



Low Carbon Day

Chemicals - Circularity

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The Repsol Commitment
Net Zero Emissions
by 2050

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01.

Repsol Chemical Business Overview



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01. Repsol Chemical Business Overview

Repsol Chemical Business Key figures



3

Main highly integrated & flexible
petrochemical sites in Iberia

~550 M€/y

Average EBITDA
2015-2020

~900 M€/y

Projected EBITDA
2021

2,800 kt/y

Sales

~20%

Average ROACE
2015-2020

~35 %

Projected ROACE
2021

>1,000

Relevant customers

~2,000

Staff

~1,700 M€

Capital employed

**High complexity
production & logistics**

~350 different grades / lean
production / multi-modal delivery

**>85
countries**

Sales

~15th

World producer high value
products (PO/ Polyols, EVA)

 **JV Dynasol**

50/50 strategic Alliance between
Repsol and KUO (Mexico) in synthetic
rubber business plants in Europe,
LATAM and China

~100 M\$/y

Average EBITDA
2016-2020

310 kt/y

Sales
2020



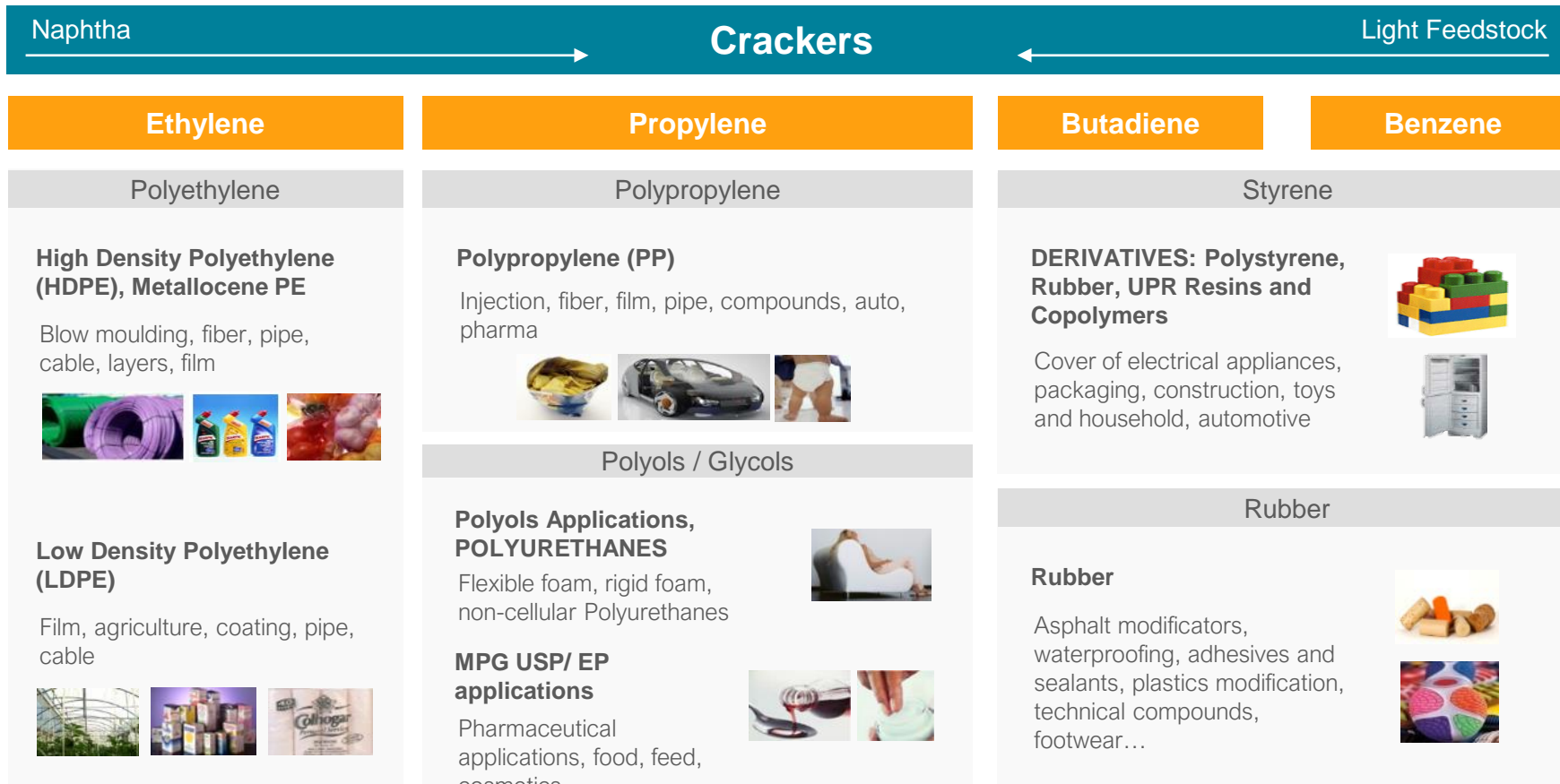
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01. Repsol Chemical Business Overview

Diversified Portfolio committed with improving Life Standards and with Energy Transition



Many low-carbon technologies rely on innovations in chemistry to become more efficient, affordable and scalable



Chemicals are key

Efficient building envelopers	11%
Lightweight material	4%
Fuel efficient tires	2%

Chemicals relevant

Wind & Solar Power	50%
Electric cars	21%

Little influence

Efficient lighting	12%
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CO₂ emissions reduction in each area due to the use of chemicals; weight on total Study "The essential role of chemicals", ICCA



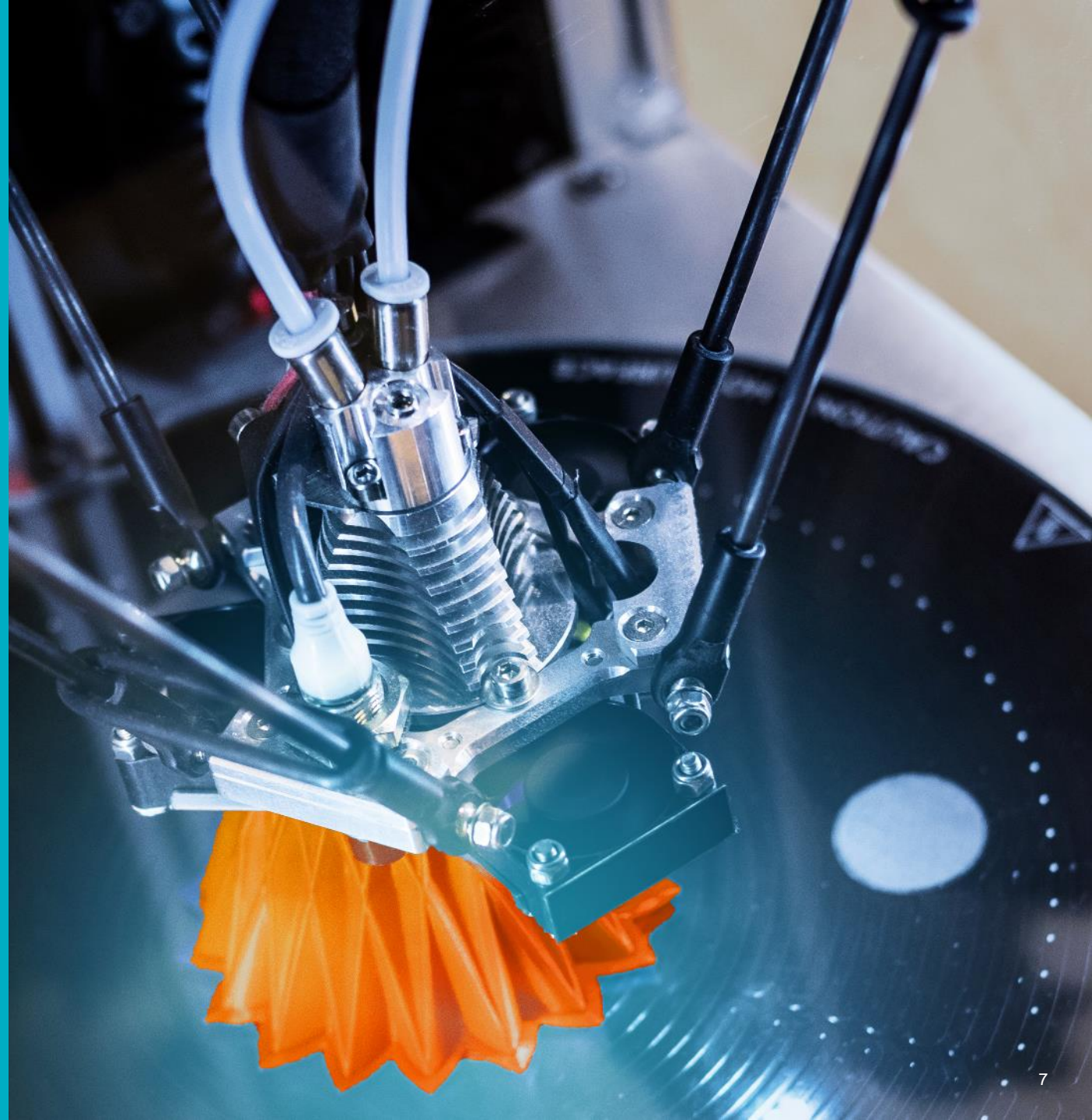


02.

Repsol Chemical Business Strategy



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02. Repsol Chemical Business Strategy



Repsol Chemicals Strategy: Opportunity for profitable growth through 3 levers



Integrate (Should do)

Reinforce our position, with Higher Integration



OPPORTUNITY to evolve to a more resilient and profitable business through horizontal and vertical integration



Expand (Could do)

International growth with added value



OPTIONALITY for additional growth in high attractive market, aligned with energy transition, where Repsol could accelerate decarbonization



Transform (Must do)

Transform Chemicals through De-carbonization, Differentiation, Digitalization and Circularity



NEED to transform Repsol Chemical business, adapting it to Industry Trends: Digitalization, Circularity, Differentiation, Flexibility... transforming it to a more profitable business with higher competitive advantages and entry barriers.

De-carbonization & Efficiency & Flexibility

Differentiation

Digitalization

Circularity

Reliability

Safety & Environment

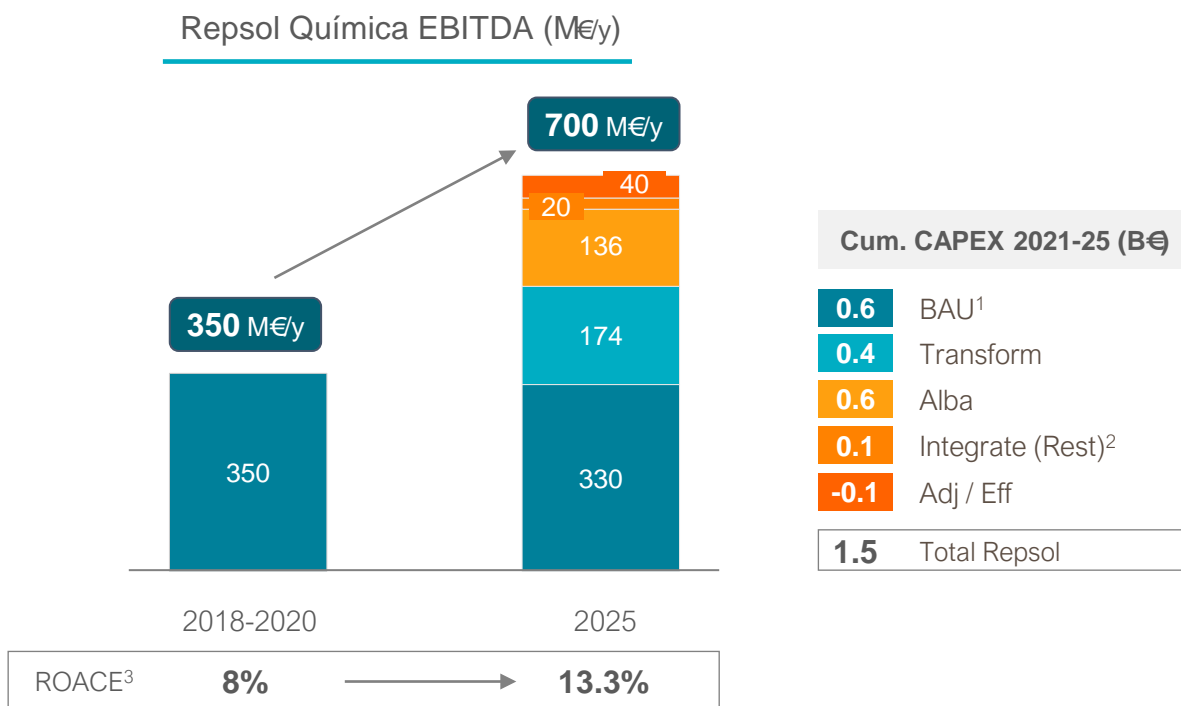


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02. Repsol Chemical Business Strategy



Repsol Chemicals Strategic Plan targets growth in EBITDA by 2025 in a stable medium-low margin scenario



1. Business as usual; 2. Including Dynasol and Repsol Química initiatives; 3. ROACE is calculated after taxes



Transform and integrate the current business to increase **Repsol Química EBITDA by ~2x in 2025** in a stable medium-low margin scenario



Optional Opportunities to invest with high return and **double capital employed**, improving ROACE from 8% to more than 13%



Boost Business Value due to a more solid business

- Integration and flexibility building resilience
- Robustness and efficiency of the operation
- Diversified footprint with differentiated products and geographies



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03.

Chemicals Transformation Circularity



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03. Chemicals Transformation - Circularity

Targets

License to Operate and Business Opportunity

Legislative, social, competitive and technological environment

Recycled polyolefins growth. New market for recycled polyols

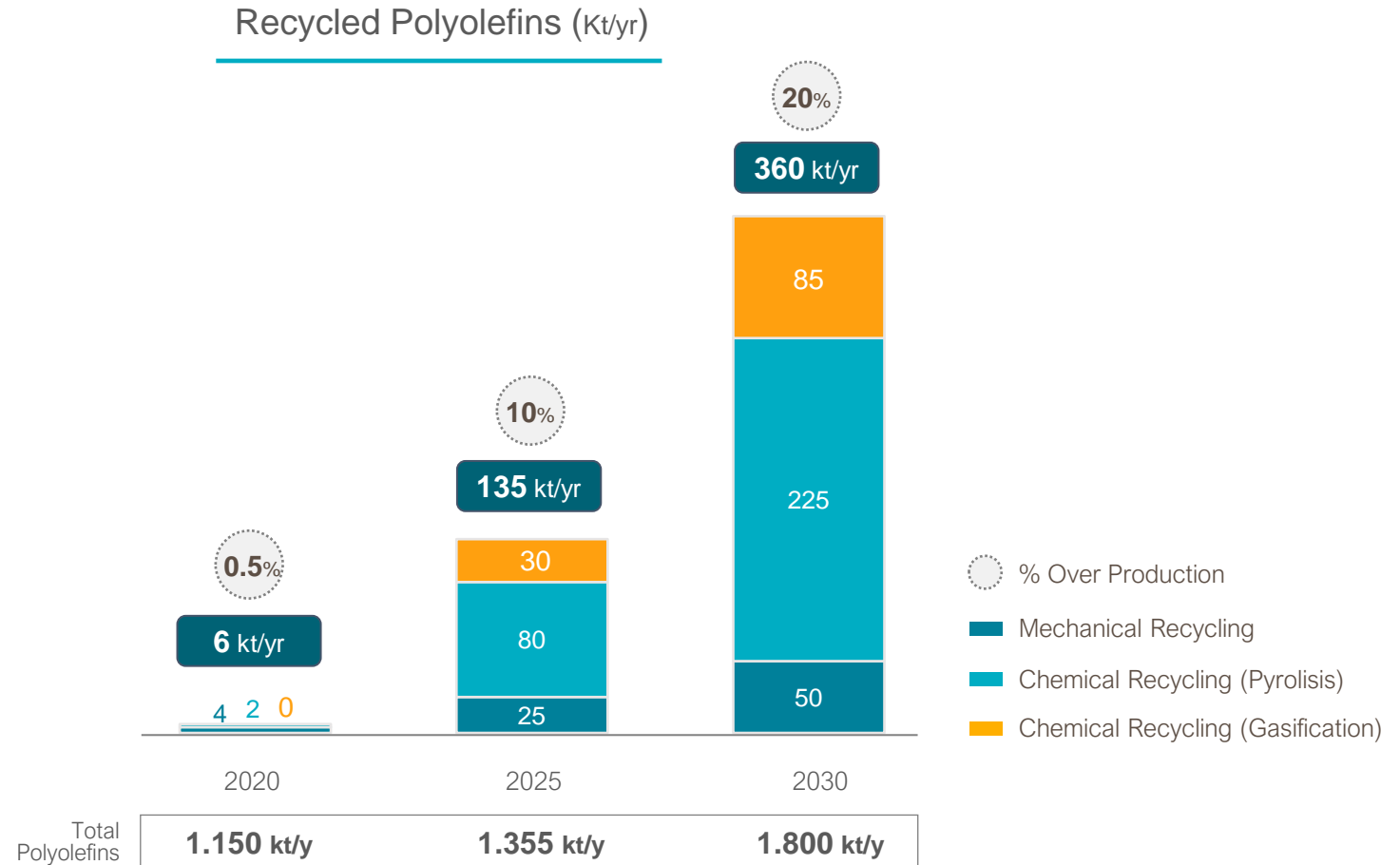
License to Operate

Business Opportunity



Target: Recycling a 20% of our polyolefins production by 2030

Target: Recycling equivalent to 20% of our polyolefins production by 2030

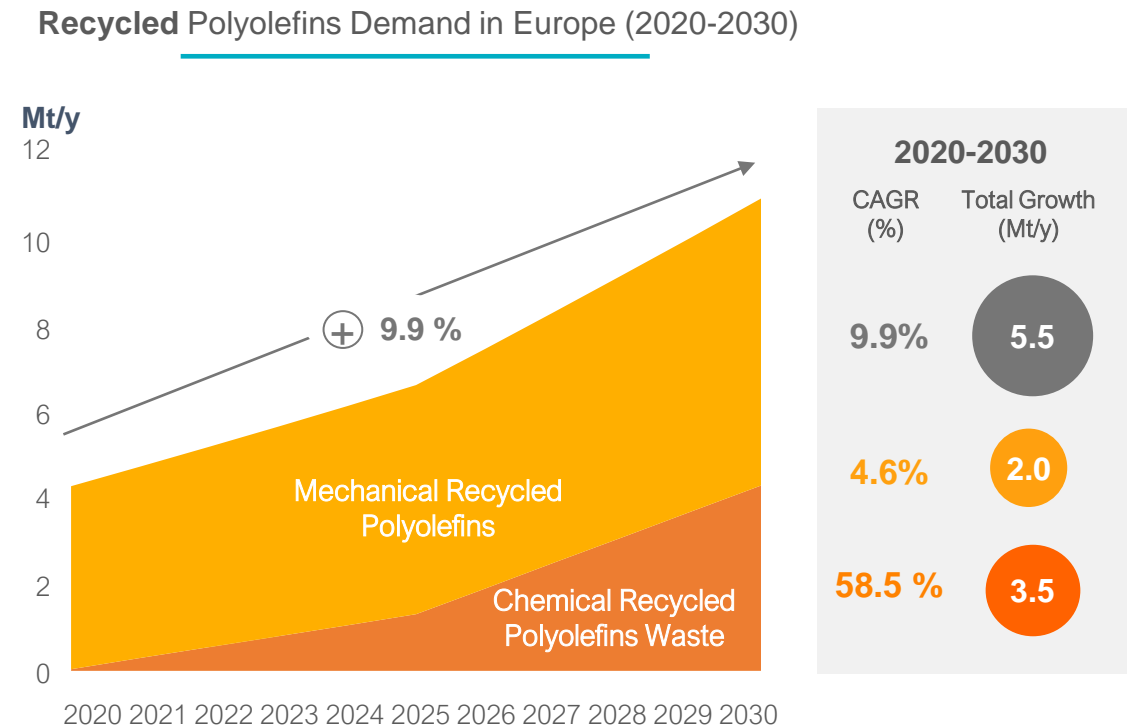
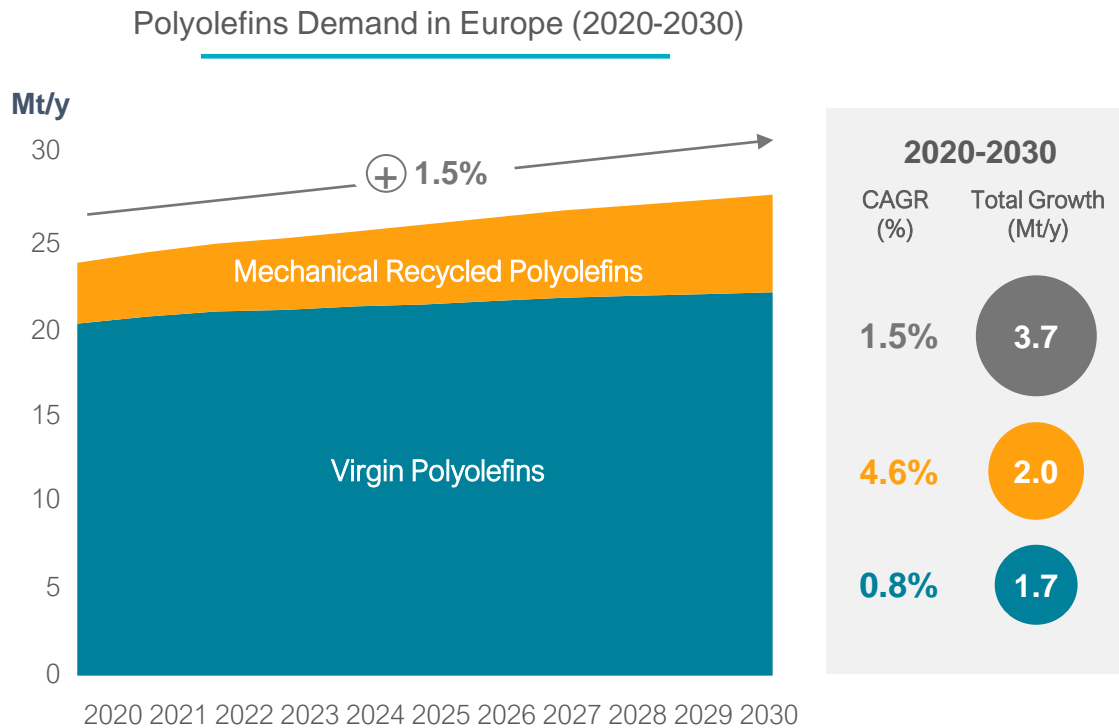


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03. Chemicals Transformation - Circularity



Polyolefin Market in Europe will be growing at healthy rates (both Virgin and Recycled) over next decade



Sources: Analyst's average: IHS, Nexant, WoodMckenzie; Recycled data from Conversio, IHS and Repsol; Europe = EU 27+UK+Switzerland+Norway



Roadmap to reach our targets

Processing pyrolysis oil in our refineries

Start-ups: 2015, 2020

ISCC PLUS certification in Tarragona, Puertollano and Sines

Start-up: 2020

Mechanical Recycling

Recycled volume: 52 kt/y
Start-ups: 2018, 2021

Polyurethane Recycling

Recycled volume: 6 kt/y
Start-ups: 2022, 2026, 2027

Pyrolysis

Recycled volume: 230 kt/y
Start-ups: 2024, 2026, 2027

Gasification

Recycled volume: 240 kt/y
(Repsol share: 85kt)
Start-ups: 2025, 2028, 2030

TOTAL CAPEX:
≈€1,400 M
(Repsol Equity €665 M - unlevered)



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03. Chemicals Transformation - Circularity



Projects and value chain

Polyolefins & Polystyrene

Polyols

	WASTE	TECHNOLOGY	PRODUCTION	MARKET
Polyolefins & Polystyrene	RECICLEX® Mechanical High quality post-consumer waste 	Mechanical Recycling	<ul style="list-style-type: none"> Repsol Compounds Plants: Monzón PP & Puertollano PE Reciclex compounds production in ACTECO 	<ul style="list-style-type: none"> Polyolefins that incorporates recycled material Usual polyolefin market (packaging, auto, etc.). Currently sales to 20 customers
	RECICLEX® Circular Plastic mix High quality CSR 	Chemical Recycling PYROLYSIS	<ul style="list-style-type: none"> Crude processing in Puertollano and free allocation to products by mass balance. In project: Pyroplast; FCC Puertollano; Tarragona's crude; Direct Styrene. 	<ul style="list-style-type: none"> Circular polyolefins with ISCC PLUS certification (3 certified complexes) Currently sales to 10 customers
	ECOPLANTA®  Urban solid waste 	Chemical Recycling GASIFICATION	<ul style="list-style-type: none"> Ecoplanta integrated in Tarragona site The extension of the model to other sites is in the conceptualization phase 	<ul style="list-style-type: none"> Methanol: RED II fuels; Chemical Industry, Marine fuels Methanol-to-Olefins under evaluation
Polyols	RECPUR Industrial/ Clients residues Mattress foam waste 	Chemical Recycling ACIDOLYSIS	<ul style="list-style-type: none"> New plant at Puertollano for production of polyols 	<ul style="list-style-type: none"> Polyols incorporating recycled material for the foam market in the comfort sector in Europe. Agreement with 6 key customers for product homologation and formulation adjustment.

03. Chemicals Transformation - Circularity

Repsol RECICLEX® Mechanical Recycling

Description

Develop a new range of polyolefin-based products that incorporate a variable percentage of recycled plastics in their formulation, without losing the properties of the virgin material in the application.



TARGET

Achieve sales of **100 kt/year** (50% average recycled content) of Reciclex Compounds by 2030

REPSOL

Reciclex



New product properties



Up to 70% recycled content
More than 20 grades



Many applications (non food contact):
film, packaging, injection, blow, moulding, and others.



Constant quality and homogeneity,
similar properties to virgin grades



Traceability Certificate UNE-15343



100% recyclable



Up to -40%
Carbon footprint reduction



Partnerships



Project to increase the capacity of the recycled materials produced by Acteco in Alicante.

TARGET: Guarantee the supply of quality raw material for the RECICLEX project.



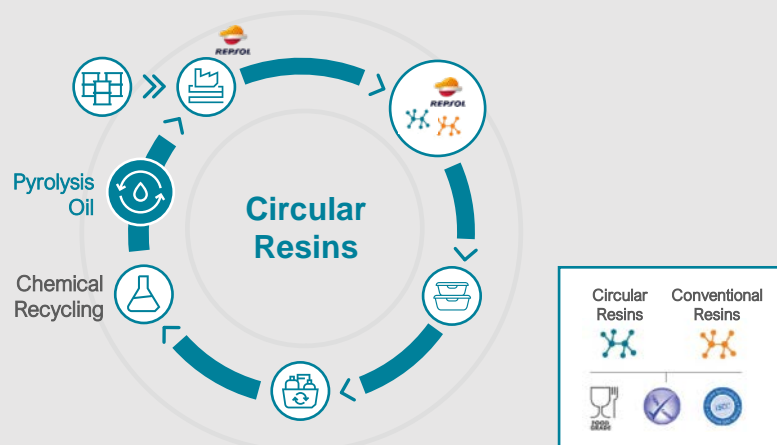
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Repsol RECICLEX® Circular: Chemical Recycling - Pyrolysis

Description

To develop a new range of circular plastics from plastic waste, not mechanically recyclable, with the same properties as products made from fossil raw materials.



TARGET

Recycle **225 kta of plastic waste** into pyrolysis oil for the development of circular polyolefin by 2030.

REPSOL

Reciclex



New product properties



Raw material 100% recycled plastic



Complete Repsol range in all applications, with same properties



Suitable for food, hygiene and medical use



3 sites ISCC Plus certified with mass balance

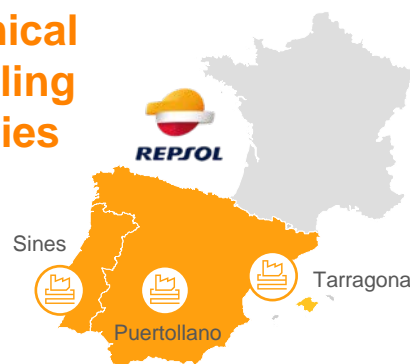


100% recyclable



Low carbon footprint

Chemical recycling facilities



Pyrolysis oil approach & partnerships



1. Production

Since 2015 supplying pyrolysis oil into Puertollano site. Now we are in the process of developing pyrolysis oil suppliers.



2. Purification I Pyroplast Project

Repsol, Axens and IFP developed and patented process to enhance the chemical recycling of plastic waste - **RewindTM Mix**



3. Marketing

Repsol signs agreements to supply main European food packaging producers with **ISCC Plus Certified Circular Polyolefins**. We are able to supply premium Polyethylene or Polypropylene grade as well as styrene to our customers



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Polyurethane Recycling RECPUR

Description

Developing a new range of **RECYCLED POLYOLS**.

RECPUR closes the cycle of the Circular Economy of Polyurethane:



Processing the waste



Our customers can incorporate recycled product in their process



"Plastic-to-plastic" process



Polyol with lower CII (Carbon Intensity Indicator)



TARGET

Achieve 15% of polyols for the Comfort Market with recycled origin by 2028.

Being a "First Mover"

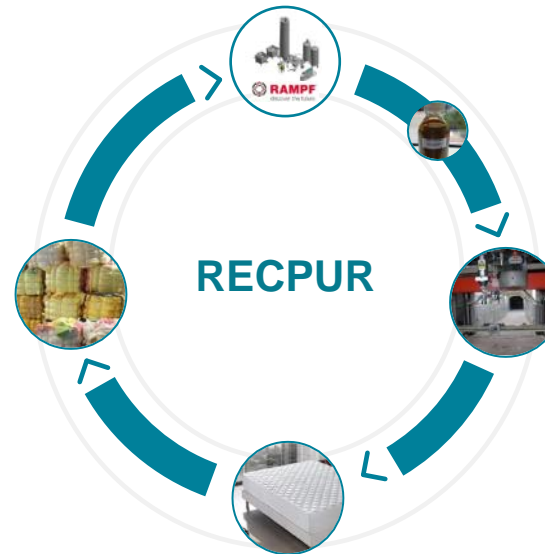
REPSOL

Reciclex



Concept

The foam residue (2 kt/y) is fed to a chemical recycling plant to produce "polyol of recycled origin" (5 kt/y) which is then incorporated into the customer's formulation to produce foam again to manufacture new mattresses or furniture.

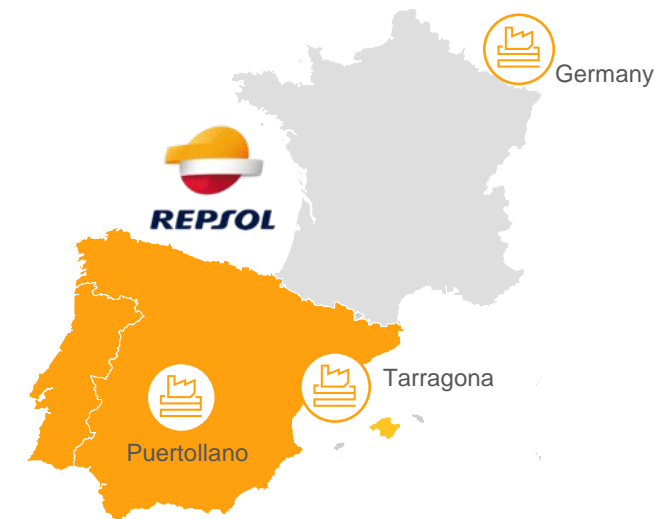


Partnerships



RAMPF Eco Solutions based in Pirmasens, Germany, is an expert in chemical solutions for the manufacture of high-quality recycled polyols

RECPUR locations



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Waste-to-Chemicals ECOPLANTA®

Description

Repsol will join the Ecoplanta® project, together with the technology leader Montreal-based firm Enkern and Agbar, a global expert in water and waste management, to build a waste to chemicals plant in Tarragona.

The plant will process municipal solid waste to produce methanol, that will be used as raw material to produce circular materials or advanced biofuels, contributing to avoid 200 kty of CO₂ and reducing the waste that ends up in the landfill.

ECOPLANTA® locations



The proposed location is **Tarragona** where various synergies will leverage the proposal



Circularity– waste to chemicals

- Reduction of landfill of 390kt of MMW (Mixed Municipal Waste)
- No competition with food supply
- No land use impact

Strengthen Tarragona Complex

- Tarragona has a high rate of landfill
- Synergies with Repsol Quimica
- Potential valorisation of Repsol's land

Suitable for EU funding

- The project can ask for funding in the European Union subsidy package
 - Innovation Fund (up to €90 M)
 - Recovery Fund

TIER 1 Partners

- **Enkern** Technology leader
- **Agbar** Waste management leader

Innovative and proven technology

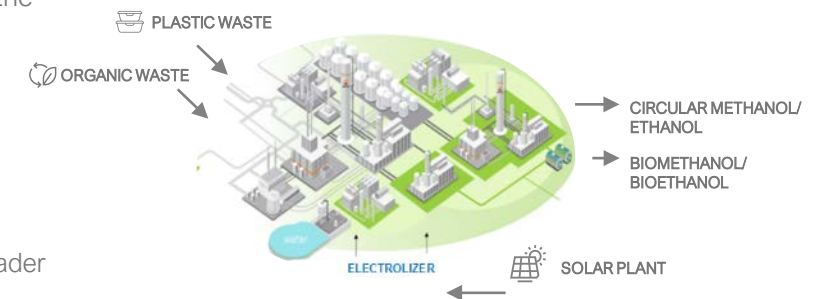
- Gasification technology
- Most developed technology in waste to chemicals

Circular and Bio products

- Interesting premium for Biomethanol
- Possible chemicals route via ethanol production

Option of Green H₂

- Requirement of 2.7 t/h H₂
- Opportunity for green H₂ project
- Low carbon footprint



390 kt/y mixed
municipal waste



220 kt/y Methanol

- Repsol Reciclex® Circular
- Advanced Fuel

Repsol Roadmap includes the extension of the project, with feasibility studies for Sines and Puertollano



Executive summary

Circularity is going to be a must for the chemical industry:

- Chemical products contribute to **reduce GHG emissions**
- The European **virgin polyolefins market grows at 0.8% and the recycled at 9.9% CAGR**
- There will be **new business opportunities** in circularity
- Repsol is well positioned for recycling as our petrochemical sites are **well integrated**
- We have been one of the **first European chemical producers** feeding pyrolysis oil into our system and marketing circular polyolefins
- Repsol has the **target of recycling 20% of our polyolefins production** by 2030
- To do that, we have a clear roadmap with **four main projects to invest €1,400 M** (Repsol Equity €665 M - unlevered) with different technologies and partners, and we continue developing new projects to reach our recycling goals in 2030





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