

RADICIGROUP & SUSTAINABILITY



www.radicigroup.com

VISION AND MISSION



VISION

- To be **one of the leading chemical groups** in the polyamide, synthetic fibres and engineering plastics production chain.

MISSION

- To promote the **development of our businesses** while pursuing our Group **values and culture**.
- To pursue our vision by **valorising and optimizing our resources**, establishing strategic alliances and searching for new markets, including niche markets.
- To embed **sustainability into new product and application development**.

AN ALL ROUND APPROACH TO SUSTAINABILITY



Environmental
Sustainability

Economic
Sustainability

Labour
Sustainability

Human Rights

Product
Sustainability

Social
Sustainability

CIRCULAR ECONOMY

EU imports x6 more materials and natural resources than it exports

European Union (EU-28)






**Total trade
EU-28 to ROW**
In 2004: 455 million tonnes
In 2014: 640 million tonnes

EU-28 exports (2014)



EU-28 imports (2014)



-  Biomass
-  Manufactures
-  Fuel/mining products

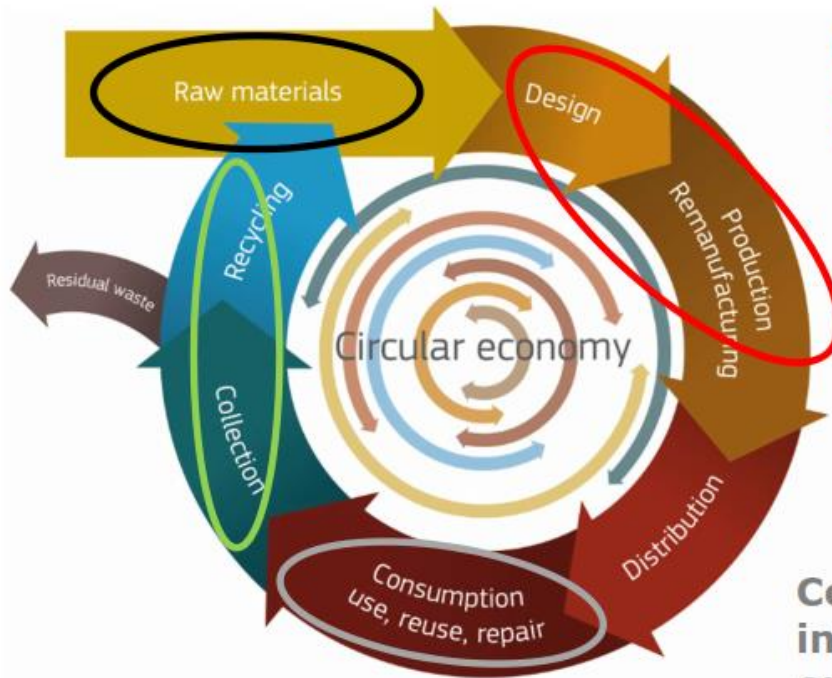
Rest of the world (ROW)



**Total trade
ROW to EU-28**
In 2004: 1664 million tonnes
In 2014: 1534 million tonnes



Circular economy: reflects the full life cycle



**Review ecodesign legislation:
Focus on durability, future re-use,
reparability, recycling and recovery**

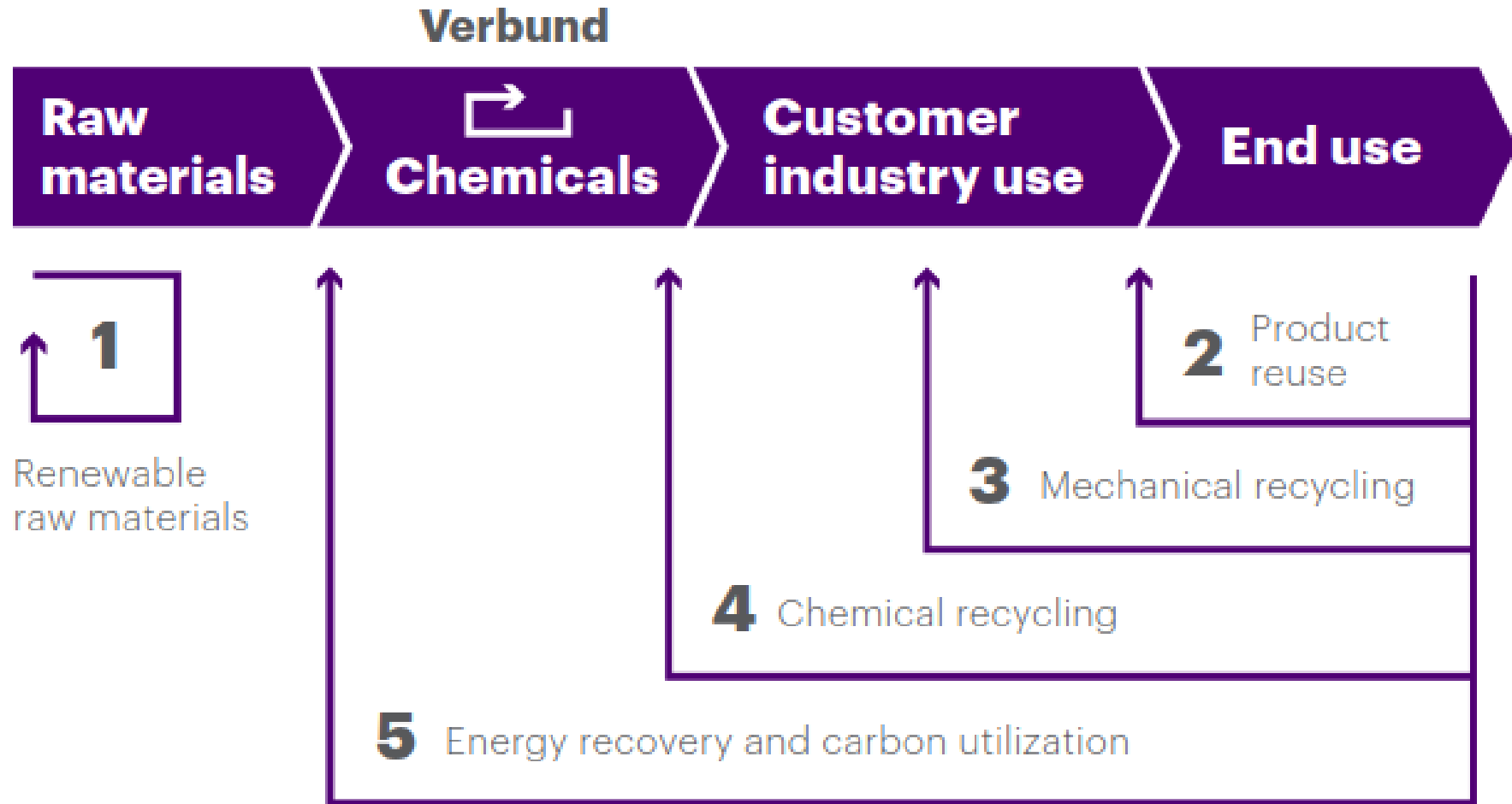
Resource efficiency indicators

**Phasing-out of landfilling,
and the right infrastructure
for recycling**

**Consumer-related measures: product
information on repair/maintenance,
environmental performance
Tackle food waste**



Circulating molecules



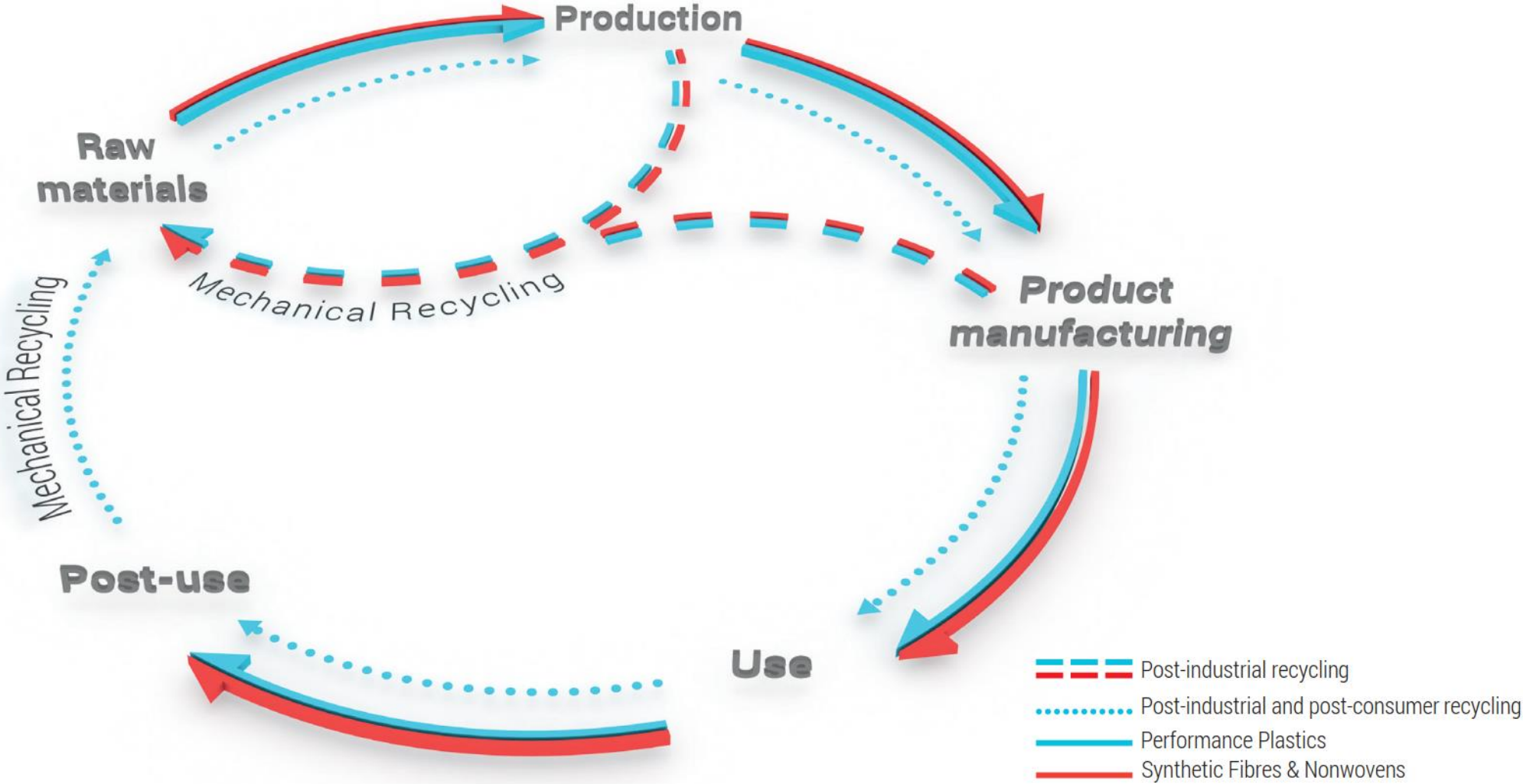
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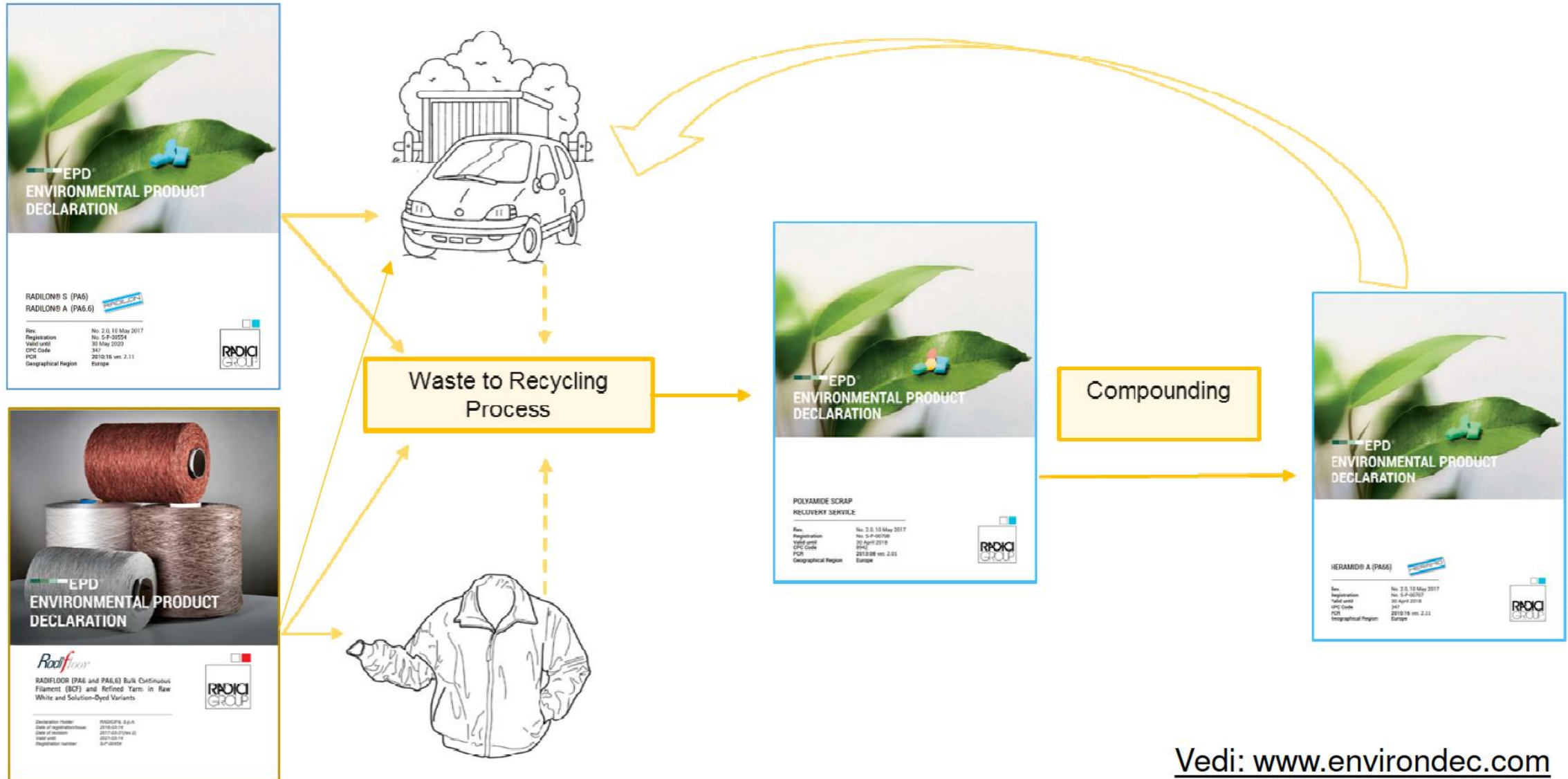
Maximizing utility of existing molecules

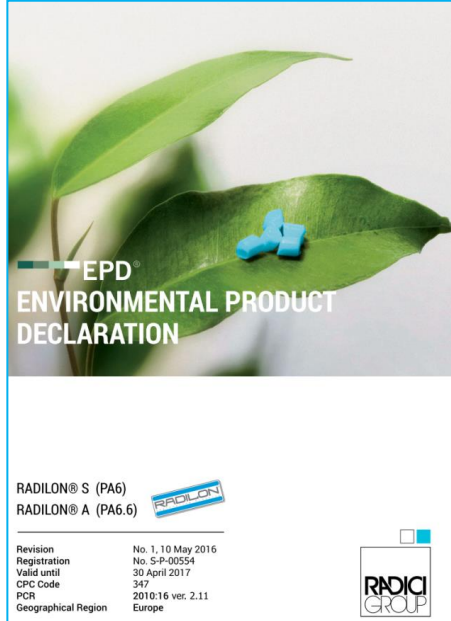
OUR ANSWERS

CIRCULAR ECONOMY@RADICIGROUP



A MULTI-PRODUCT SYNERGY





Impact category	Unit	Total	upstream	core	downstream
Acidification (fate not incl.)	kg SO2 eq	1,69E-02	1,51E-02	8,66E-04	9,09E-04
Eutrophication	kg PO4--- eq	4,21E-03	3,88E-03	1,63E-04	1,68E-04
Global warming (GWP100a)	kg CO2 eq	5,54E+00	5,25E+00	1,04E-01	1,84E-01
Photochemical oxidation	kg C2H4 eq	8,55E-04	7,89E-04	3,30E-05	3,29E-05

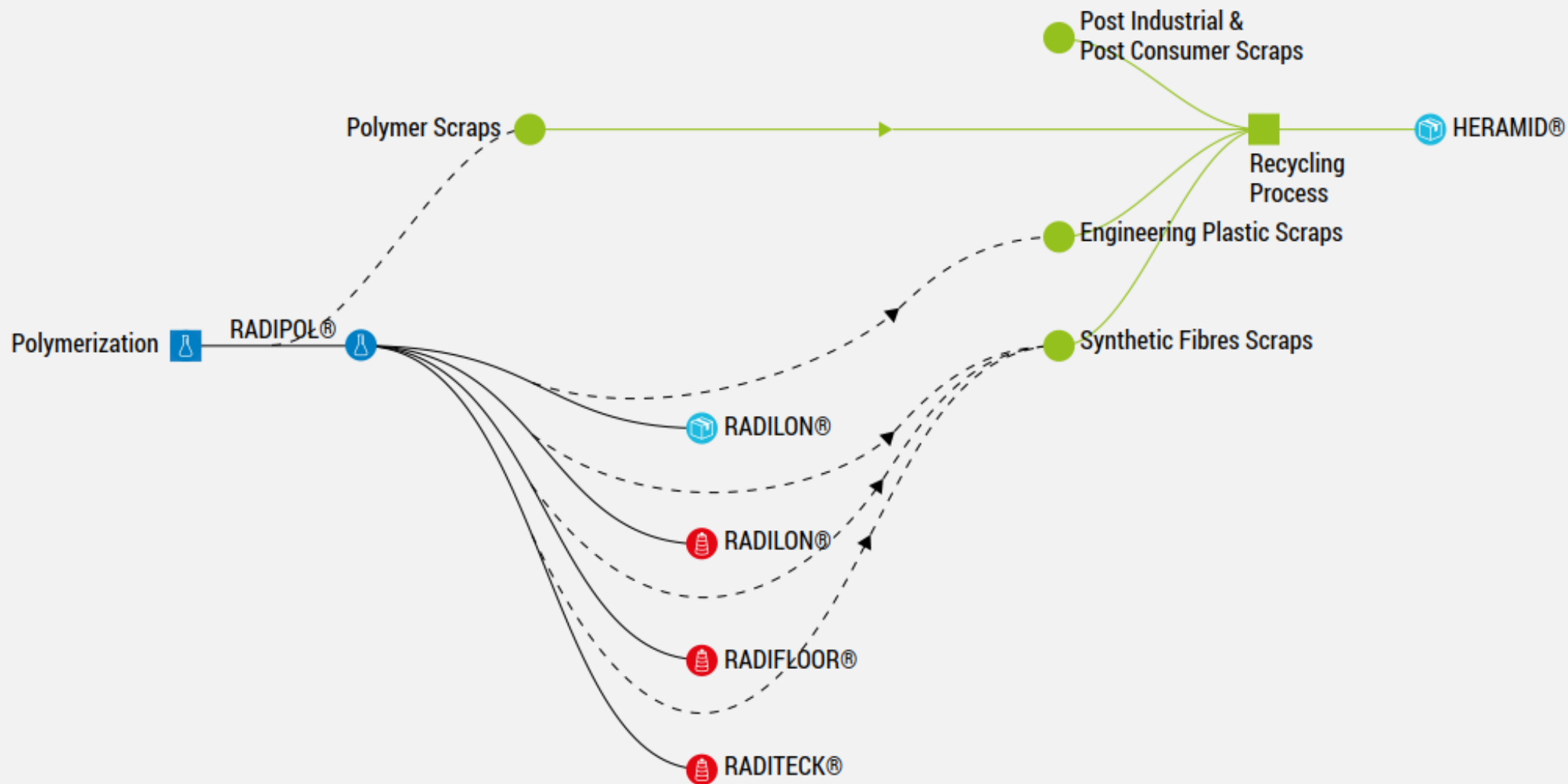
Our EPDs: Primary Grade, Recycling, Industrial Grade



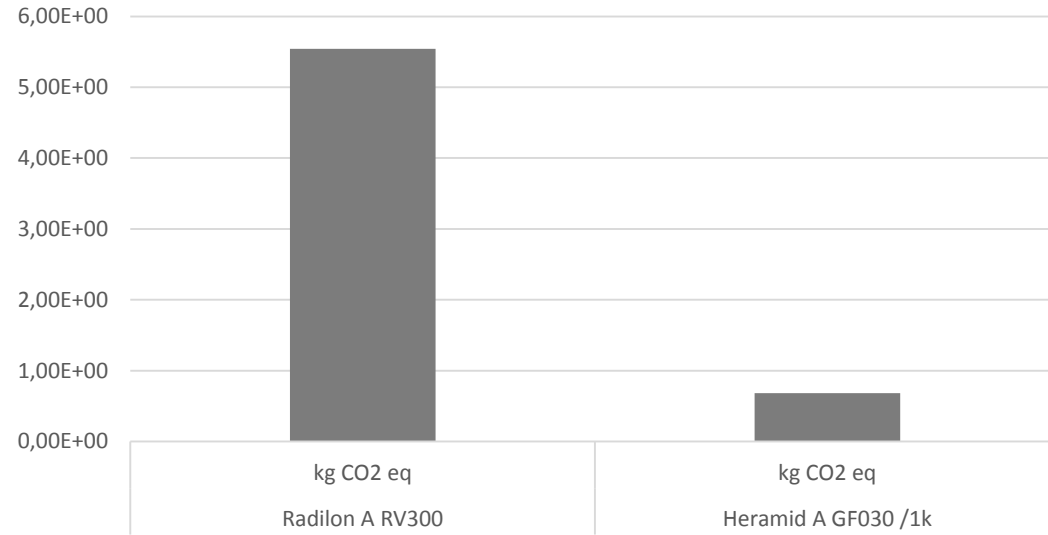
Impact category	Unit	Total	upstream	core	downstream
Acidification (fate not incl.)	kg SO2 eq	4,52E-03	3,26E-03	2,00E-04	1,05E-03
Eutrophication	kg PO4--- eq	9,45E-04	6,85E-04	9,24E-05	1,67E-04
Global warming (GWP100a)	kg CO2 eq	6,81E-01	4,72E-01	4,72E-02	1,61E-01
Photochemical oxidation	kg C2H4 eq	1,75E-04	1,26E-04	1,20E-05	3,68E-05

100% efficiency of raw materials through internal or controlled recycling

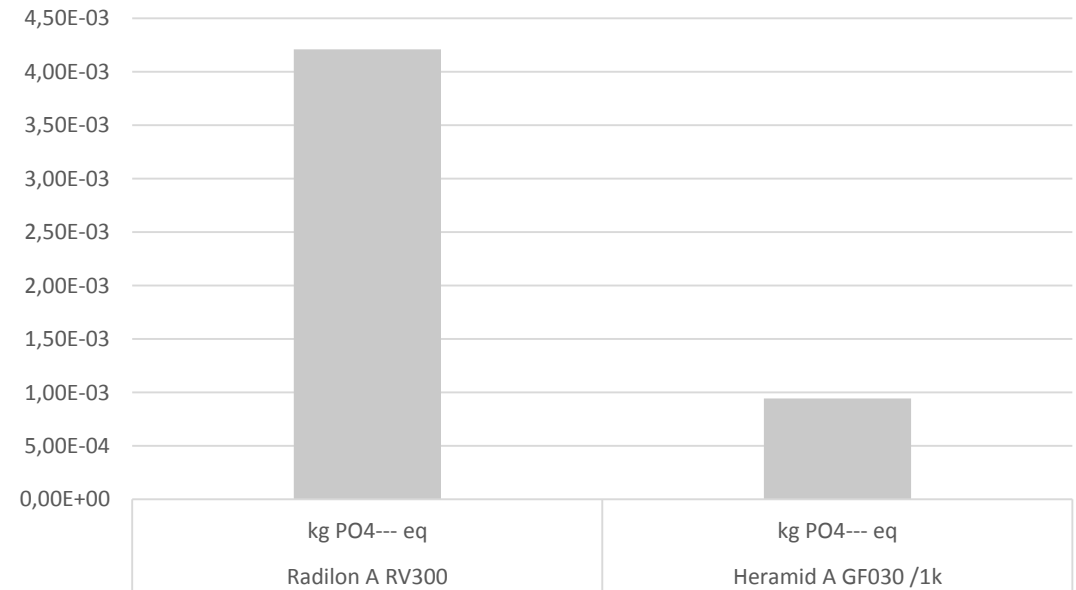
POLYAMIDE RECYCLING



GLOBAL WARMING



EUTROPHICATION



PRIMARY GRADE VS INDUSTRIAL GRADE
 THROUGH OUR RECYCLING SERVICES

ENVIRONMENTAL PRODUCT DECLARATION

CHEMICAL RECYCLING

Energy amount necessary to produce 1 kg of polyamide polymer coming at 50% from post-industrial waste and at 50% from post consumer waste.

Revision 1, 20. November 2014
Certification No.: S-P-00500
Valid until: 15. November 2016

EPD®

CPC347-PLASTICS IN PRIMARY FORMS
PCR2010:16 VERS. 2.1

> **TABLE 10.** PRIMARY ENERGY DEMAND PRODUCTION OF 1 kg |

	Units	UPSTREAM	CORE	DOWSTREAM	TOTAL
Non renewable energy resources	MJ	4	59	<0,3	63
Renewable energy resources	MJ	<0,3	5	<0,02	6

Tot. 69

EPD®
ENVIRONMENTAL PRODUCT
DECLARATION

MECHANICAL RECYCLING

Energy amount necessary to produce 1 kg of polyamide polymer coming at 100% from post-industrial 30% glass fibre waste

HERAMID®
A NER GF030 /1K



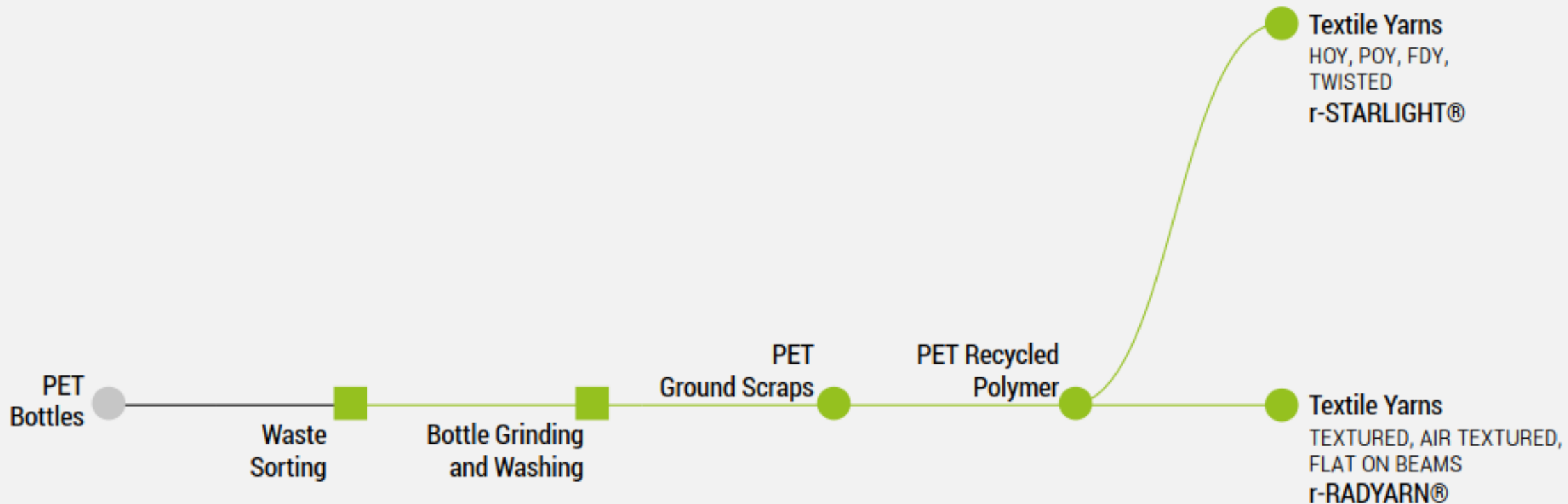
Rev.
Registration
Valid until
CPC Code
PCR
Geographical Region

No. 1, 10 May 2016
No. S-P-00707
30 April 2018
347
2010:16 ver. 2.11
Europe

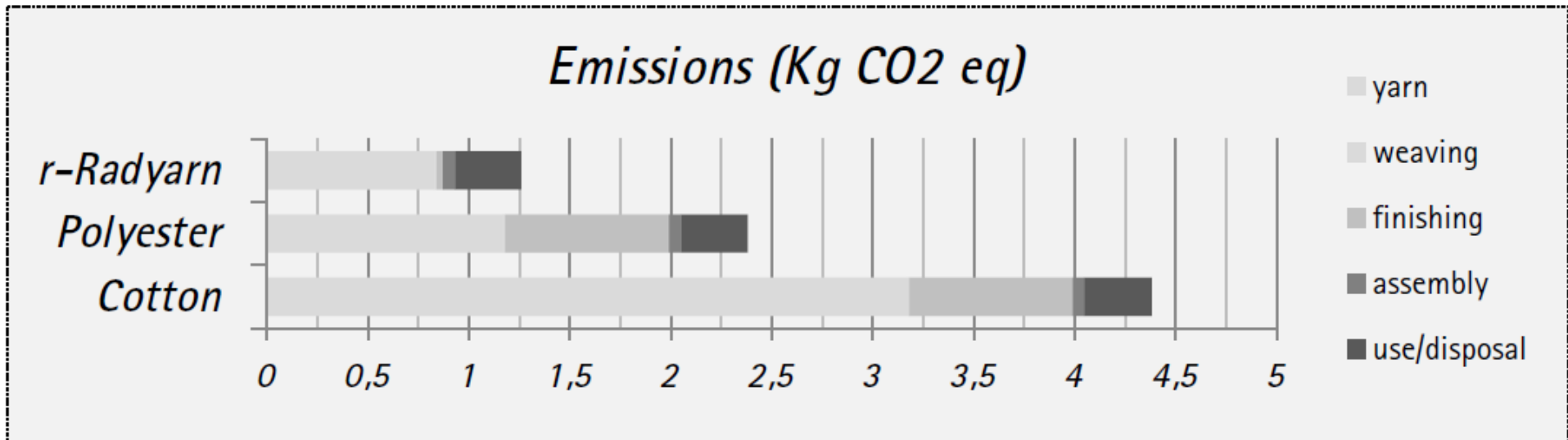
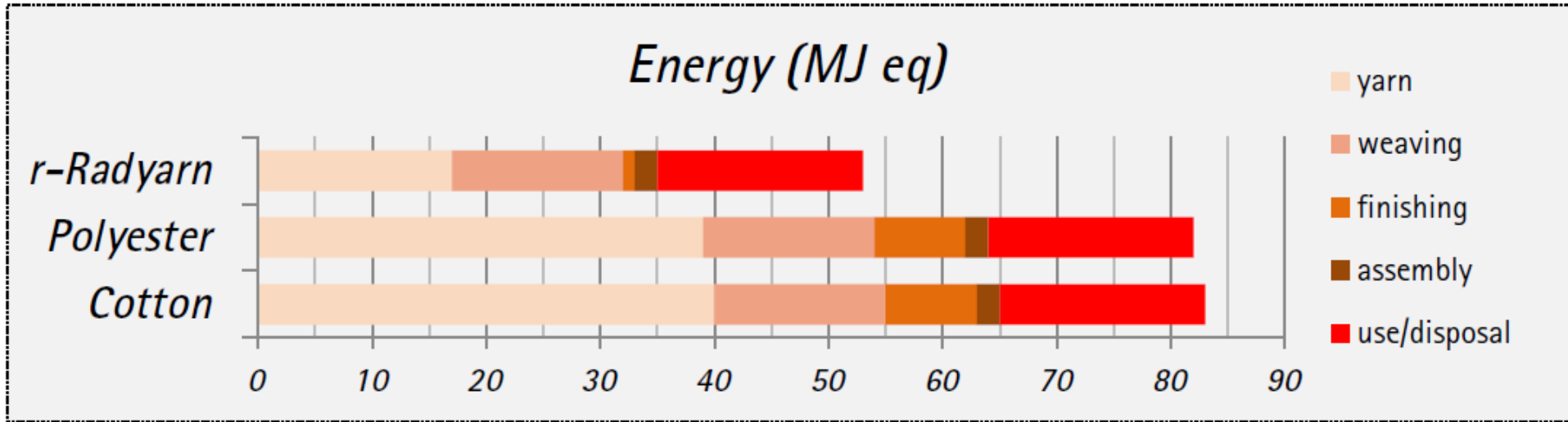
GER - Gross Energy Requirements

GER	UNIT	UPSTREAM PROCESSES	CORE PROCESSES	DOWNSTREAM PROCESSES	TOTAL	
Non-renewable resources	MJ	7.14	2.36	2.98	12.48	10,2
Renewable resources	MJ	0.30	2.89	0.04	3.23	3,43
Total	MJ	7.44	5.26	3.01	15.72	13,63

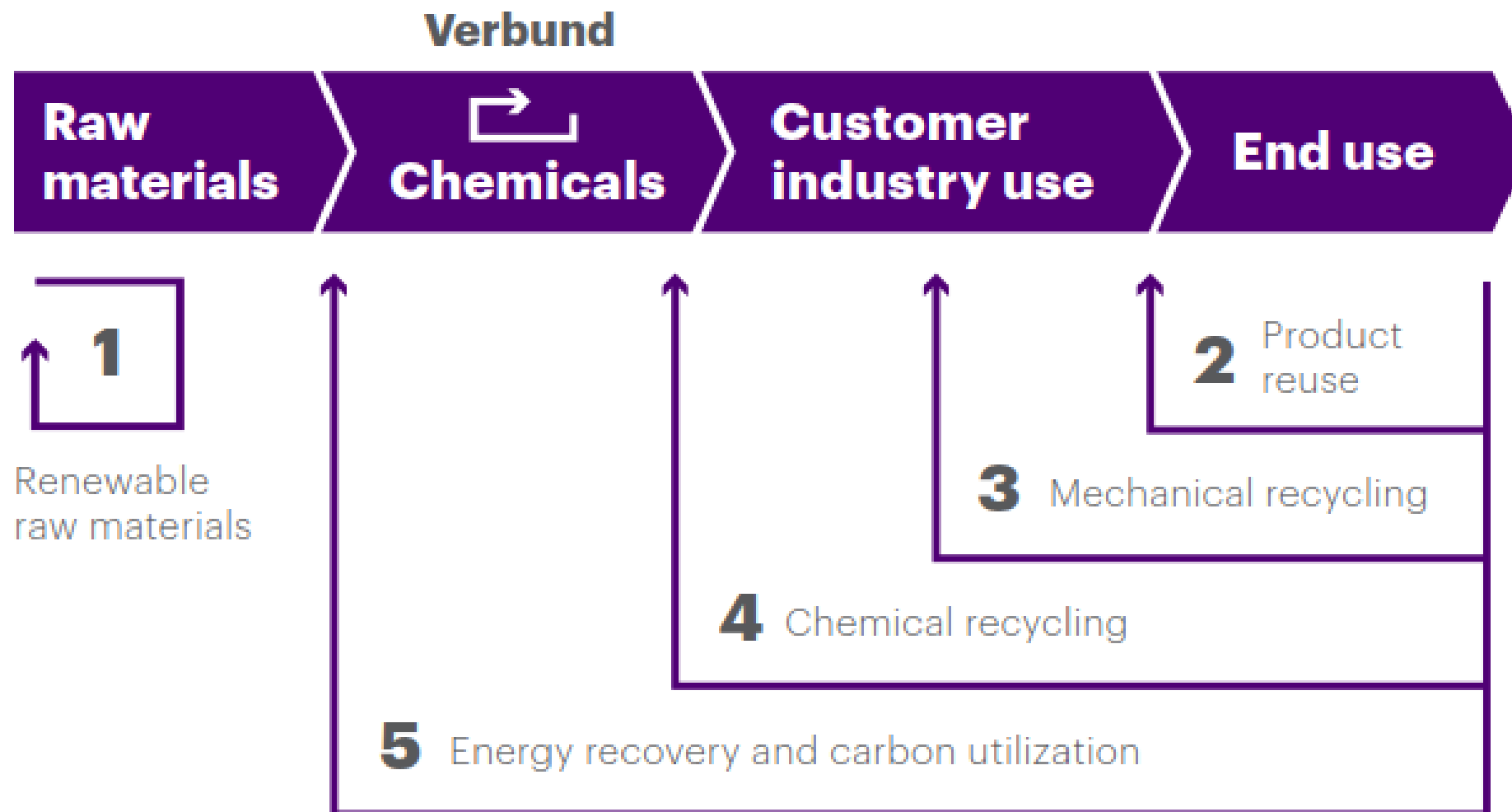
MECHANICAL RECYCLING OF POLYESTER



Estimated enviromental impact for apron unit.



Circulating molecules



Maximizing utility of existing molecules

FIBRES & PLASTICS SYNERGY



What comes out from our contacts with **apparel brands** is **the importance of synergy of the plastics & fibres areas, a strategic strong point.**

Part Number	Part identification	Meting T (°C)	Cristallization T from melt (°C)	Note	Part Number	Part identification	Meting T (°C)	Cristallization T from melt (°C)	Note
1	FILLING	219	184	PA 6	13	STOPPER	216	185	PA 6
2	FLAG LABELS	221	142	PA 6 + altro che disturba la cristallizzazione	14	CARE LABELS	215	156	PA 6 / PA 6 copo
3	MAIN LABEL	169 - 218	175	PA 6 + altro	15	CARE LABELS	209	160	PA 6 copo
4	MAIN LABEL	219	148	PA 6 cristallizzazione rallentata	16	PATCH FLAG	225	177	PA 6
5	PLASTIC HOOK	219	182	PA 6	17	PATCH	222	173	PA 6
6	FABRIC	218	184	PA 6	18	ZIP	220	184	PA 6
7	FABRIC	221	175	PA 6	19	NEW LIGHT TYPE	218	181	PA 6
8	BEADS	217	184	PA 6	20	FABRIC	214	174	PA 6 + PUR
9	CORD	220	177	PA 6	21	LAMINATED FABRIC	220	176	PA 6
10	VELCRO	221	157	PA 6 modificato (lenta cristallizzazione)	22	LINING	223	179	PA 6
11	SEWING YARN	228	175	PA 6	23	MINISTOP	221	181	PA 6
12	PULLER+STRING BLACK	145	90	PP?					



“100% Nylon for the eco-design of the materials of the future”



RESEARCH & DEVELOPMENT

FROM YARN TO GARMENT: 100% NYLON
FOR TOTAL RECYCLABILITY

DAL FILATO ALLA CONFEZIONE: 100% NYLON PER LA RICICLABILITÀ DEI CAPI

OUR TEAM

A 100% NYLON, 100% RECYCLABLE GILET FOR THE RADICIGROUP SKI CLUB

UN GILET 100% NYLON, 100% RICICLABILE
PER LO SCI CLUB RADICI GROUP



Introducing a new gilet made exclusively for the RadiciGroup Ski Club, but designed to soon become a “must have” garment for athletes and casual skiers alike.

The gilet is made of RadiciGroup **Raditek® Fine** yarn - a high-tenacity polyamide yarn patented for high technology applications, such as sails and parachutes -, which endows the fabric with high tear and abrasion resistance, while keeping it lightweight (less than 40 gr/sqm of fabric). Furthermore, the yarn was developed to resist UV radiation and maintain its performance characteristics unchanged over time.

The fabric was woven in Germany, whereas all the other processing was done in the Region of Lombardy, Italy. Moreover, the fabric was enhanced with a PFC-free anti-drop treatment. The gilet features fibreball insulation with siliconized **Radillon®** staple fibre, another RadiciGroup product. This filling is an excellent alternative to goose down, provides effective warmth, and is lightweight and hypoallergenic.

As for the accessories, the zipper was made of polyamide, while the ropes were made of nylon with a minimal percentage of elastomer, so as not to jeopardize recyclability.

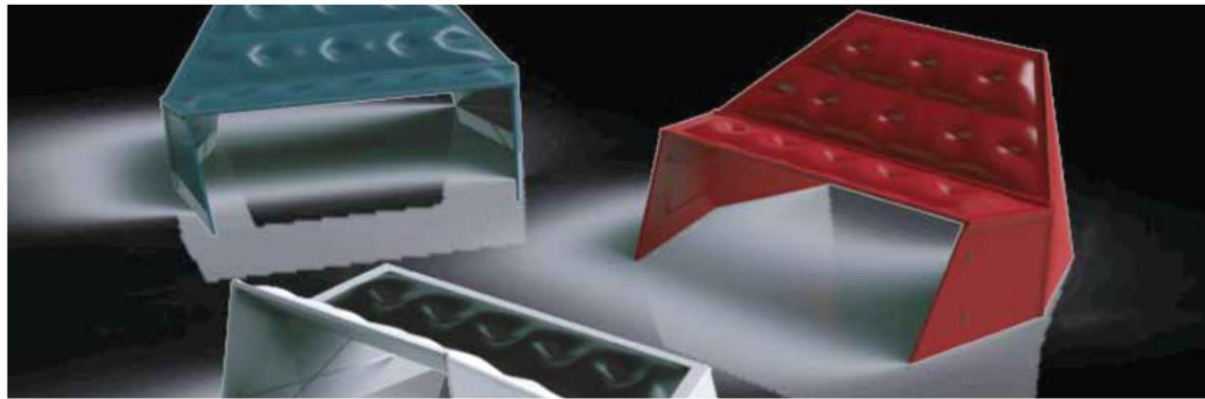
The clothing item was devised, designed and made according to the ecodesign concept: at the end of its useful life, the gilet will be shredded, ground, thermomechanically extruded, and finally compounded to give life to a new plastic material. In fact, one of the most important challenges today for RadiciGroup is to process all textile scraps and recycled materials into new plastic: this is the only way for the synthetic fibre textile industry to be truly sustainable.

The above collaboration among highly specialized companies making up a short and sustainable production chain made it possible to produce a sportswear garment, not only combining technical performance with comfort, style and ease of maintenance, but also incorporating a second life.

RadiciGroup with the Politecnico di Milano,
Design Department:

**“100% Nylon for the eco-design of the
materials of the future”**

RADICI
GROUP



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Thank you