustainable challenges of the 21st century. The BioLace project explores the potential of a biological manufacturing future by investigating the cellular programming of morphogenesis in plant systems. For this the designer imagined the creation of reprogrammed plants such as a hybrid strawberry plant, which would simultaneously produce both strawberry fruits and lace samples from its roots.

→ www.carolecollet.com/dodesign/biolace

## Historical Models '…the accumulated past is life's best resource for innovation … reinventing beats inventing nearly every time.' Stewart Brand

**76. Research: Matilda Aspinal, 'Unpicking: Historical refashioning skills as a foundation for sustainable clothing design'**
Textile designer and researcher Matilda Aspinall is looking at historical garments and the way they were made and mended to rediscover techniques for contemporary sustainable fashion design. Looking at the time before the industrial revolution when labour was cheaper than material, the designer finds creative solutions to reduce waste and to use resources sparingly. In this period alterations were a common way to prolong the life of a garment, as well as complete disassembly of clothes was employed to remake the garment according to the latest fashion. The designer addresses how clothing today could be designed and constructed with the notion of durability incorporated into the very seams by creating garments designed for reconstruction into another predetermined style.

→ www.tedresearch.net/people/research-students/matilda-aspinall

**77. Yves Saint Laurent,**
**New Vintage I, II & III, 2011**
These three collections are made from recycled fabric from the brand's archives and created using existing patterns instead of creating new ones. YSL's creative director Stefano Pilati initiated the concept. The New Vintage III, the third collection in Pilati's environmentally aware series, offers 180 pieces ranging from metallic wide leg trousers to velvet tuxedo suiting jackets inspired by Saint Laurent's iconic 1970s designs. Each piece is individually numbered and produced as limited edition. According to fashion news website Refinery 29, the brand's goal is to reclaim and

recycle in an effort to espouse more sustainable approaches in fashion.

→ www.treehugger.com/style/new-vintage-yves-saint-laurent-recycles-old-looks-into-new.html

Textile Toolbox

# 7

# Design for Ethical Production

## Designers In The Factory

**78. Noir, The Illuminati Line, 2012**
The Danish high-end fashion label's ethical 'Illuminati Line' is made of fair trade organic cotton from Uganda. The cotton is produced through a project led by Noir, which aims to expand organic cotton farming along with educating the local community and the 4000 farmers currently employed for the ethical collection. The garments are basic looking with clean lines according to the Danish design tradition. The brand describes the collection as work in progress presenting seven varied styles in different qualities like basic cotton, cotton voile and jersey for their SS13 season.

→ www.noir.dk/illuminati2.php

**H&M's Code of Conduct has eight sections, covering:**

1. Legal requirements: No Child labour (under 15) Young workers rights (under 18). A ban on child labour!
2. Health and safety: Build safety, Fire safety, Accidents and first aid, Working environment must be clean and healthy.
3. Workers' rights: Basic Rights ex. No forced work, No abuse, Treated respectfully, No discrimination (ex. sex, race, colour, age, pregnancy, sexual orientation, religion, political opinion, nationality, ethnic origin, disease or disability).
4. Wages, Benefits, Working Hours and Leave
5. Housing conditions
6. Environment
7. Systems approach
8. Monitoring and enforcement

To help our suppliers and their subcontractors understand our Code of Conduct and our expectations, we provide an implementation guide for suppliers. This guidance is available in English, Chinese, Turkish and Romanian.

→ about.hm.com/content/dam/hm/about/documents/en/CSR/codeofconduct/Code%20of%20Conduct_en.pdf

**H&M Bangladesh development plan, CSR, Workers Rights, Building Communeties**
Bangladesh is an important buying market for H&M but is also one of the world's poorest nations. As a long-term buyer, H&M wants to help strengthen workers' influence over their own situation and increase their skill levels while creating stability in the labour market. H&M is encouraging the Bangladeshi government to improve the minimum wage. H&M is cooperating with 18 other companies to improve fire prevention measures in factories. H&M's skill development project aims to provide students with improved technical skills and relevant knowledge of their rights and responsibilities. They also promote access to higher education and is offering financial support to Bangladeshi students in co-operation with the Grameen Foundation. H&M wants to support women in Bangladesh who are exposed to violence and discrimination through

a Helpline. H&M have made a film about Healthcare for their employees to raise awareness on the issue.

→ about.hm.com/AboutSection/en/About/Sustainability/Reporting-and-Resources/Case-Studies/bangladeshplan.html

## Designers In The Community

**79. Alabama Chanin, Jersey off cuts Quilt, 2010**
To reduce waste designer Alabama Chanin keeps and recycles her leftover fabrics in a 'fabric-library'. These 'old designs' are continuously offered to costumers since the company believes that a good idea does not have a half-life, nor should it be wasted. Chanin employs local women aged 20 to 70- former factory workers, retired teachers, widows, stay-at-home moms, and secretaries - to help sew one-of-a-kind, handmade garments for her fashion line. She prepares her seamstresses for the task with lessons of mindfulness, instructing them to handle the thread with love as they sew. She believes that, "If you love your thread, it brings something to the wearer."

→ www.textiletoolbox.com/posts/design-minimise-waste/ www.slowlab.net/alabama_chanin.html

**80. Gudrun & Gudrun, Slow fashion Knitwear, 2012**
This knitwear brand is based on the Faroe Island in the North Atlantic Sea. Their collections are made from local, 100% untreated Faroese wool from sheep walking the hills of the island all year around. The yarns and lambskins used in production are waste products. The sheep are kept for the mutton, so no animals are used for production only. Most garments are hand made by Faroese or Jordanian woman. G&G know all of their knitters by name and have the ambition to always be proud and happy meeting with their employees. The brand follows the environmental and ethical rules set by the European Union.

→ www.gudrungudrun.com/#/women/philosophy

## Designers Bringing Factory & Community Together

**81. Research: Clara Vuletich, Design for Change, 2012**
The designer was commissioned by a large US clothing company to develop a 'model' for how a clothing factory/brand can take more responsibility for their place in a community. A local design team developed a small range of fashion accessories; these products are then made using waste from a local factory and produced by employing local people. The project was inspired by research where designers are playing a different role in local communities, working outside of their normal 'design studio' context. Three prototype bags were created along with a short film that explored the issues and context to this new design activity.

→ claravuletich.com/design-for-change-2-2012

## A Note About Celebrity & Sustainability

**82. People Tree, Fair Trade, 2012**
People Tree Ltd is a fashion and accessories company that champions Fair Trade and environmentally sustainable fashion. People Tree says that 'Fair Trade doesn't just mean paying a fair price. It is an entirely different way of doing business, where the objective is not profit at any cost, but to help people in the world's most marginalised communities escape poverty and promote sustainability.' People Tree has collaborated with designers Orla Kiely and Zakee Shariff helping to gain a wider audience and brand acknowledgement. Celebrities such as Emma Watson modeling in their advertising campaigns and a wide string of awards can only add to the company's growing positive reputation. People Tree is primarily an online business.

→ www.peopletree.co.uk/content/27/fair-trade

**83. Chinti and Parker, Ethical Luxury, 2012**
Cousins Anna Singh and Rachel Wood launched luxury ethical fashion label Chinti and Parker in 2009. They had guest designs from Gwyneth Paltrow and are currently stocked by major online retailer Net-A-Porter. Garments are made from highest quality natural materials, and both aesthetical and ethical considerations are taken into account when sourcing fabrics. All their jersey is produced in Portugal while the cashmere and wool are made from fine Italian yarns and produced in a small family run factory in Mauritius. Each garment comes clearly labeled with information stating whether it's organic, fair trade or made within the EU.

→ www.chintiandparker.com/uk/about

# 8
# Design to Reduce the Need to Consume

## Multifunction

**84. Butter By Nadia, Signature Jersey, 2012**
This clever Jersey or Satin garment allows the wearer to create multiple classic dress and skirt shapes with one purchase. Maintaining a variety of shapes in one garment helps the wearer to reduce the need for multiple purchases and increases the durability of the garment while ultimately minimising waste. The garment only comes in one size, which fits US 2- 16, reducing production costs and making sharing easier. Butter by Nadia also sells Jersey convertible pantsuits with the same wrapping possibilities. Online tutorials show the various possibilities.

→ www.shopbutterbynadia.com/product/2-19-0/Signature-Jersey.html

**85. Hussein Chalayan, Rise, 2013**
The Rise collection features transformable two-in-one dresses. With an elegant tug of the neckline a short dress is transformed into a longer garment of different style and colour. The mechanism is quite simple; the top layer is looped over the under-layer and when the wearer releases a flap, the dress transforms into something else. The designer's goal was to combine daywear with eveningwear, which has the clear advantage of reducing the need to wear more then one garment in a day.
The collection also features peeling wall prints in 3D textures on dresses and trousers to comment on an urban setting where information is beginning to escape.

→ www.dezeen.com/2013/03/06/rise-by-hussein-chalayan

## Fine Fit

**86. Body Metrics, Body Scanning, 2013**

This technology provides accurate body measurements through careful body scanning that determine the best possible size, shape and style for the consumer. For the Body Scanning a customer enters a circular dressing room called "the pod" wearing only underwear or slinky clothes; inside 16 Microsoft Kinect devices scan the customer's body, and in five seconds the devise takes more than 100 different measurements to make a 3D representation of the body's shape and size. After the scanning a Bodymetrics stylist helps the customer pick out clothes that fit and suit them. The technology is available at several retailers across Europe and the United States.

→ www.bodymetrics.com/retail.php

**87. Holition, Augmented Reality, 2011**
This company uses a 3D digital technology called Augmented Reality to create an enhanced retail experience. There is a major difference between Augmented Reality and Virtual Reality. Augmented Reality is an enhancement of reality, while Virtual Reality does not claim to be real. Whether the enhancements are minor or major, Augmented Reality 3D technology aims to change how we look at the real world. Through their engineered platform the company reflects the bespoke requirements of different brands from traditional marketing channels to interactive

digital platforms. The company is made up of experts including marketers, retail experts, digital strategists, producers, developers and augmented reality specialists.

→ www.holition.com

## Online / Crowd Sourcing

**88. Fashion Conscience, Sustainable Online Fashion, 2012**
UK based online retailer Fashion Conscience stocks ethical and eco fashion, accessories and gifts from various worldwide designers. All products have one or more than the following credentials: recycled, organic cotton, non-toxic, fair trade, sustainable, vegan or non-exploitative. Symbols used in the product description are there to help the shopper make a well-informed choice. The clothes are also neatly organised by style and latest fashion. The e-commerce site acts as a preventing process for consumers, relying on a strong level of trust between the consumer and retailer.

→ www.fashion-conscience.com/ethical-policy

**89. Threadless, Crowd-Sourcing, 2012**
This online platform is using online voting to manufacture popular design on demand while preventing overproduction. Crowd-sourcing means that users can submit designs or vote on designs they would like to see in production, guaranteeing a certain number of purchases and helping to prevent overstocking. It also works as a form of advertising creating an online community with sense of brand loyalty. Crowd-sourcing has become increasingly popular. Like Threadless, The Front Row Society also encourages design competitions, where the winner earns a cash prize and possible development to online sales.

→ www.threadless.com

## Online / Co-Design

**90. Continuum, CONSTRVCT: Design Your Own Fashion, 2012**
Construvct is the world's first completely crowd sourced fashion label. The online company runs an open fashion collection that allows the customer to upload their own photos or patterns on selected garment shapes based on his or her personal measurements. The products are digitally printed including a personalised label with name and date of creation. The emotional attachment to the collaborative design along with quality of materials aims to create a longwearing sentimental garment. The name CONSTRVCT refers to the word "construct", which both means an idea comprised of systematic parts as well as the very act of creating.

→ continuumfashion.com/constrvct.php

## Online / Customisation

**91. OpenWear, Collaborative Clothing, 2010**
This collaborative online platform shares fashion concepts and ideas. On the website people can gain access to clothes patterns which they can download and then use to make garments to sell themselves. The idea was created by EDUfashion which is a project financed with the support of the European Commission to promote an alternative approach to fashion through a learning environment that reunites two social trends: The first one being the rising demand for no-sweatshop, ecologically sustainable, locally produced, fairly traded apparel, and the second based on the growing relevance of a self managed workforce focused on independent, socially engaged, critical and multi-tasking creative production.

→ openwear.org/info/about

Textile Toolbox

# 9

# Design to Dematerialise and Develop Systems & Services

## Designers For Rent

**92. Bag, Borrow or Steal, Designer Accessories Rental, 2012**
This US fashion rental company specialises in high end, luxury accessories. Their services make it possible to wear the latest bags, shoes, jewellery, watches and sunglasses without spending a fortune. Ultimately this system reduces cost and waste for the consumer. On the website users can also sell own unwanted designer accessories or send them for a specialist clean and repair service to increase the longevity of the bags. The company gained a lot of interest through the first Sex and the City movie, since then many other companies have followed their business model.

→ www.bagborroworsteal.com/aboutus

## Repair & Maintain Services

**93. Nudie Jeans, Complimentary Repair and Upcycling Service, 2012**
Nudie Jeans' environmental policy is 'Repair, Reuse, Reduce'. The company provides a free in-store repair service to prolong the life of their jeans. By extending the life of their garments they reduce the amount of textiles ending up in landfill. When the jeans are finally beyond repair the customer can trade their old jeans in to be recycled, re-worked and re-homed by the company, and receive money off their next pair of Nudie Jeans purchase. The company just recently started distributing free repair kits with an online handbook and demonstration video. The kit can be ordered from the company's website.

→ www.nudiejeans.com/repair

## Designers As Service Providers

**94. Worn Again, Corporate Upcycling, 2012**
Worn Again works with companies to revalue their existing textile waste and to develop systems for securing and turning it into reusable resources. The company supports the development of collection systems for recollecting textiles so that they can be recycled responsibly instead of ending up in landfill. Worn Again claims this provides the foundation for a closed loop resource model for the future. Recently they have worked with Hemingway designs and McDonald's on their new uniforms. They have also turned old Eurostar uniforms into new bags and Virgin hot air balloons and airplane seat covers into apparel.

→ www.wornagain.co.uk/pages/our-story-2

Textile Toolbox

# 10
# Design Activism

## Wellbeing

**H&M Mentor Scheme, CSR, Local Communities**
H&M cooperates with Mentor Sweden in their health promotion and drug prevention work among children and young people in Sweden. The target groups are young people between the ages of 13 and 17, parents with children 6–18 years, and schools. Mentor Sweden manages three key programmers: 'Mentoring', 'Parenting' and 'Inspiration' activities that create study motivation. The Mentoring program offers students that are younger teens the opportunity to have a mentor for a year. H&M encourages employees in Sweden to become mentors. (Sustainability 2011 report, Page 87)

→ mentor.se/in-english

**95. Topshop, Fashion Targets Breast Cancer Bracelets, 2012**
Fashion Targets Breast Cancer was set up by Ralph Lauren in 1994 to raise awareness and funds for breakthroughs against breast cancer. For every £2.00 Fashion Targets Topshop bracelet sold, £1.00 goes towards Fashion Targets Breast Cancer. Topshop has had other products in the past with a percentage of profits going to charities such as the Centre Point homeless charity. Other retailers such as Marks & Spencer, Laura Ashley and River Island have Fashion Targets Breast cancer product of their own.

→ fashiontargetsbreastcancer.org.uk/what-is-ftbc

**96a. Benetton Group, Un-hate Foundation, 2012**
This charity was formed by the Benetton Group to promote equality and fight against hate and discrimination in all forms. The Un-hate foundation supports new generations and provides grants for projects that share the core principles of the charity, which are to fight discrimination and support new generations through the social impact of art. The campaigns are promoted through the United Colors of Benetton shops with eye catching controversial posters. The Foundation is now targeting unemployed youth through 'Un-Employee of the Year', funding 100 individual non-work projects. The Un-hate Foundation is an important step in Benetton Group's corporate responsibility strategy.

→ unhate.benetton.com/foundation

**96b. The Nike Foundation, The Girl Effect, 2008**
The Nike Foundation founded The Girl Effect, a charitable organisation that helps including girls in education, health and economic investments. Educating girls helps to prevent issues such as child marriage, teen pregnancy, HIV/AIDS and breaking the inter-generational cycle of poverty. In India, adolescent pregnancy results in nearly $10billion lost potential income per year, in Uganda, 85% of girls leave school early, resulting in $10billion lost potential earnings. The Nike foundation's The Girl Effect thinks that this is an investment for the future that cannot be overlooked.

→ nikeinc.com/pages/the-nike-foundation

**97. Research: Jenny Tillotson, Reader in Scentsory Fashion**
Jenny Tillotson is directing the Scentsory Design® initiative. The project explores the fusion of Emotional Fashion with 'aromachology' (the science of perfume) and how this can have a radical impact on mental and physical health. The idea is to create a personal 'scent bubble' that enhances the visual message of fashion with medical, sensory and psychological wellbeing for the wearer. According to the World Health Organisation, in 2020 depression will be the illness of the age, second only to heart disease. As a response to this Scentsory Design clothing and accessories offer a holistic 'anti-depressive' form of embodied capability to respond to biological conditions for psychological benefits.

→ www.tfrc.org.uk/author/jenny

## Transparency

**98a. Green Peace, Toxic Threads: The Big Fashion Stitch-Up, 2012**
The Greenpeace Detox campaign was launched in 2011 to expose the direct links between global clothing brands, their suppliers and toxic water pollution around the world. Fieldwork and investigations in manufacturing countries, along with the testing of branded garments for traces of hazardous chemicals, resulted in the release of groundbreaking reports that exposed the toxic content in clothing. Today fifteen of the world's biggest fashion retailers have committed to be toxic-free by 2020. The latest additions to the campaign are Zara, Mango, Uniqlo, United Colors of Benetton and Victoria's Secret. Other clothing companies, like Calvin Klein, GAP and Abercrombie&Fitch still need to respond.

→ www.greenpeace.org/international/Global/international/publications/toxics/Water%202012/ToxicThreads01.pdf

**98b. Honest By**
Ready to wear brand Honest By is the first company in the world to share the full cost breakdown of its products. The word Honest refers to the way in which the company operates with a 100% transparency policy. The brand's philosophy is about beauty and that the story behind fashion can be equally beautiful. They choose not to distribute leather goods, or clothes that are made or trimmed with fur, shell or horn. The company wants to give the customer the opportunity to shop with complete awareness of what they are buying; this means it produces all their products with a holistic sustainable approach.

→ www.honestby.com/en/page/16/about.html

**H&M supplier list, 2013**
H&M is one of the few retailers to publish this information. The list, which covers 95 percent of H&M's production, in Bangladesh and 22 other countries, includes 785 suppliers (166 are in Bangladesh) who in turn operate 1,798 factories. The company says that 148 of those suppliers are "strategic partners," and they make about half its products. H&M, like other companies, has a code of conduct for its suppliers that covers environmental and social issues. In 2012, it audited 485 potential new factories around the world. Twenty-five percent of them didn't make the cut. Most of those were in Asia.

→ www.businessweek.com/articles/2013-04-04/h-and-m-goes-public-with-list-of-suppliers

## Products As Politics

**99. Research: Dahea Sun, Rain Palette, 2012**
These garments are dyed with natural dyes and change colour in reaction to the pH levels of rainwater. The collection aims to provide an at-a-glance indication of atmospheric air quality, with the potential for the wearer to record and upload rain pH readings online to create a global database of real-time environmental data. Based on material exploration with red cabbage dye, the designer applied a form of apparel textiles using their property that alters colour by pH levels of the rain. This collection wants to highlight the important value of raising public consciousness about environmental issues such as air pollution.

→ www.sundahea.com/rain%20palette.html

## Designers Without Labels

**100. Vivienne Westwood, Fashion Activism, 2012**
Vivienne Westwood has used her reputation as a fashion designer to promote a new environmentally conscience approach to fashion. She has urged people to buy quality not quantity. She has donated £1million to rainforest charity Cool Earth and supports Amnesty International,

the Environmental Justice Foundation, Friends of the Earth, and Greenpeace's Arctic Campaign.  As well as shunning fast fashion Vivienne Westwood encourages donating to charity, cooking homemade meals, cutting out plastic and for people to inform themselves. Her Africa Bags are made out of recycled materials and handcrafted by marginalised communities of women in Kenya with the support of the International Trade Center's Ethical Fashion Program of the United Nations.

→ worldsendshop.co.uk/?page_id=73