TECNOLOGIE MATERIALI PROCESSI STAMPI E STAMPAGGIO

INNOVAZIONE NELLA TRASFORMAZIONE DEI MATERIALI POLIMERICI

20 NOVEMBRE 2025

MILANO

NH Milano Congress Centre

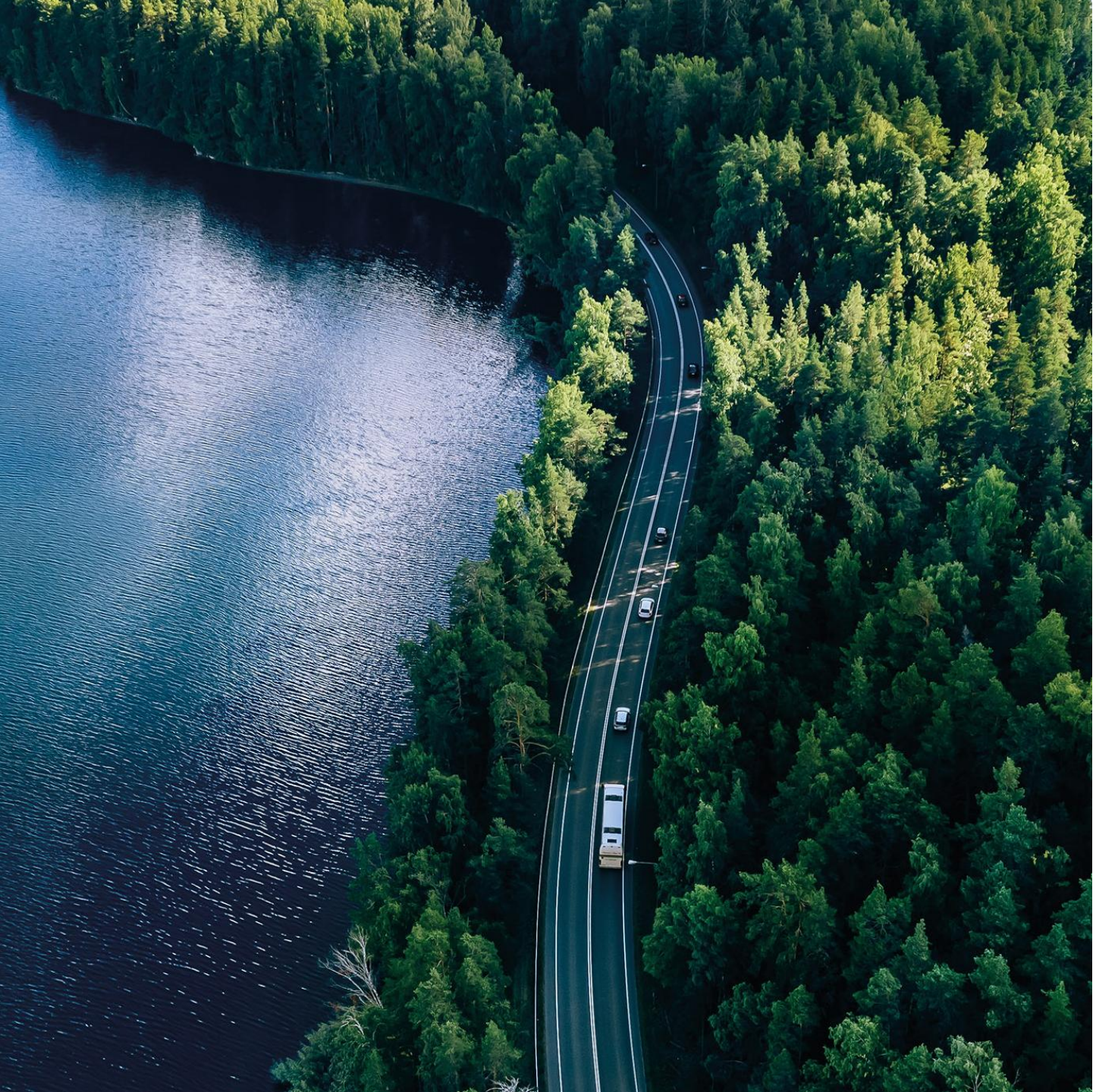
CONGRESSO

DELLE MATERIE PLASTICHE DEGLI STAMPI E DELLO STAMPAGGIO

gruppo tecniche nuove
Forma alle idee, valore alle persone

Plastix Stampi tmp

In collaborazione con UCISAP



HIGH PERFORMANCE POLYMERS

Sustainable pathways: latest updates from RadiciGroup High Performance Polymers

Riccardo Galeazzi
MKT Sustainability Project Leader

November 20, 2025

RadiciGroup milestones to sustainability

1st Sustainability Report in 2004

GRI, third-party certified **Sustainability Report** covering all RadiciGroup companies worldwide.

-80% Direct emission reduction

Since 2011, in RadiciGroup plants.

Water reused up to 60 times

Water reused in RadiciGroup production plants.

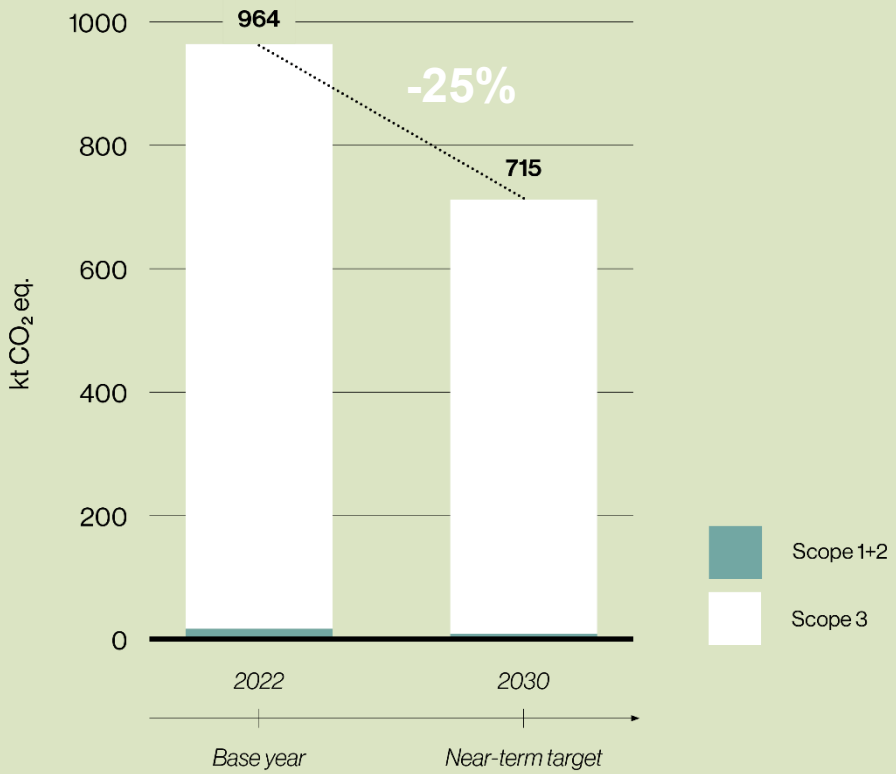
Data source: RadiciGroup Sustainability Reports - www.radicigroup.com

RadiciGroup High Performance Polymers: $CO_{2\ eq.}$ emissions reduction targets validated by SBTi

The Company* has set the following near-term GHG emissions reduction targets for the Business Area:

- **Radici Novacips SpA commits to reduce absolute scope 1 and 2 GHG emissions 80% by 2030 from a 2022 base year**.
- **Radici Novacips SpA also commits to reduce absolute scope 3 GHG emissions 25% within the same timeframe.**

Reference:
*Companies taking action - Science Based Targets



***Targets organizational boundary**
Targets have been set for Radici Novacips SpA, as parent company of the RadiciGroup High Performance Polymers Business Area. All the production sites, offices and warehouses under the operational control of RadiciGroup High Performance Polymers are included in the reporting perimeter.

SCIENCE BASED TARGETS
APPROVED
NEAR-TERM SCIENCE-BASED TARGETS

RENYCLE®

nylon after nylon

BIONSIDE®

naturally radilon

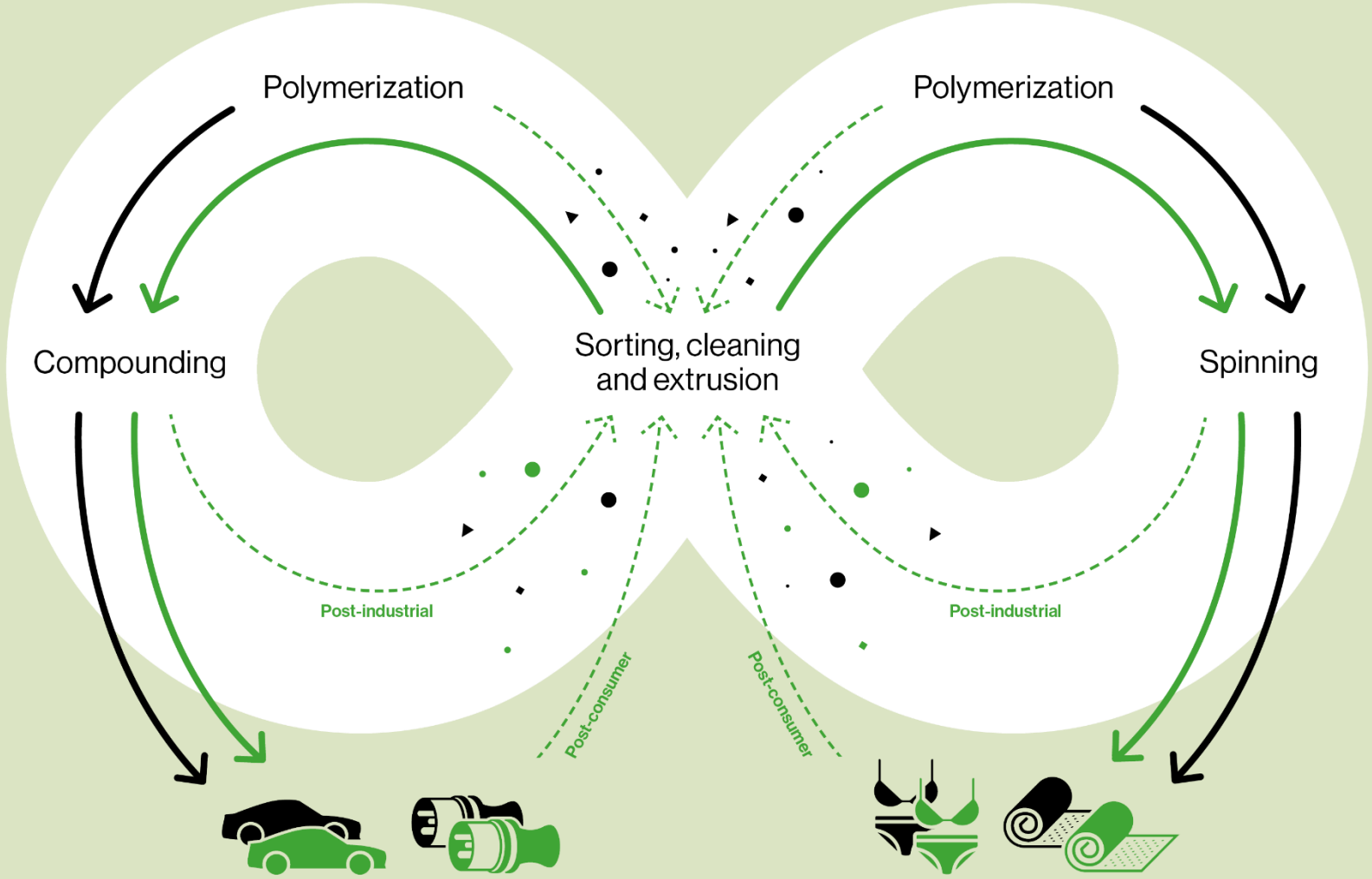
RADICI GROUP

RadiciGroup: nylon recycling system for circularity

RENYCLE®

nylon after nylon

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



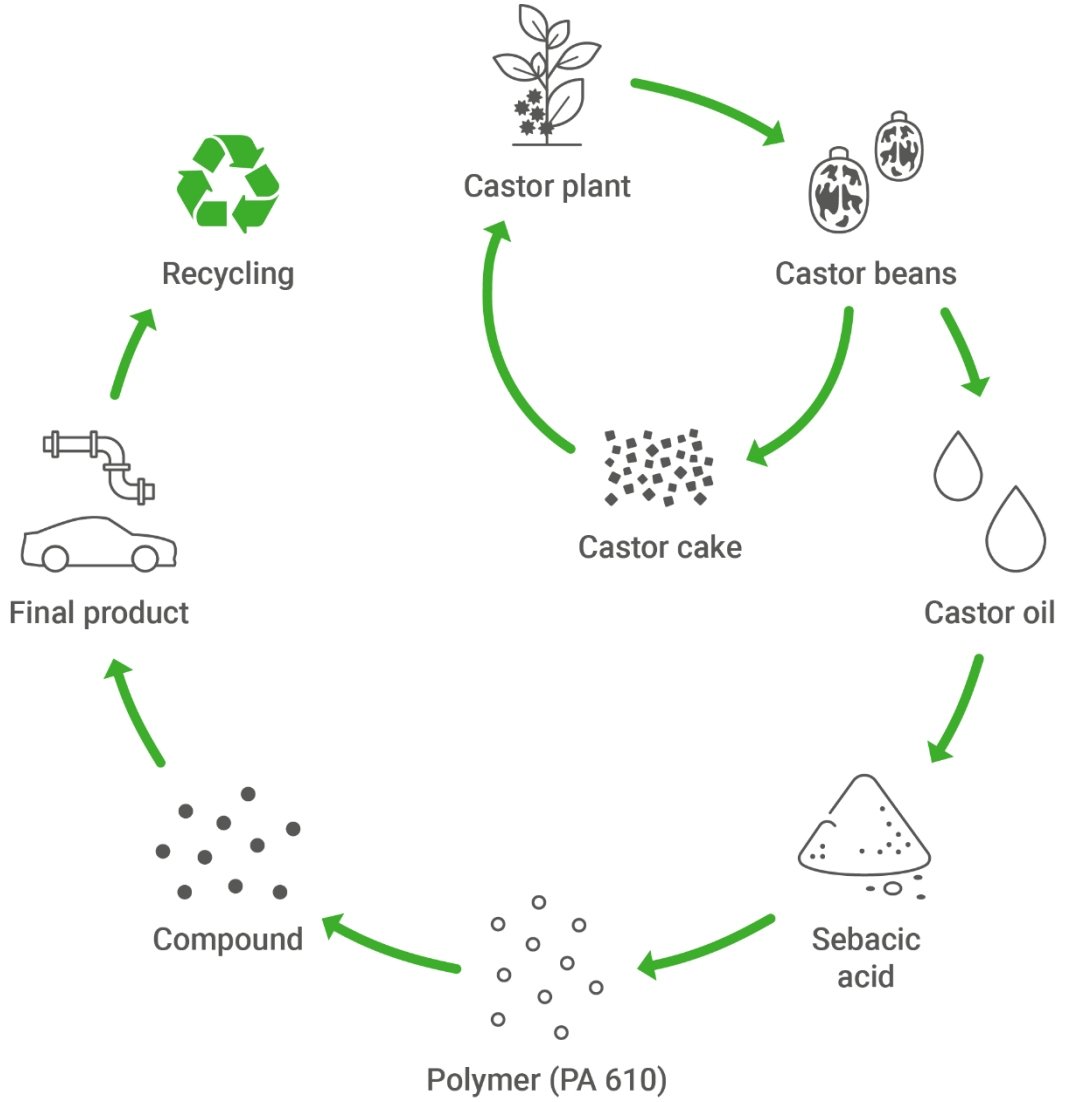
Legend

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

BIONSIDE® production concept

Bionside® is crafted using **renewable raw materials**, primarily derived from the oil extracted from castor beans.

The castor plant is cultivated in semi-arid regions, requiring minimal water to thrive. This approach reduces water consumption and supports sustainable agricultural practices, **making Bionside® an eco-friendly choice** for industries seeking to lower their environmental impact without compromising on quality and performance.

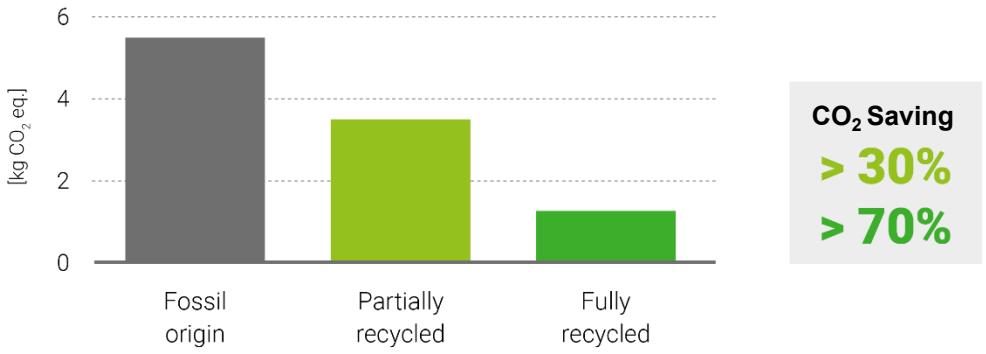


RENYCLE® Grades: Mechanical vs Environmental performance

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

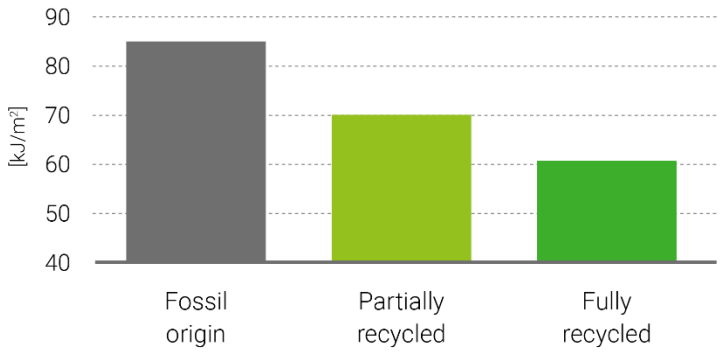
Finished Product	Recycled content range [%]	Stress at Break [MPa]	Strain at Break [%]	Impact Unnotched [kJ/m²]
PA6 - GF30 (Prime grade reference)	-	165	3.2	85
RENYCLE S GF3001K 3033BK	>30%	150	3.0	70
RENYCLE S GF3003K 3033BK	>65%	150	3.0	61

Global warming potential per kg [kg CO_2 eq.]



CO_2 Saving
> 30%
> 70%

Impact Unnotched [kJ/m²]

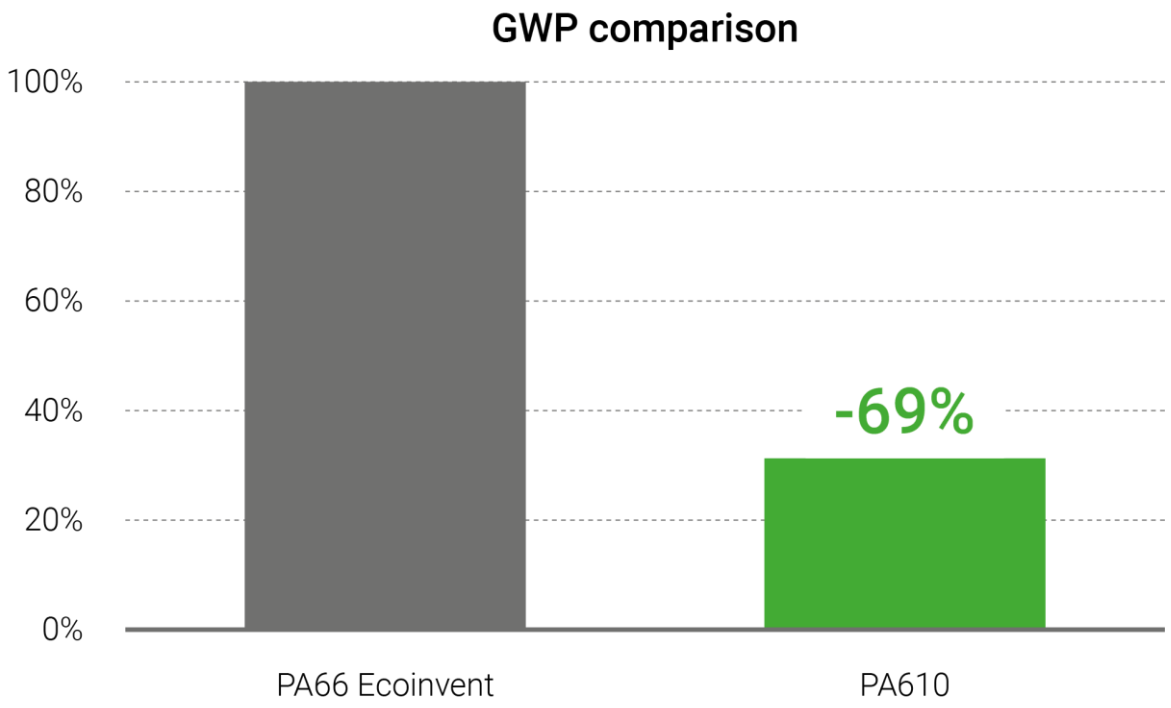


Reduction
- 18%
- 28%

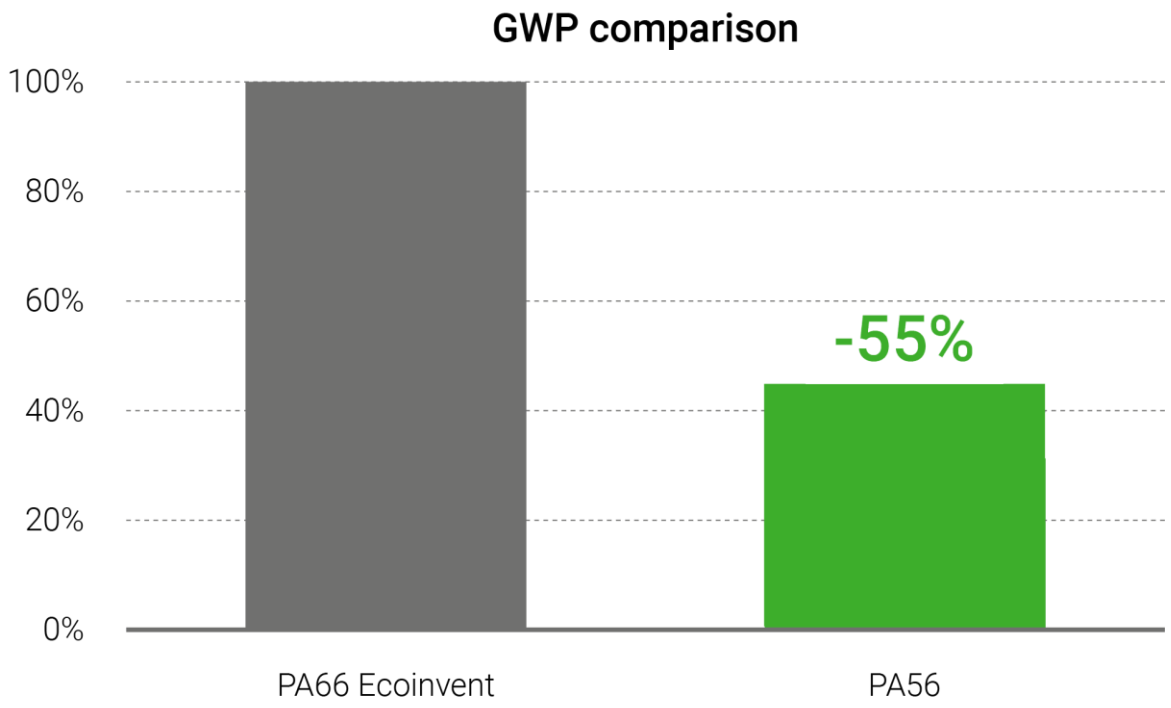
**The information provided in this documentation corresponds to the knowledge of RadiciGroup High Performance Polymers on the subject at the date of its publication. This information may be subjected to revision as new knowledge and experience become available. The data provided relates only to the designated 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.*

BIONSIDE® environmental impact

PA610 with **64%** bio content



PA56 with **41%** bio content



The calculation is carried out through SimaPro v. 9.3.0.3, the database Ecoinvent 3.5 and the assessment method IPCC 2021 (incl. CO2 uptake). It is a cradle-to-gate study critically reviewed by Certiquality in 2022. Data refer to 2019 production data, kindly provided by Radici InNova.

Circularity
at RadiciGroup
High Performance Polymers

Car-E Service European Project

Circular Economy Business Models
for innovative **hybrid and electric mobility** through advanced re-use and re-manufacturing technologies and services.

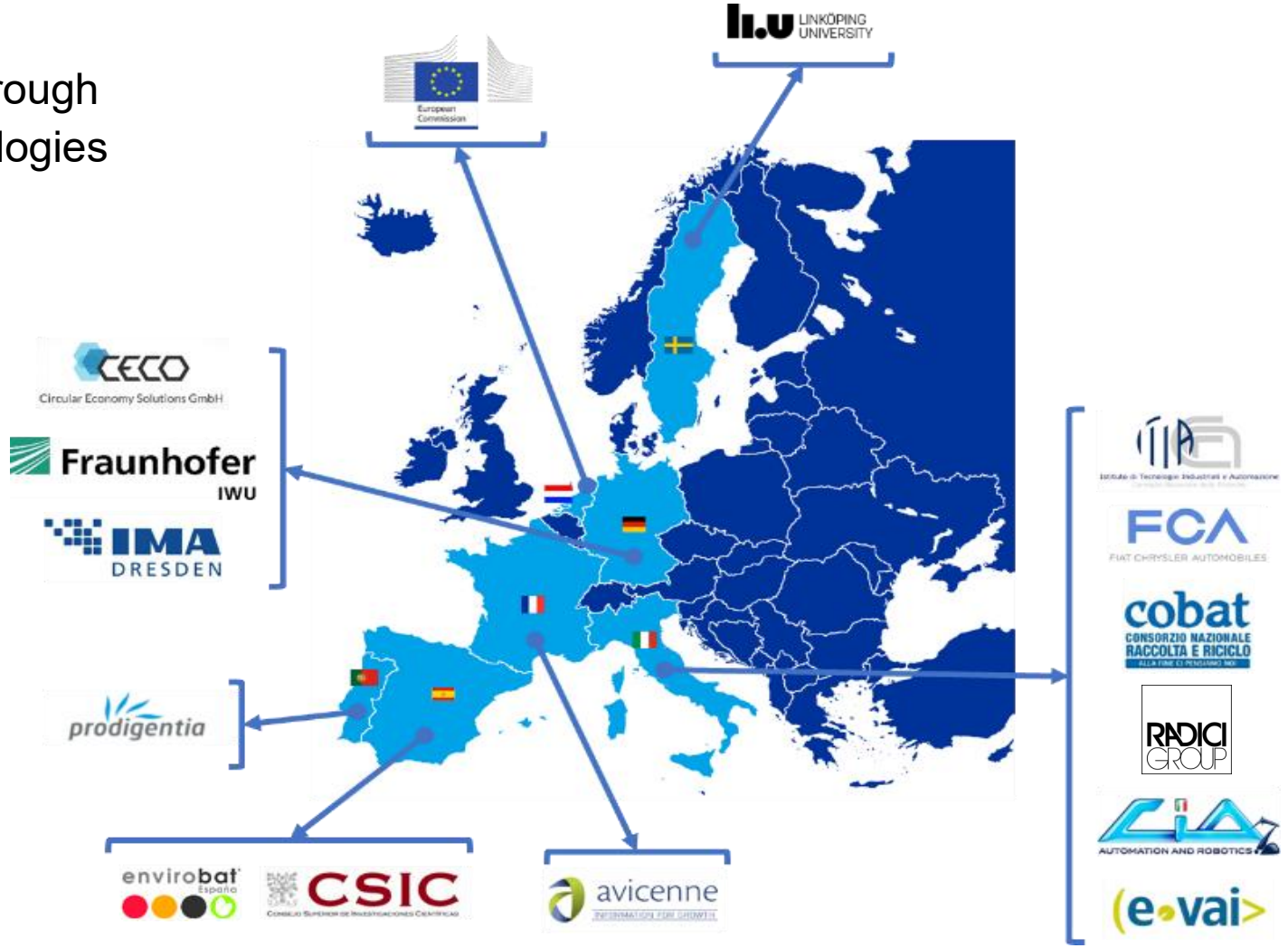
Acronym: CAR-E Service

Duration: 42 Months

Kick Off: 1 June 2018
Closing: 1 December 2021

Type: H2020-CIRC-2017

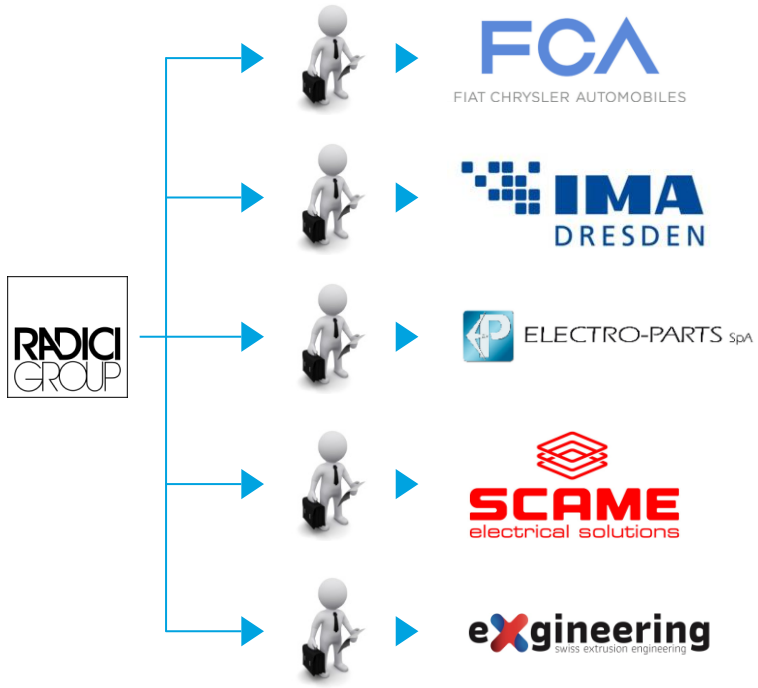
15 Partner



CarE-Service

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 776851.

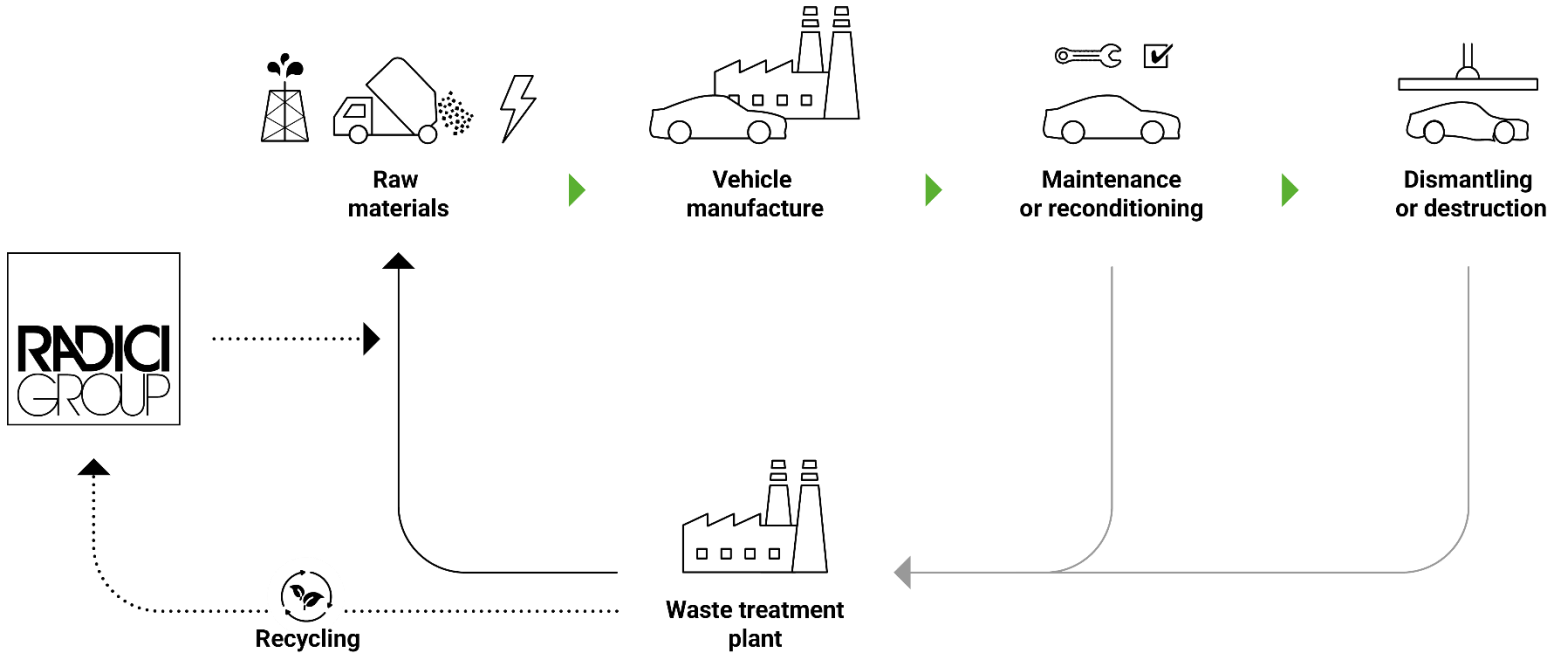
Car-E Service European Project - Steps



Ribbed beams (testing)	Gear box	Gear box cover	Electric motor cover	Back electric engine cover	Female recharge connector	Male recharge connector
				(Fan actuator) 		
• 5 materials • 2 molding conditions (one side and head) • 100 parts	• 1 material • 1 molding condition • 42 parts	• 1 material • 1 molding condition • 82 parts	• 1 material • 1 molding condition • 122 parts	• 1 material • 1 molding condition • 56 parts	• 1 material • 1 molding condition • 15 parts	• 1 material • 1 molding condition • 20 parts

RAD CARE A NER MP/1K	RAD CARE A GFP3015
RAD CARE A NER GF050/1	RAD CARE A NER GF030/1K
RDF CARE A RV250 HF	PA66 After silicon dilution

New closed-loop projects



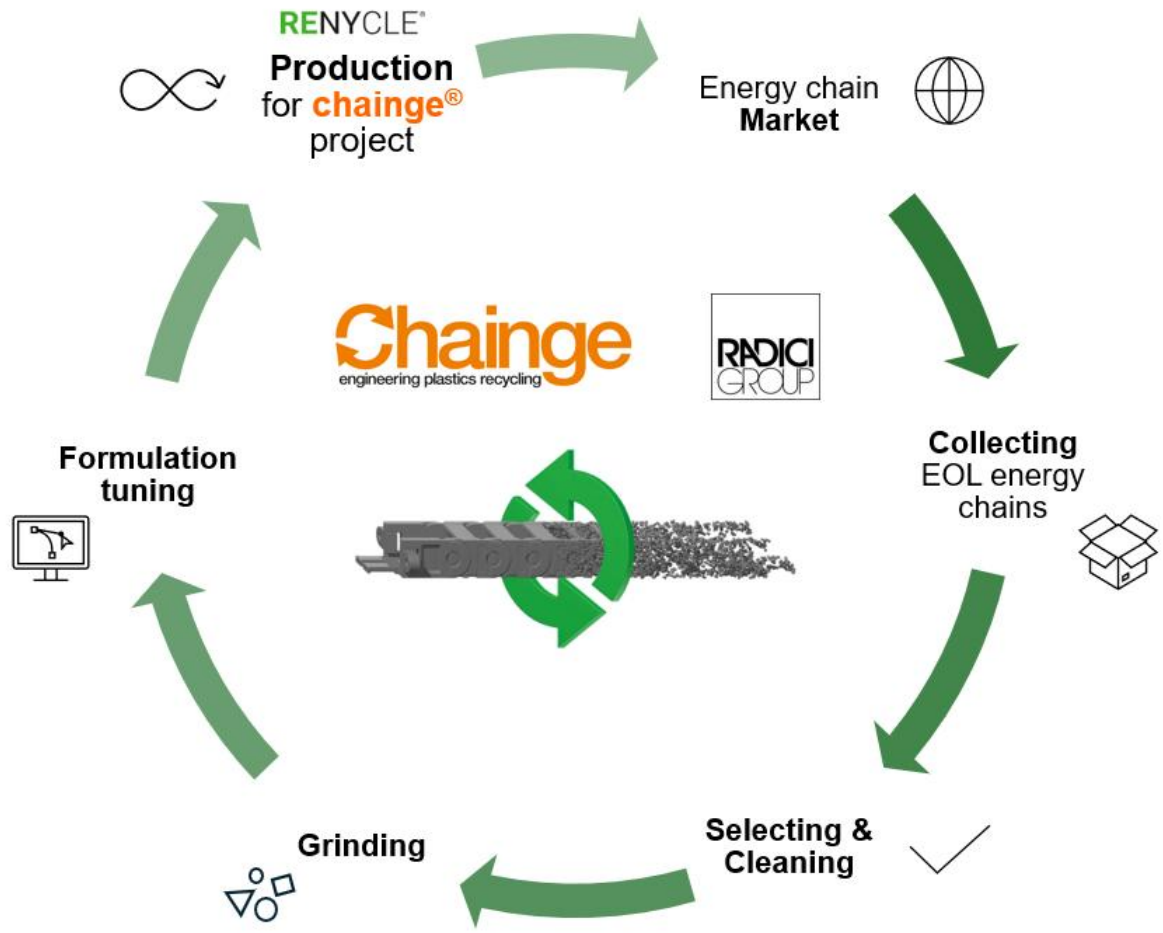
Project stages:

1. Evaluation and characterization of a few parts.
2. Collection of industrial samples.
3. Focus on some RENYCLE® grades that could contain this feedstock.
4. Testing on real parts.

RENYCLE® for chainge®

Special partnership for an environmentally conscious choice

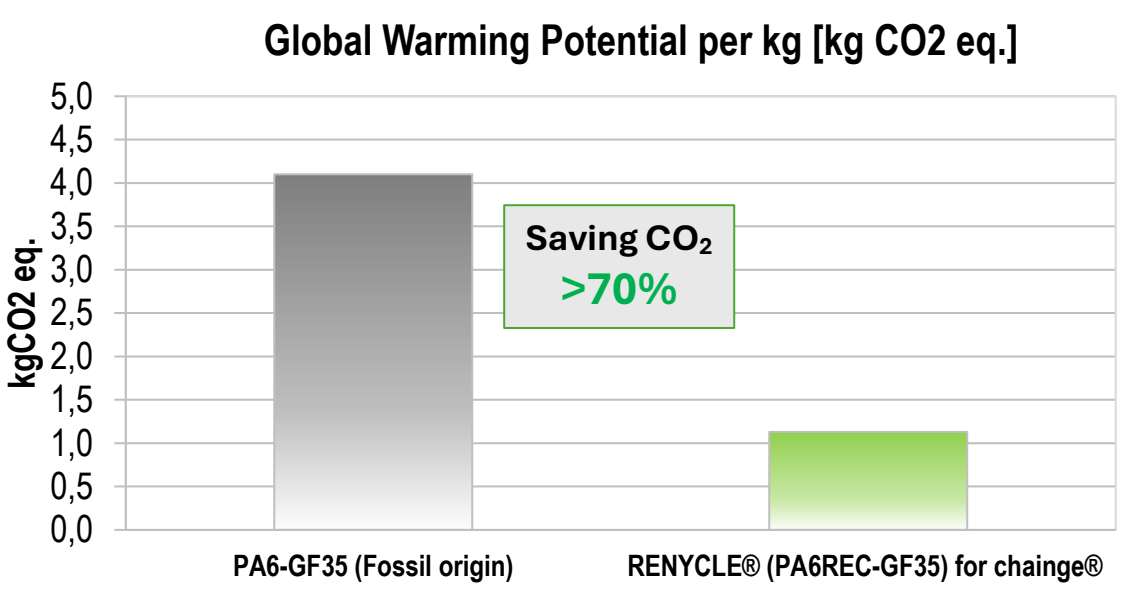
- Low-carbon footprint through effective waste reduction.
- Right selection, treatment and characterization of post-consumer and post-industrial materials.
- Development of high-performance polymers from recycled End-of-Life feedstock.

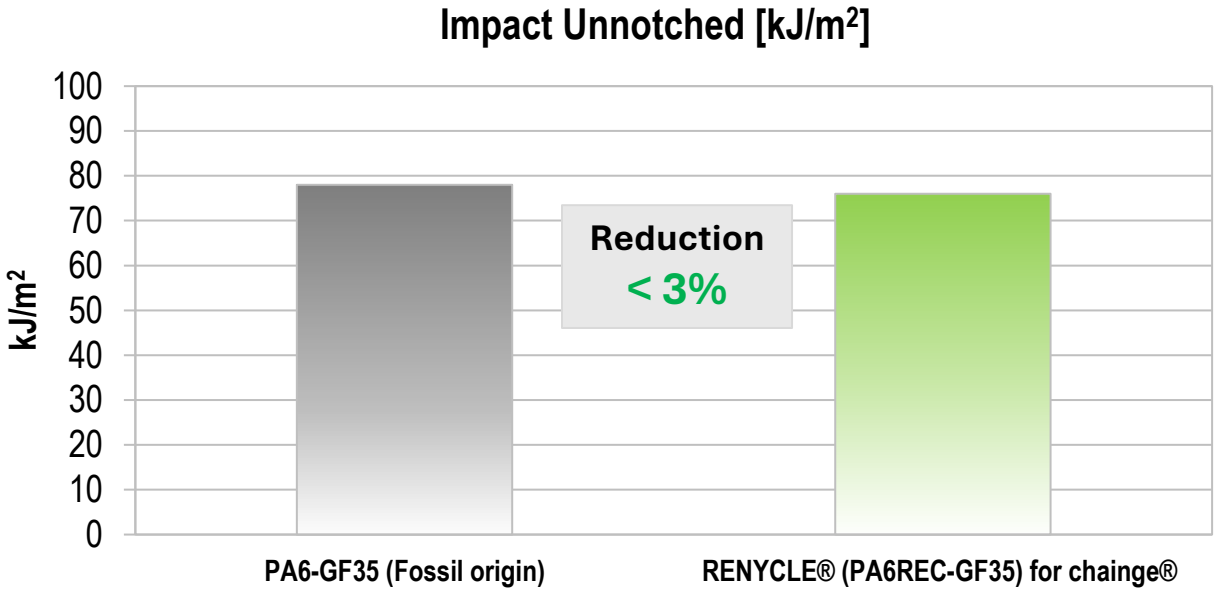


RENYCLE® for chainge®

PA6 recycled, 35% glass fibre-reinforced injection moulding grade. Black colour.

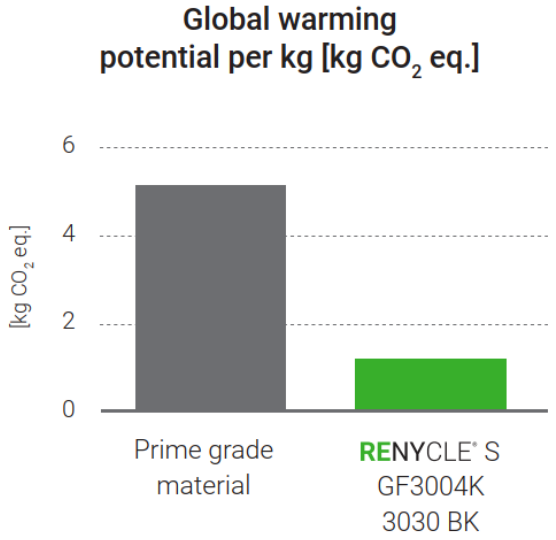
Finished Product	Stress at Break [MPa]	Strain at Break [%]	Impact Unnotched [kJ/m2]
PA6 - GF35 (Prime grade reference)	165	2.8	78
RENYCLE® (PA6REC-GF35) for chainge®	150	3.1	76

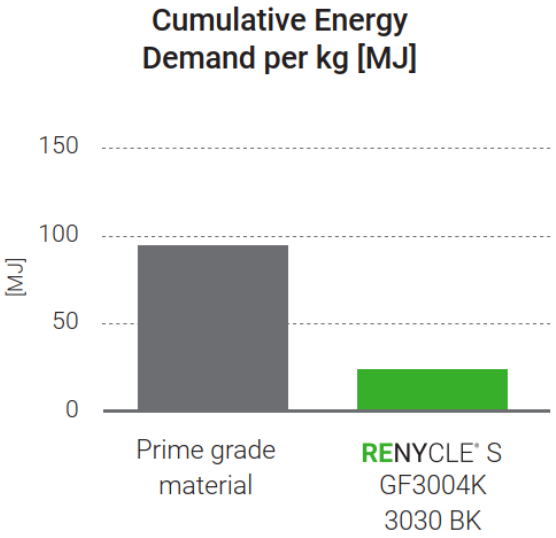




Materials and applications

RENYCLE® S Reduction of CO_2 emissions





Applications examples in RENYCLE® S GF3004K 3030 BK

Automotive – SPE Award 2024
Air Intake Manifold

Key features:
- Burst pressure resistance.
- Pressure pulsation and prolonged vibrating tests.
- Acoustic performance.
- 100% recycled material.

Furniture
Office Chair components

Key features:
- Good surface appearance.
- Good processability.
- Recycled content >90%.

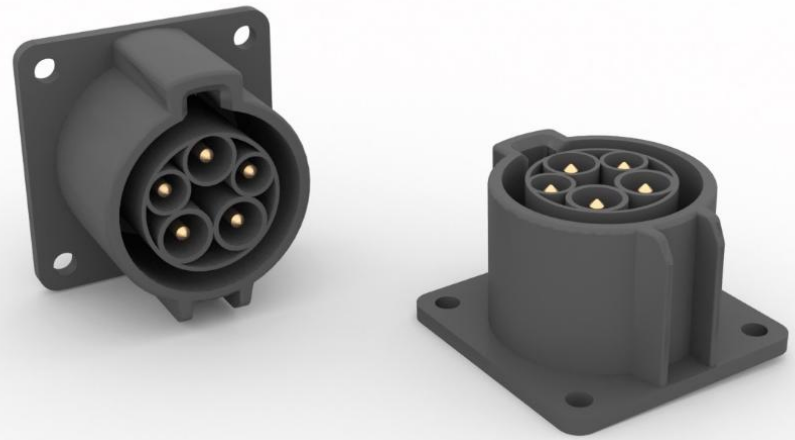
RENYCLE® E/E application example

E-mobility plug and socket components

RENYCLE® S GF2501 HF0 3033 BK

- Self-extinguishing properties (V0 @ 0.8mm - UL94).
- Excellent stiffness.
- Laser markable.
- Very good dimensional stability.
- Good aesthetics.

Property	Dry-As-Moulded
Tensile modulus [MPa]	9,400
Tensile stress at break [MPa]	120
Tensile strain at break [%]	2.9
Impact strength [kJ/m²]	50
Notched Impact Strength [kJ/m²]	7
Flammability UL-94	V0 - 0.8 mm
Glow Wire Flammability Index (GWFI)	960°C - 1 mm
Glow Wire Ignition Temperature (GWIT)	750°C - 0.8 mm



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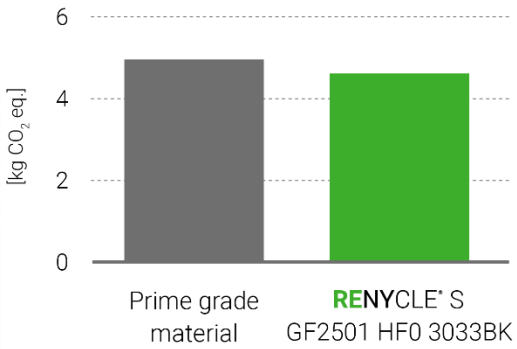
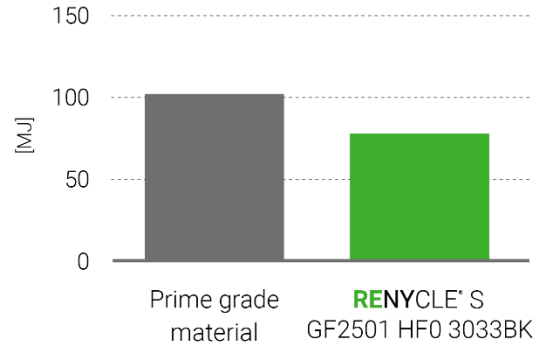
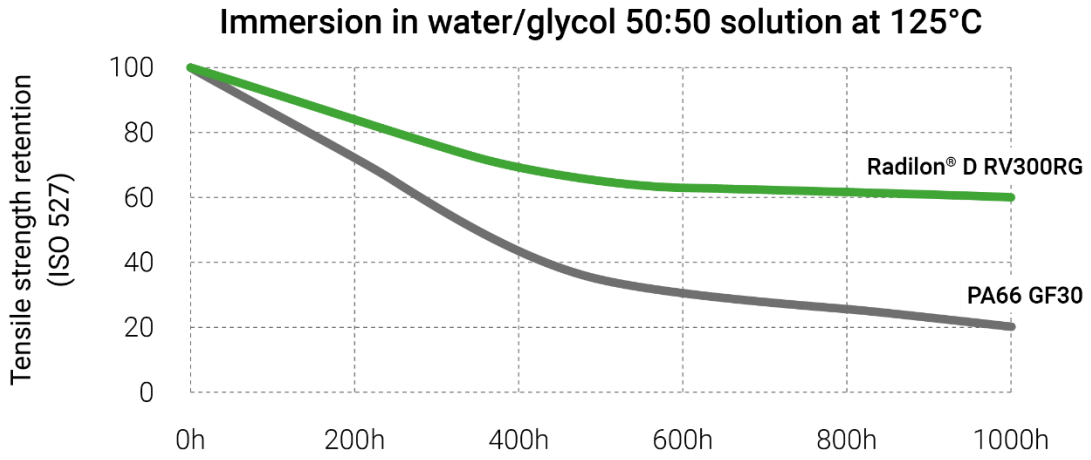


Cumulative Energy Demand per kg [MJ]



BIONSIDE® radilon® D (PA610) applications

Cooling line connectors, cooling pipes



- 60% retention with Radilon® D RV300RG (PA610-GF30-hydrolysis resistant).
- 22% retention with standard PA66-GF30.

Materials:

- Radilon® D RV300RG (PA610-GF30, hydrolysis resistant) for injection molding.
- Radilon® D 40EP25ZW (PA610, high flexibility) for extrusion.

Main requirements:

- Resistance to cooling liquid.
- Resistance to road salt solutions contact.
- Dimensional stability.
- Easy welding process with the same base polymer.

BIONSIDE® radilon® D (PA610) applications

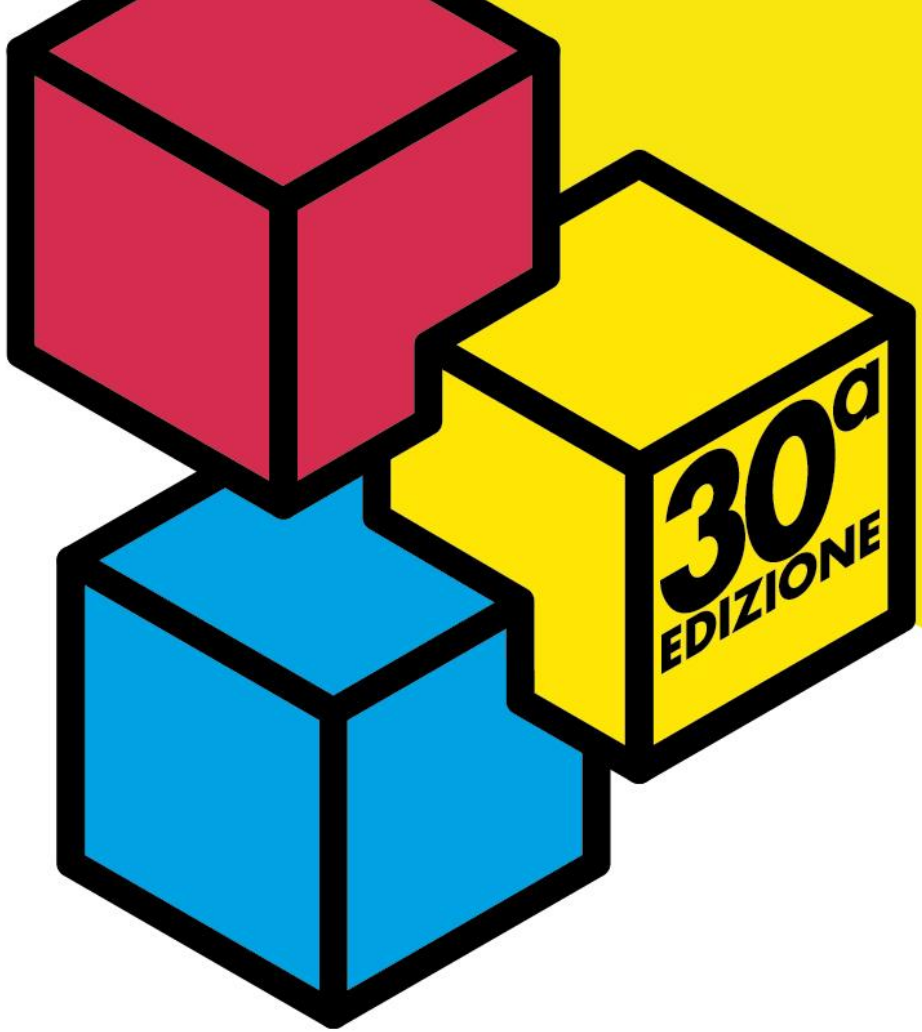
In-tank fuel lines

Material:

- Radilon® D 40P50K (PA610 flexible).
- Radilon® D 40EP50XK1C 333BK (conductive and flexible PA610 for internal layer).

Main requirements:

- Resistance to different fuels (diesel and gasoline).
- Conductivity retention after prolonged fuel immersion for the two-layer solutions.
- Excellent processability.



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grazie

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