

Tech Day 2023



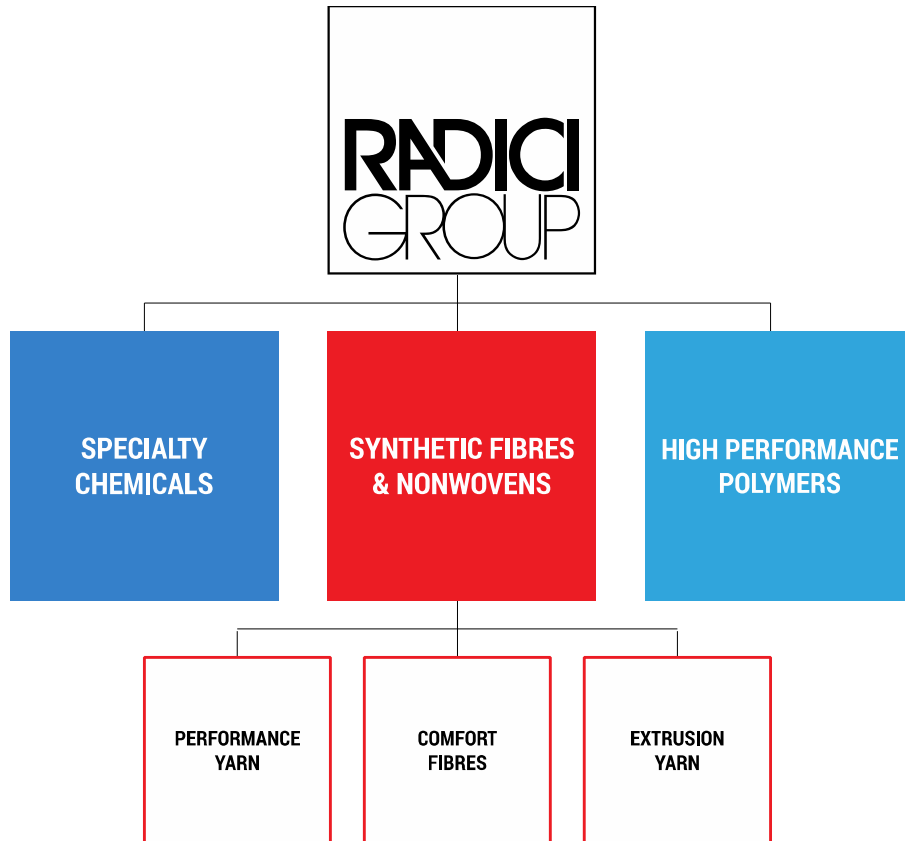
&



HIGH PERFORMANCE POLYMERS

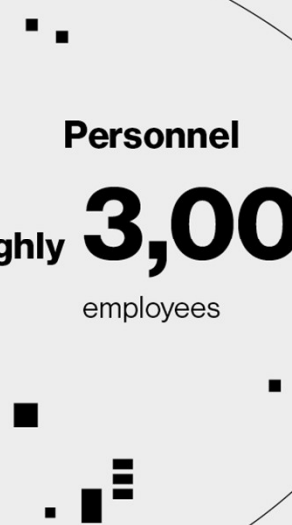


RadiciGroup | World



RadiciGroup is one of the most active chemical companies at an international level. Its diversified businesses operate worldwide and are focused on:

- SPECIALTY CHEMICALS**
- HIGH PERFORMANCE POLYMERS**
- SYNTHETIC FIBRES & NON WOVENS**



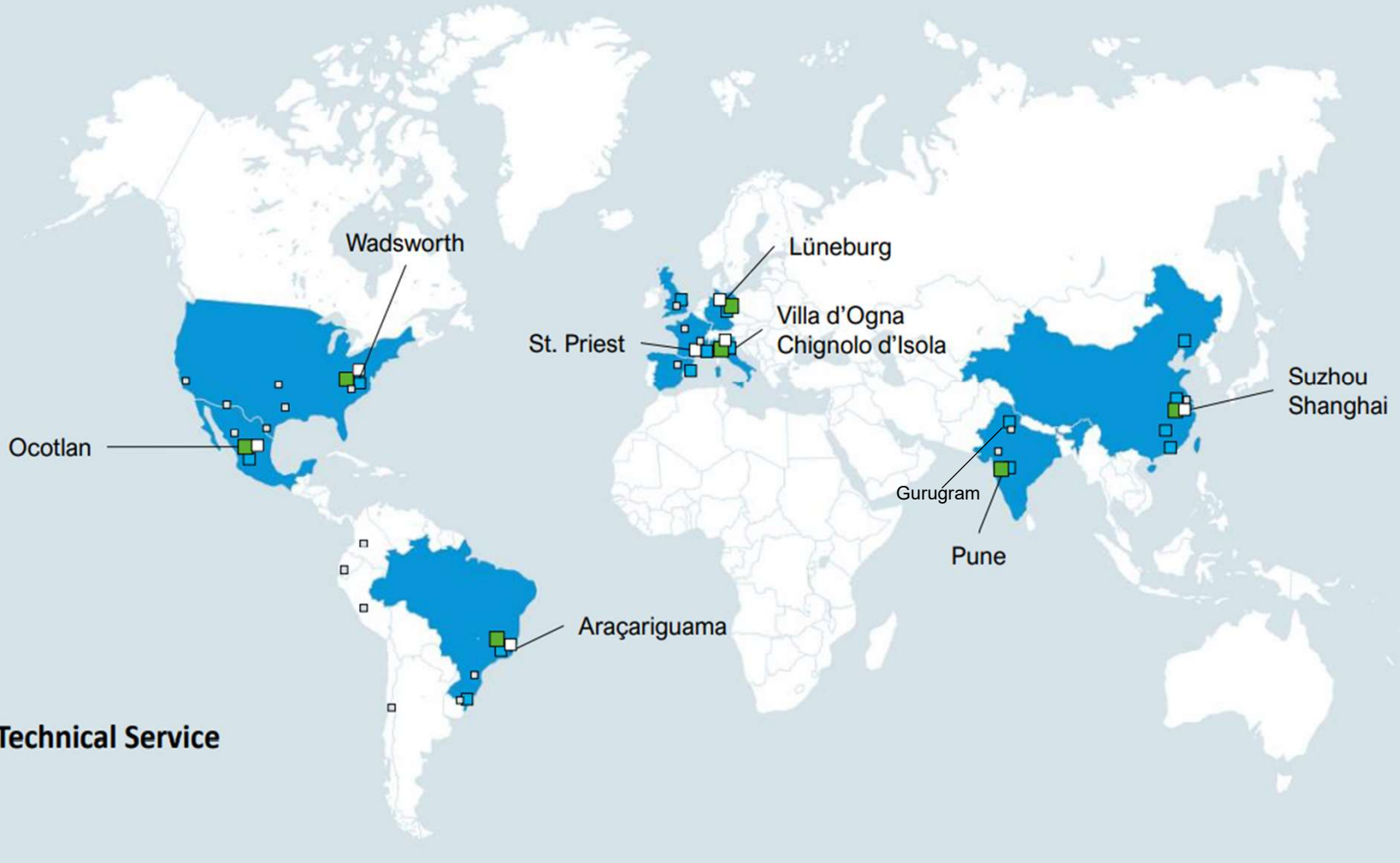
Personnel
roughly **3,000**
employees

2022 Sales*
1,542
million €

Network
>30
production and sales
units in Europe, North and
South America, and Asia.

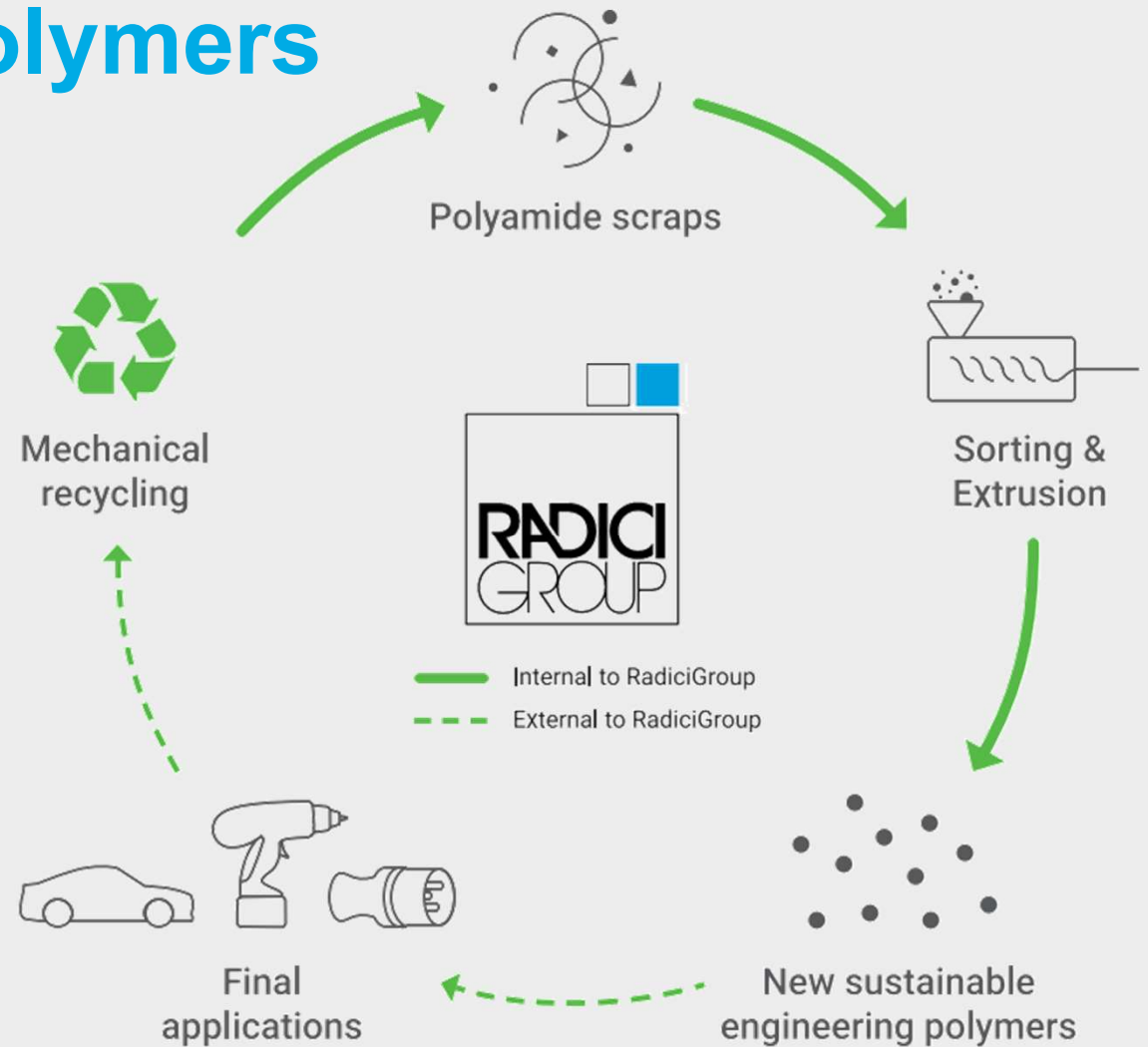
*2022 RadiciGroup consolidated turnover.

High Performance Polymers - Global presence



RadiciGroup High Performance Polymers

RENYCLE[®]
nylon after nylon

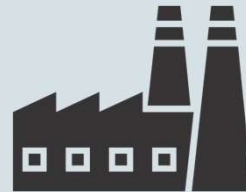


Product definition by raw material source



Fossil-based PA

This material is produced starting from the chemical precursors of the base polymers.



Post-industrial PA

Material diverted from the waste stream during a manufacturing process.



Post-consumer PA

Waste materials that has been recycled and transformed into a new product after it has been used and discarded by the consumer.

RadiciGroup High Performance Polymers

A leader in recycled engineering polymers,

wants to express

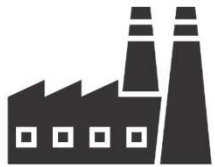
its commitment to sustainability

through concrete action.

Our answer is....

RENYCLE[®]

nylon after nylon



New **sustainability**-oriented product range of **polyamides** from **post industrial** and **post consumer** sources



Lower and measurable environmental impact

Safety

Reliability

Traceability

Quality



RENYCLE® is the answer to:



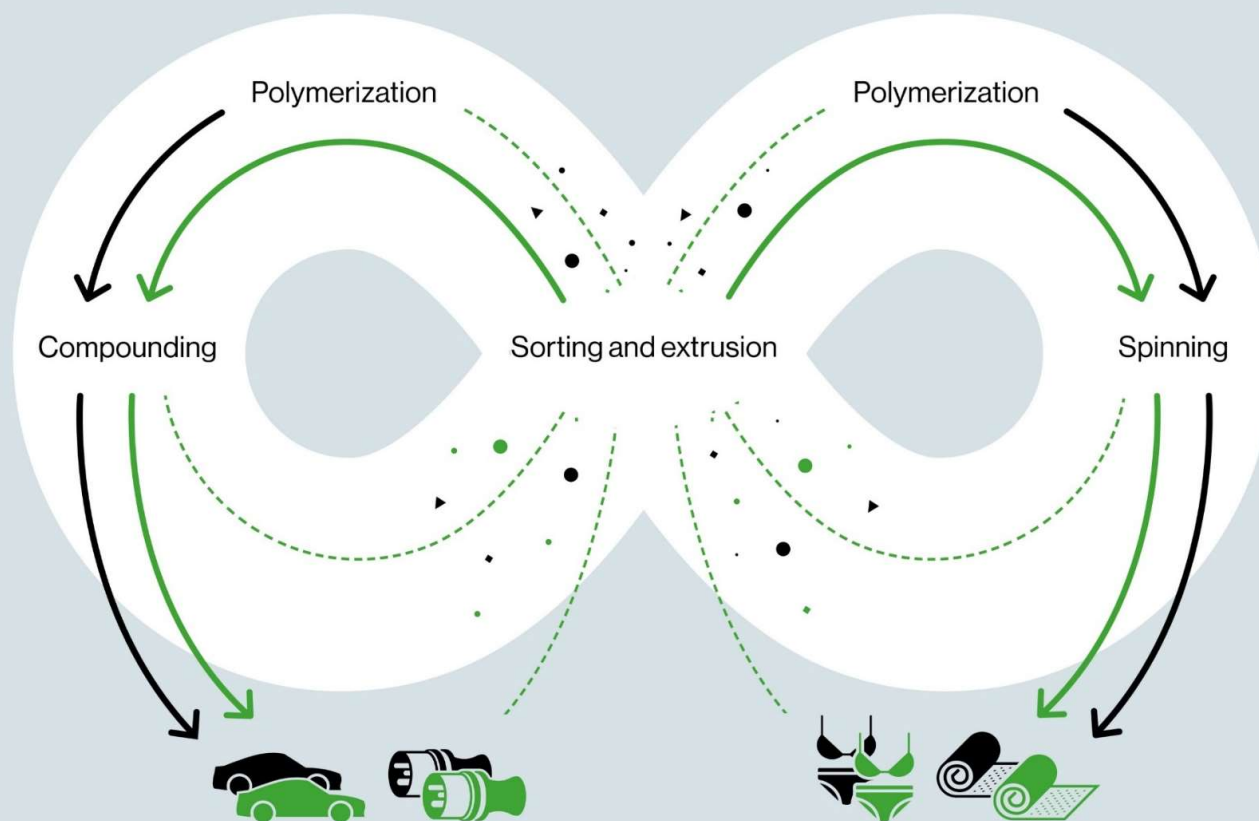
- **Customers** who want to reduce the environmental impact of their finished products and are committed to make environmentally conscious choices.
- **The evolving legislative context**, which is shifting more and more towards the reuse and recycling of materials now considered waste (so-called End-of-Life materials).
- **The need for stricter controls and standards** to guarantee the safety and traceability of the raw materials used.
- **Society** in general, which is asking industry to make a greater and more tangible commitment to sustainability.
- **Ensuring the right selection, treatment and characterization** of post-consumer and post-industrial materials.

RadiciGroup High Performance Polymers has decades of experience in the recycling field

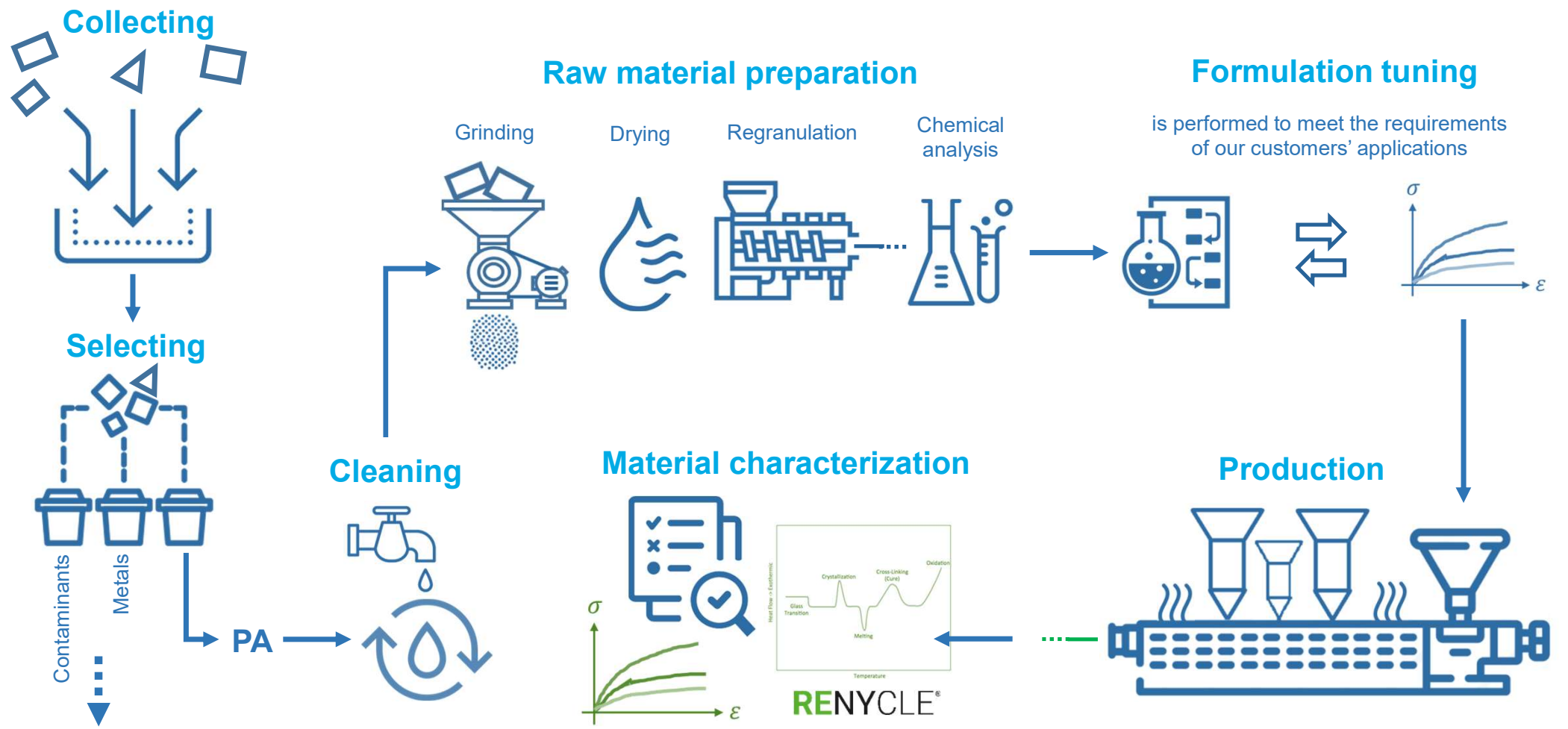


RadiciGroup, thanks to its long-standing know-how in material formulation and recycling, is able to **convey scraps either to the same industry they came from or to a different one.** Choosing the most **sustainable solution** depends on the specific characteristics of the materials and the performance expected from the final applications.

- Virgin raw materials
- Recycled raw materials
- - - Recycling process
- Scraps



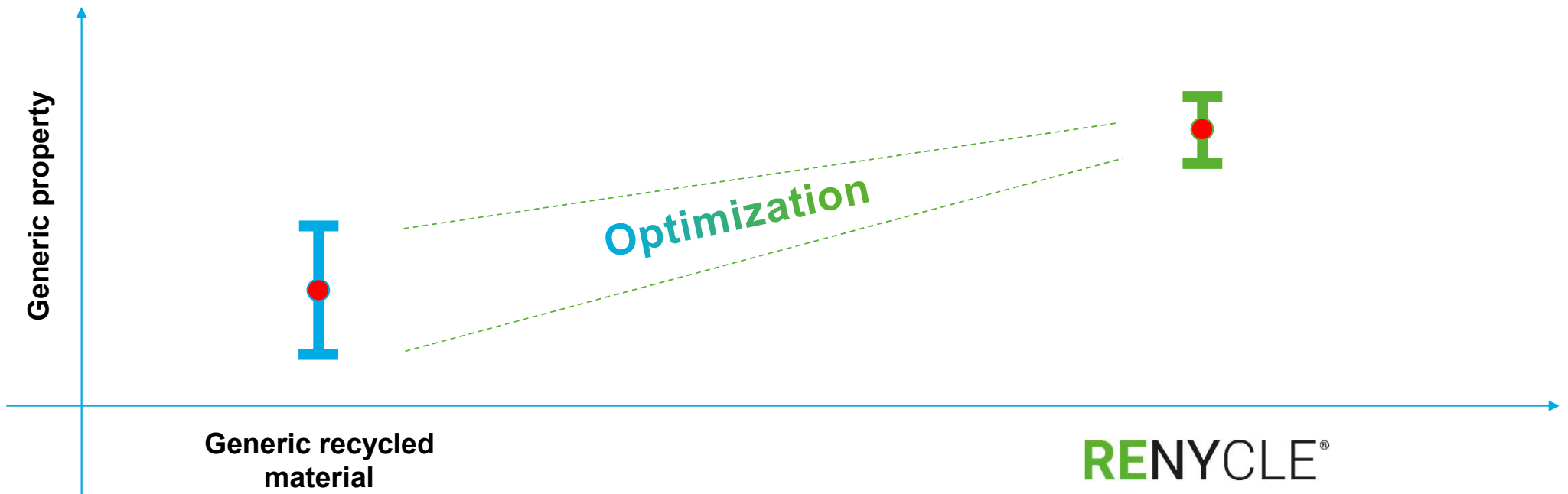
RENYCLE[®] Production process stages



RENYCLE® Scope

- Property
- I Variability

The experience gained in post-industrial materials production and the opportunity to participate in circular economy projects has allowed us to develop a production process that **thoroughly monitors raw material selection and treatment** in order to optimize material characteristics and variability.



RENYCLE[®] Current product offering



Post-consumer
base



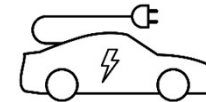
Post-industrial
base



General
purpose



Automotive



E-mobility



Electrical
& Electronic

Hydrolysis resistance and flame retardancy (red phosphorus-free, and halogen-free) are just some achievable properties for this new materials family.

RENYCLE® Selection of grades



Renycle® S GF1501K 3030 BK	Partially recycled PA6 15% glass-fibre-reinforced injection moulding grade. Heat stabilized.
Renycle® S GF2501 HF0 3033 BK	Partially recycled PA6 flame retardant injection moulding grade, halogen and red phosphorus free. 25% glass-fibre-reinforced. Laser markable.
Renycle® S GF3001K 3030 BK	Partially recycled PA6 30% glass-fibre-reinforced injection moulding grade. Heat stabilized.
Renycle® S GF3003 3033 BK	Partially recycled PA6 30% glass-fibre-reinforced injection moulding grade.
Renycle® S N101 3030 BK	Partially recycled PA6 injection moulding grade. Black colour.
Renycle® S T203K 3030 BK	Partially recycled PA6 injection moulding grade. Toughened. Heat stabilized.
Renycle® S GF3004K 3033 BK	Recycled PA6 30% glass-fibre injection moulding grade. Heat stabilized.
Renycle® A GF3002HR 3039 BK	Partially recycled PA66 30% glass-fibre injection moulding grade. Heat stabilized, hydrolysis resistant.
Renycle® A GF3502K 3033 BK	Partially recycled PA66 35% glass-fibre injection moulding grade. Heat stabilized.
Renycle® A GF3504K 3033 BK	Recycled PA66 35% glass-fibre injection moulding grade. Heat stabilized.

The material's availability must be checked project by project considering:

- Potential volume, Geographic area,
- Material,
- Start of production,
- Supply duration;

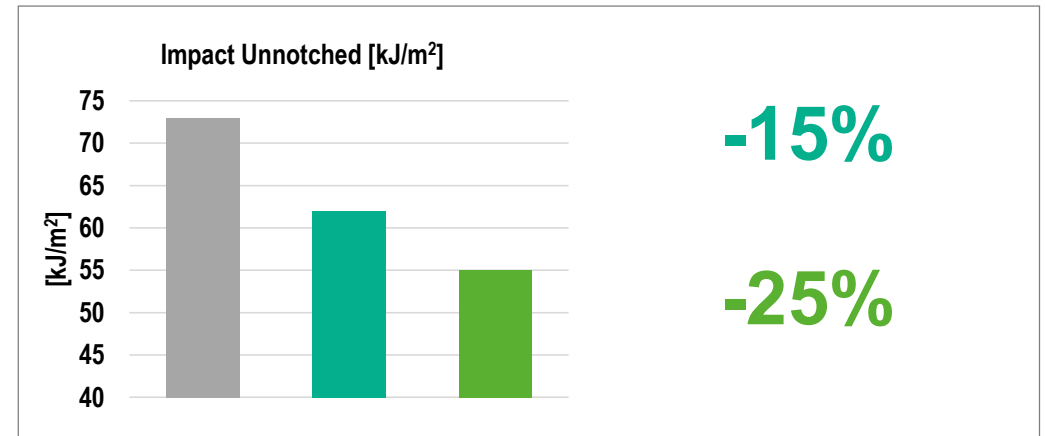
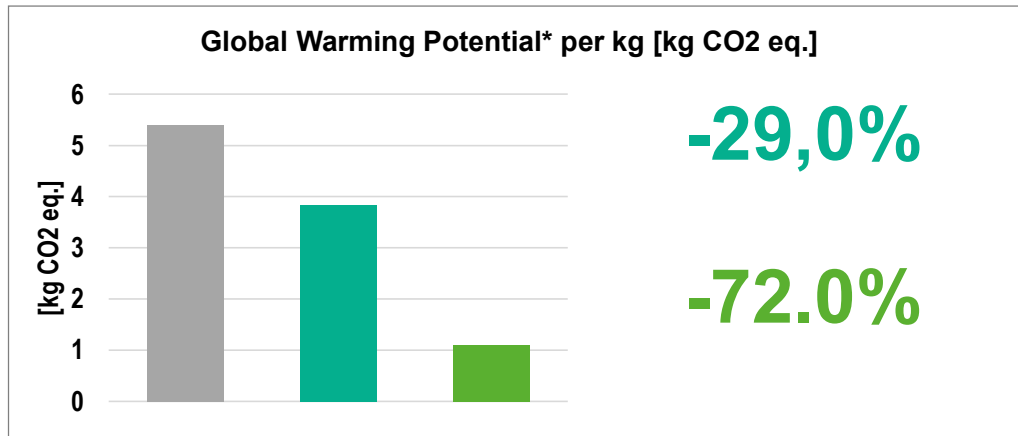


RENYCLE® Grades: Mechanical vs environmental performance



PA6 recycled, 30% glass-fibre reinforced injection moulding grade. Heat stabilized, black colour.

Finished Product	Stress at Break [MPa]	Strain at Break [%]	Impact Unnotched [kJ/m ²]
■ RAD S RV300W 333BK (Reference)	173	3,2	73
■ RENYCLE S GF3001K 3030 BK	150	3,5	62
■ RENYCLE S GF3004K 3033 BK	130	2.5	55

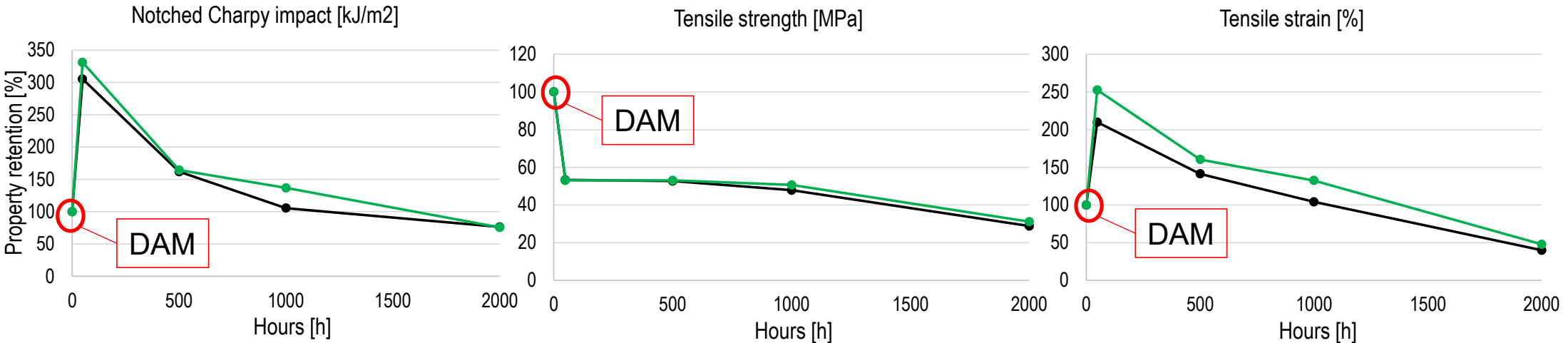


*The information provided in this documentation corresponds to the knowledge of RadiciGroup High Performance Polymers on the subject at the date of its publication. This information may be subjected to revision as new knowledge and experience become available. The data provided relates only to the designated material; this data may not be valid for such material used in combination with any other materials or additives or in any process unless expressly indicated otherwise. The data provided should not be used to establish specification limits or used alone as the basis of design; it is not intended to substitute for any testing you may need to conduct to determine yourself the suitability of a specific material for your particular purpose. Since RadiciGroup High Performance Polymers cannot anticipate all variations in actual end-use conditions, RadiciGroup High Performance Polymers makes no warranties and assumes no liability in connection with any use of this information. Nothing in this publication is to be considered as a license to operate under or recommendation to infringe any patent rights.

RENYCLE® Grades: Mechanical performance

Partially recycled PA66 30% glass-fibre injection moulding grade. Heat stabilized, hydrolysis resistant. Black colour.

Finished Product	DAM conditions		
	Stress at Break [MPa]	Strain at Break [%]	Impact Unnotched [kJ/m ²]
■ RADILON A RV300 RG 3900BK (<i>Ref</i>)	195	3.5	95
■ RENYCLE A GF3002HR 3039BK	170	2.9	65



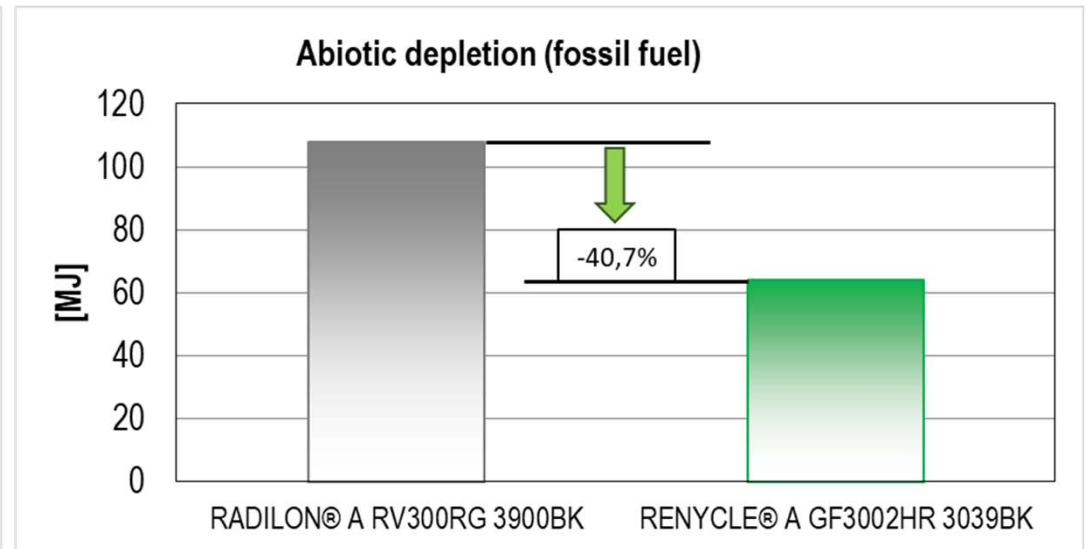
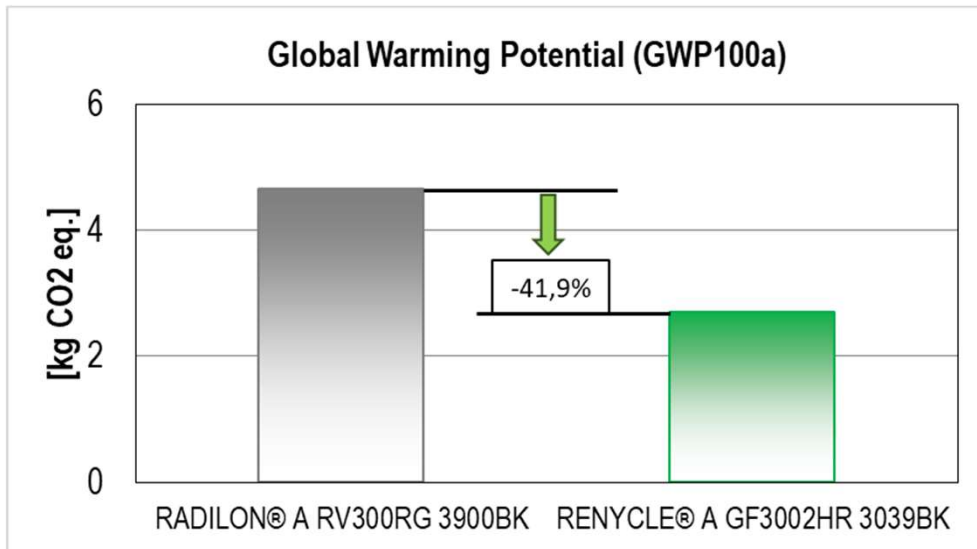
These tests have been performed in the characterization physical-mechanics laboratories of RadiciGroup High-Performance Polymers. The samples have been tested simultaneously using the same equipment.

Temperature: 118°C
Media: Water + Havoline XFC
Relative quantity: 1:1

RENYCLE® Grades: Mechanical vs environmental performance

Partially recycled PA66 30% glass-fibre injection moulding grade. Heat stabilized, hydrolysis resistant. Black colour.



Finished Product	Stress at Break [MPa]	Strain at Break [%]	Impact Unnotched [kJ/m ²]
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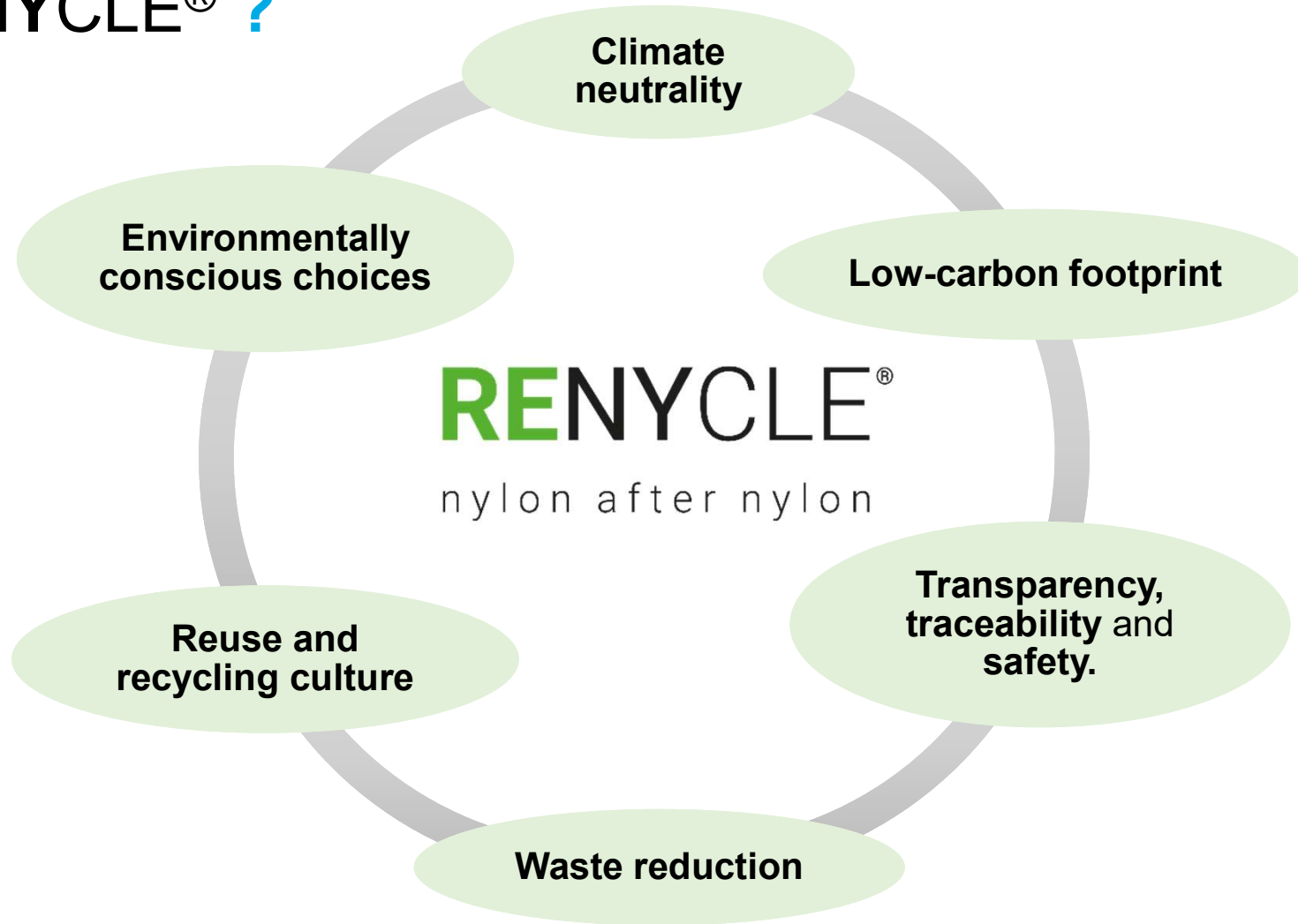
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Renycle® vs Heramid®



Comparison		
Cost-saving choice	●	
Circular economy range of materials		●
Intensive pre-treatments on raw materials (collecting, separation and cleaning)		●
Standard quality controls	●	●
Advanced mechanical characterization		●
Post-industrial sources	●	●
Post-consumer sources		●
LCA performances evaluation		●
Co-Branding		●
Social perception		●

Why RENYCLE[®] ?





HIGH PERFORMANCE POLYMERS

RENYCLE[®]
nylon after nylon

Thanks for your attention

