



UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

UNIDO Regional Office in India



SUSTAINABLE DEVELOPMENT GOAL 9
INDUSTRY, INNOVATION AND INFRASTRUCTURE

Water Efficiency in Textile Processing: good practices and emerging technologies

René VAN BERKEL
UNIDO Representative
UNIDO Regional Office in India

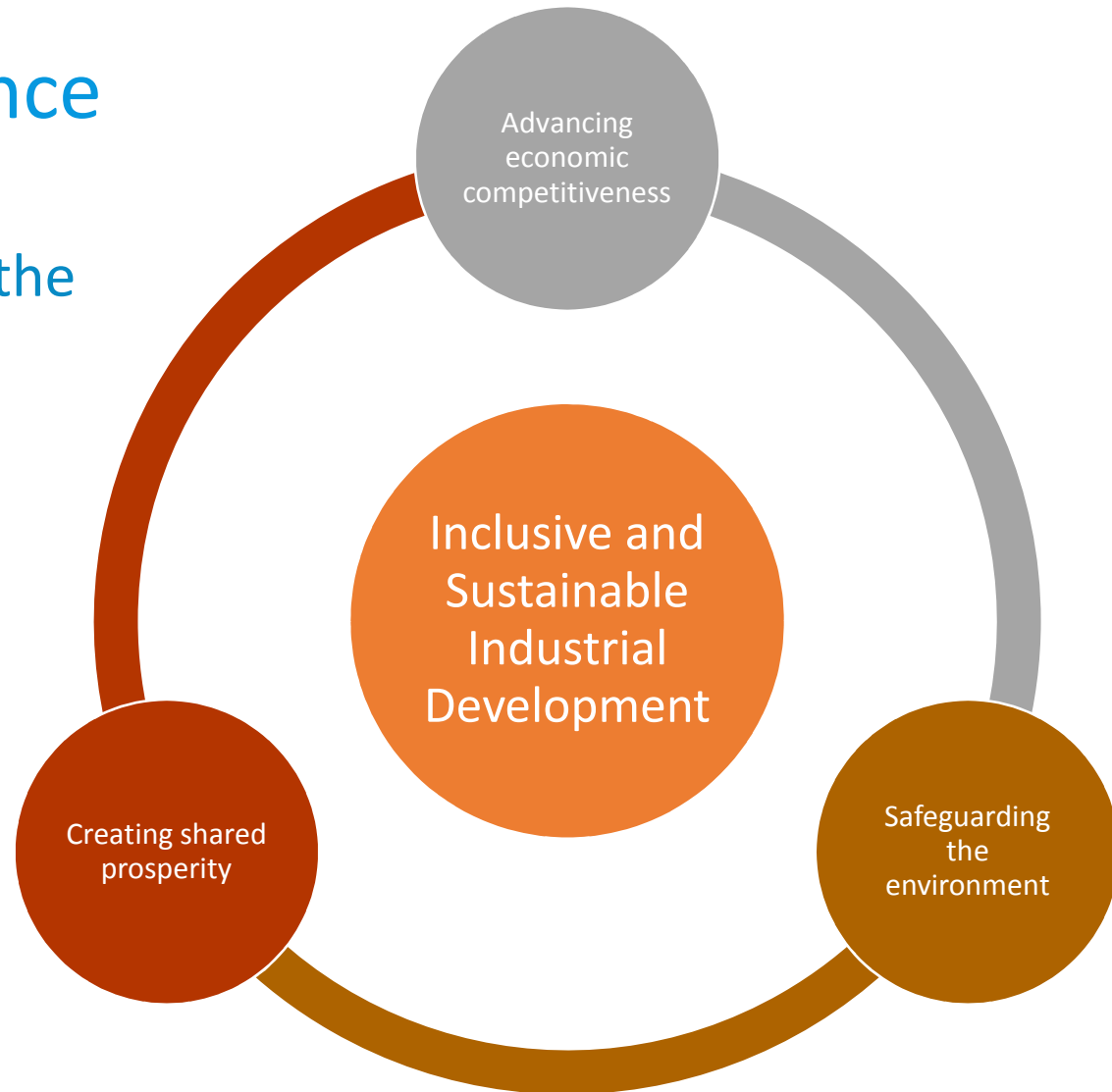
1 July 2017





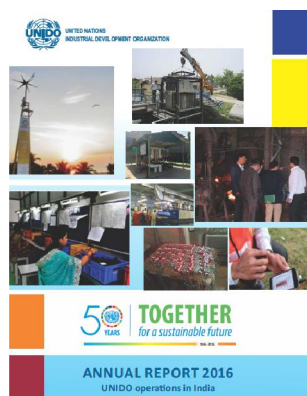
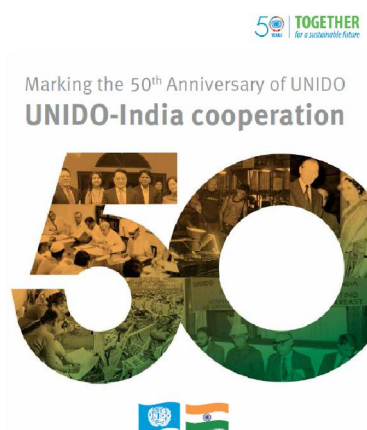
UNIDO at a Glance

- Specialized agency of the United Nations that supports inclusive and sustainable industrial development in its developing country member states





UNIDO in India



- Current portfolio of 17 ongoing projects with total value of ~ USD83 million
 - Chemicals and Chemicals Waste (3)
 - Energy Efficiency, Innovation and Renewables (7)
 - Inclusive Economic Development (5)
 - South-South Cooperation (1)
 - Centre (1)
- Wide range of sectors
 - Textile, foundry, ceramics, dairy, automotive, hospitals, cement, leather, etc
 - Target MSME sector, 20+ clusters
- Geographic coverage
 - Gujarat, Karnataka, Maharashtra, Odisha, Punjab, Rajasthan, Sikkim, Tamil Nadu, Uttar Pradesh, West Bengal
 - Upcoming sustainable cities: Bhopal, Jaipur, Vijayawada, Guntur and Mysore



2017 ▼

Home Projects Donors Publications About ▾ 🔍



Projects

Donors

Country Overview



Ongoing Projects (18) ⓘ

- > GC1 Creating Shared Prosperity (2)
- > GC2 Advancing Economic Competitiveness (4)
- ▼ GC3 Safeguarding the Environment (12)

103029 - Promoting Energy Efficiency... ●

🔍 104044 - Environmentally Sound Man...

🔍 104088 - Regional network on persist...

104160 - Environmentally Sound Man...

120095 - Organic waste streams for i...

120182 - Promoting ultra low-head m...

120262 - Promoting Market Transfor...

🖼️ 120345 - GEF UNIDO Cleantech Progr...

Promoting Energy Efficiency and Renewable Energy in Selected Micro, Small and Medium Enterprises (MSME) Clusters in Indi



Overview 🐦

Project ID	103029 ⓘ
Thematic Priority	GC3 Safeguarding the Environment ⓘ
Location	India
Project Manager	Sanjaya SHRESTHA
Donors	▶ Global Environment Facility ▶ Regular Programme Of Technical Cooperation
Funds	Operational Budget Global Environment Facility Regular Programme of Technical Cooperati



The aim of the project is to develop and promote a market environment for introducing energy efficiencies and enhanced use of RE technologies in process applications in 12 selected energy-intensive MSME clusters in India with expansion to more clusters later, in order to improve the productivity and competitiveness of units as well as to reduce overall carbon emissions and improve the local environment. The project w... [More](#)

<https://open.unido.org/projects/IN>





UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

UNIDO Regional Office in India



SUSTAINABLE DEVELOPMENT GOAL 9
INDUSTRY, INNOVATION AND INFRASTRUCTURE



SUSTAINABLE DEVELOPMENT GOALS



The mandate of UNIDO is an essential component of Sustainable Development Goal 9, and is instrumental to the achievement of all the other goals



Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

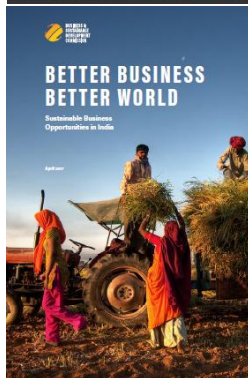


Ensure availability and sustainable management of water and sanitation for all



Ensure sustainable consumption and production patterns





- Achieving the Global Goals creates at least US\$12 trillion in opportunities by 2030, just in four major economic systems



Food and Agriculture



Cities



Energy and Materials

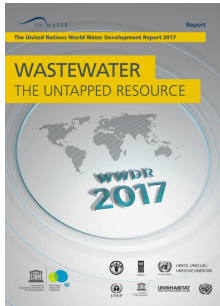


Health and Well-Being

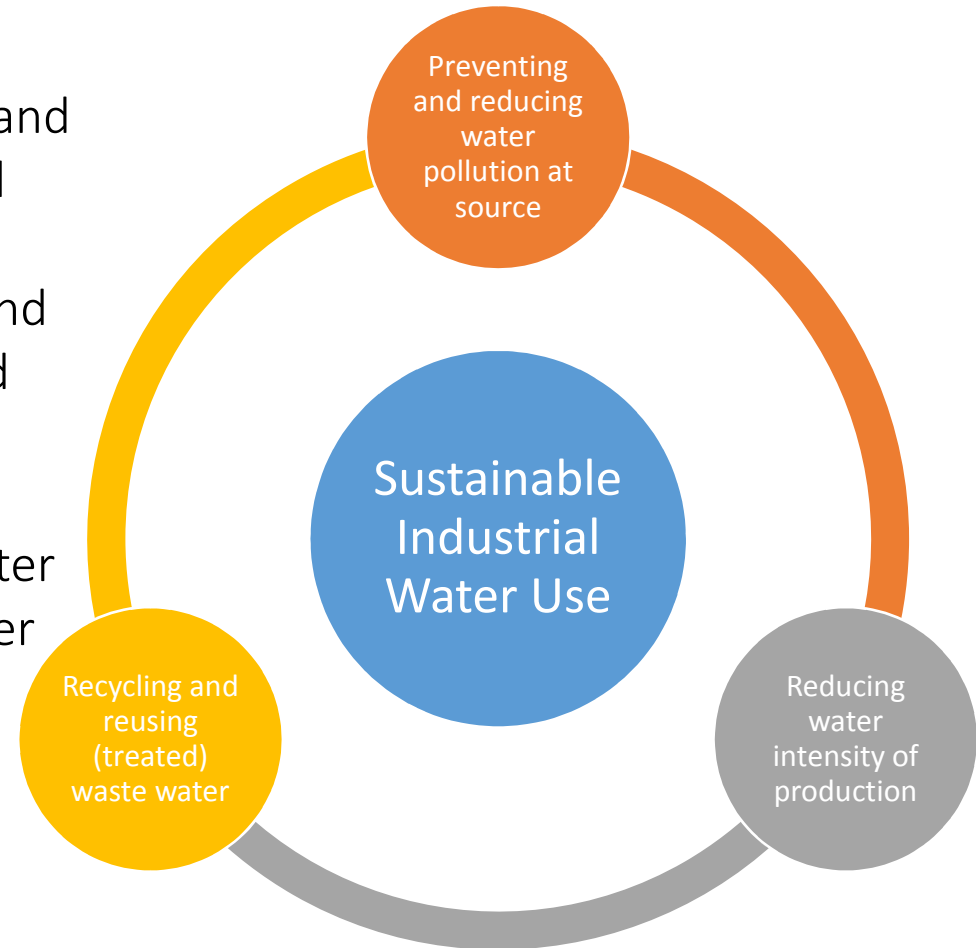
- Achieving the Global Goals creates at least US\$5 trillion in opportunities in Asia across the four major economic systems
- Pursuing those opportunities could create almost 230 million new jobs in the region by 2030, equivalent to 12 percent of the Asian labour force
- The SDGs offer a compelling growth strategy, opening up and economic prize of at least US\$1 trillion by 2030 for the Indian private sector
- Over 73 million new jobs could be created in India by 2030. One market hot spot alone, low income food markets, could create around 11 million of these jobs



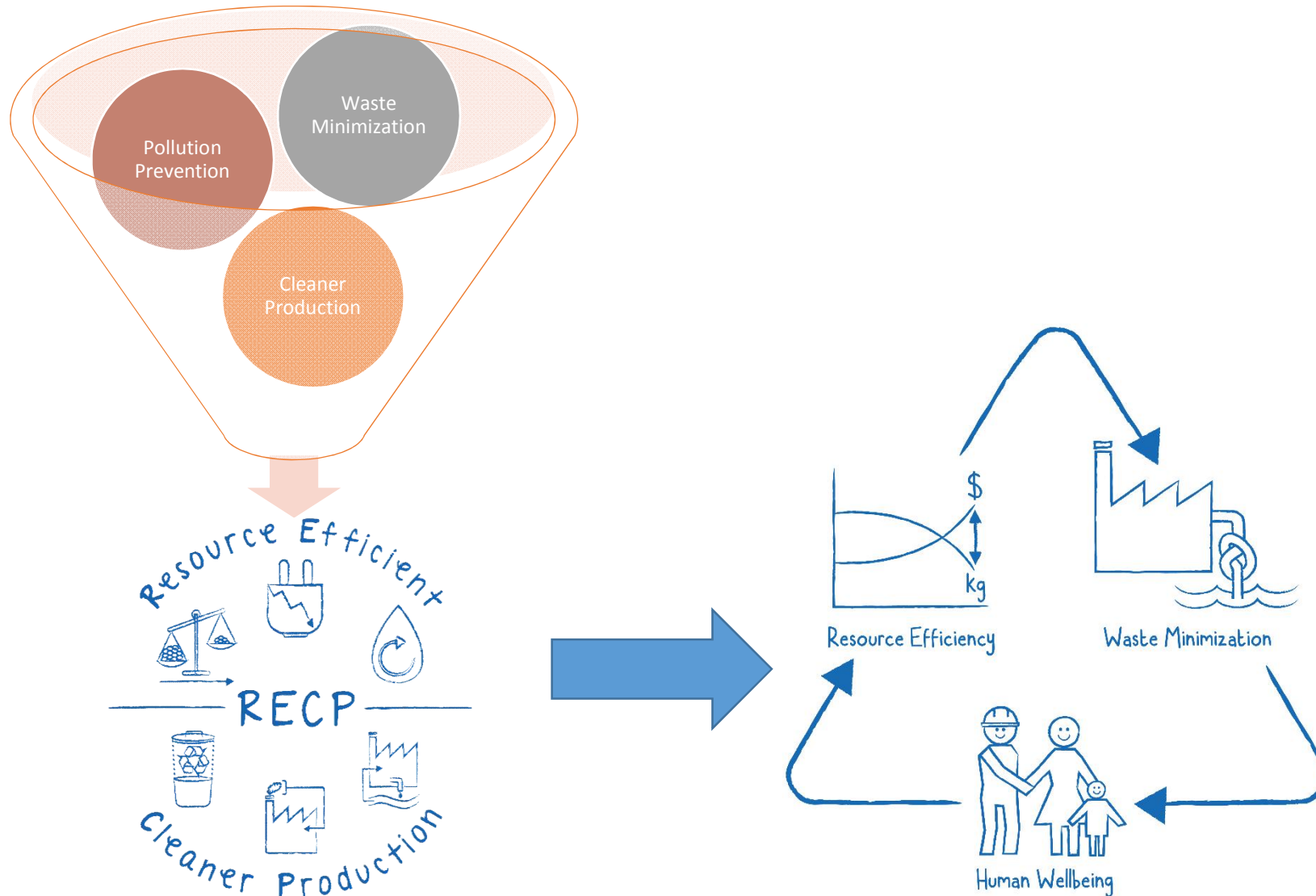
Water Trends

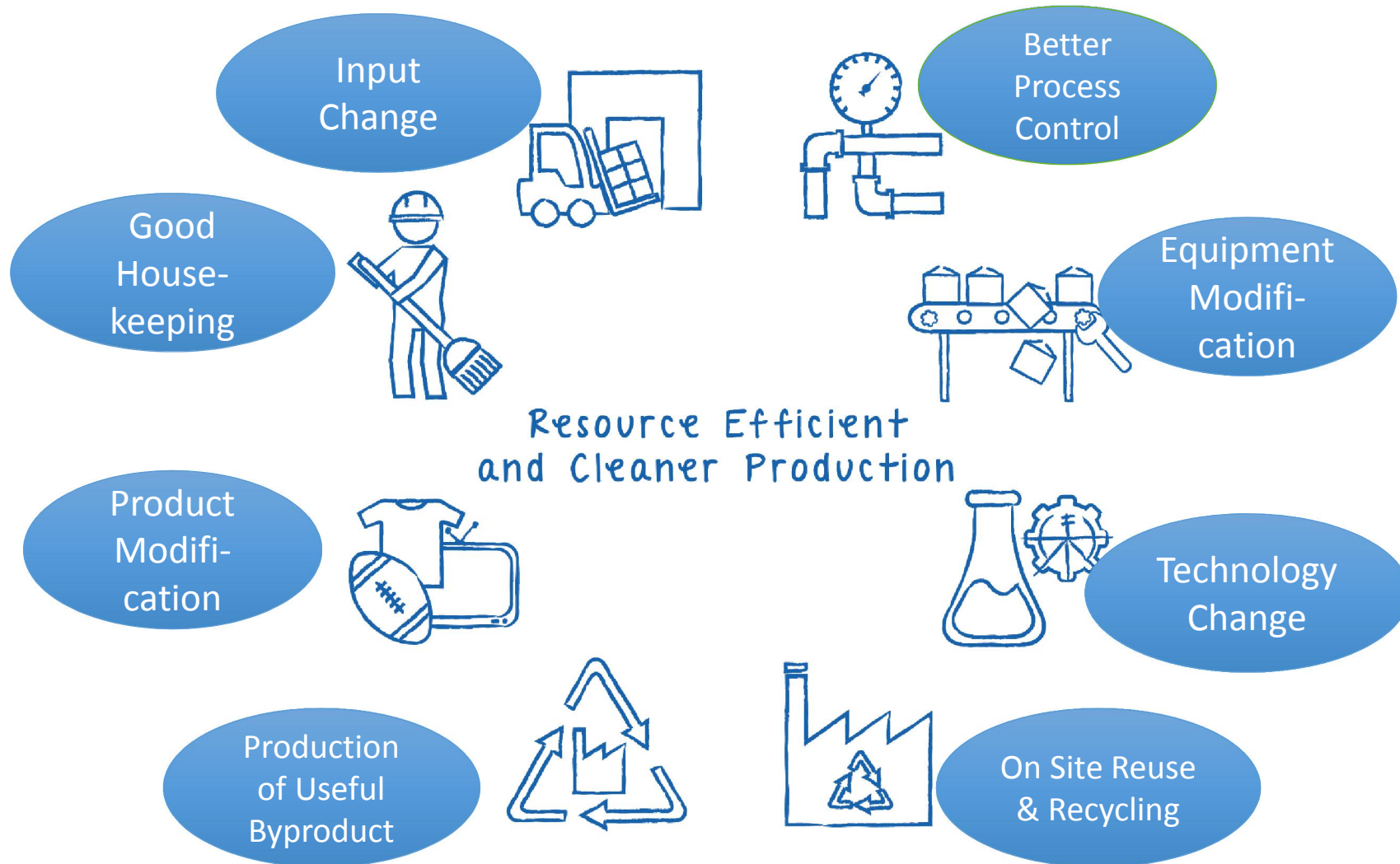


- Large increases in water demand are predicted for industry and energy production, further augmented by urbanization and extension of water supply and sanitation.
- India has 17% of world population but only 4% of water resources – about half of water demand in 2030 will remain unmet.



World Water Development Report, 2017





UNIDO, 2010



RECP Practice	Description	Common Water-Related Example
Good Housekeeping	Maintain a clean, organized and productive ('neat') workplace to eliminate avoidable 'wastage'	<ul style="list-style-type: none"> • Switch off what is not in use (e.g. taps) • Repair what is broken or leaking (e.g. pipes) • Remove dry-debris before factory wash down
Input Change	Choose inputs that are efficient, effective and/or pose minimum harm to the environment and health	<ul style="list-style-type: none"> • Use secondary, recovered water • Use less harmful chemical substances (dyes, detergents, etc.) • Enzyme-enhanced bleaching, scouring
Better Process Control	Monitor and control processes and equipment so that they always run at highest efficiency and with lowest wastage	<ul style="list-style-type: none"> • Establish and follow Standard Operating Procedures (SOP) • Sub-meter use of water • Install automatic shut-off and overflow prevention valves
Equipment Modification	Make existing equipment more efficient and less wasteful	<ul style="list-style-type: none"> • Align and debottleneck production line • Close, hot and cold, process equipment
Technology Change	Change over to new technology that is more efficient or produces less waste	<ul style="list-style-type: none"> • Waterless dyeing • Additive, 3D printing
On-Site Reuse & Recycling	Use previous 'waste' for similar or alternative purpose in company	<ul style="list-style-type: none"> • Counter-current or cascaded use of water • Condensate recovery
Production of Usefull By-Product	Convert a previous 'waste' for a useful use elsewhere	<ul style="list-style-type: none"> • Provide used cooling water for external heating or cooling purposes
Product Modification	Redesign product to reduce its environmental impact during production, use and/or disposal	<ul style="list-style-type: none"> • Produce easy care textiles that require minimal water by consumers

Van Berkel, 2017



Full Fortune Knitting Ltd

Table 3: RE/EE measures implemented with investment

Nº	Measures Implemented	Invest. (US\$)
1	Recovered condensate to use as BFW	14,000
2	Prevent steam leak from valves	150
3	Improve the insulation around the boiler	100
4	Insulated the steam distribution	250
5	Replace the paper carton of cooling system	3,000
6	Replace the fluorescence tube T8 to T5	4,202
7	Install sky light on the roof	62,976
TOTAL INVESTMENT		84,678



Table 7: Results of energy efficiency at a glance

Nº	Items	No.of Value	% Share
1	Total No. of EE Options identified	24	
2	No. of EE Options selected for feasibility analysis	14	58%
3	No. of EE Solutions Implemented	10	42%
4	Savings in Energy Resource Cons./year		
	- Electricity (\$)	30,348	10%
	- Wood (\$)	52,198	32%
	- Diesel Oil (\$)	37,144	35%
5	Total GHG Emissions reduction achieved (Ton/year)	615	16%
6	Direct Savings	119,690	
7	Total Investments in US\$	84,678	Pay Back 8.5 months





Argo Pantes

Closed Washing Line



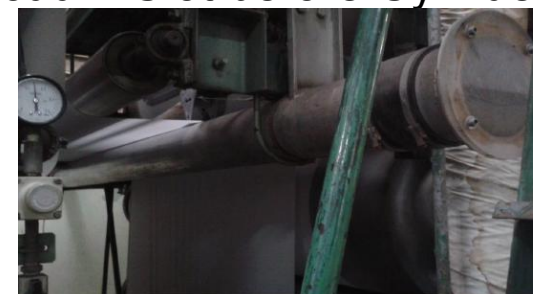
Humidifiers in Weaving



Hot Water Tank for Washers



Vacuum Slot before Cylinder Dryers



Y Susanto, 24 May 2016



Tarasima Apparels



• Key measures

- Installation of thermal oil heaters to cut down steam consumption
- Installation of a 2-ton incineration boiler resulting in savings in natural gas consumption
- Using skylights in the cutting, washing and finishing units
- Installation of Electro Catalytic Reactor in Effluent Treatment Plant
- Establishment of biogas plant, producing 56m³ biogas from canteen waste

Environmental Benefit		Financial Benefit	
Water Savings	40,560,000 l/year	Total Investment	US\$ 1,398,520
Electricity Savings	105,000 kWh/year	Cost Savings	US\$ 655,800 /year
Natural Gas Savings	1,073,280 m ³ /year	Payback Period	0.67-15 years
Steam Savings	21,840,000 kg/year		
Other benefits: Chemical conservation, improved wastewater quality, improved waste management, reduced GHG emissions			

www.textilepact.net



Business Case



UNIDO, 2015

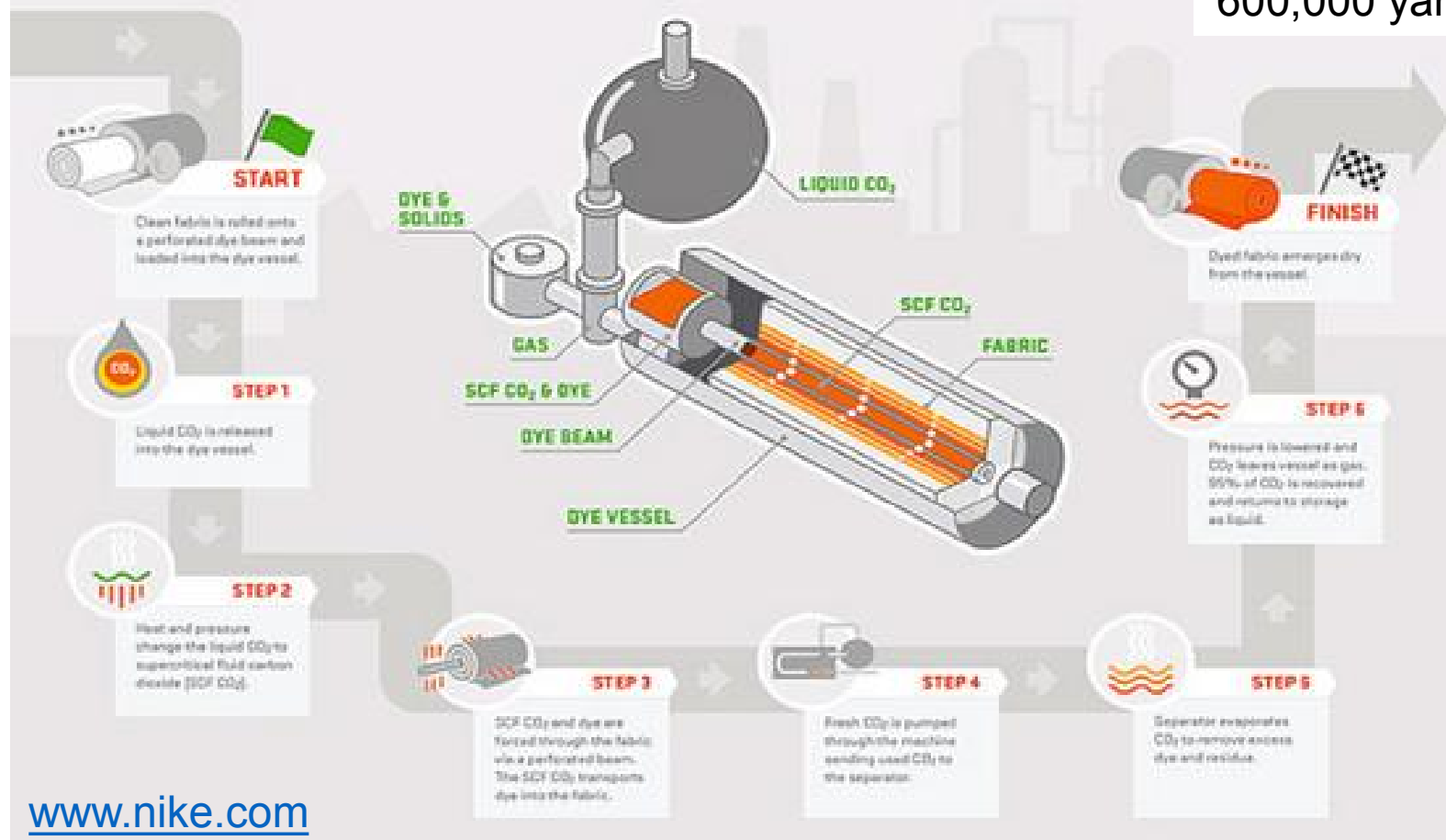


NIKECOLOR DRY

REVOLUTIONARY WATERFREE DYEING PROCESS

Nike believes innovation extends from design to how products are made. Dyeing without water is one example of how Nike is working to scale sustainable innovations across its supply chain.

600,000 yards in FY 2015



www.nike.com



Process Benefits



Zero water
Zero waste water

Zero process chemicals
98% dye uptake

Vibrant colours
1/4th floorspace
40% faster
63% lower energy

www.dyecoo.com
www.nike.com



Equipment



- Three dye vessels, each with a loading capacity of 20 to 200 kg, adding up to a maximum daily capacity of 4000 kg.
- Operate in parallel with different colours.
- Suitable for virtually all synthetic fabrics and yarn. From woven to non-woven and knits, CO₂ dyes various fabric constructions and types of permeability.

www.dyecoo.com





3D Printing

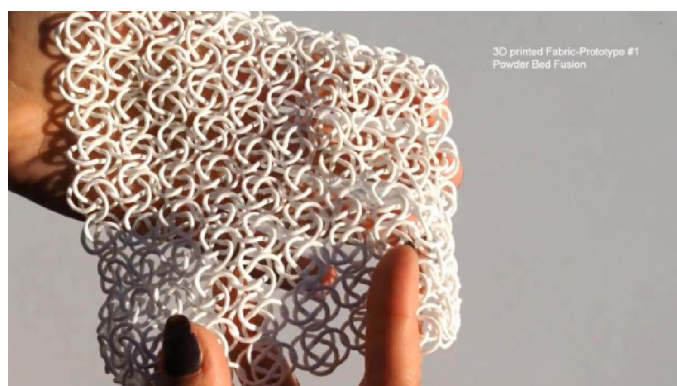
- Additive manufacturing
 - Material is laid down layer by layer to create 3D objects with no waste, from material to final product
 - Liquid polymers are extruded by printer which can employ a wide range of materials and techniques
 - Key technology in Industry 4.0



TamiCare
Textile Reinvented



Versatility – Fabric Prototypes





Potential



- Instant creation of finished products from raw materials with no cutting and no waste.
- Manufacturing with multiple stage 3D printing processes and with many controllable variables allowing unlimited fabric variations.
- Various types of liquid polymers such as natural latex, silicon, polyurethane and teflon, as well as variety of textile fibres such as cotton, viscose and polyamide enable tailor-made fabrics for any need.

TamiCare
Textile Reinvented



In Closing

- Water efficiency and effluent reduction are among greatest challenges for the textile sector
- These are intrinsically linked to chemicals and energy use, productivity and quality, calling for integrated, and well proven approaches, such as Resource Efficiency and Cleaner Production
- Rapid emergence of innovative technologies, including waterless dyeing and 3D printing, has potential to transform industry and uproot global textile value chains in a manner not witnessed before
- The transition to waterless future starts with using less water today



UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

UNIDO Regional Office in India



SUSTAINABLE DEVELOPMENT GOAL 9
INDUSTRY, INNOVATION AND INFRASTRUCTURE

Thank you

www.unido.org

www.recpnet.org

r.vanberkel@unido.org

