ABOUT US

Our vision
Be a trusted partner. A partner who assists brands, retailers and their supply chain partners to improve compliance, optimise costs and ultimately to reduce environmental impact.

Our team

Our clients
International brands and retailers NGOs, industry bodies and local mills. Our expertise is valued by Stakeholders across the industry.
OUR LOCATIONS

STS OFFICES:
- Bangladesh
- Brazil
- China
- Germany
- Hong Kong
- India
- Pakistan
- Portugal
- Spain
- Turkey

SERVICES:
- In 40+ countries globally
- United Kingdom
At Sustainable Textile Solutions we are proud creating impact through working with our partners.
01 THE TEXILE INDUSTRY
HISTORY OF TEXTILE PRODUCTION

Source: http://ficci.in/spdocumnet/208173-FICCI-TAG-2016-Whitepaper.pdf
GLOBAL TEXTILE MARKETS

Increasing Pollution across Supplying Countries

Source: UN Comtrade
FROM FARMING TO FINISHING: THE TEXTILE INDUSTRY USES UP TO 25% OF ALL CHEMICALS PRODUCED.
2,000 DIFFERENT CHEMICALS ARE USED IN WET PROCESSING.
THE TEXTILE INDUSTRY IS THE LARGEST CONSUMER OF DYESTUFFS WITH NEARLY 70%.
ONLY SELECTED HAZARDOUS CHEMICALS ARE REGULATED BUT MANY MORE ARE IN USE.
17-20% of industrial water pollution comes from textile processing.
72 of the toxic chemical substances in wastewater of these operations could be detected and 30 of them could not be cleaned.
WATER FACTS

ABUNDANT WATER YES; BUT VERY LIMITED FRESHWATER

Approximately 70% of the Earth’s surface is water

But ACCESSIBLE AND USEABLE FRESHWATER represents just a tiny silver...

97.5% SALTMWATER

2.5% FRESHWATER

...LESS THAN 1% of all water resources

Source: United Nations Environment Programme (UNEP) with Clean Edge analysis
IMPACT ON POLLUTION

Dead fish floating in the Meghna river due to toxic wastes from factories near the farms.
CASE STUDY: TEXTILE PRODUCTION RELEASES TOXIC CHEMICALS INTO THE ENVIRONMENT

1. Formulations containing nonylphenol ethoxylates (NPEs) and other chemicals are delivered to textile manufacturers for use as surfactants and others.

2. Lax regulation permits wastewater discharge of NPEs which break down into persistent, bioaccumulative and hormone-disrupting nonylphenols (NPs) in rivers.

3. NPs accumulate in sediments and can build up in the food chain, such as in fish.

4. Global exports deliver clothing containing residual levels of NPEs to markets even where these chemicals are banned in clothing manufacture.

5. Washing releases NPEs to water treatment facilities.

6. Water treatment is generally ineffective in dealing with NPEs, essentially only speeding up their breakdown to toxic NPs.

7. Hormone-disrupting NPs end up in aquatic systems even in countries where use of the parent compounds (NPEs) are banned.

Source: Dirty Laundry: Reloaded
IMPACTS ON PEOPLE:
CASE STUDY: FUAN TEXTILE MILL (FOUNTAIN SET HOLDINGS)

- River turned dark red from dyeing effluent, villagers complained to authorities.
- Surprise inspection: government official crawled through a hole in the wall.
- Pipe underneath the factory floor was dumping ≈ 22,000 tonnes of contaminated water per day from its dyeing operations into a nearby river.
- Release of wastewater and sludge contaminated with azo dyes, polluting the water and ultimately reaching the food chain.
- Some azo dyes release dangerous aromatic amines which can cause cancer.
- $1.5M penalties, $2.7M investment at water-treatment facilities
WHY CLEANER PRODUCTION?

• Cleaning up after pollution is more costly than avoiding pollution.
• Is not impossible restoring degraded ecological balance after pollution.
CLEANER PRODUCTION

Cleaner Production is a general term that describes a preventive environmental approach, aimed at increasing resource efficiency and reducing the generation of pollution and waste at source, rather than addressing and mitigating just the symptoms by only technically “treating” an existing waste/pollution problem.

In essence, Cleaner Production is about:

• Preventing waste and pollution at its source.
• Minimizing the use of hazardous raw materials.
• Improving water and energy efficiency.
• Reducing risks to human health.
• Saving money.
• Improving efficient management practices.
• Promoting sustainable development.
STAKEHOLDER PRESSURE: FOR CLEANER TECHNOLOGY

The public awareness and the growing perception of social cognizance about the environment have forced the textile industry to produce environmentally friendly products.

e.g.

- Greenpeace
- WWF
- Friends of earth
GREENPEACE'S DETOX CAMPAIGN

- Greenpeace launched its “Detox my Fashion” campaign in July 2011.

- The campaign asked the textile industry to urgently take responsibility for phasing out toxic chemicals within their supply chains.

- Public activism and widespread use of social media.

- As a result of the campaign many “big players” have made ‘Detox Commitments’.

- Greenpeace assesses signatories’ efforts and progress in their ‘Detox Catwalk’ report.
WHICH CRITERIA ARE GREENPEACE ASSESSING?

• 1. Detox 2020 Plan
  • Manufacturing Restricted Substances List (MRSL), to enable brands to eliminate all hazardous chemicals.

• 2. PFC Elimination
  • Commitment for the elimination of per/poly fluorinated chemicals (PFC) as a group.

• 3. Transparency
  • Publication of precise, relevant, up to date and locally accurate information on the use and discharge of hazardous chemicals.

• Greenpeace aims to remove hazardous chemicals from the textile supply chain, engage consumers, whilst ultimately “closing and slowing the loop”.
More than 44 international brands & retailers are committed to stop the usage of hazardous chemicals
THE ZDHC PROGRAMME & TOOLS

ZDHC MRSL and Research
Data & Disclosure ZDHC Gateway – Chemical Module

Audit Protocol Chemical Management
Training ZDHC Academy

ZDHC Wastewater Guidelines
Data & Disclosure ZDHC Gateway – Wastewater Module
VARIABLES IN THE HOLISTIC APPROACH TO CM

- **INPUT**
  - Input chemistry
  - Target first

- **PROCESS**
  - People
  - Technologies for sustainable processing

- **OUTPUT**
  - Finished Product
  - End of Pipeline Solutions
INPUT CHEMISTRY MANAGEMENT TOOLS
INPUT CHEMISTRY MANAGEMENT TOOLS

- Mills
- Chemical Suppliers
- Equipment Manufacturers
- Brand
- Chemicals suppliers

Certification possible
ECOLABELS PROMOTING SUSTAINABLE PROCESSING

- Almost every eco-label sets limits for harmful substances
- Emphasis on the sustainable manufacturing process while ensuring the minimum social requirements
UPSKILL PEOPLE THROUGH CAPACITY BUILDING
MORE SUSTAINABLE TEXTILE PROCESSING
PROCESS – BENEFITS FROM NEWER TECHNOLOGIES FOR SUSTAINABLE PRODUCTION

A preventive environmental approach to increase resource efficiency
Preventing waste and pollution at its source
Minimizing the use of hazardous raw materials
Improving water and energy efficiency
Reducing risks to human health
Saving money
Improving efficient management practices
Promoting sustainable development

Source: Cleaner (sustainable) production in textile wet processing by E. Alkaya, M. Böğürçü, F. Ulutas, G.N.Demirer*
Hydrogen peroxide bleaching

- Most common process for cotton
- Takes 2-5 hours at 75-100° Celsius
- Requires “clean up”
- Can weaken tensile strength of material

Enzyme bleaching: More Sustainable

- Discoloration can be achieved in 60 minutes
- High temperatures not required
- Caustic Soda eliminated
- Salt concentration in effluent reduced
- Less rinsing required
- Combo Bleaching
- Bleach Clean-up
• Discoloration can be achieved in 60 minutes
• High temperatures not required
• Caustic Soda eliminated
• Salt concentration in effluent reduced
• Less rinsing required
• Combo Bleaching
• Bleach Clean-up
HYDROGEN PEROXIDE WITH CATALYST AT LOW TEMPERATURE

- Bleaching temperature in process reduced by up to 35 °C
- Improved handling characteristics of the final fabric
- Reduced processing time.
CELLULOSE DYEING

(HFRD)

High Fixation Reactive Dye (HFRD):
Less water, energy and chemicals
WATERLESS DYEING

Super critical carbon dioxide dyeing

A substance becomes a supercritical fluid above its critical point of temperature and pressure.

Pressure

Liquid state

Supercritical Fluid

Critical Point

Gas state

Temperature

Flow scheme of a supercritical fluid dyeing process:
SOLUTION (DOPE) 

DYEING

- Fibres are extruded with pigments already included, so no separate dyeing step is required
- Color is incorporated throughout the fibre
- Such color resists chemicals, bleach and even sun-fading
PLASMA TREATMENT
<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Application</th>
</tr>
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<tbody>
<tr>
<td>Acxys, France</td>
<td>Wettability, water repellent (<a href="http://www.acxys.com">www.acxys.com</a>)</td>
</tr>
<tr>
<td>Apjet, USA</td>
<td>Water and stain repellency (<a href="http://www.apjet.com">www.apjet.com</a>)</td>
</tr>
<tr>
<td>Arioli, Italy</td>
<td>Water repellent (<a href="http://www.arioli.biz">www.arioli.biz</a>)</td>
</tr>
<tr>
<td>Diener, Germany</td>
<td>Cleaning, etching, activation, polymerization</td>
</tr>
<tr>
<td>Dow corning corporation</td>
<td>Surface modification and coating</td>
</tr>
<tr>
<td>Europlasma, Belgium</td>
<td>Surface coating, water repellent (<a href="http://www.europlasma.be">www.europlasma.be</a>)</td>
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<tr>
<td>Grinp, Italy</td>
<td>Surface modification and coating (<a href="http://www.grinp.com">www.grinp.com</a>)</td>
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<tr>
<td>Plasmatreat, USA</td>
<td>Self-cleaning, flame retardancy (<a href="http://www.plasmatreat.com">www.plasmatreat.com</a>)</td>
</tr>
<tr>
<td>Sigma, USA</td>
<td>Surface modification and coating</td>
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<tr>
<td>Softal, Germany</td>
<td>Water repellent, wettability (<a href="http://www.softal.de">www.softal.de</a>)</td>
</tr>
<tr>
<td>Vito, Belgium</td>
<td>Cleaning, activating, coating (<a href="http://www.vitoplasma.com">www.vitoplasma.com</a>)</td>
</tr>
</tbody>
</table>
LASER TECHNOLOGY

Use of hazardous PP

Use of laser technology for faded look and worn-out effect on denim materials
JERSEY FROM RECYCLED POLYESTER

- ‘Breathable’ Jersey is made from polyester
- Nike recycling 16 PET bottles to make each jersey
- Since 2016, more than three billion plastic bottles have been diverted by Nike from landfills into recycled polyester
SUSTAINABLE DENIM

- Making a pair of jeans creates massive pollution
- However, Everlane has founded a factory
- Where denim by-product is turned into bricks
Donation boxes for used clothing exist, but not enough people use them. One Ontario study found that 85 per cent of discarded textiles end up in the landfill. (Havard Gould/CBC)

Discarded clothes, blankets and other textiles are compacted into 450 kg bales at the Salvation Army warehouse in Oakville, Ont., and sold on to private companies. (Havard Gould/CBC)

RECYCLING
DuPont™ Sorona® EP - Poly Trimethylene Terephthalate, a Thermoplastic Polymer

Contains 20% to 37% renewable material from non-food biomass, and has performance similar to conventional PBT plastics.

The Story of Sorona®

Harvest feedstock

Ferment sugar into Bio-PDO™

Add TPA to Bio-PDO™ to produce Sorona®

Fibers and fabrics created with Sorona®

Apparel and carpet made with Sorona®

Sorona® is made, in part, with annually renewable plant-based ingredients.
- Partial Biopolymer: Toray’s ecodear®PET is a polyester fiber which is produced by polymerizing petroleum-based terephthalic acid (TPA) and plant-based mono-ethylene glycol (MEG) made from sugar cane, etc. The plant-based polymer’s content is approximately 30% of the polyester.

- Using terephthalic acid synthesized from Gevo’s bioPX (para xylene) from renewable isobutanol and commercially available renewable mono ethylene glycol (MEG) from sugarcane, Toray succeeded in lab-level PET production.
BIO-BASED TPA FOR PET FROM SUGAR

BASF & Avantium (Dutch technology firm) are forming a joint-venture company focused on Polyethylene Furanoate (PEF):
BIOPOLYESTER- POLYETHYLENE FURANOATE (PEF)

- A bio-based polyester

- Produced via the catalytic transformation of sugars, FDCA is reacted with ethylene glycol to make PEF.

- The companies are touting PEF as a better alternative to polymers such as polyethylene terephthalate (PET) for food and drink packaging because of its superior gas barrier properties.

- “This can lead to longer shelf-life of packaged products,” the partners say.

- PEF also has a higher mechanical strength than existing packaging plastics, so less material is required, they say.
Genomatica’s GENO CPL™ process
more sustainable nylon from renewable ingredients rather than crude oil

renewable feedstocks  
GENO CPL™ Process  
biocaprolactam  
bionylon-6

BIO NYLON 6
BIO NYLON 6,6
Sampling points for facility with own WWTP and direct discharge

OUT PUT – END OF PIPELINE
Sampling points for facility with own WWTP and indirect discharge
# CLEANER PRODUCTION APPROACH FOR COST-EFFECTIVE SLUDGE MANAGEMENT

### Reduce

**Reduce quantity of sludge generation**
- Segregate waste flow from dyeing.
- Use appropriate wastewater treatment technologies with low sludge production.
- Use proper operation and maintenance in the plant. Monitor pH, dosing of chemicals, aeration level, retention time etc.
- Evaluate efficiency of the existing ETP.

### Reduce

**Reduce volume of sludge**
- Reduce moisture content in the sludge.
- Use techniques such as filter press, vacuum, centrifuge etc.

### Reduce

**Reduce the burden of chemical/hazardous load from processing**
- ZDHC approach on MRSL: the use of less hazardous chemicals results in less hazardous sludge.
- Know your raw materials.
- Know your dyes/chemicals.
- Substitute dyes/chemicals.
- Process approach.
- New technology.
“As long as babies born naked there will continue to have demand for textile”

- Unknown
THANK YOU FOR YOUR ATTENTION
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