

Vom Textil zum Granulat – Technische Konzepte und Realitäten für textile Extrusion

***Oder
PET Fibre2Fibre
Recycling
GOES TEXTILES***

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Business Development Manager, EREMA Group

Application Fibers & Textiles

BVSE Tagung June 2026



- Global Volumes Plastics & Fibres
- Textiles Industry: Issues and Potential
- Erema Strategy to Fibres and Textiles Recycling
- “**FibReC**” Fibre Recycling Center @ Erema for Customers
- Closing The Loop: Customer Projects, Examples
- Cooperation in Post Consumer Textiles Recycling with BlockTexx®
- Key Success Factors for Textiles Recycling

Erema “Bonus Material”:

- Erema Group
- Supporting and Ancillary Recycling Technologies, usable for Textiles Recycling:
 - Agglorema + Chemarema Technologies for Chemical Recycling
 - Erema + Lindner Washtec: Synergies, Projects, Examples

Global volumes polymers, plastics & fibres

> **400** MT global annual **PLASTICS** Production (excl. Polymer Fibres)

70 MT global annual **POLYMER** Based **FIBRE** Production



85 MT PET (Fibres + Plastics) = 20% of Plastics in total

2/3 of PET Volume in Textiles, 1/3 in Plastics (Bottles, Trays)

> 50 % Textiles Fibres = PET > 50 MT PET „hidden in textiles“

Global volumes: polymers, plastics & fibres in more detail



400 MT	plastics global anual production (excl. polymer fibers)
107 MT	Global fibre production
70 MT	polymer based FIBERS
470 MT	plastics incl. polymer fibers

85 MT to PET = **20%** of Plastics (incl. Fibers)

= **3rd biggest** volume in plastics (after Polyolefines)

~ 60 MT PET fibers = 2/3 in Textiles + 1/3 in Bottles, Trays

PET = > 50% of textiles fiber

PET fibres = constant growth over decades (CAGR ~ 5%)



Textiles Industry is 3rd largest plastics „consumer“

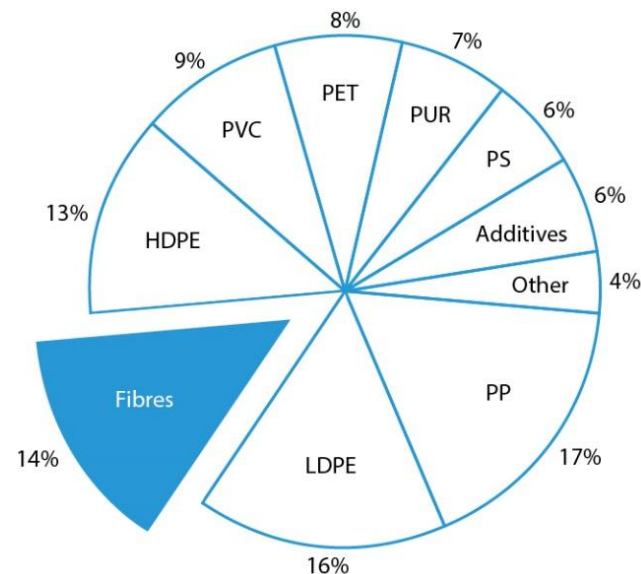
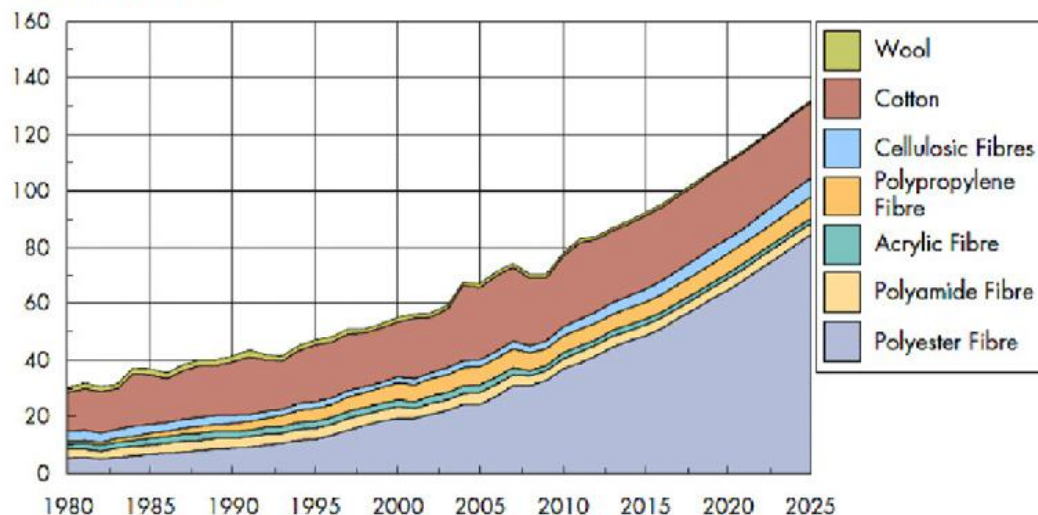
(after Packaging, Construction)

World fibers and plastics and volumes: Role of PET

WORLD FIBER PRODUCTION 1980 – 2025

Source CIRFS / [Tecnion Orbichem](#), 2015

Million Metric Tons



Source: Beckman E. 2018, The world of plastics

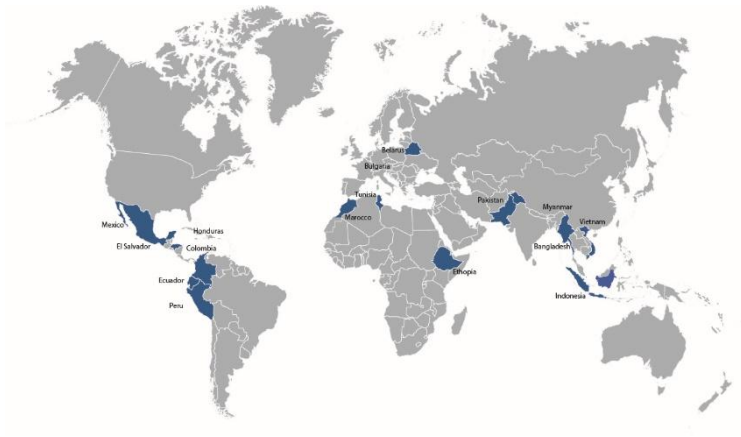


Textiles Industry: Issues and Potential

Textiles industry: **Issues**

Textiles industry moved to low-cost countries for production

- well known „hot spots“: costs, regulations, H&S standards...
- consequences as long global supply chain distances



Textiles Industry known as „major pollutant“



10% of global **carbon dioxide emissions**



20% of global **water pollution**

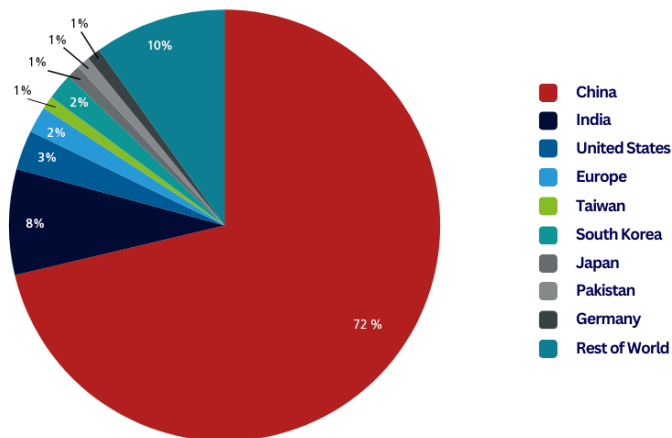


35% of **primary microplastics**

by „producing“ 2% of GDP

by binding 12% of Global Workforce

China has a 72% Share of Global Polyester Capacity (2022)





92 MILLION

Tons of textiles go to landfill annually.

The textile industry accounts
for 10% of all GHGs.¹

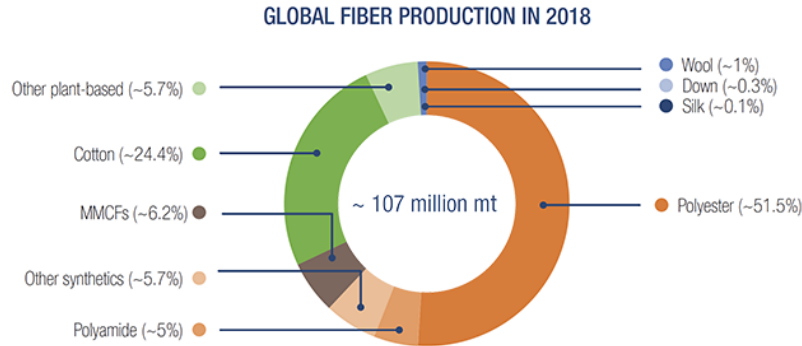
¹ businesswaste.co.uk/your-waste/textile-recycling/fashion-waste-facts-and-statistics

Textiles Industry: Potential

PET predominant in fibres production

Textiles industry **3rd biggest „consumer“** of plastics (after packaging, construction)

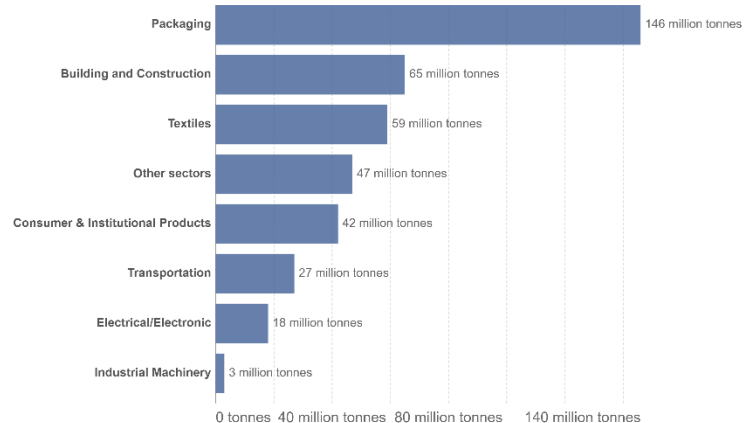
> 50 mio to PET „hidden“ in Textiles (annual consumption)



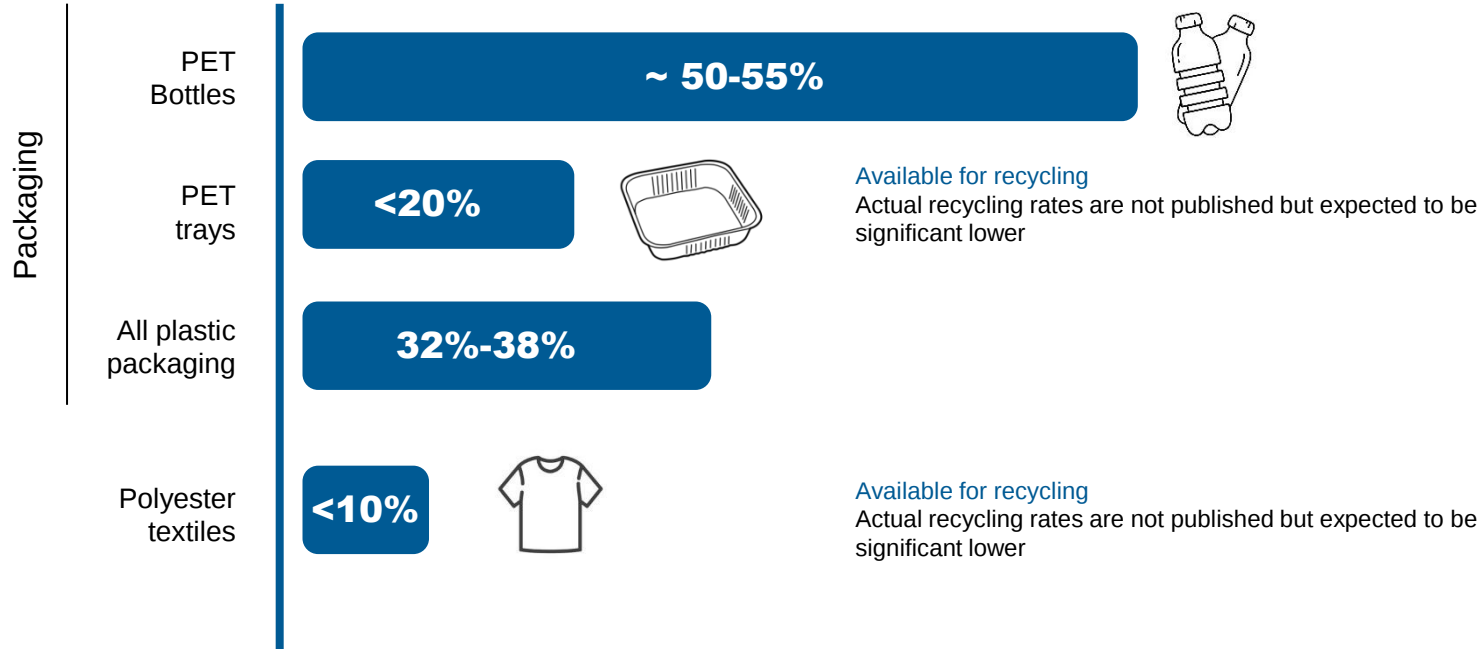
Primary plastic production by industrial sector, 2015

Primary global plastic production by industrial sector allocation, measured in tonnes per year.

Our World
In Data



European average recycling rates: LOW for textiles



Textiles Recycling: Political Will, Directions EU

BASEMENT: EU DIRECTIVE: STRATEGY for SUSTAINABLE + CIRCULAR TEXTILES 30.03.22

- **Textiles Collection System mandatory** in each EU state by 01/25
- Annually **11kg per capita p a. waste**,... 1% recycled „adequately“
- **Mandatory Eco Design → ESPR** (Ecodesign for Sustainable Products Regulation)
- **Stop of Destruction of unused Textiles** (Pre Consumer)
- **Tackling of Microplastics** (out of Textiles)
- Introduction of Tracing / Info systems,.. **Digital Product Passport**
- ..eg Info on Recycling, R-Content

GREEN CLAIMS

Extended Producer Responsibility France-Refashion, NL (currently ~ 60 % labels correct....)

Fibre to Fibre >> Bottles to Fibre (= Downcycling, respectively „Dead End“)

Fast Fashion to be abandoned (Fast Fashion = out of Fashion)

Support Funding, Invest into R&D,... Technology „green + digital“.....



Advanced Thermomechanical Recycling EREMA Strategy

PET F2F 100%

2dtex

Short to medium term

Fiber Recycling

Medium to long term

Textile Recycling



Erema in 2019: Potential of a business model „Fibres & Textiles Recycling“

Focus on growing PET Fibre Production now @ 60 Mio. to p.a. 5 % Constant Growth Rate

STEP 1

Fibre-to-Fibre

with inhouse industrial waste

~ **5** million tonnes per year

Immediate potential
= fibre production + subsequent
processes (towards garment)

STEP 2

Textiles recycling

with pre- & post-consumer waste

~ **50** million tonnes per year

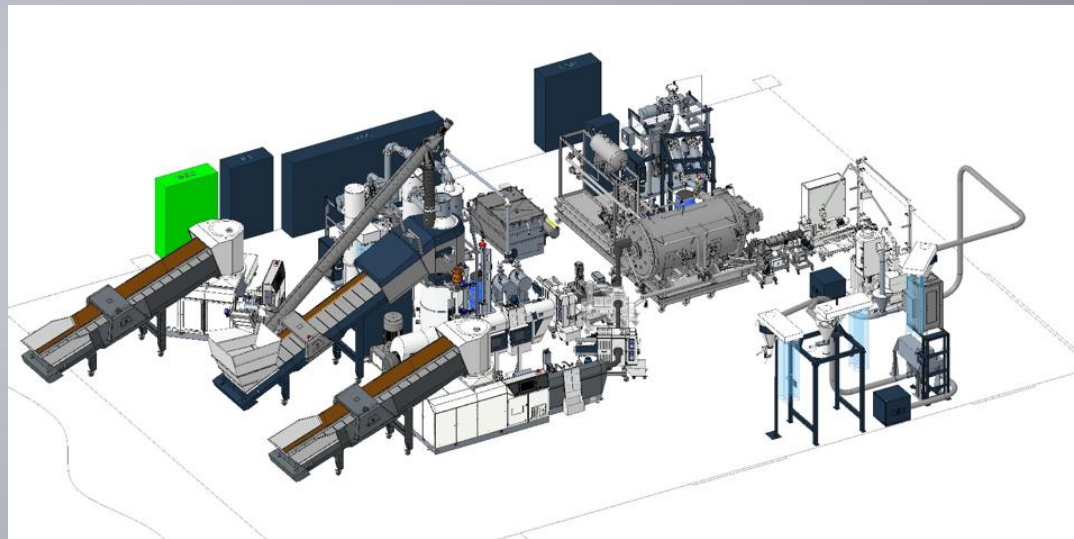
(moving towards 100 million tonnes
per year (A. MacArthur))

Fiber Recycling Center



- **Industrial Scale Demo Line for Customer Trials**
for 100% PET Fiber to Fiber Recycling
350 kg / h Throughput
- **Existing** EREMA Group **Technology**
+ **New Technology** (IV Optimizer)
for IV Setting F2F
- fully equipped for **Fiber (Waste) Processing** incl. Preparation, Processing,...(Shredder,...)
- Immediate **Fiber Processing Evaluation** at all levels with all common Fiber Technologies by Scientific + Industrial Experts Network

Fibre Recycling Centre



Current setup – all options :
INTAREMA, ISEC...+ IV Optimizer

Issues & Erema Solutions for Fibers Recycling

PET FIBERS Recycling

- PET Fibers „contaminated“ with Spinnoil from production step
- PET undergoes substantial degradation when „just extruded“
- F2F Recycling requires **substantial IV LIFT** (Repolymerisation) for „back to Fiber“
 - *Erema IV Optimizer for cleaning off spinnoils
and for Lifting / Adjusting IV for Spinning*
- Particles Contamination: F2F needs (super)fine Filtration for Fiber Process
 - *Proven Erema Backflush Filter or Candle Filter Solutions available to 15um*

Issues & Erema Solutions for Textiles Recycling

POST CONSUMER TEXTILES Recycling

- Close Loop „Lighthouse“ Projects with well known, controlled feedstock materials
- Cleaning and Separation Step in advance to PET fraction process required
 - *Partners on hands for Post Consumer Textiles Feedstock Treatment*
e.g. Lindner WashTech
- Heavy foreign fibers, „Contamination Levels“ due to „wild materials mix“ in textiles
For „non thermplastic“ Materials:
 - *Laserfilter Setup for coarse Filtration / Cleaning off Residues in Textiles*

REALLY GOOD SUCCESS,....PET F2F, 100%





**PET Fibres Recycling, 100%
“DONE” by Erema Technologies
Intarema / ISEC + IV Uptimizer**

INTAREMA® FibrePro:IV

PET fibre-to-fibre recycling.

Spin finish under perfect control.



**First machines
SOLD**



ISEC evo 302E FibrePro:IV



CLOSING THE LOOP FOR TEXTILES

CUSTOMER PROJECTS

Project Re:Claim

Europe's first Recyclingsystem for Textiles Polyester

TARGET: Post-Industrial- and Post-Consumer- Clothes and Textiles for Recycling.

Upholstry Polyester out of Hospitals and Hotels (e.g. Bedding- and Tableclothes), Protective Clothes and School Uniforms as well as Banners (e.g. printed banners for sports events). The Materials are originated out of well defined and controlled systems (Closed-Loop-Systems), to ensure a low contamination level, after several successful trials to show the capabilities there is the system now up and running in UK.



Textiles Trials at EREMA – Example Fa. Getzner & TFE

Bildquelle: Jens Ellensohn, Getzner Textil AG



getzner

Company: **Getzner Textil AG / TFE Textil GmbH, AUT**
Material: PET (& PA Sewings)

Outcome:
Worked in spinning evaluation
100% Loop established

Bildquelle: Marcel Hagen, Getzner Textil AG



TEXTILES
FOR
EUROPE

Feedstock Technical Textiles - PET Woven + PA Sewings



Full Loop Conversion: Textile back to Textile



Project Getzner

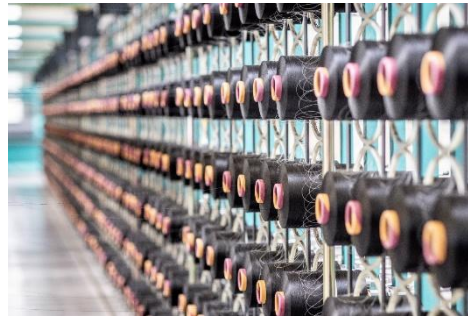
Recycling of woven fabrics: Polyester-waste back to Fabric

TARGET: Technical Textiles (PET + PA Sewing yarns) Recycling back to PET Fabric, virgin quality

Getzner Textil, producing a broad range of Products with focus on Technical Textiles is a pioneer in sustainable economy and circularity, therefore already experienced in this field and was heavily interested to feed a few of their technical textiles products (fabrics as carrier for adhesives) into a circularity loop.

With our FibReC demo line and an European industrial spinning partner it was possible to fully (100%) feed the fabric through the Erema process towards the filament spinning process and finally at Getzner convert to a „new“ Fabric, fully meeting their own expectation and customers requirements (fully meeting mechanical properties and processing of fabric along the virgin specification).

Another and bigger campaigns are on the way !



Presseinformation

13. Juni 2024

Erfolg im Recycling synthetischer Garne

Das österreichische Familienunternehmen Getzner Textil beschäftigt sich intensiv mit den Möglichkeiten der Kreislaufwirtschaft in der Textilindustrie. Aktuell verzeichnet man erste Erfolge im Recycling von Webabfällen: Aus Polyester-Abfällen entsteht ein Garn, aus dem schließlich wieder das Ausgangsprodukt erzeugt werden kann.

Die TFE Textil GmbH, ein Tochterunternehmen von Getzner Textil, produziert Trägergewebe für industrielle Anwendungen aus 100 Prozent Polyester. „Während des Webprozesses fallen Abfälle an den Webkanten an. Diese Abfälle werden nun in einem Pilotprojekt gesammelt und wieder zu einem Garn verarbeitet“, erläutert Barbara Paul, Nachhaltigkeitsbeauftragte bei Getzner Textil. Die Zusammenarbeit mit dem österreichischen Recyclingunternehmen Erema Group ist vielversprechend: „Das recycelte Garn zeigte bei zahlreichen Tests in unseren Labors hervorragende Werte. Unser Ziel ist es nun, aus dem eigentlichen Abfallprodukt das Ausgangsprodukt herzustellen und somit einen Kreislauf zu schaffen – die Maschinen laufen und das Ergebnis ist äußerst zufriedenstellend“, so Entwicklungskoordinator Jonas Bemetz.

Textiles Trials at EREMA - Example Clean Room Clothes



Material: 97% PET
Basically design for Recycling
With some nasty exceptions

Outcome:
Basically spinnable materials
Residues of Fibres in Filters

Textiles Trials at EREMA



Company: xy
Material: PET, PA,
Cellulosic fiber, PUR,
Polyacrylnitril, Metal

Outcome:
Trial refused, “no chance”

Separating cotton and polyester for good WHEN FIBERS PART, RECYCLING STARTS



INTAREMA® FibrePro:IV

PET fibre-to-fibre recycling.
Spin finish under perfect control.



Collaboration BlockTexx

Post Consumer Textiles - Processing of PET Fractions

- **BlockTexx® AU: founded in 2018**
- **Established S.O.F.T.™** (separation of fibre technology) **Process**
that separates polyester / cotton blended, post-consumer fabric
- **Collaboration with Erema since ITMA 2023 contact**
- **Successful commercial scale Trials on PET Fractions**
from the S.O.F.T.™ Process
- **Full loop Evaluation done** including Filament Spinning, Knitting
- Proceeding into **larger scale** garment processing
- Announcement at K25 for further deeper collaboration

CHEMICAL SEPARATION FACILITY FOR BLENDED TEXTILES

Commercial scale



Textile recovery technologies



Chemical recycling process



Capacity: 10,000 tpa



100% post-consumer feedstock



Connects to existing supply chains

Target materials

Our preferred fibres:



Polyester/
cotton blends



Polyester/
man-made cellulosics



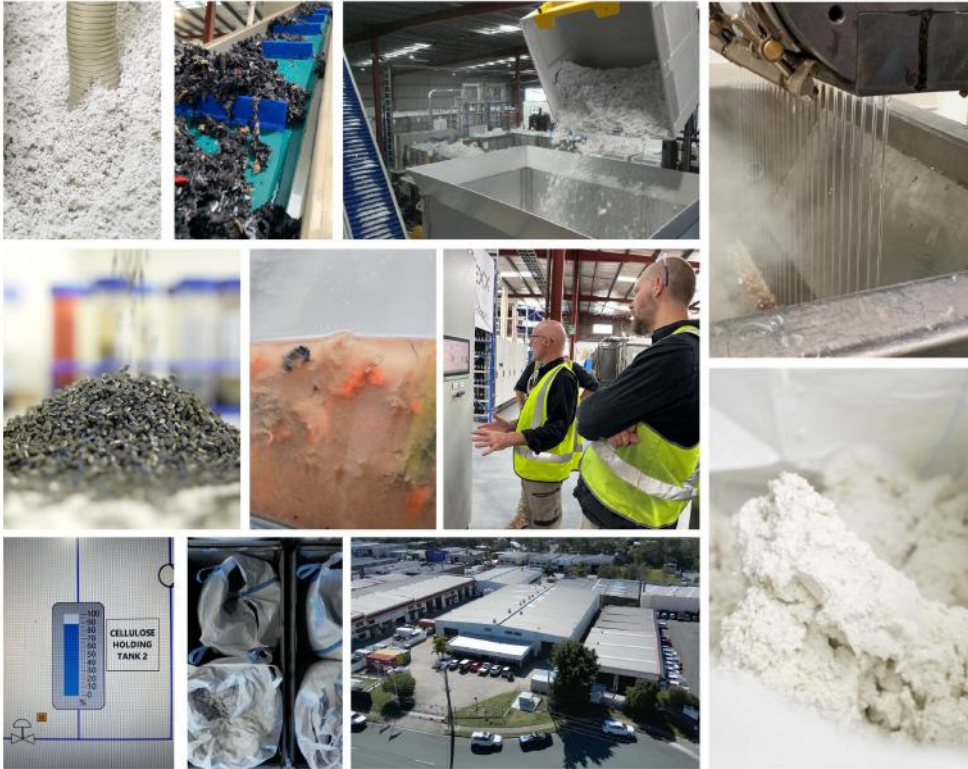
Cotton 100%



Polyester 100%

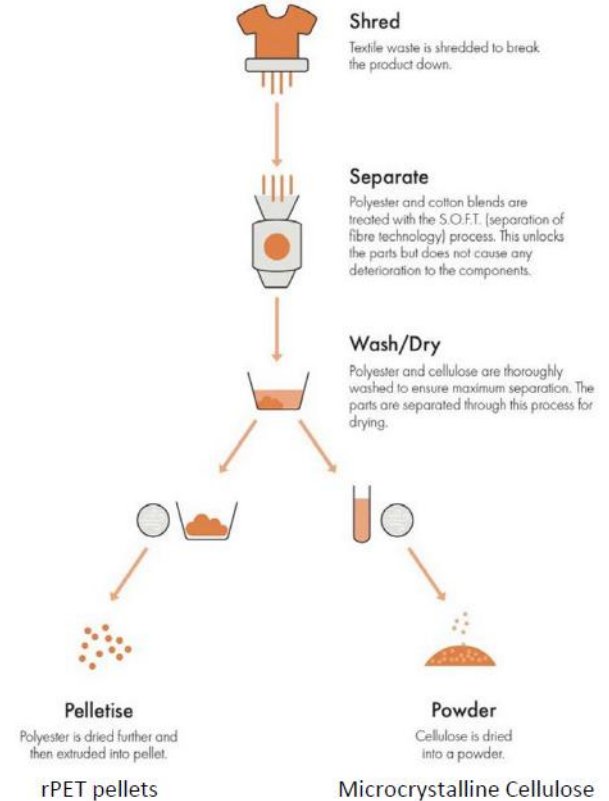


The facility and process overview



Video link: [Commercial scale textile recovery facility](#)

S.O.F.T. (separation of fibre technology) process



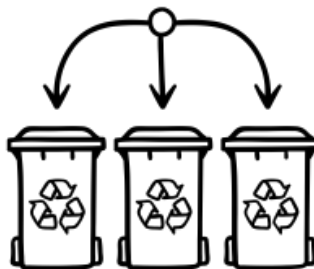
Commercial in confidence

Key Success Factors for Textiles Recycling



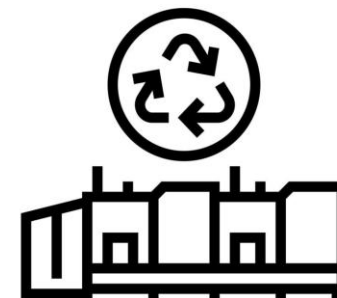
PRODUCT DESIGN

Monomaterials (instead of or multilayers separation technology)
for Recycling



COLLECTION / SORTING

- digital marking / chemical tracers for efficient Identification
- NIR (and other optical scanning - computer vision technologies) sorting systems
- Artificial Intelligence machine learning / Advanced Robotics systems to support sorting



PROCESSING

- Complementary Application of all existing and new Recycling Technologies:
- MECHANICAL RECYCLING
- **ADVANCED THERMOMECHANICAL RECYCLING**
- CHEMICAL RECYCLING

Three Founders

One Vision „Another life for plastic“

1983



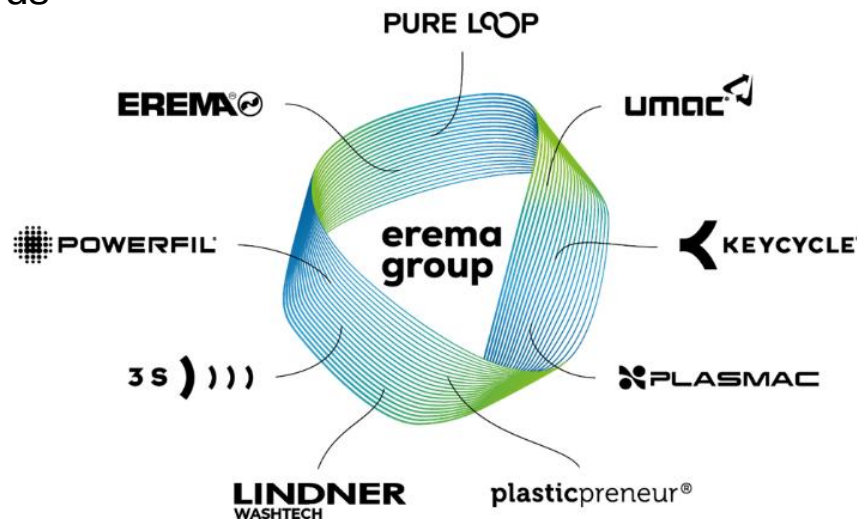
1983: Georg Wendelin, Helmut Bacher and Helmuth Schulz found Erema

EREMA Group

Connecting the plastics industry



- **World market leader** with a very comprehensive portfolio of plastic recycling solutions for industrialization
- **120 patent families** set technological standards
- More than **8.500 systems** worldwide
- Turnover **€M 380**
- **900 employees** worldwide
- 100% **privately owned** by founder families



INHOUSE & INDUSTRIAL RECYCLING



INTAREMA
K, T, TE
& TVEplus

POST CONSUMER RECYCLING



INTAREMA
TVEplus
DuaFil Compact

BOTTLE RECYCLING



VACUREMA
portfolio

FIBRE RECYCLING



INTAREMA
FibrePro:IV

CHEMICAL RECYCLING

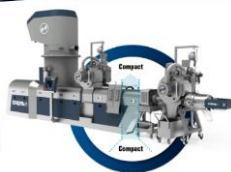


CHEMAREMA

SPECIAL MATERIALS



Applications



About 8,500 Worldwide.
Total capacity: ~ 25 Mio. t

North
America

1121

South
America

551

Europe

3.841

Asia

1.857

Australia

135

Africa

278

Plastic Recycling Systems

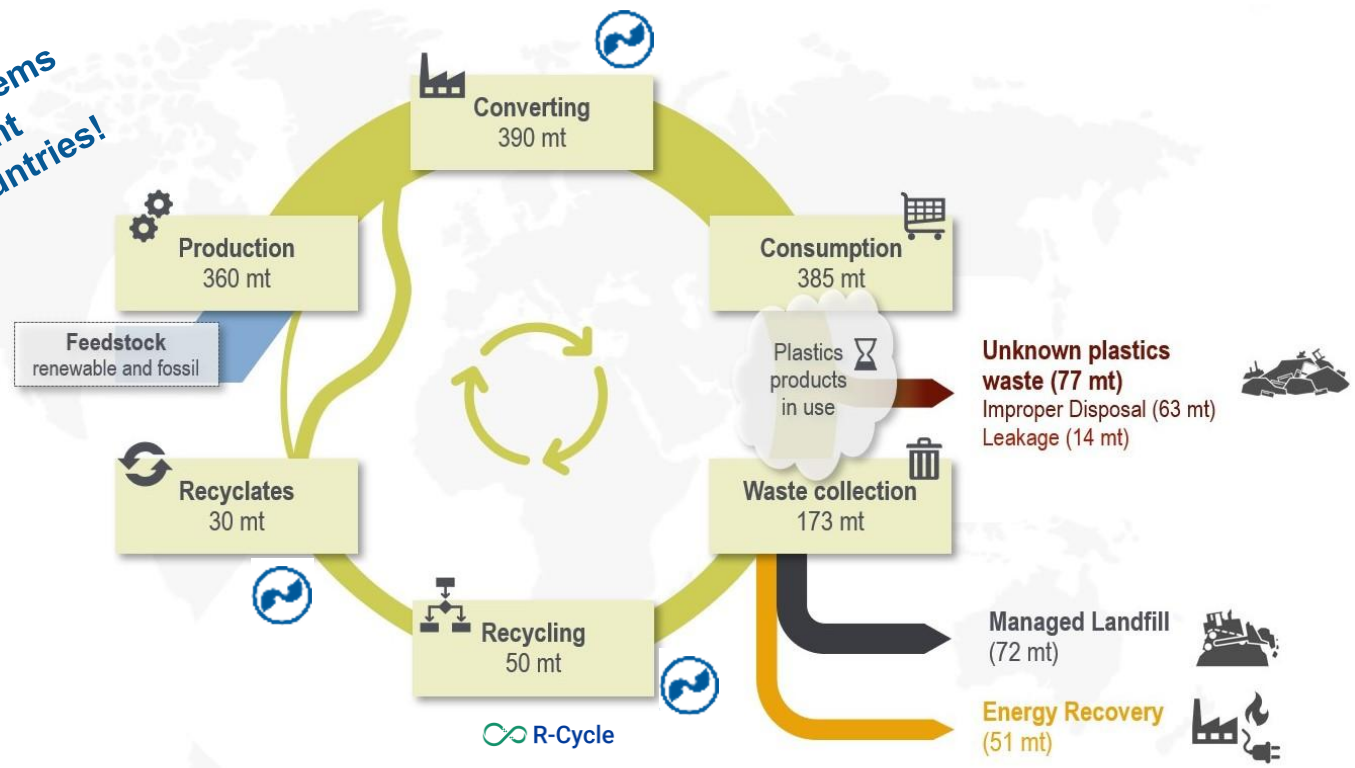
EREMA Group is the
global market leader

[more info](#)

Global Plastic Flow

Globally less than 10% recycled

Today,
9000 Erema systems
recycle 25 mt
in over 100 countries!



Recycling Technologies

Mechanical Recycling

- Guaranteeing lowest investment and highest savings in Carbon footprint

Solvent Based Recycling / Purification

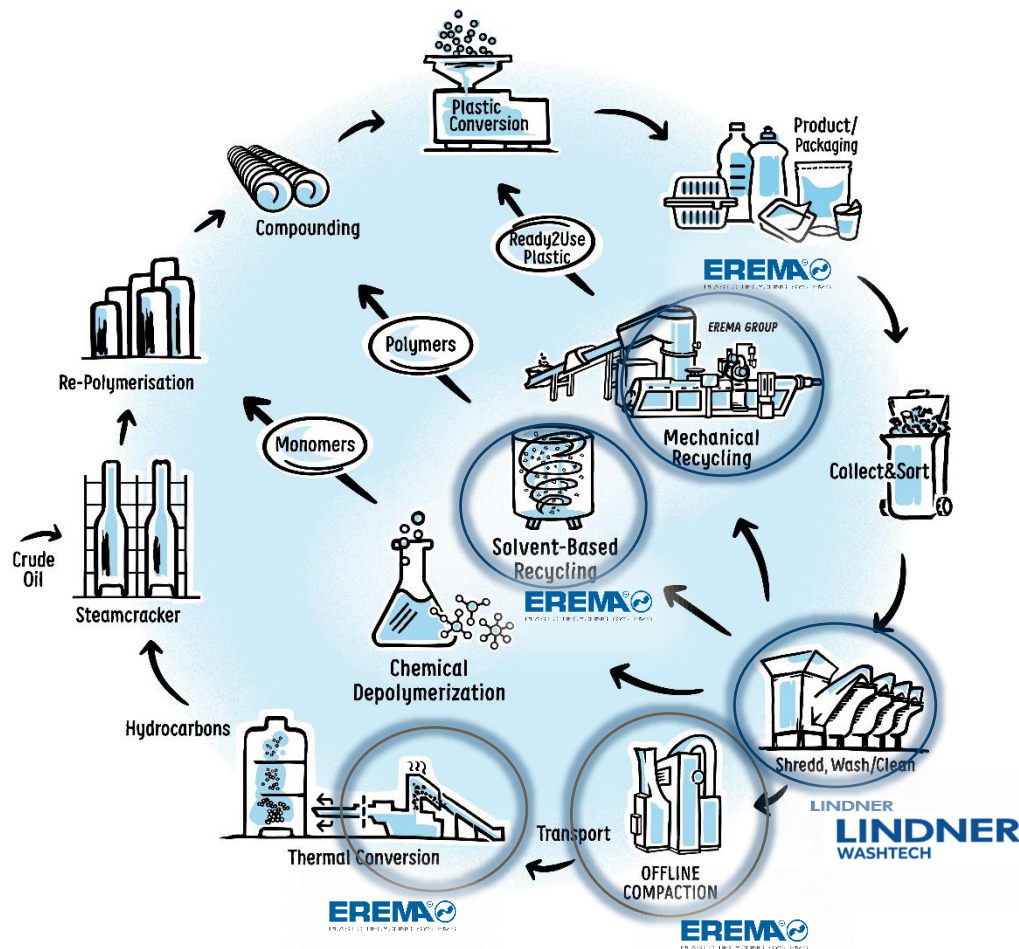
- Dissolving target polymer allows for filtration of contaminants.

Chemical Depolymerization

- certain polymers (e.g. polycondensates as PET) allow for reversal of polymerisation = depolymerisation back to monomers

Thermal Conversion (e.g. Pyrolysis)

- chemical destruction of polymers back to mixture of Hydrocarbons (=Synthetic Crude)



INNOVATION

AGGLOREMA

SIMPLE YET ROBUST



**The first machine of a
new machine series**



AGGLOREMA

Output: Recycled
Agglomerates



High bulk densities:
280-380 kg/m³
moisture < 1 %

Chemical Recycling

Decentralised compaction for
centralised Chemical Recycling

Easy and efficient logistics handling

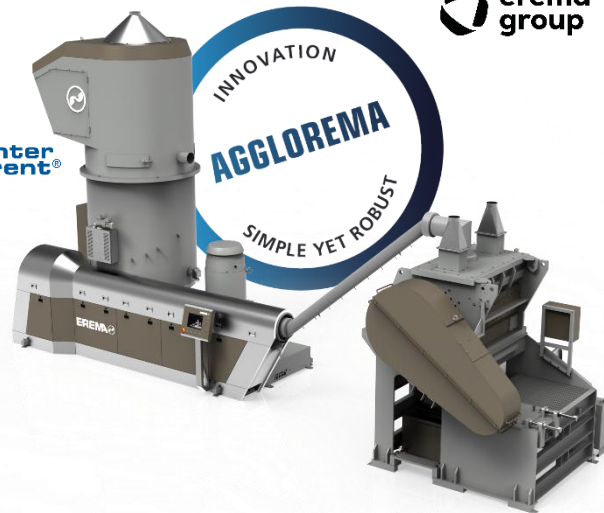
Clean and safe operations
in petrochemical environments

Mechanical Recycling

Simple end-applications
building on mixed PO fractions, e.g.
highway / construction site fence holders

Simple yet robust process design

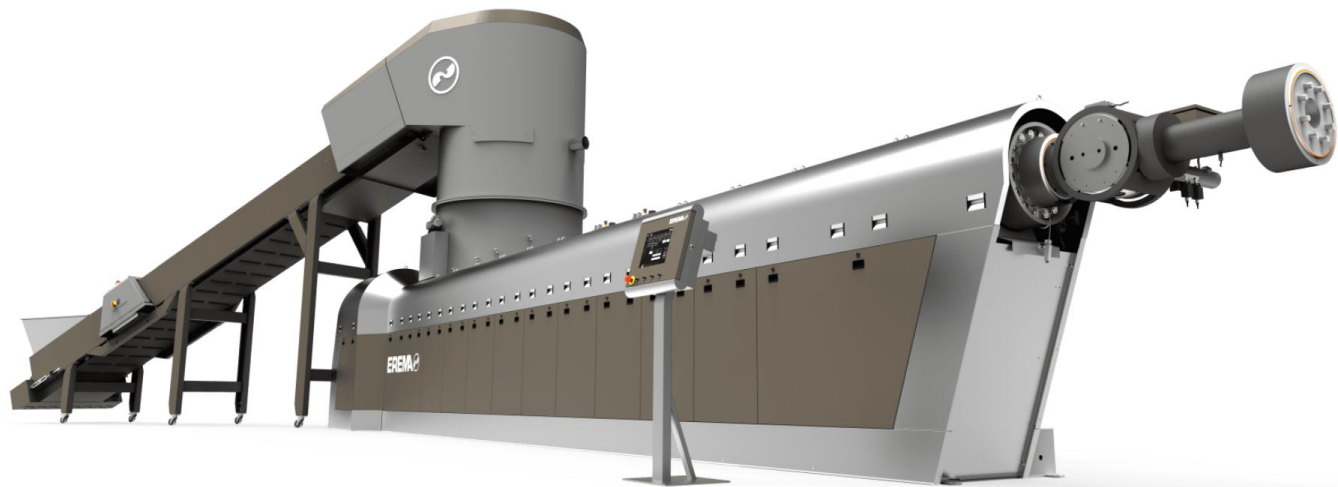
Robust Building Block
for Textiles Chemical Recycling



- **No predrying needed** up to 12 % input moisture
- Works with **highly heterogenous feedstock** specifications (material, shape, moisture)
- **Homogenisation**
- **High tolerance against contamination** without blocking elements (such as die plates, calanders, etc.)
- Allows adding of stabilisers, if needed
- Keeping **advantages of melt extrusion** while strongly **reducing temperature and energy consumption**
- **Robust system for high throughputs:** currently 2 – 2,3 tons/hour (potential for scaling up)



CHEMAREMA® Robust & energyefficient singlescrew meltpreparation for thermal conversion eliminates need for pre-drying and pre-compacting.



CHEMAREMA® remains the technology of choice for energy efficient melt extrusion into a chemical recycling reactor.

Available up to **4500 kg/h** (CHEMAREMA®2628)

Commercially proven up to **3300 kg/h** (CHEMAREMA® 2325)



LINDNER
WASHTECH

&

EREMA® 

**We work and learn together
For your performance.**

**Getting out MORE of
the material**

An abstract graphic of a plastic bottle, rendered with many thin, curved lines in shades of blue and green, creating a sense of motion and transformation. The bottle is positioned on the left side of the frame, with its neck pointing upwards and its body curving around the text.

**Another life
for plastic.
Because we care.**



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