TextileExchange

Creating Material Change

Recycled Synthetic Fibers

AGENDA

- Textile Exchange
- Global Fiber Production
- Some Definitions
- Inputs
- Recycling Processes
- Comparison and Environmental Impacts
- Certification

The answer to who we are begins with who we've been

A place and space where organic farmers had a voice, suppliers could share best practices, and competing brands could collaborate

The market asked for more

An organization positioned at the juncture of material solutions, resources, and environmental impacts to help make sense of the confusing world of sustainable textiles

TextileExchange

Creating Material Change

As a global, non-profit, membership organization, we help accelerate sustainable practices in the textile value chain.

Target
PUMA
HUNTSMAN — Enriching lives through innovation
Walmart
Gap Inc.
Nike
ADOLFO DOMINGUEZ
NORDSTROM
L.L.Bean
POTTERY BARN
LENZING — LEADING FIBER INNOVATION
Sears
asos — discover fashion online
YOUR M&S
Clariant
WILLIAMS-SONOMA
G-STAR RAW
THE NORTH FACE
adidas GROUP
patagonia
WOOLWORTHS
EILEEN FISHER
H&M
C&A
HORNY TOAD
LEVI STRAUSS & CO.
hoss INTROPIA
Clothing at TESCO F&F
Disney
REI

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We also work closely with organic cotton producer groups to help build supply and improve value chain relations.

Why textiles?




Impacts

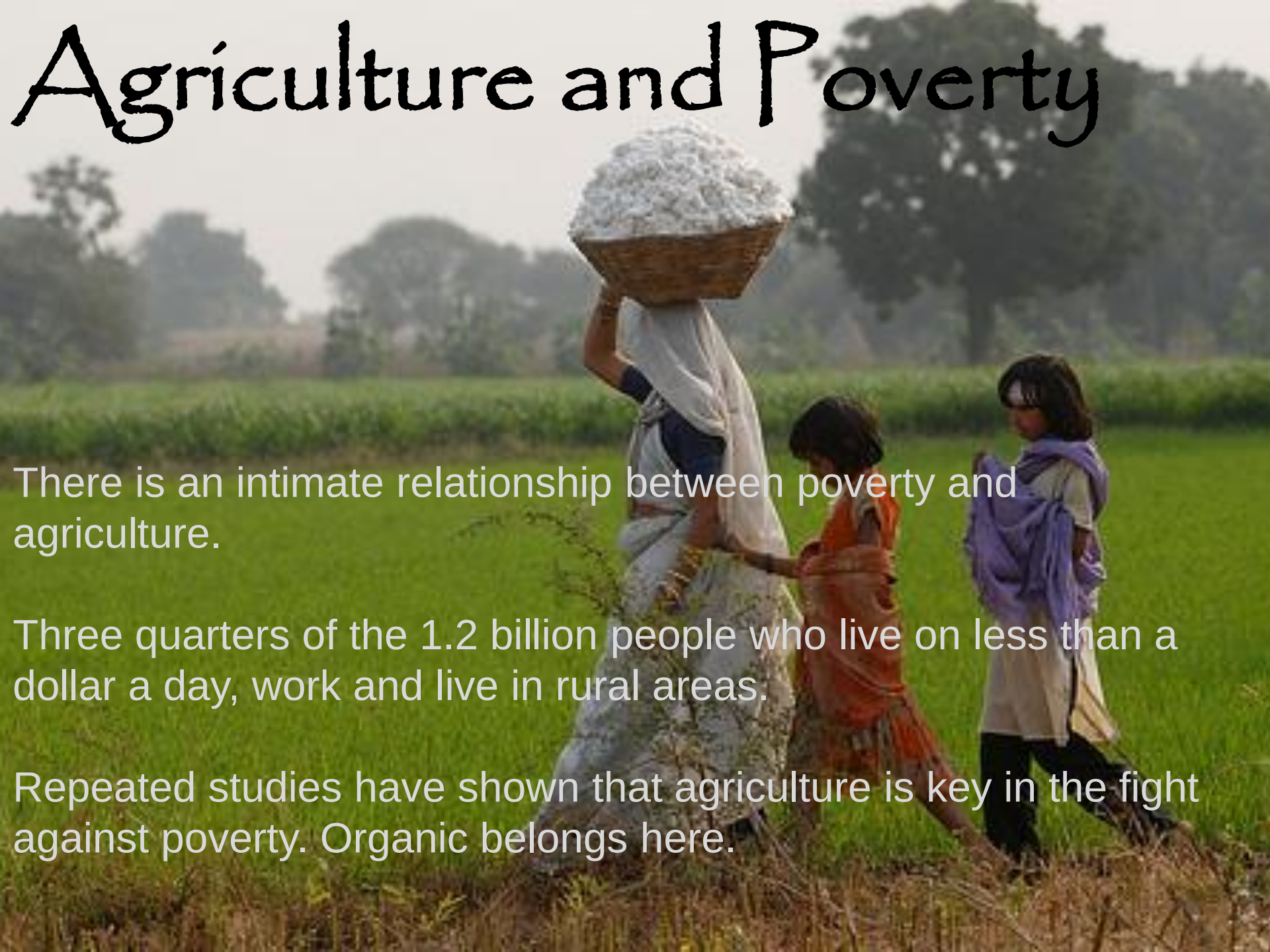
People.

Lots and lots of people.

9 billion by 2050.

Waste. Water. Energy. Toxics. Climate. Biodiversity.

Agriculture and Poverty



There is an intimate relationship between poverty and agriculture.

Three quarters of the 1.2 billion people who live on less than a dollar a day, work and live in rural areas.

Repeated studies have shown that agriculture is key in the fight against poverty. Organic belongs here.


Textile waste occupies nearly
5%
of all landfill space.

It takes

2700

litres of fresh water to make **1** cotton t-shirt.

In 2009, the world used **3 trillion** gallons of fresh water to produce 60 billion kilograms of fabric.

The average US citizen throws away

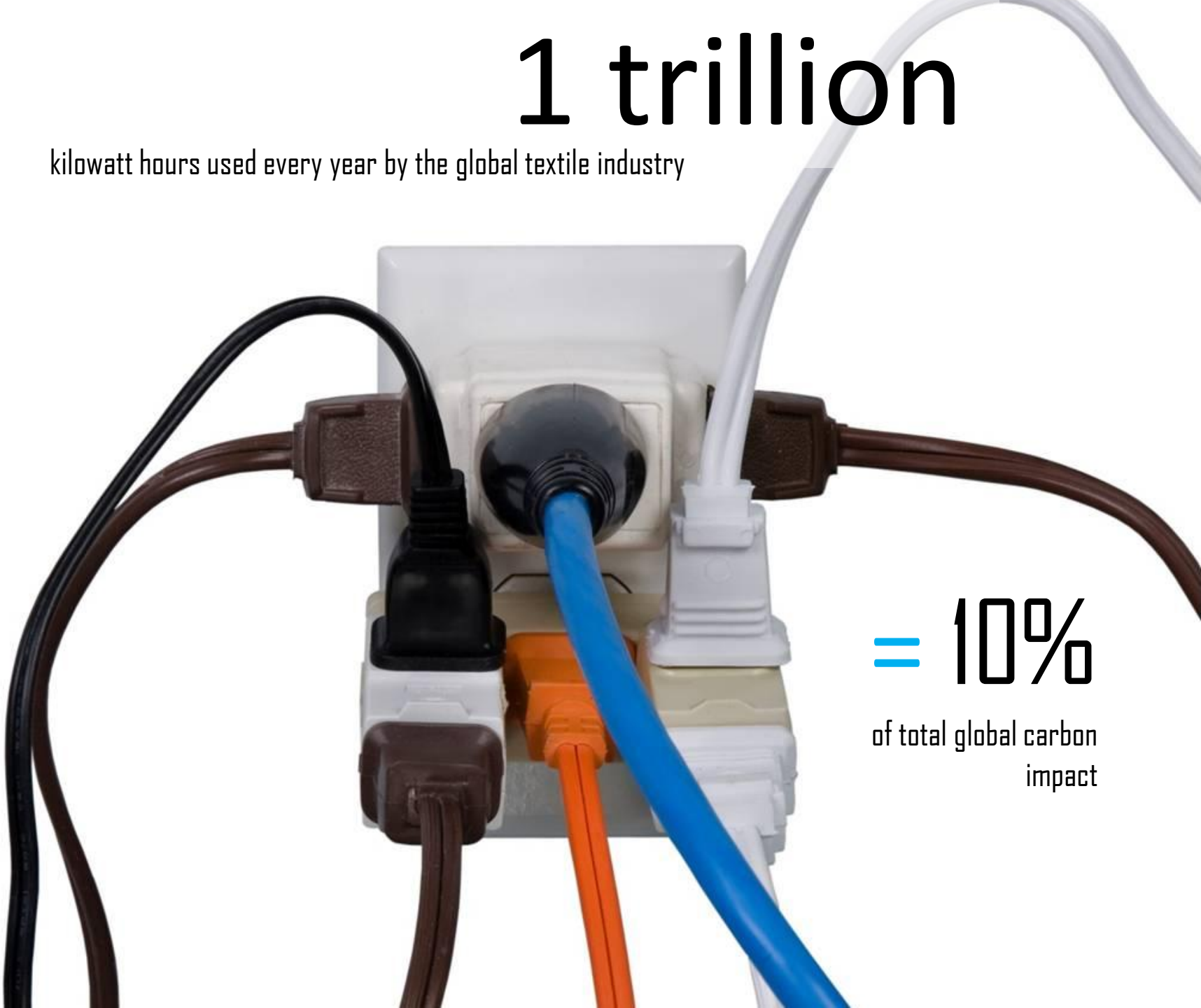
30

kilograms

of clothing every year.

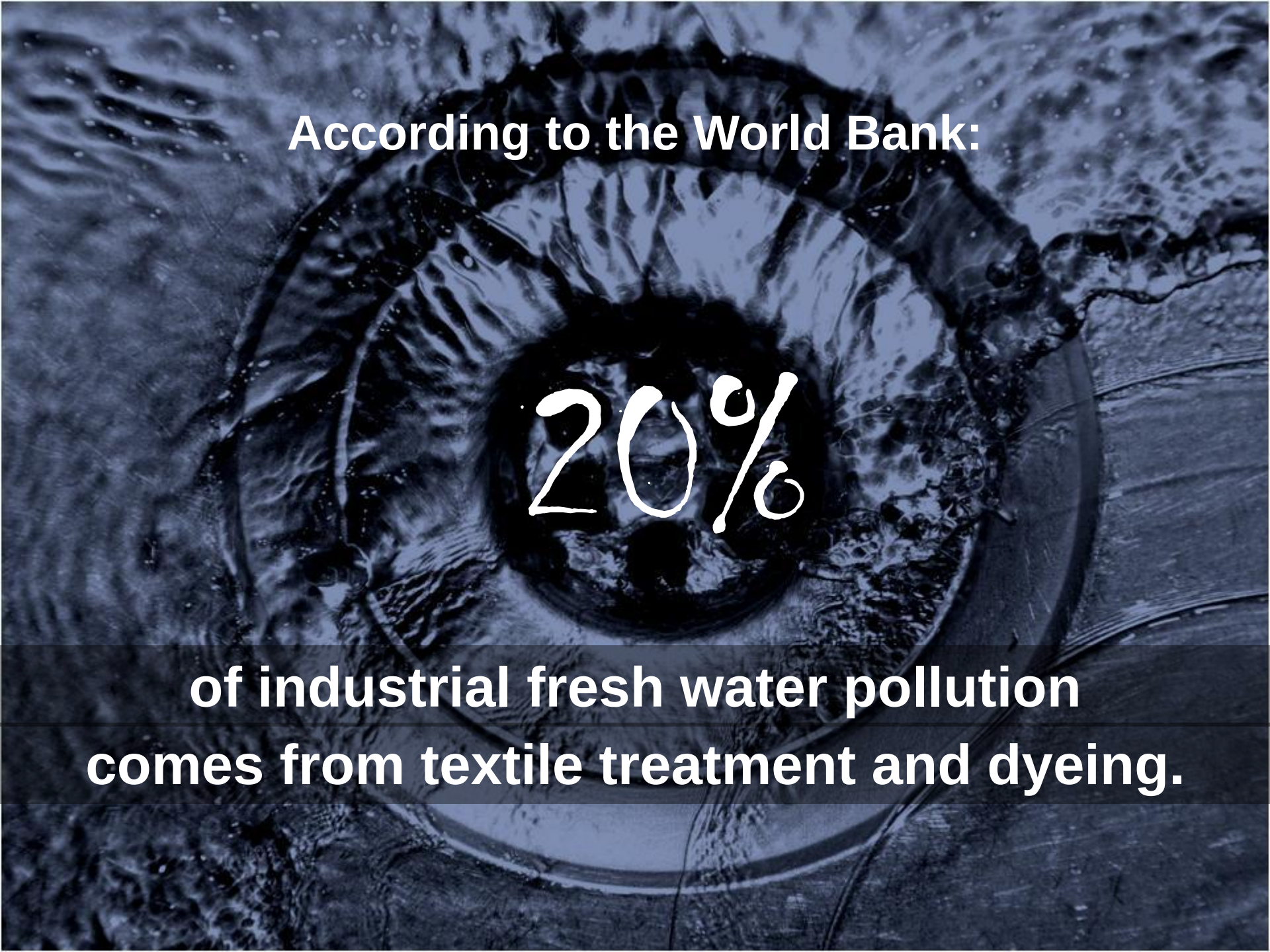
1 trillion

kilowatt hours used every year by the global textile industry



= 10%

of total global carbon impact


According to the World Bank:
20%
of industrial fresh water pollution
comes from textile treatment and dyeing.

Our Vision






We envision a global textile industry that restores the environment and enhances lives.

Our Mission






We inspire and equip people to accelerate sustainable practices in the textile value chain.

TEXTILE EXCHANGE






- We take a global approach to developing markets
- We focus on the whole value chain from raw materials, to retail through manufacturing
- We help building synergies between all actors in the value chain
- We create standards that help ensure integrity of sustainable textiles
- We provide tools, training and technical assistance as well as a platform for sharing knowledge and experience with like minded individuals and companies

START HERE. GO ANYWHERE.

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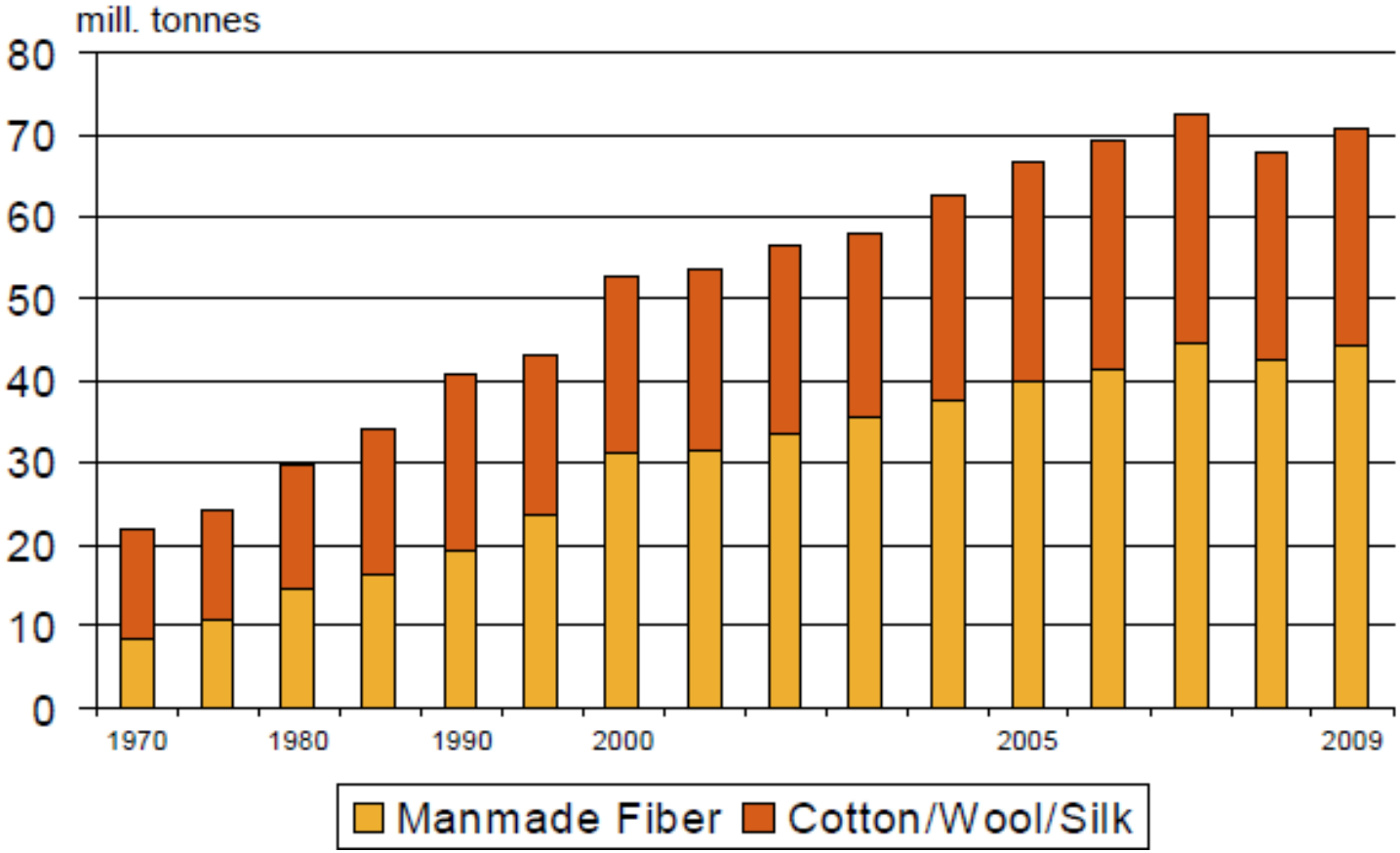
GLOBAL FIBER PRODUCTION 1970 - 2009



- Polyamide accounts for about 10% of all man-made fibers
- Polyester accounts for more than 70% of all man-made fibers

Source: The Oerlikon Textile "The Fiber Year 2009/10 Report"

SYNTHETIC FIBERS

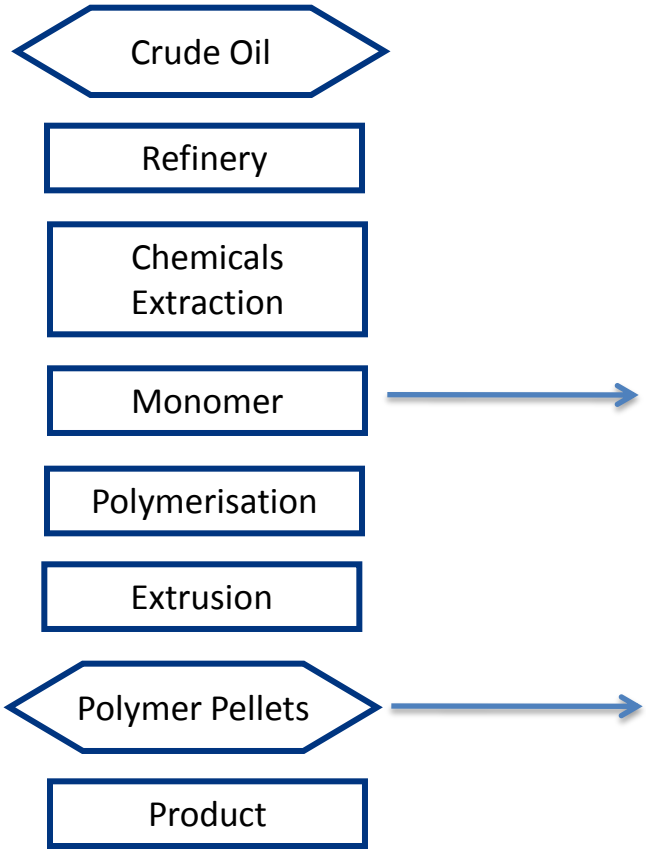
- Synthetic fibers are made from **petroleum based chemicals.** The raw material is crude oil; the same resource as gasoline

- The production of synthetic fibers is fully relying on a **non renewable** and hence limited resource which we need in many ways in our everyday life

- Going through different processes, including refining oil, breaking it into chemicals followed by a polymerization process, polymers are produced, extruded and then spun into fibers

- These processes are **energy intensive**

VIRGIN PROCESS



Monomer 

An atom or a small molecule that may bind chemically to other monomers

Polymer 

Consists of an “unlimited” number of monomers. These monomers are typically connected by chemical bonds

Oligomer 

Consists of a few monomer units

Recycled content:
Definition by FTC (Federal Trade Commission)

- A recycled content claim may be made only for **materials that have been recovered or otherwise diverted from the solid waste stream**, either during the manufacturing process (pre-consumer), or after consumer use (post-consumer)

- Any express or implied claim about the specific pre-consumer or post-consumer content of a product or package must be **substantiated**

- For products that are only partially made of recycled material the **percentage of recycled content in the product must be stated clearly** to avoid consumer deception about the amount of recycled content in the finished product.

RECYCLED CONTENT

Example 1

A manufacturer routinely collects spilled raw material and scraps left over from the original manufacturing process.

After a minimal amount of reprocessing, the manufacturer combines the spills and scraps with virgin material for use in further production of the same product.

A claim that the product contains recycled material is **misleading** since **the spills and scraps are normally reused by industry** within the original manufacturing process, and would not normally have entered the waste stream.

RECYCLED CONTENT

Example 2

A manufacturer purchases material from a firm that collects discarded material.

All of the material was diverted from the solid waste stream and is **not normally reused by industry within the original manufacturing process**. The manufacturer includes the weight of this material in its calculations of the recycled content of its products.

A claim of recycled content based on this calculation **is not misleading** as it **would have entered the waste stream if not reused**.

Input in various Forms

Post Industrial/Pre consumer waste:

- yarn and fabric manufacture
- garment-making processes
- retail industry

Post Consumer waste:

- house hold sources
- for polyester: bottles, garments

1
PET

- for polyamide: garments, fishing nets

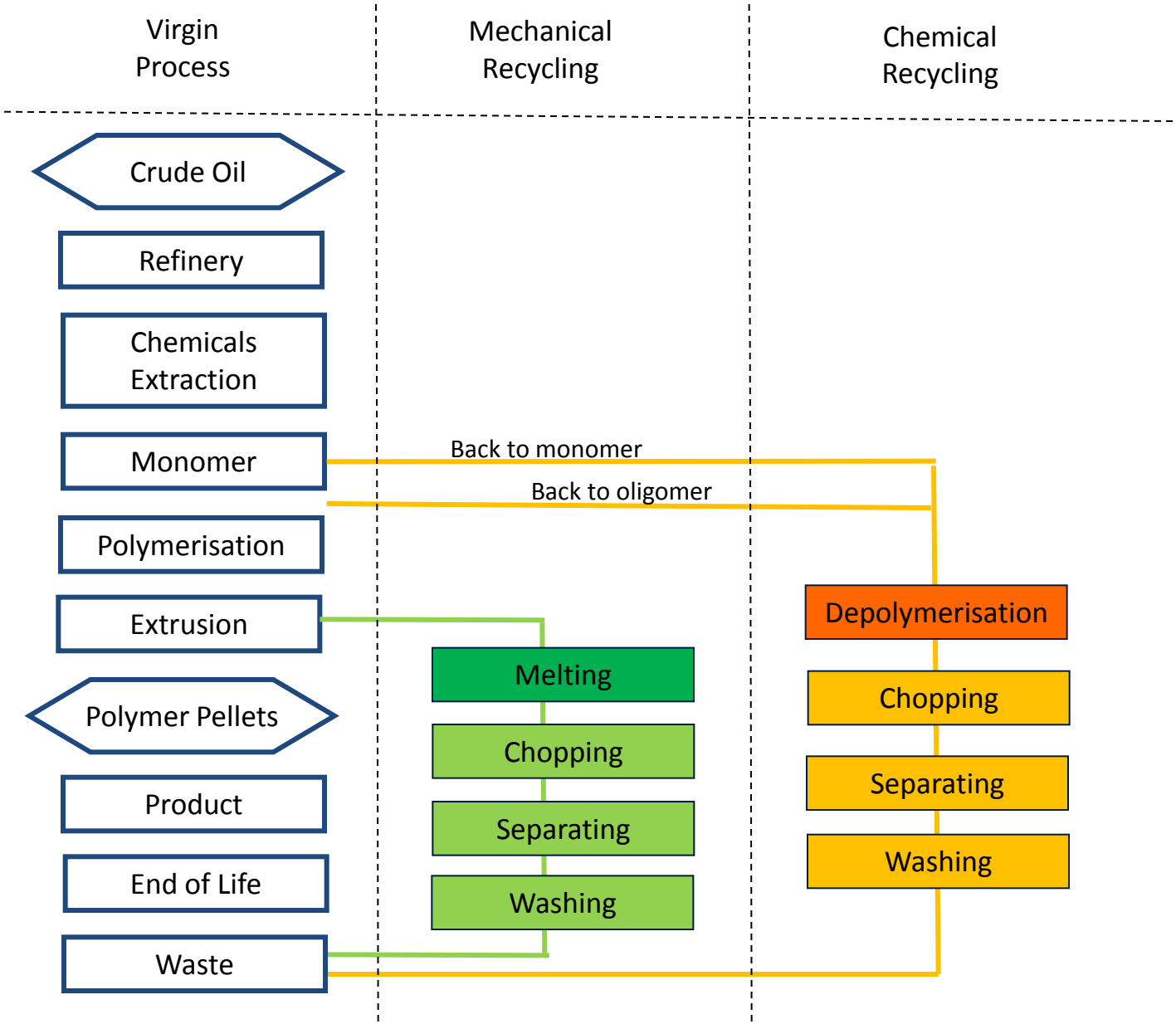
Often combined in differing amounts and possibly including some virgin polymer

Cap
Polyethylene
PE

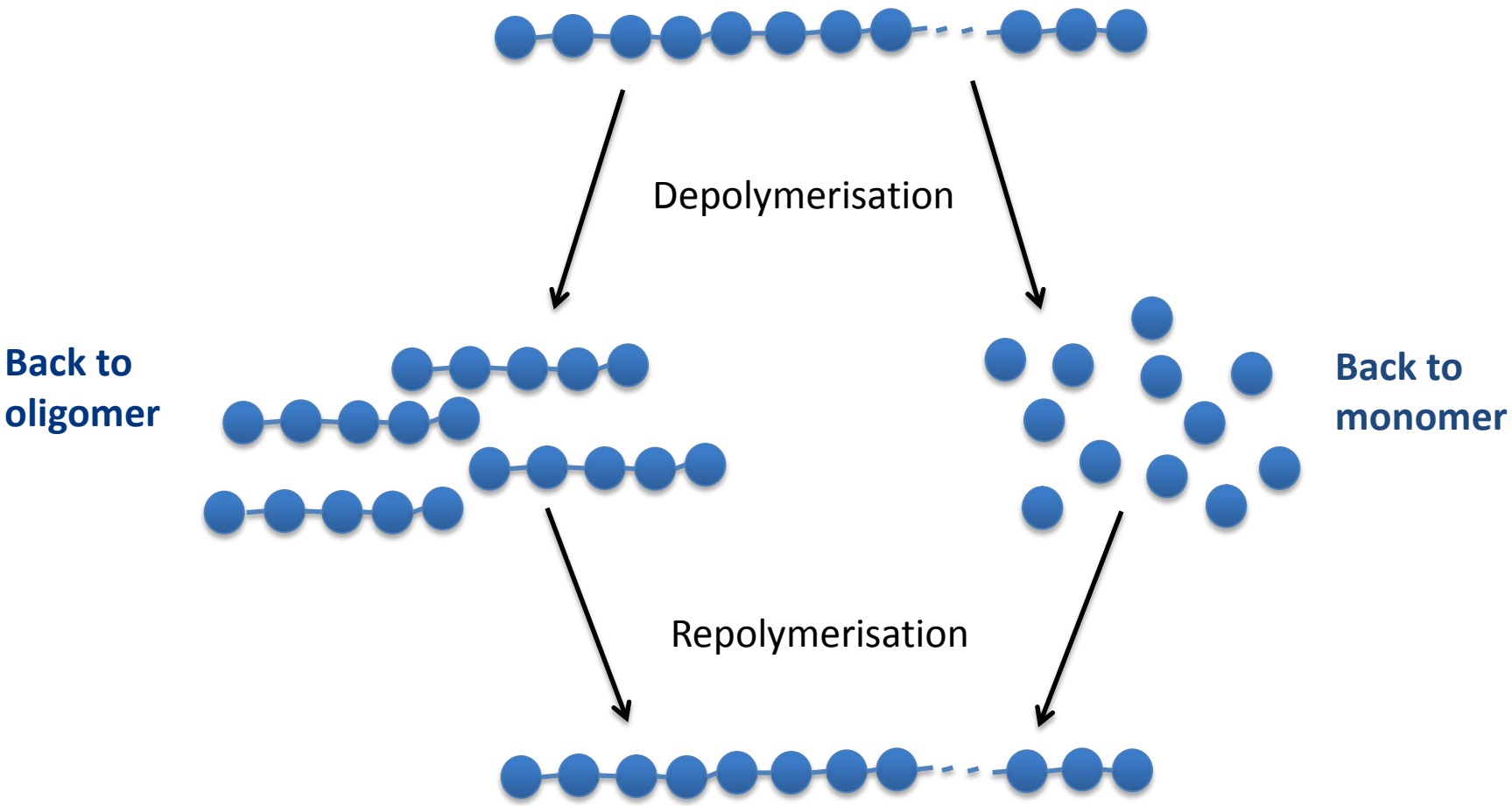
Label
Polyvinylchloride
PVC

Bottle
Polyester
PES

Mechanical and Chemical Recycling



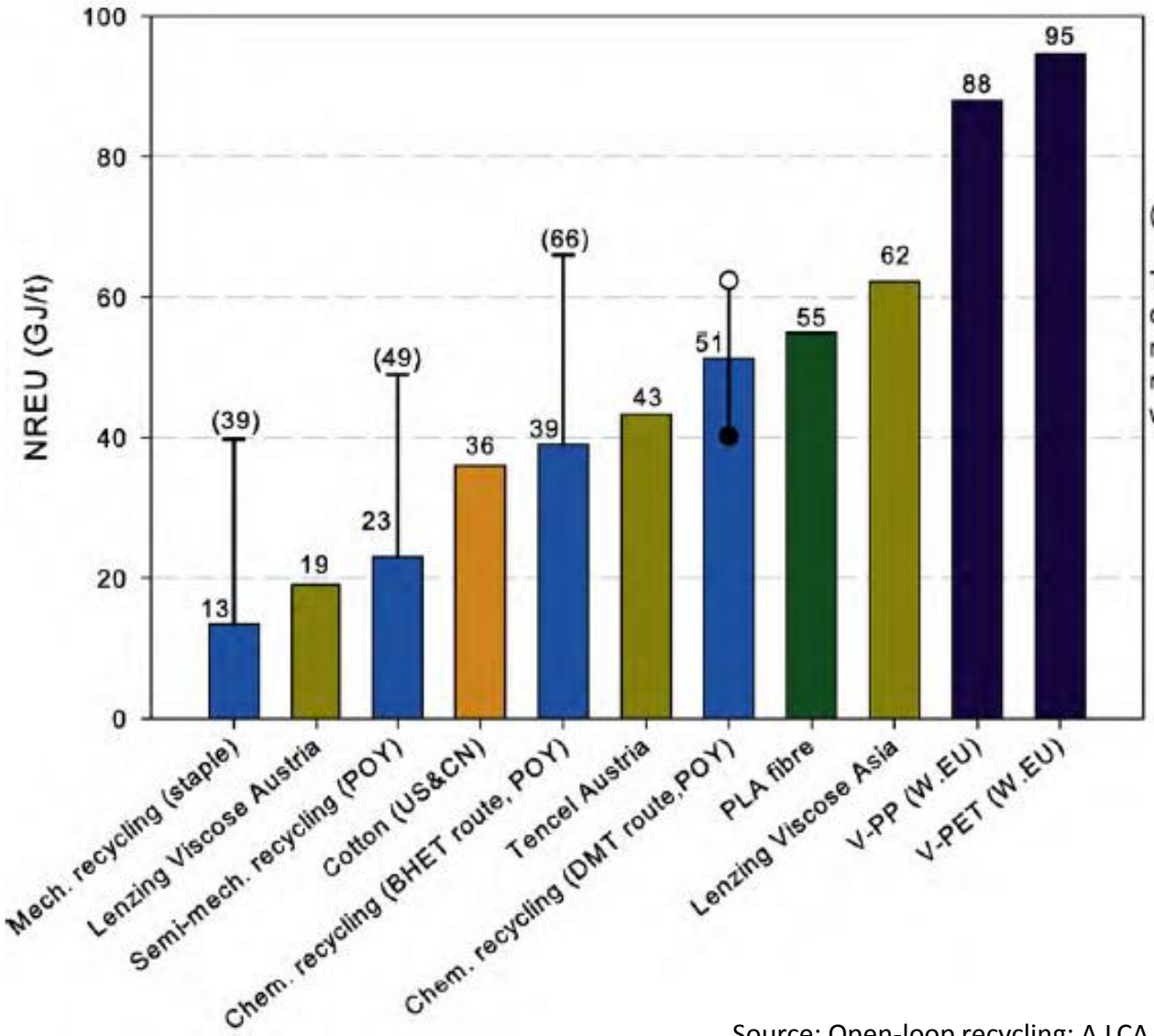
Depolymerisation and Repolymerisation



COMPARISON

	Mechanical	**Chemical** (to Oligomer)	**Chemical** (to Monomer)
Process	Thermal decomposition through melting process	Decomposition into intermediary by chemical reaction	Decomposition into molecules by chemical reaction
Waste stream	Limited: Transparent bottles and greige textiles	Limited: Transparent bottles and greige textiles	Wider: Coloured goods
Input	Labour Water Energy	Labour Water, Energy Chemicals	Labour Water, Energy Chemicals
Environmental Impact	*	**	***
Impurities	Yes	Yes but limited	No
Fiber Quality	No microfiber Possible colour limitations and uneveness	Possible colour limitations	Same as virgin polymer
Close Loop	Materials' life extension	Materials' life extension	Close loop opportunity

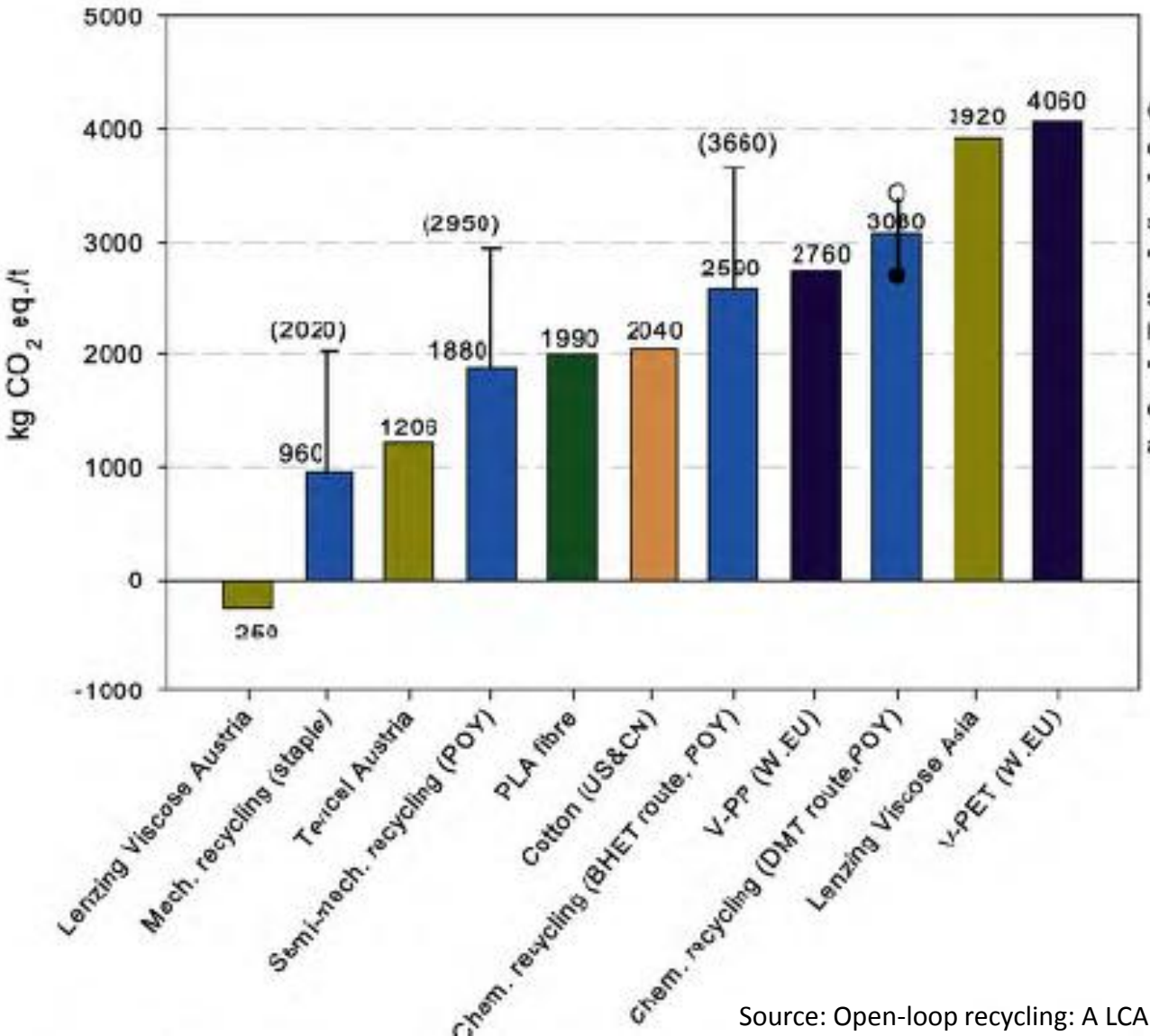
Environmental Impact of Recycled Polyester Energy



(a) Cradle-to-factory gate NREUof 1 t fibre based on the "cut-off" approach. The error bar shows the results corrected by the "waste valuation" method. For "Chem. recycling (DMT route, POY)", only the "cut-off" approach was applied.

Source: Open-loop recycling: A LCA case study of PET bottle-to-fibre recycling

Environmental Impact of Recycled Polyester Green House Gas Emissions



(a) Cradle-to-factory gate GWP of 1 tonne staple fibre based on the "cut-off" approach. The error bar shows the results corrected by the "waste valuation" method. The carbon sequestration of bio-based fibres has been taken into account. For "Chem. recycling (DMT route, POY)" only the "cut-off" approach was applied.

Source: Open-loop recycling: A LCA case study of PET bottle-to-fibre recycling

CERTIFICATION

Voluntary standards

Global Recycle Standard
Textile Exchange 2008

Recycled Content Standard
Scientific Certification Systems 2009

Key elements

- % recycled content (pre / post consumer)
- Traceability

CONCLUSION

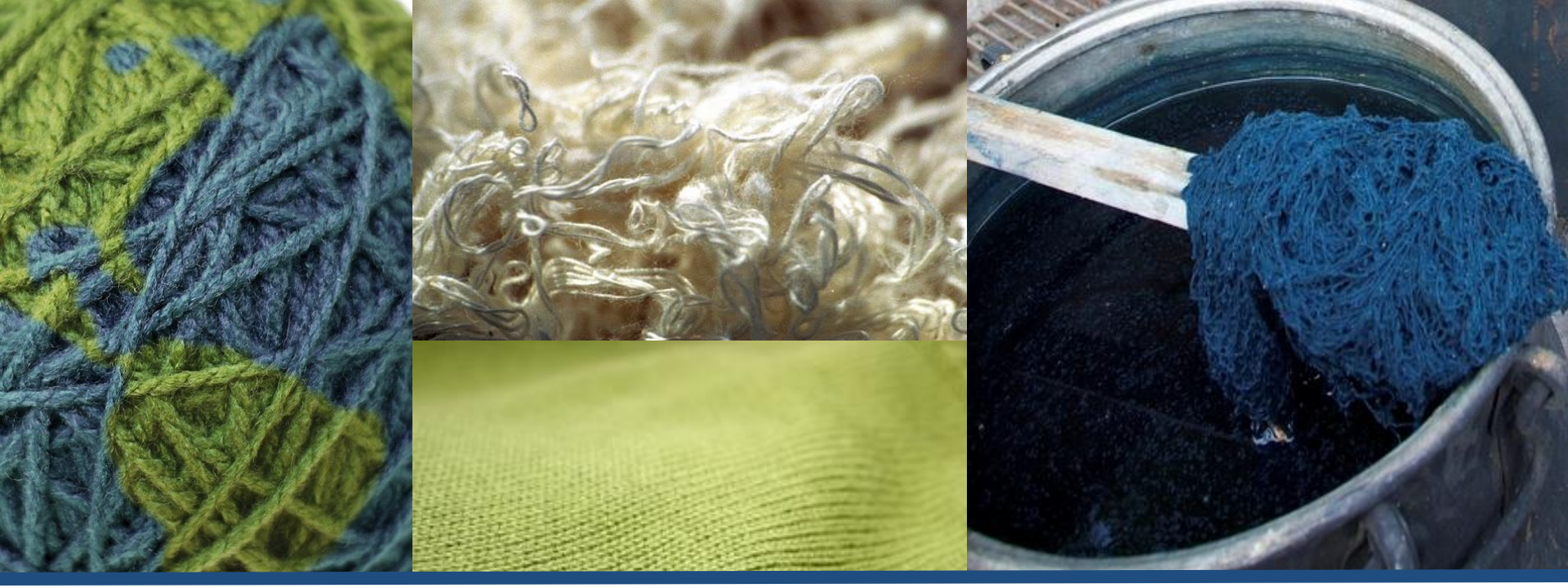
- Recycling conserves non renewable resources by replacing the need for primary extraction

- It is beneficial both from an energy use and green house gas emissions perspective

- Recycling should always come after reducing and reusing following waste hierarchy principles

- It is important to ensure integrity of the claims

- Next steps should include
- Maximizing materials recovery
- Developing innovative garment to garment solutions



THANK YOU!

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