EPS Circular Economy Workshop Kralupy

Marcin Cebulski

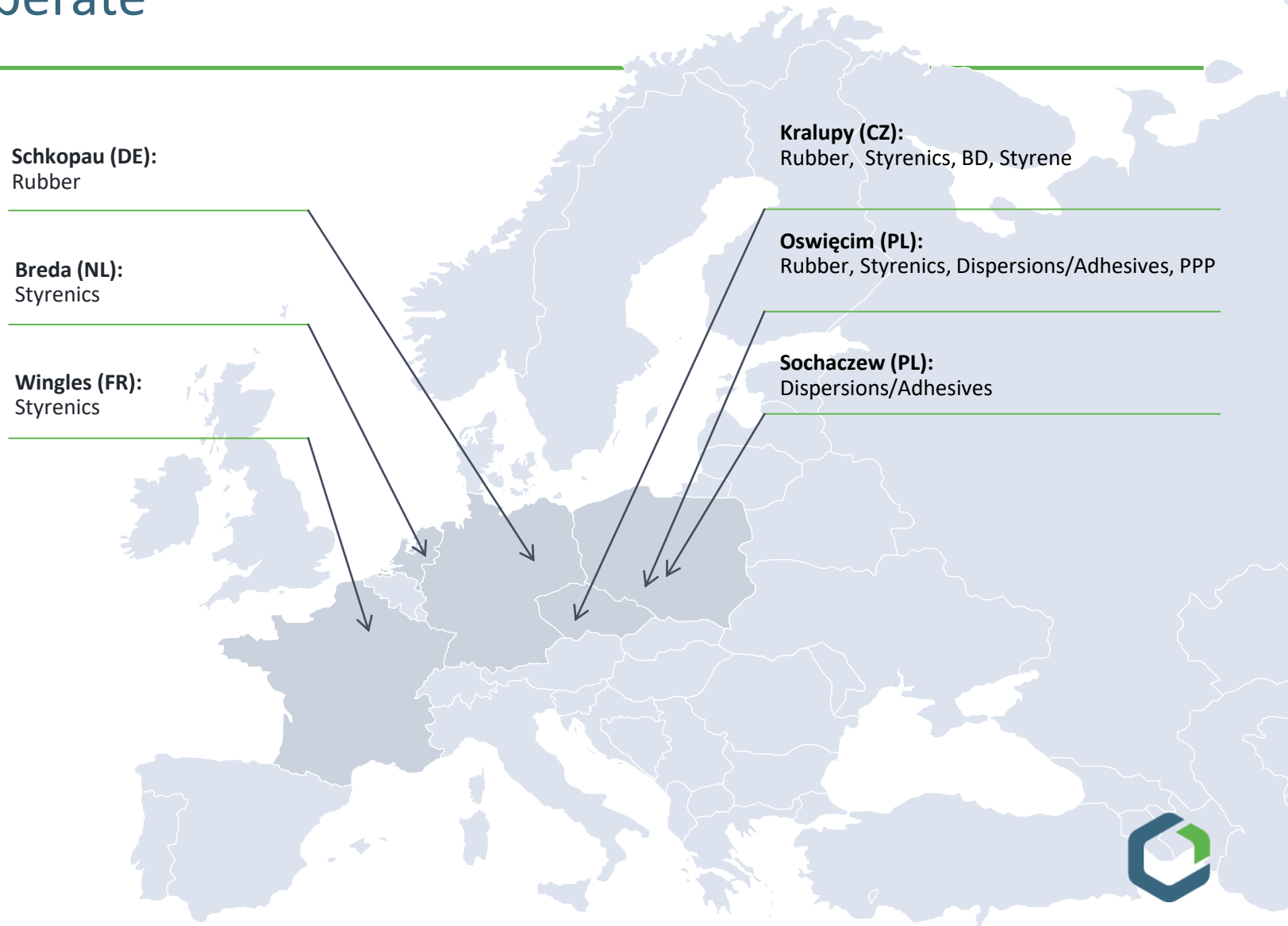
28.04.2022

Agenda

1. **Synthos – general overview.**
2. **Raw Material Suppliers (RMS) activities.**
3. **Synthos activities.**
4. **Barriers in CE .**

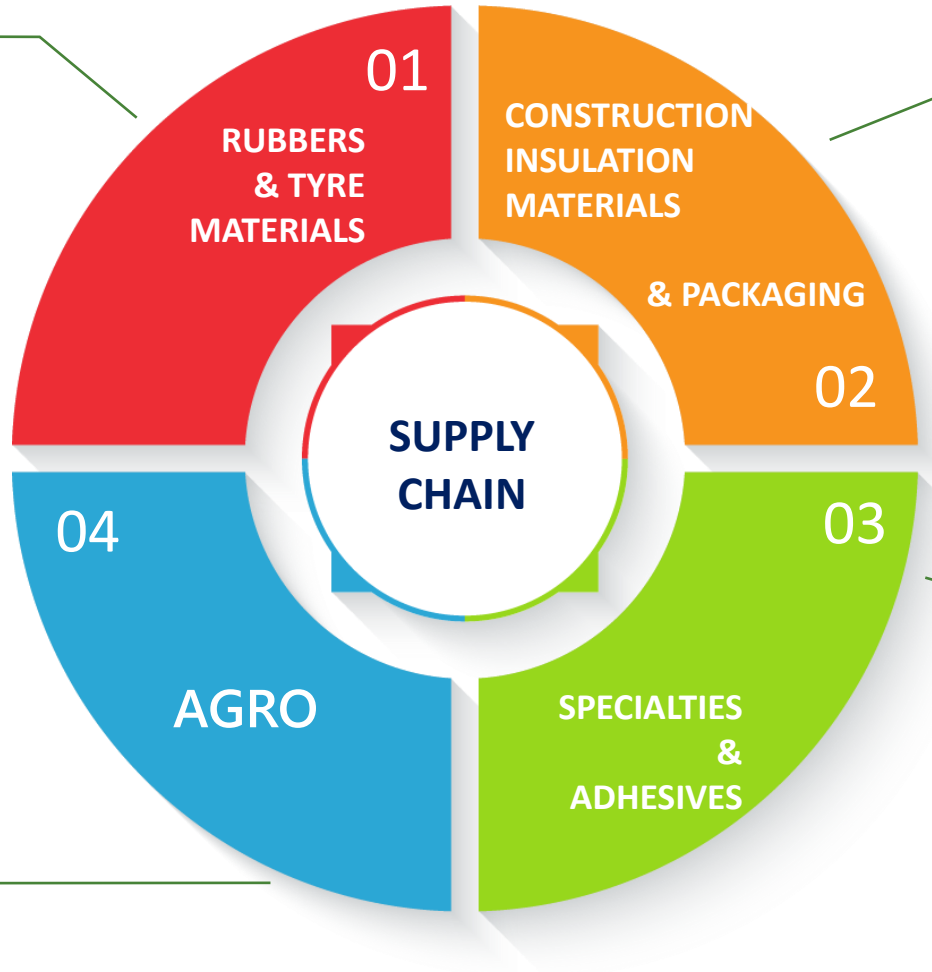
Who we are and how we operate

- **Synthos is a leading global manufacturer** of synthetic rubber, styrene plastics, plant protection products and dispersions, latex and adhesives to a wide range of industries.
- Our manufacturing facilities are in **Poland, the Czech Republic, the Netherlands, Germany and France**.
- We have three state-of-the-art research and development centres where we are constantly working **to develop and improve our technologies and solutions**, focusing on reducing our environmental footprint and that of our customers.
- We employ over **3,600 passionate people**.



Synthos S.A. main numbers

Innovative solutions for a sustainable future



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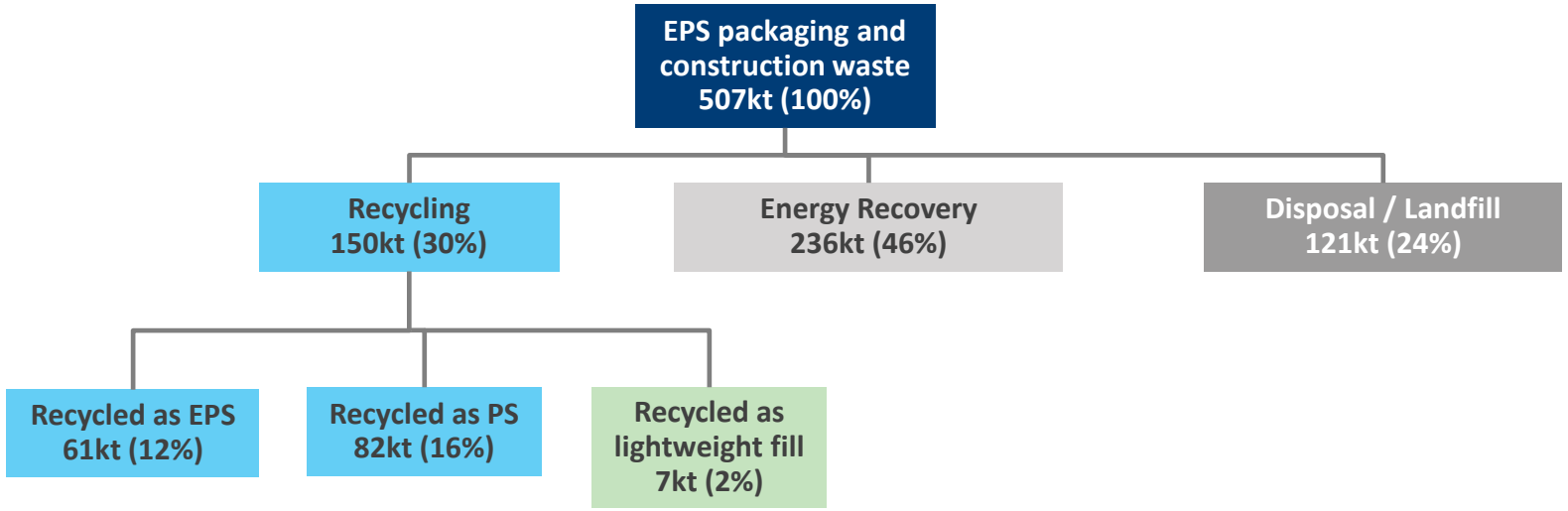
Recycling data across EU

Recovery and disposal streams of EPS packaging and construction waste. EUMEPS / Conversio Study

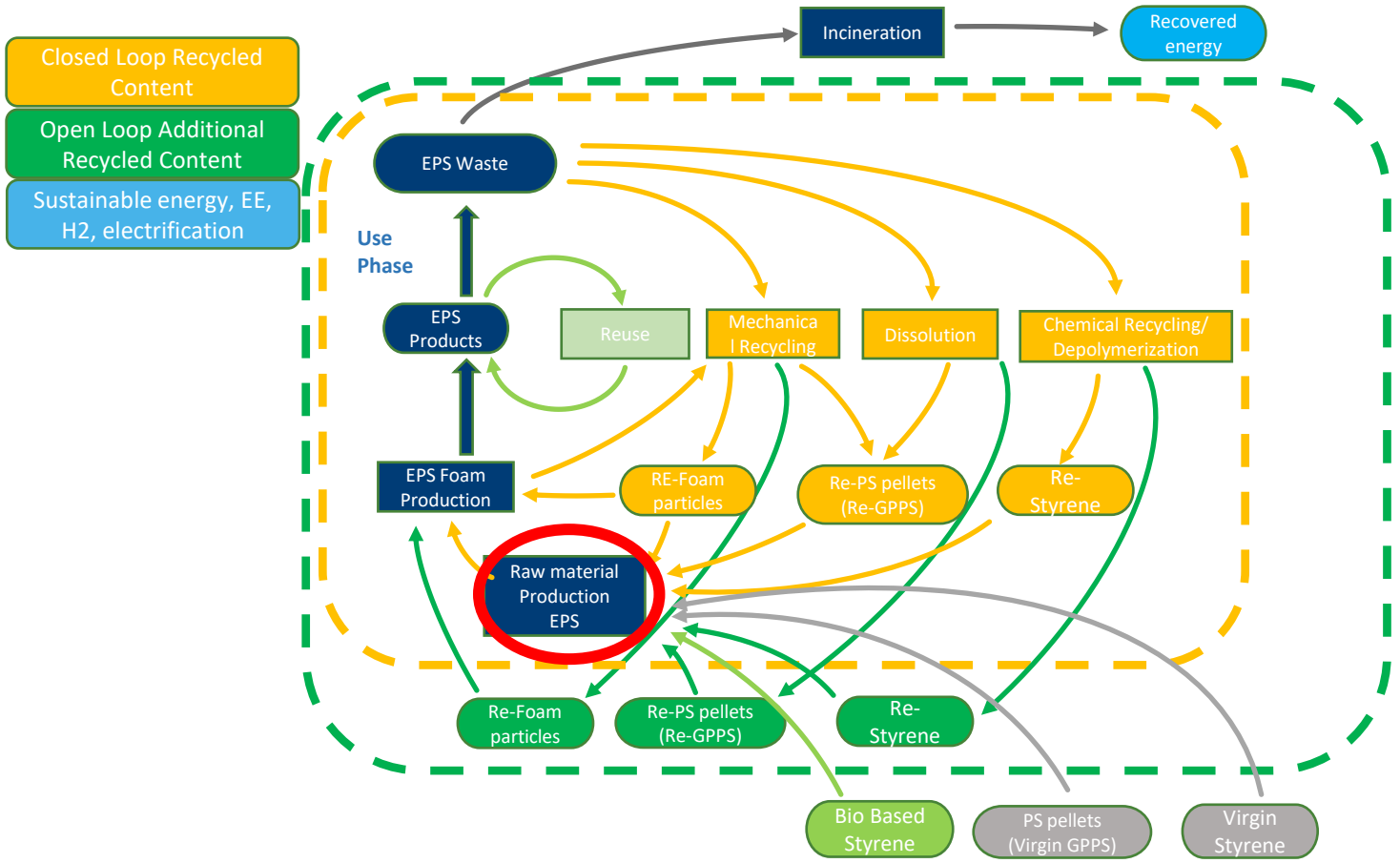


EPS waste	EPS collected in kt	%	Recycling in kt			Recycling rate	Energy Recovery in kt	Landfill / Disposal in kt
			Recycled as EPS	Recycled as PS	Recycled as lightweight fill			
EPS Packaging	372,2	73,4%	50,7	80,4	5,5	36,7%	146,7	88,9
EPS Construction	135,0	26,6%	10,5	1,2	1,3	9,6%	89,3	32,7
TOTAL	507,2	100%	61,2	81,6	6,8	29,5%	236,0	121,6
			12,1%	16,1%	1,3%		46,5%	24,0%

- Regarding total EPS waste **the largest share** of collected waste **is generated by** the **packaging** application in Europe.
- **Around 30%** of EPS **is recycled**, 46% is recovered energetically (with a major contribution from the EPS construction waste, 2/3 of which being incinerated) and **24% is still landfilled**.

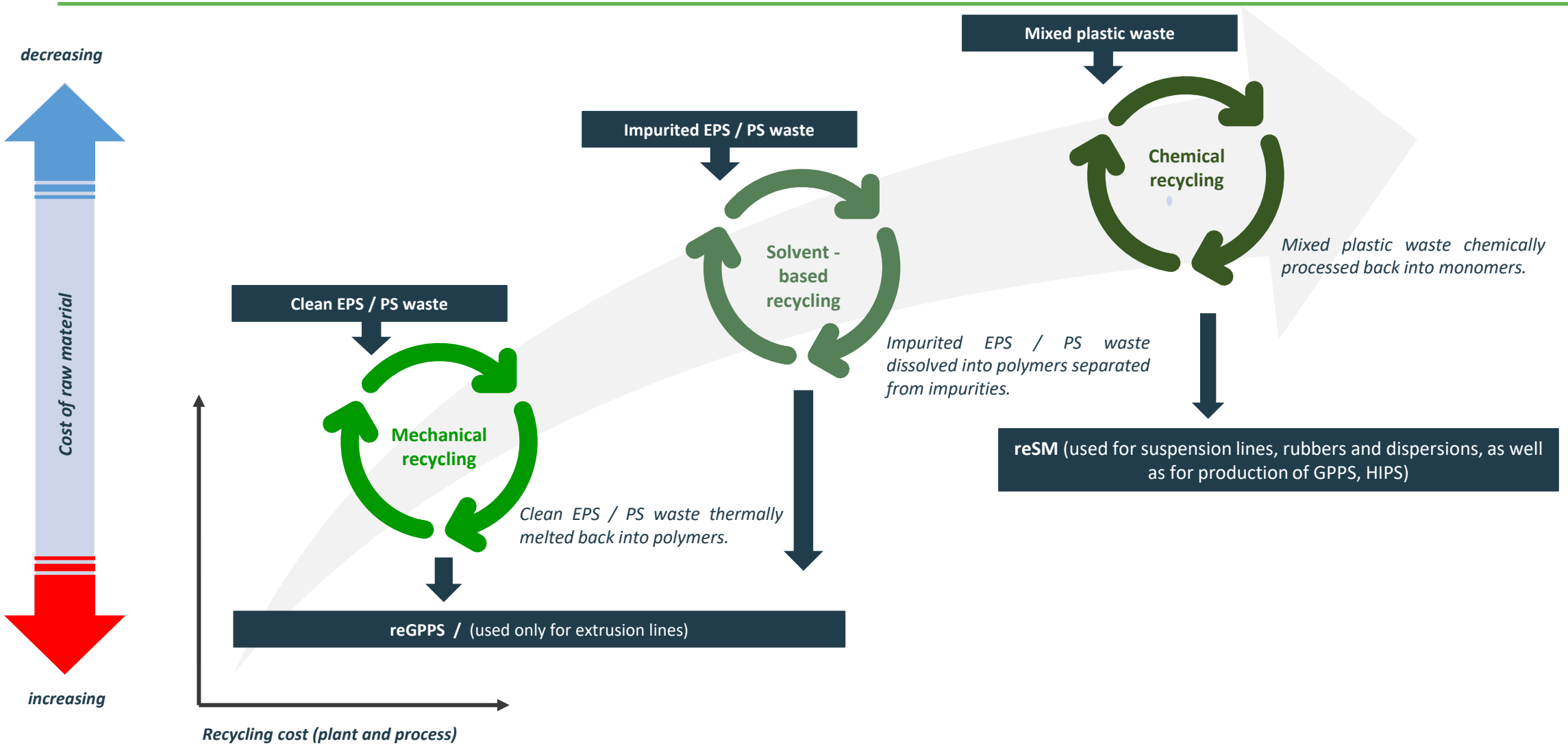
RMS Role in EPS Post Consumer Waste Streams

Understanding the EPS waste streams



- **RMS companies play central role** in almost all elements of waste streams, as we are able to put reGPPS into new products as recycling content (RC)
- RMS companies are also able to **develop and invest in innovative recycling technologies**

Recycling technologies – summary and conclusions



RMS Companies activities

		Waste collection		Recycling technologies						BIO
				Mechanical Recycling	Solvent Recycling		Chemical Recycling			
		Backward integration	Own collection and sorting		PS Loop	Polystyvert	RT Tech	Agilyx	Other/own	Biomass (BMB)
synthos	EPS PS XPS	■	■	■	■	■	■	■	■	■
BASF We create chemistry	EPS XPS	■		■	■	■			■	■
sunpor	EPS	■		■	■					■
BEWi Synbra GROUP	EPS XPS	■	■	■	■	■			■	■
Ravago	EPS XPS	■	■	■					■	■
eni versalis	EPS XPS	■		■			■	■	■	■
TOTAL	EPS PS	■		■		■	■	■	■	■
UNIPOL	EPS	■		■	■					■

RMS Companies activities

1. Collection, sorting, mechanical recycling – **all** EU RMS companies **are intensively looking** for **new waste streams** by:

- Internal investment (SYNTHOS, BEWI, RAVAGO, TOTAL, VERSALIS)
- Long term strategic agreements with waste holders.
- Capital ties with companies specialized in the collection and sorting of waste.

2. Solvent recycling - RMS are **developing their own technologies** and/or cooperating with existing know-how holders.

- Co-creating a solution with external entities (Polystywert)
- Co-creating within a cooperative a solution with future technology rights and know-how (PSLOOP)
- Own development/technology.

3. Chemical Recycling – cooperation with startups or development of own technologies

- Own activities on the development of chemical recycling technology (SYNTHOS, BASF, BEWI, RAVAGO, TOTAL, VERSALIS)
- Co-creation of technology with external entities (Agylix, RT Tech, etc)

Result of RMS survey 2020 (5 out of 7 RMS companies):

- **Committed to introduce recycled material as a feedstock in the EPS Raw Material by 2025 in a range 15 – 100%**
- **Expected Recycled Material uptake**

from Mechanical Recycling	**78 000 ton/y**
from Solvent/Chemical Recucling	**90 000 ton/y**
	168 000 ton/y (Yearly waste generation 507 000 t)

RMS activities - solvent and chemical recycling plants

	Technology provider	Existing plants	Planned plants (announced)
Solvent recycling technology	**PS Loop** (consortium)	Demo plant 3500 t/y NL	▪ 10 000 t/y NL (2023) **COOP** ▪ 10 000 t/y DE/AT ▪ **10 000 t/y PL Synthos**
	Polystyvert (private company)	Demo plant 400 t/y Canada	▪ 12 000 t/y EU **Bewi** ▪ *10 000 t/y F **Total, Synthos***
Chemical recycling technology	**Agylix** (private company + consortium)	Demo plant 3500 t/y USA Oregon	▪ 15 000 t/r EU **Total, Ineos, Trinseo**
	Recycling Technology UK (private company)	Demo plant GB	▪ 15 000 t/r FR **Ineos** (2023) ▪ 15 000 t/r B **Trinseo** (2023) ▪ 15 000 t/t FR **Total**
	Quantofuel (private company)	Lab scale DK	▪ 20 000 t/r DK **BASF** (2022)
	Hoop (own project of Versalis)	x	▪ 6 000 t/r IT **Versalis**
	Pureeps (consortium)	Lab scale	▪ 3000 t/y NL (demo plant)
	Alterra Energy (private company)	20 000 t/y USA, Ohio	▪ **55 000 t/y NL Ravago, Neste**
	Honeywell (UpCycle)	x	▪ **30 000 t/y ES, Honeywell, Sacyr**
		TOTAL	**216 000 t/y**

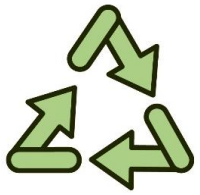
▪ European plastics producers plan to **increase investment in chemical recycling from EUR 2.6 billion in 2025 to EUR 7.5 billion in 2030**. Investments in the development of chemical recycling and other innovative technologies are expected **to achieve production of recyclates at the level of 1.2 million tons by 2025 and 3.4 m tons by 2030.**

RMS activities - PS / EPS / XPS products containing recyclates or biocomponents

Use of recyclates or biocomponents in products

Examples of competition activities

BEWI	▪ Introduced **GreenLine of EPS** made of 100% recycled material (EPS collected and recycled by BEWI).
BASF	▪ EPS Styropor , Neopor BMB, XPS Styrodur 3000 BMB – products based on a biomass balance certified by REDcert.
VERSALIS	▪ EPS Revive – **PS / EPS with a declaration of 20% recyclate content** from post-consumer waste.
TOTAL	▪ Announced introduction in 2022 of **grey EPS containing 20% recyclate** from post-consumer waste.
SUNPOR	▪ Announced introduction in 2022 of a product with a declared **20% content of recyclate** from post-consumer waste.
Synthos	▪ July 2021 - Introduction of **InVento product with 20 % of post consumer recycling content** . Certified by ISCC+ ▪ Introduction of **XPS product with approx. 16 % of recyclate content** in 2022.



! ▪ **Recyclability** and use of **recycled content in products will be a critical competition factor for all products** and will be another **competitive advantage on the insulation materials (in favor for EPS)**

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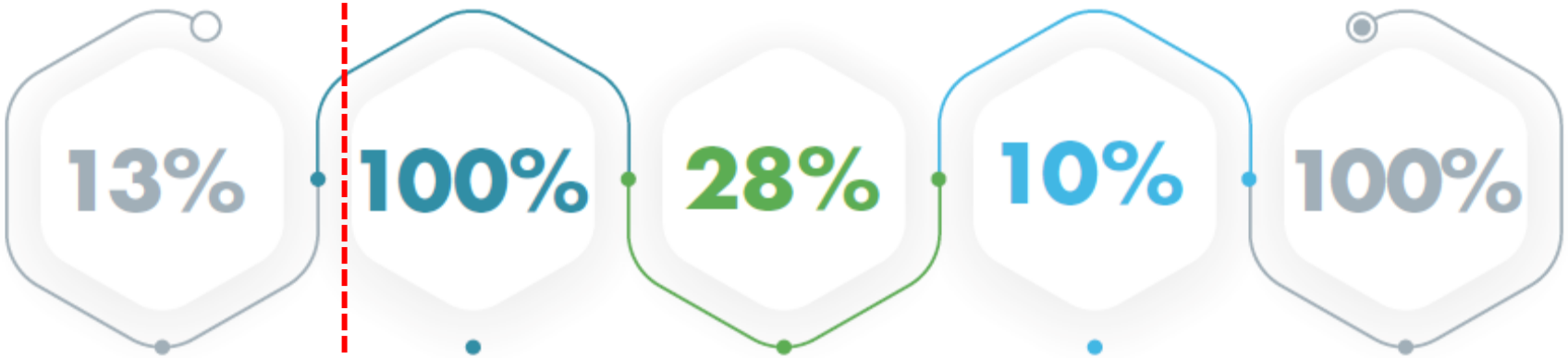
Synthos Sustainable Development Strategy

synthos EVERGREEN 2030

STRATEGIC OBJECTIVES



GREEN RAW MATERIALS

We strive to ensure that 13% of our raw material base is made up of bio-based or recycled materials.

GREEN PRODUCTS

We aim for 100% of our product list to be made up of sustainable products.

GREEN ENERGY

We strive to reduce greenhouse gas emissions by 28% per GJ of energy in our production process.

GREEN PRODUCTION

We strive to reduce energy and utility consumption by 10% per tonne of product in our production facilities.

SUSTAINABLE PARTNERSHIP

We strive to ensure that 100% of our partnerships are sustainable.

Synthos Sustainable Development Strategy

synthos

synthos EVERGREEN 2030

KEY PERFORMANCE INDICATORS (KPIs)

GREEN RAW MATERIALS

10% Green butadiene and styrene

We aim to have 10% of key monomers of bio and recycled origin in our production process.

40% Green polystyrene

We want a 40% share of mechanically or solvent recycled polystyrene in the production process.

GREEN PRODUCTS

100% Sustainable design

We want 100% of new products to be sustainable.

100% Carbon footprint monitoring

We want 100% of our products to have a calculated carbon footprint.

GREEN PRODUCTION

10% Efficient production

We want to reduce the energy consumption of our production plants by 10% per tonne of product.

10% Optimising production processes

We want to reduce utility consumption* in our production plants by 10% per tonne of product.

* water, technical gases, cooling

GREEN ENERGY

EKO Low-carbon energy

We want to close the coal-fired energy assets.

28% Reduction of greenhouse gas emissions

We want to reduce greenhouse gas emissions by 28% per GJ of energy in our production process.

SYNTHOS activities in CE

1. **Synthos' investment actions and plans** towards recycling of EPS / PS / XPS:
   - Q2 2021 - startup of the EPS mechanical recycling installation - capacity: 6400 t/y
   - Q3 2024 - startup of the EPS mechanical recycling installation - capacity: 16 000 t/y
   - Q3 2022 - decision to invest in the installation of solvent recycling of EPS waste - capacity 15 000 t/year (start up - 2025)
   - Direct cooperation with NL startup on chemical recycling installations for EPS waste.

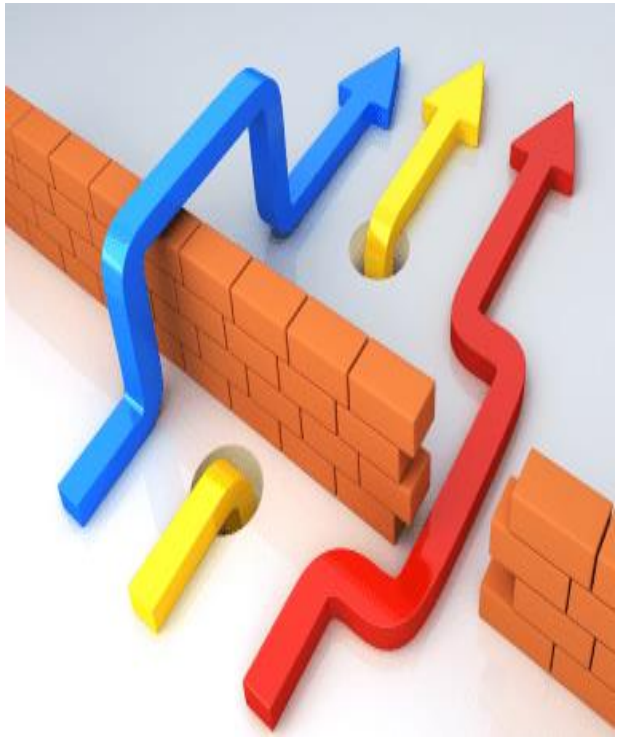
2. In June 2021 Synthos **launched on the EU market first EPS construction material with Post Consumer Recycling Content (PCRC) at the level of 20%**.

3. **Other Synthos short therm goals** :
   - reach min. **30% of PCRC in 2023**
   - From 2025 to sell our innovative Synthos EPS products (InVento) **only with 30% recycling content** – 110 000 t/y
   - From 2023 Synthos will start to use a **bioStyrene in production** of packaging and construction EPS / PS grades.

Barriers in CE.

The main barriers in EU to reach higher recycling rates of EPS / PS waste:

1. **Economical**
   - low landfill fees,
   - incineration as accepted way of dealing with waste
   - high investment cost in recycling for SME but also for big companies.
   - current demand for clean waste EPS for mechanical recycling significantly exceeds possibilities on collecting and sorting
2. **Social**
   - lack or inappropriate education,
   - ignorance of the issue, prejudices,
3. **Operational / Technological**
   - no separate collection of EPS waste,
   - high contamination of municipal and B2B waste,
   - advanced technologies at initial stage (e.g., chemical recycling, advanced sorting AI)
4. **Legislative**
   - no obligatory material flow records harmonization for the management of EPS waste,
   - not enough support for sorting and recycling of waste EPS, (e.g., ban on landfill, higher cost of incineration)
   - incomprehensible changes in the EU / National legislation (e.g., UTC for HBCD or endless discussion on chemical recycling)



Expectations from EU, National regulators

1. Stability and continuity of regulation (do not change regulatory frames every year)
2. Separate waste codes for EPS waste streams - packaging and construction.
3. Mandatory reporting of all EPS waste streams in whole chain. National or/and EU harmonized tool.
4. Incentives/grants programs to boost all important CE steps (collection, sorting, innovative recycling).
5. Education

SYNTHESIS.ORTHOS