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Gentle Power Bleach™ , a new benchmark in sustainable pretreatment

IFATCC International Congress, May 5 – 7, 2010, Stresa, Italy

Lode Vermeersch

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Sustainability - what are the concerns?

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- Minimise **pollution:** air, water, land
- Optimise **resources:** energy, water, chemicals, time
- Ensure **worker safety**, improve EHS standards
- Ensure **consumer safety** and **satisfaction**
- **Communication** brands & retailers and consumers
- **All factors need to be taken into consideration**
- **Responsible textile dye & chemical supplier can contribute in all stages**

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Life-cycle of a cotton T-shirt, intelligent effects

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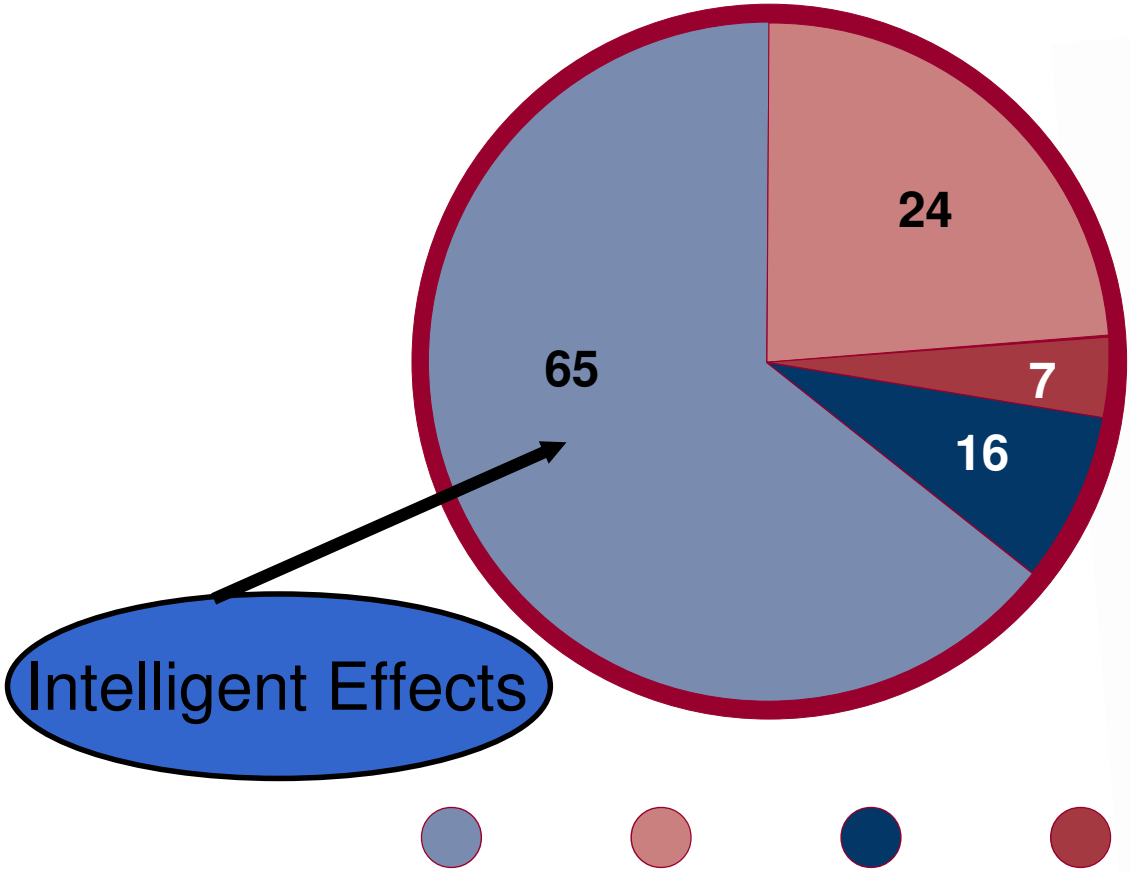
Ecological balance, primary energy profile (MJ per article)



use production material transportation

Source; well dressed? University of Cambridge 2006

High IQ Intelligent Effects

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Energy and water consumption in use phase at home can be significantly reduced by different effects such as:

Freshness: garments need to be laundered less

Active Comfort: make cleaning easier

Lasting Color: to give the garment a longer life

Easy Care Plus: Reduce the need for tumble drying / ironing

www.high-iq.com

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Life Cycle of a cotton T-shirt, smart processing

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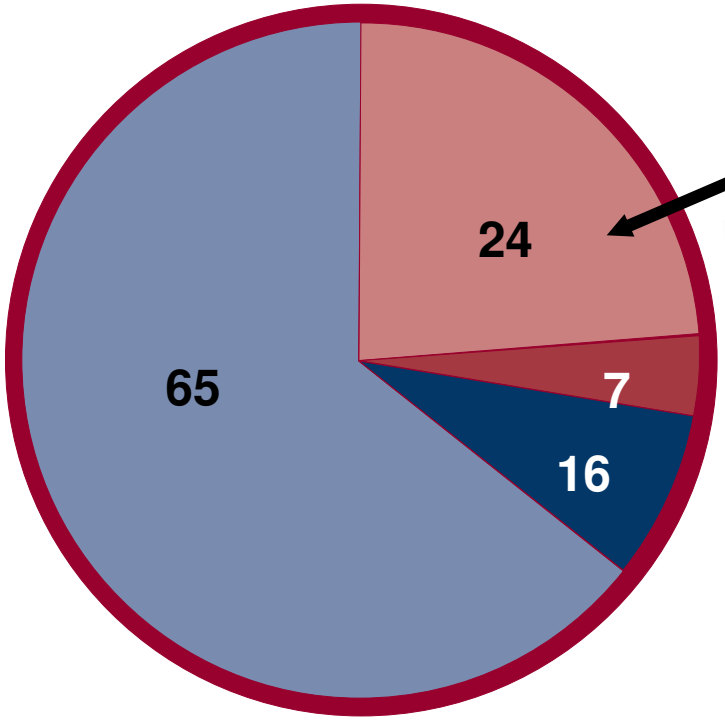
Ecological balance, primary energy profile (MJ per article)



Smart Processing

use production material transportation

Source; well dressed? University of Cambridge 2006

Water Footprint in Textile Processing

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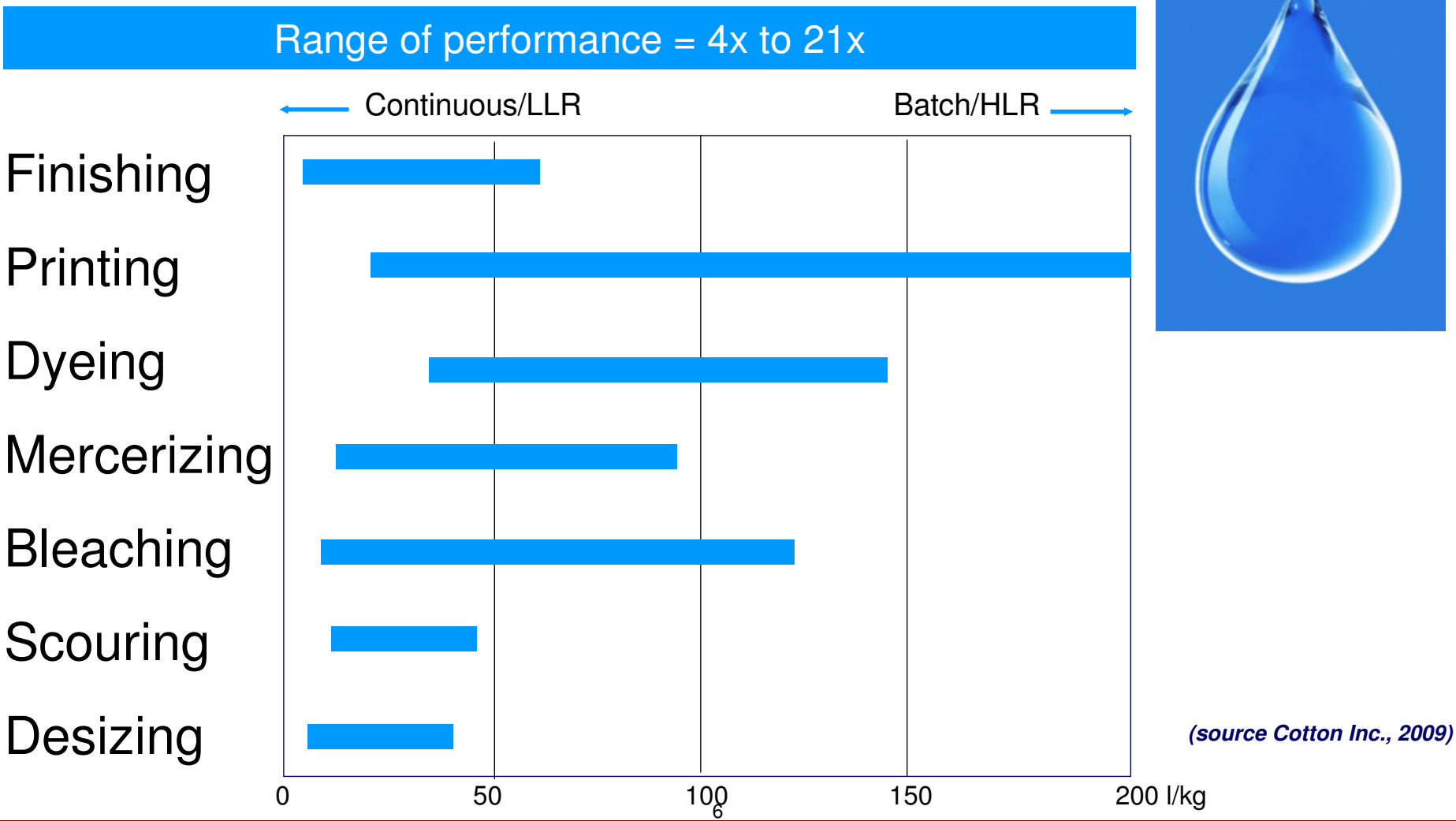
- Water consumption by Wet Processing Step



(source Cotton Inc., 2009)

Smart textile processing - preparation

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Smart Prep – batchwise process

	liquor ratio	rinsing baths	hours	equivalent to l/kg water
Best Available Technology	5:1	2	1	15
Current Industrial Practice	8:1	3	2	32

Total energy and resource cost reduction of 60%, yet equal quality

25 m tons cotton (all articles)= potential saving
Ca. 500 billion litres water, per year

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Smart textile processing - dyeing

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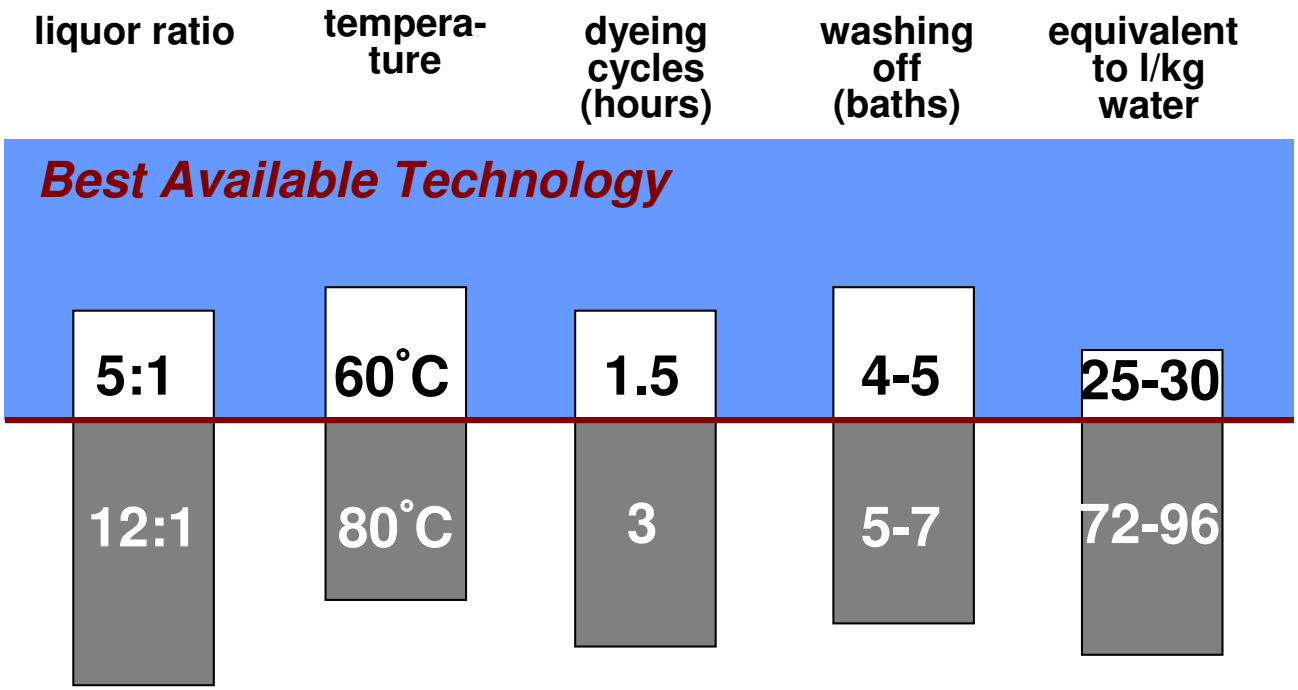
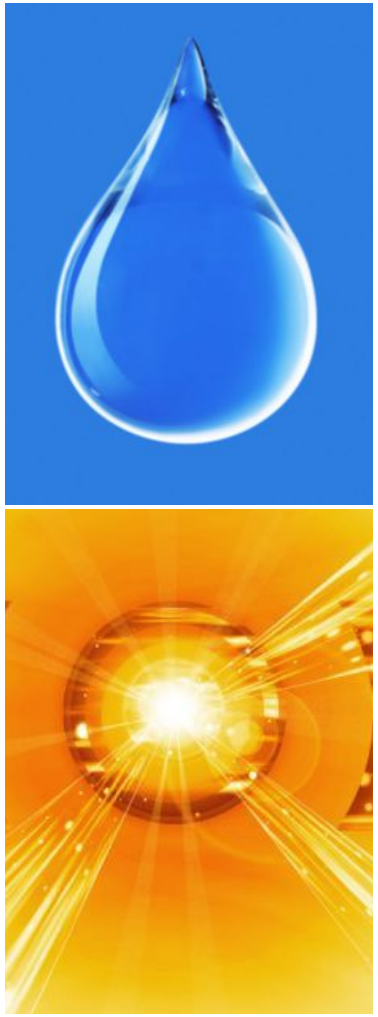
Smart Jet- batchwise process





Better reproducibility, repeatability, quality textile

25 m tons cotton (all articles)= potential saving
Ca. 1500 billion litres water, per year

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Gentle Power Bleach™

Novel bio-based, high-quality & environmentally friendly peroxide bleaching system at neutral pH and low temperature

Gentle Power Bleach™ - Perfect preparation

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Discontinuous oxidative bleaching based on breakthrough enzyme technology (Genencor)

- ***low temperature of 65 ° C (<-> 100° C)***
- ***neutral pH conditions (<-> pH 11-12)***

→ especially suitable for all fibers that are temperature and pH sensitive.

Cotton is perfectly prepared ready for dyeing

Regenerated cellulosic fibers with excellent full white levels, also recommended for ***non-fibrillating lyocell.***

Applicable on all closed discontinuous equipments such as jet, jigger, overflow and cheese dyeing machines.

No supplementary special equipment required, runs on established machinery

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Gentle Power Bleach™ Products

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Product overview

CLARITE® LTC	Combination product for the low temperature Gentle Power Bleach™ with excellent wetting, detergent and dispersing properties
INVATEX® LTA	Agent to assist and boost the peroxide reaction in the Gentle Power Bleach™
INVAZYME® LTE	Enzyme for the Gentle Power Bleach™ to catalyse the peroxide bleach in combination with INVATEX® LTA
INVATEX® LAB	Liquid buffer system for optimum pH setting and regulating
INVAZYME® CAT	Stabilized, liquid catalase-enzyme to remove residual peroxide after discontinuous peroxide bleaching
NOVACRON®	Reactive dye ranges NOVACRON® FN and S are recommended for dyeing at 60°C

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Gentle Power Bleach™ Process

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Process

Novel Gentle Power Bleach™ (GPB)

- low temperature
- neutral pH range

Recipe

Application: Exhaust
Material: CO, CO/EL, knitgood, yarn, woven and terry towel
Machine: Closed equipment e. g.: Jet, overflow, jig, package dyeing machine ...

			Low liquor ratio 4:1—6:1	High liquor ratio 8:1—12:1
A	CLARITE® LTC	g/l	2.0	1.5
	INVATEX® LAB or soda ash	g/l	7.5 or 3.0	5.0 or 2.0
	INVATEX® LTA	g/l	4.5	3.0
	H_2O_2 35%	ml/l	9.0	6.0
	INVAZYME® LTE	g/l	1.5	1.0
B	INVAZYME® CAT (2x)	g/l	0.7	0.5

Process condition: bleaching 50 min at 65 °C, draining, rinsing 2x10 min at 50 °C.
Woven and terry towel preparation: add INVAZYME® ADC for starch desizing.

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Soft handle – maximum strength

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Gentle in application, soft to the touch

Cotton fabrics pretreated with Gentle Power Bleach™ have ***a superior handle*** compared to conventionally bleached goods.

- Soft, bulky and ***natural*** handle
- The effect is fast and permanent
- The crease recovery properties are excellent, much ***less crease marking*** during processing
- Sewability (needle resistance) and stretch are improved

Maximum strength of the textile material with ***the lowest degree of chemical damage on cotton seen in the industry***.

→ e.g. especially important in case of subsequent moist cross linking finishing

Brilliant color – better appearance

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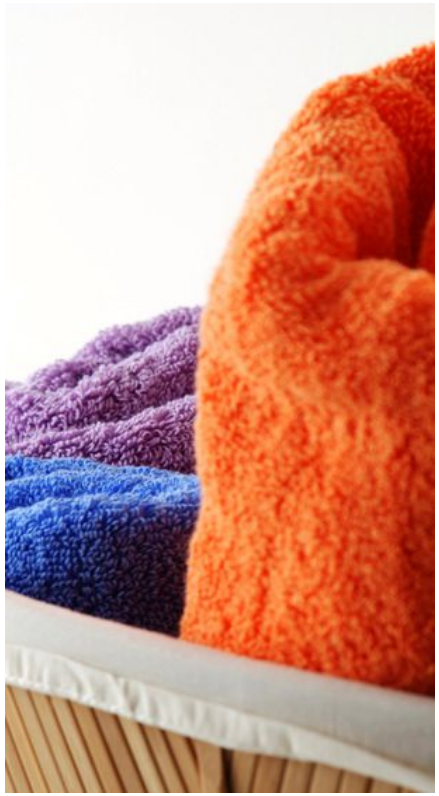
Giving you the colors you want to see

The Gentle Power Bleach™ brings the following advantages to the subsequent dyeing process:

- In many cases a better color yield
- Better appearance/levelness and brighter shades
- Savings in dyeing costs possible
- Similar or even better wash-, water- and rubbing-fastness properties

The Gentle Power Bleach™, the perfect pretreatment for ***excellent dyeing results***.



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Process optimization

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Keeping cost conscious customers in mind – saving resources

- ***Savings in energy consumption*** by about 40% due to the considerably lower treatment and rinsing temperature

- No neutralization is required, at least one or two rinsing baths can be omitted leading to ***a strong reduction in water usage by 50 %***

- ***The cotton weight loss is reduced by up to half.***

- As the material remains naturally soft and bulky, possible ***savings in softening*** can be obtained or ***new unattained softness levels*** are reachable

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Process optimization

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Keeping cost conscious customers in mind – enhanced reproducibility

Right-first-time production with Gentle Power Bleach™ reducing costly & resource consuming re-works:

- Improved reproducibility in reactive dyeing by avoiding the risk of too high ***residual alkalinity, the main cause of faulty dyeings***
- Less swelling of the natural fiber and avoidance of ***'channeling' effect in yarn cheese*** dyeing machines
- Lower risk for ***crease marking*** in piece good and garment processing

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Gentle Power Bleach™ Cost comparison

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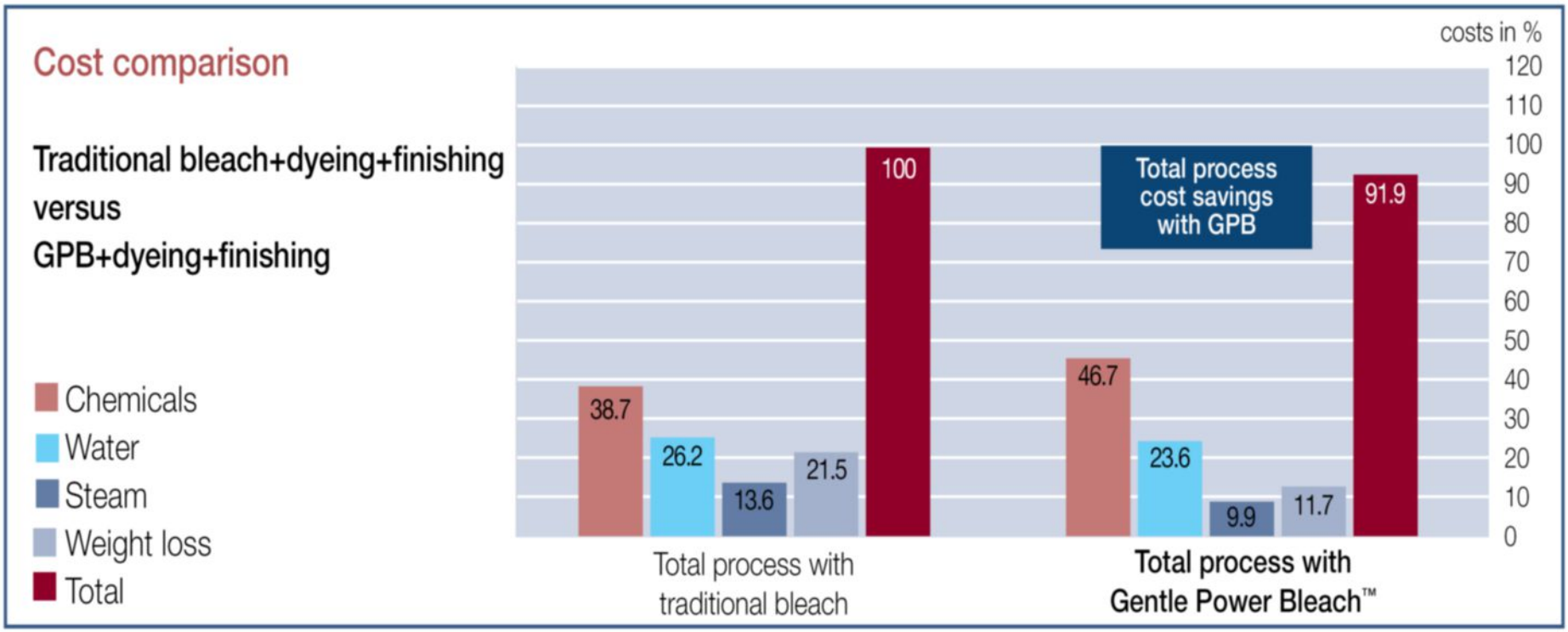

Life Cycle Assessment (LCA)

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In each step **resources** & **emissions** are evaluated

source Quantis, 2010

Life Cycle Assessment – Impact

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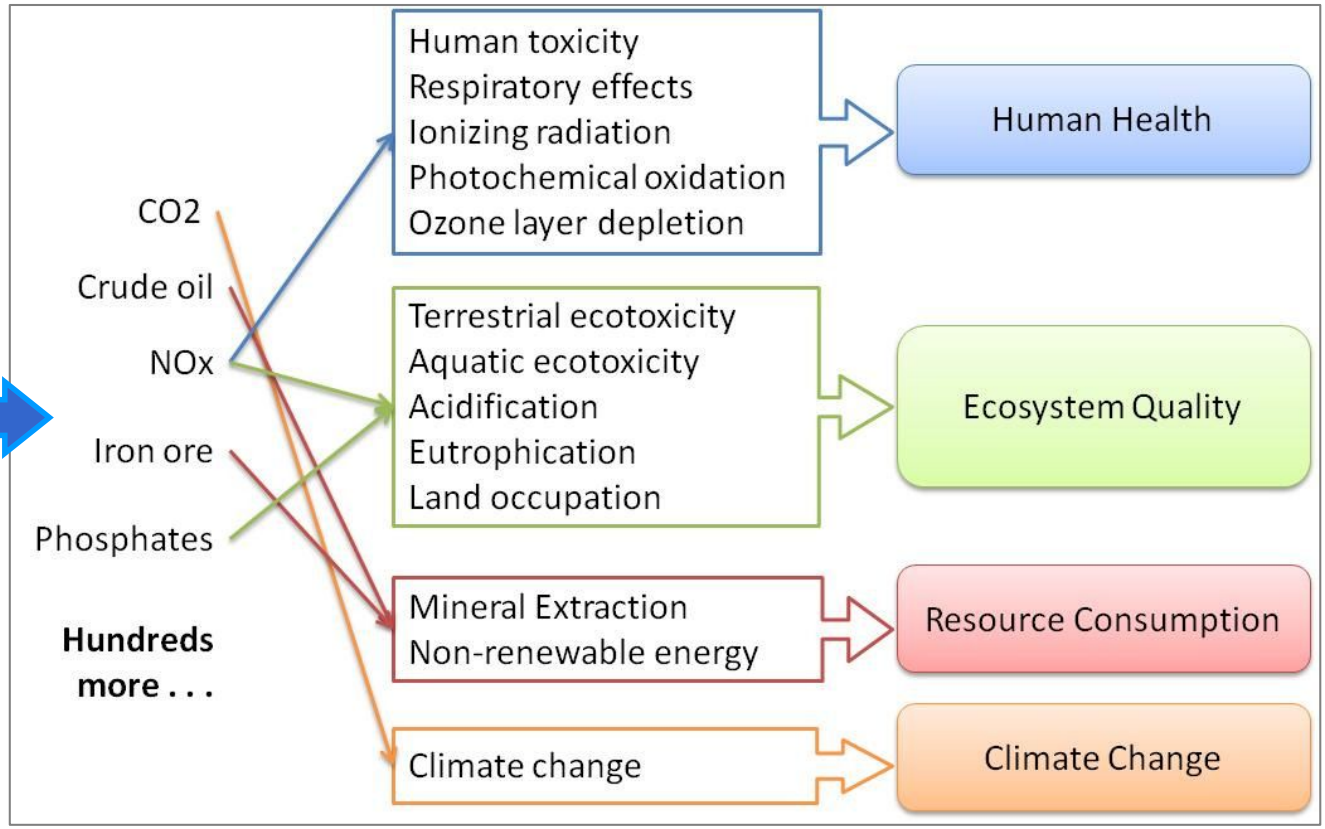
Product or Process Life Cycle Inventory



source Quantis, 2010

Life Cycle Assessment - Carbon Footprint

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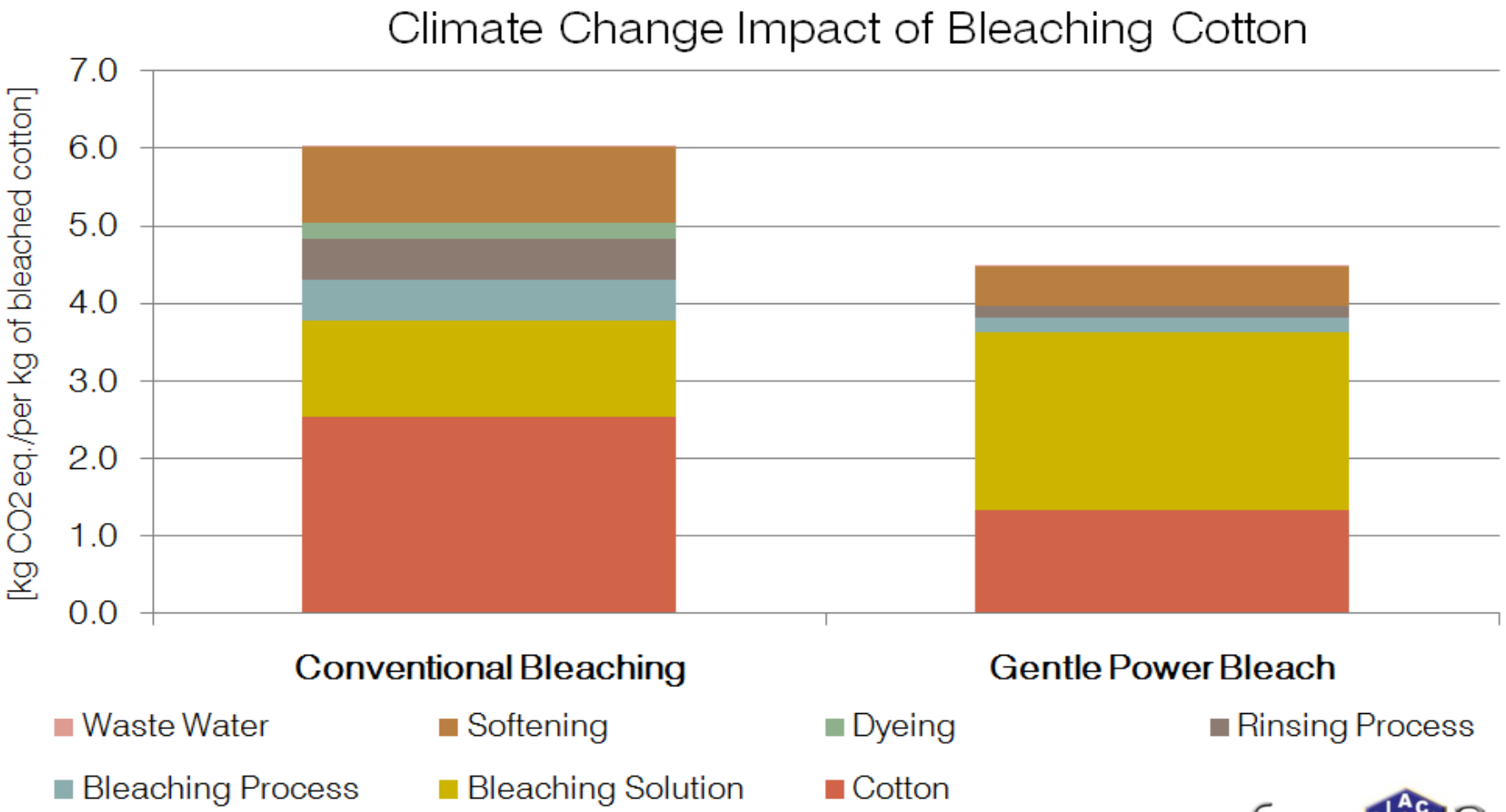
Gentle Power Bleach™ with 25 % savings in Climate Change Impact



Preliminary results, source Quantis, 2010

Gentle Power Bleach™ – Sustainable Benchmark with Improved Quality

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- Considerable ***water (50%) and energy (40%)*** **savings**
- Reduced ***effluent salt load,*** avoiding the use of harsh chemicals such as caustic soda.
- All auxiliaries with ***excellent bio-elimination*** and free of APEO and AOX.
- Better ***reproducibility, right-first-time*** processing
- First Textile Process Life Cycle Assessment:

carbon footprint with 25% savings in climate change impact

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