Plastics Circularity Multiplier

REACT
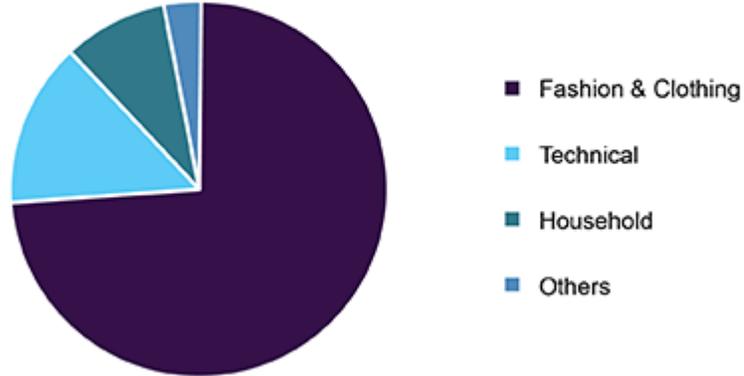
RECYCLED ACRYLIC FABRICS, THE PROBLEM OF IMPURITIES

Piga Daniele

15/10/2020, Plastics Circularity Multipliers Conference

TEXTILE SECTOR

Global textile market share, by application, 2019 (%)

- Fashion & Clothing
- Technical
- Household
- Others

Source: www.grandviewresearch.com

Market value USD 961,5 billion in 2019

+ 4,3% to 2027
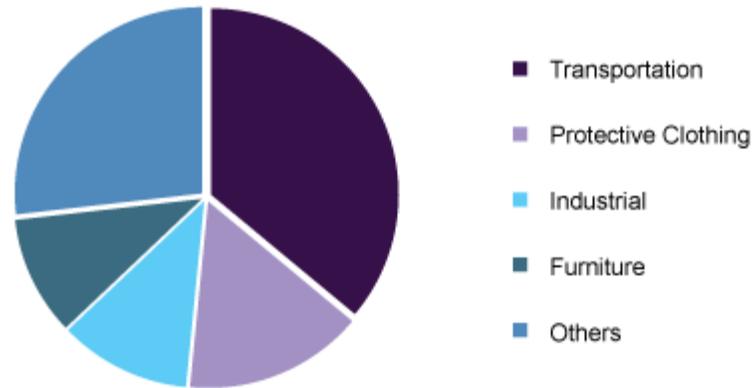
Only 1% of market is recycled

Textile Market Size, Share & Trends Analysis Report By Raw Material (Wool, Chemical, Silk, Cotton), By Product (Natural Fibers, Polyester, Nylon), By Application, By Region, And Segment Forecasts, 2020 – 2027, Grand View Research

Recycled Textile Market to Reach $8.0 Billion by 2026 at 5.2% CAGR, Allied Market Research

TECHNICAL FABRICS

North America coated fabrics market size, by product, 2012 - 2020 (USD Million)

- Transportation
- Protective Clothing
- Industrial
- Furniture
- Others

REACT focused on:

- Awnings

- Furniture

Coated Fabric Market Size, Share & Trends Analysis Report By Product, By Application (Transportation, Protective Clothing, Industrial, Furniture), By Region, And Segment Forecasts, 2012 - 2020, Grand View Research

THE CHALLENGE

Acrylic fibre is used for clothing, outdoor furniture, boat covers and awnings, with almost 2 million tonnes produced every year.

In the 'awning and outdoor furnishing' textile market, acrylic is still the main material used (more than 90% of production) **thanks to its unmatchable performance** (combination of weatherability, UV resistance and mechanical strength).
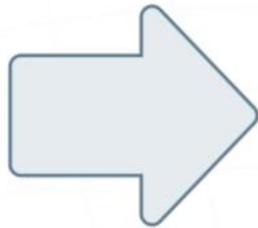
- 11'000 tonnes/year of outdoor acrylic textiles
- 2.5 million awnings installed in Europe

IT IS ESTIMATED THAT EVERY YEAR, IN EUROPE, ABOUT 7'700 TONNES OF ACRYLIC TEXTILE WASTE ARE DISPOSED OF BY LANDFILL OR INCINERATION

REACT GOAL

Our goal is to identify processes to treat and recycle acrylic textile waste in an ecological and economical way. We aim to enable European fabric producers to improve sustainability and reduce environmental and health risks, by disposing of less waste, recovering hazardous chemicals and using smaller amounts of traditional chemicals.

– **Recycling of acrylic textile waste**

– To develop a method to **remove undesirable substances** from waste of acrylic fabrics
  • with an environment friendly process (if possible)
  • to enhance their recycling
  • to improve sustainability
  • to reduce environmental and health risks

– Main application sectors are **awnings and outdoor furniture**
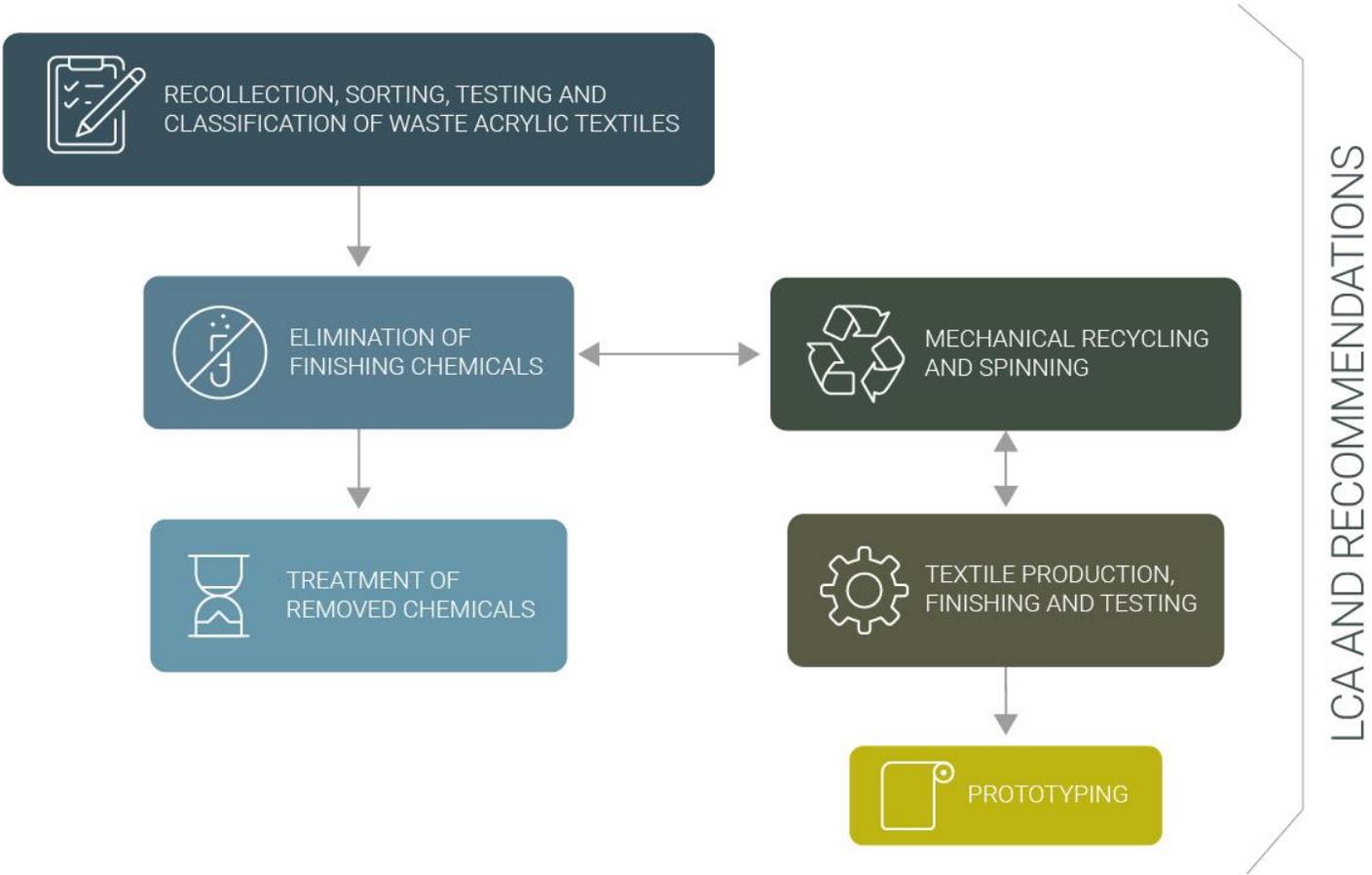
– **to reach a removal rate** of **90-95%** of chemicals/substances that prevent their recycling

– to treat up to **99% of all** sewage **impurities** obtained from removal steps

– to obtain a final textile product with yarn coming from **100% recycled fibre**, mixing regenerated fibres from card, winding opened thread and waste material collected fibre, each up to 33%

– to re-use the acrylic textiles as raw material for other production cycles, to reach 30 % **of waste prevented** from disposal **(3.600 tonnes total)** for the outdoor sector (awnings and furnishing)
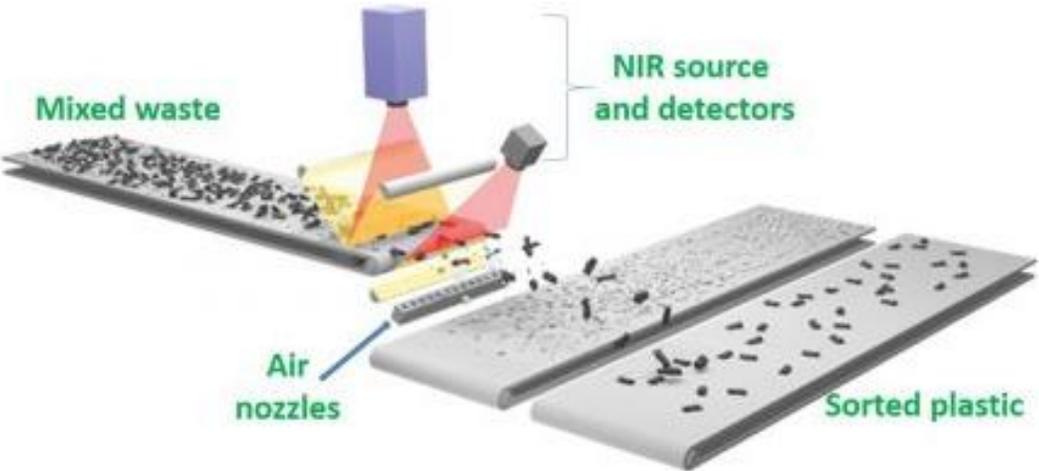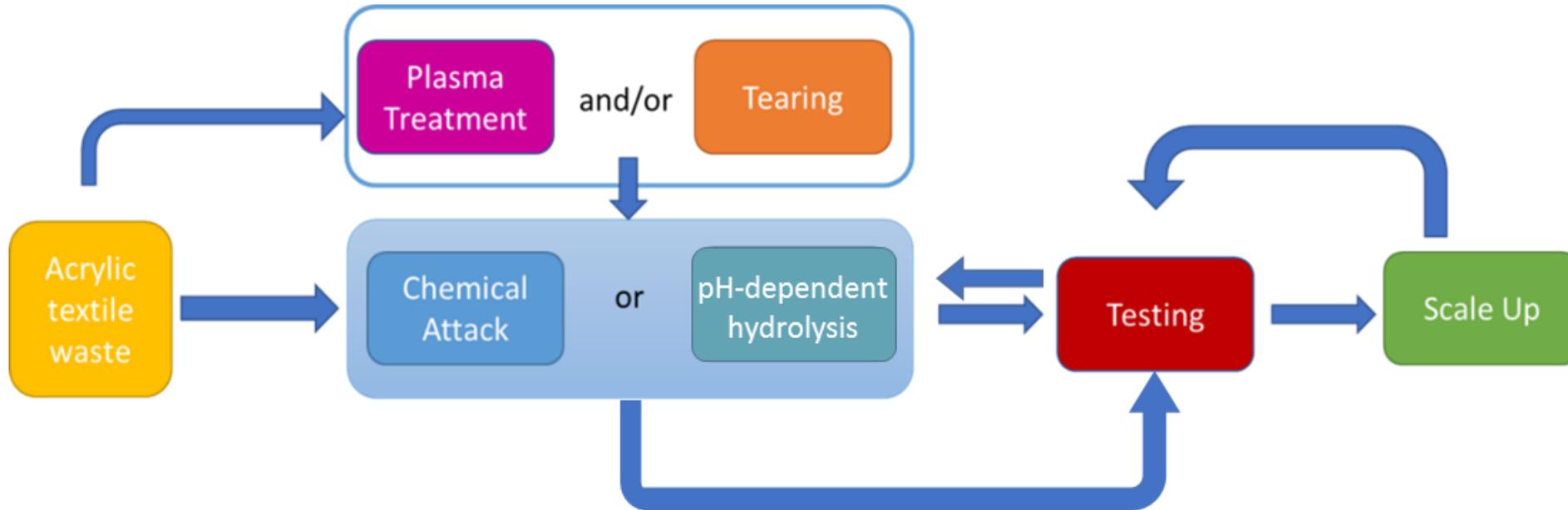
● Different finishing applied

Fabric and / or Product without Finishing

Finish type A fabrics for awnings and umbrellas

Finish type B fabric for waterproof awnings (coated)

Finish type C fabrics for outdoor furniture

REACT METHODOLOGY

RECOLLECTION, SORTING, TESTING AND CLASSIFICATION OF WASTE ACRYLIC TEXTILES

ELIMINATION OF FINISHING CHEMICALS

TREATMENT OF REMOVED CHEMICALS

MECHANICAL RECYCLING AND SPINNING

TEXTILE PRODUCTION, FINISHING AND TESTING

PROTOTYPING

LCA AND RECOMMENDATIONS

FIBRE	YARN	MULTI-COL. FABRIC	WHITE FABRIC
Waste 1 + 3	Waste 4 + 5 + 6	Waste 7A+8A+ 8A1	Waste 8AW + 8A1W
Waste 1W + 3W	Waste 4W + 5W	Waste 7B + 8B + 8B1	Waste 8BW + 8B1W
		Waste 7C + 8C + 8C1	Waste 8CW + 8C1W
Powder Waste 2?		Waste 9A	Waste 9AW
		Waste 9B	Waste 9BW
		Waste 9C	Waste 9CW

Spinning

Spinning

Finishing, Q.C., Customer's Processing

«End of Life» from end users

Finishing

+

Unknown substances

Mixed waste

NIR source and detectors

Air nozzles

Sorted plastic

- **Increased purity and quality of secondary raw materials**
  - Our project aims to a **90% removal of chemicals of the finishing** process
  - The mixing with the virgin regenerated fibre (up to 33%), the final purity of the recycled fibre will reach 90-95%
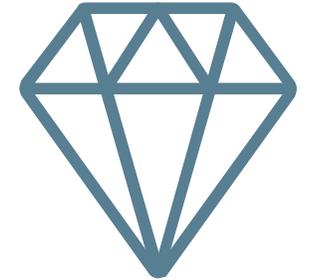
- **Reduced risk of retaining hazardous substances in recycled materials**
  - A reduction of hazardous substances in recycled materials
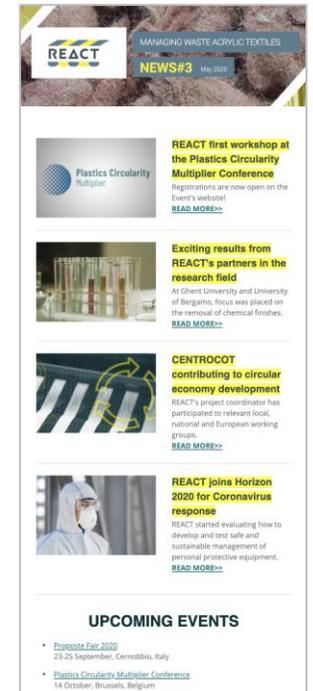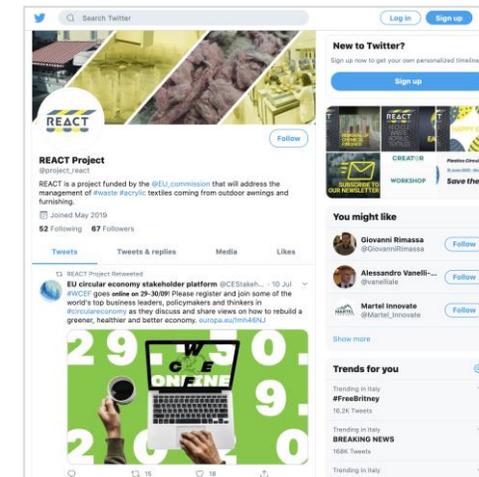 - Reduction of hazardous substances in landfill
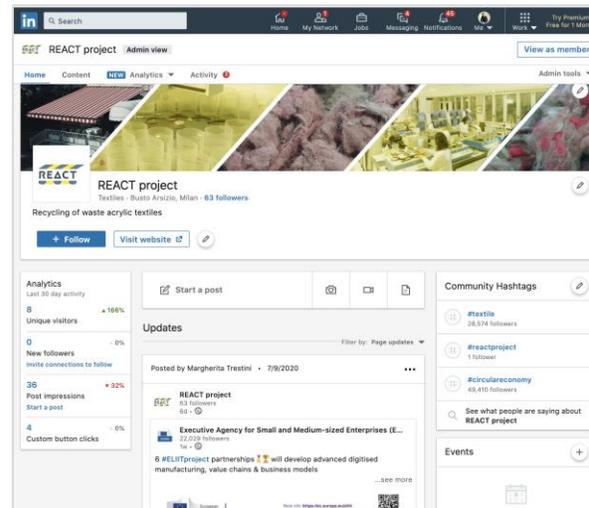
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