



# Low Carbon Day

Chemicals - Circularity

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The Repsol Commitment  
Net Zero Emissions  
by 2050

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# Index

## 01.

Repsol Chemical Business Overview

## 02.

Repsol Chemical Business Strategy

## 03.

Chemicals Transformation - Circularity

- Targets
- Roadmap
- Projects and value chain

## 04.

Executive summary



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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

**~15<sup>th</sup>**

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



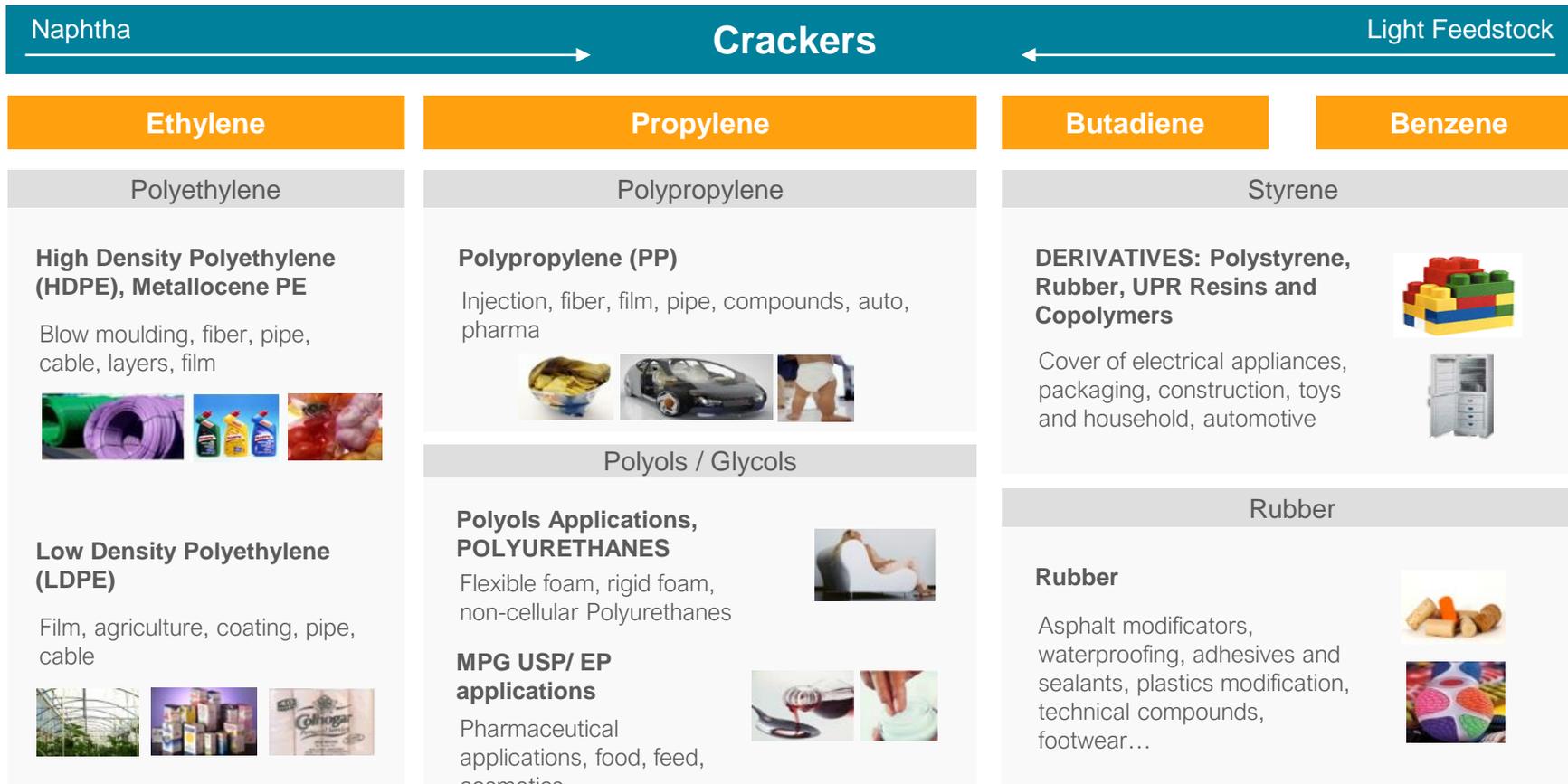
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## 01. Repsol Chemical Business Overview

# 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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CO<sub>2</sub> emissions reduction in each area due to the use of chemicals; weight on total Study "The essential role of chemicals", ICCA



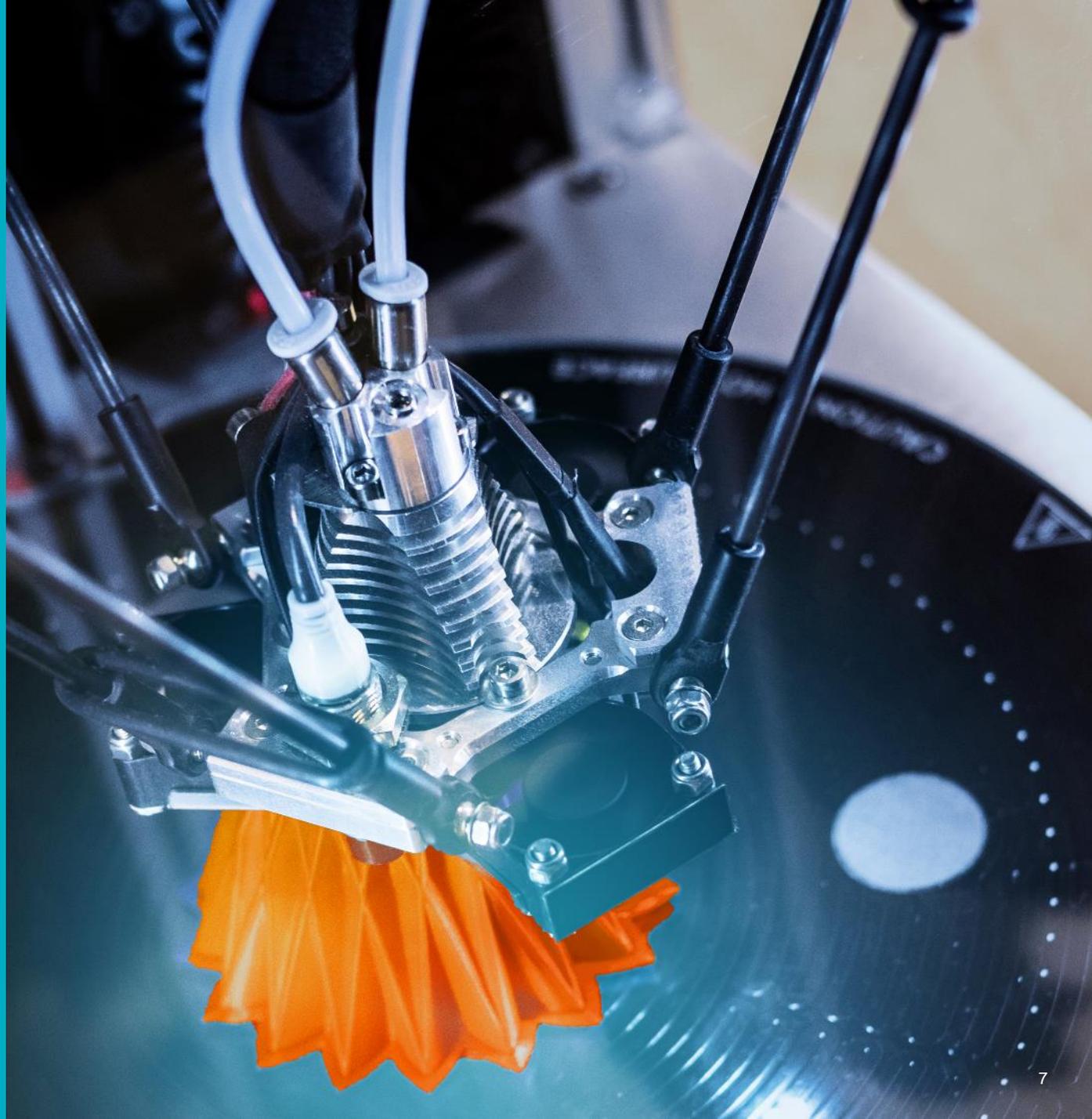


# 02.

## 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



### Expand (Could do)

International growth with added value



### Transform (Must do)

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



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



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



**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

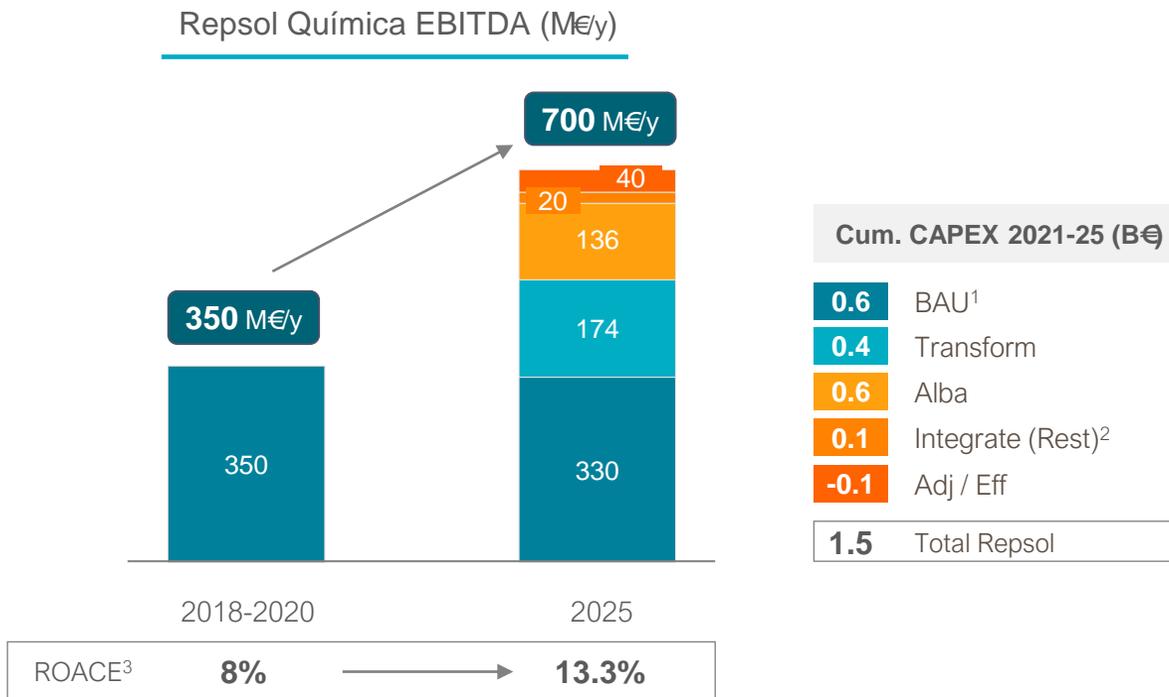
Safety & Environment



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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



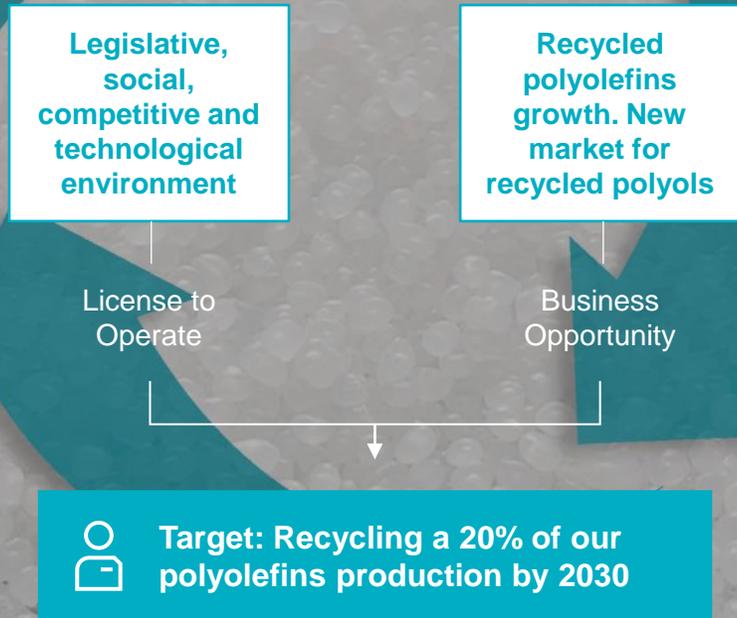
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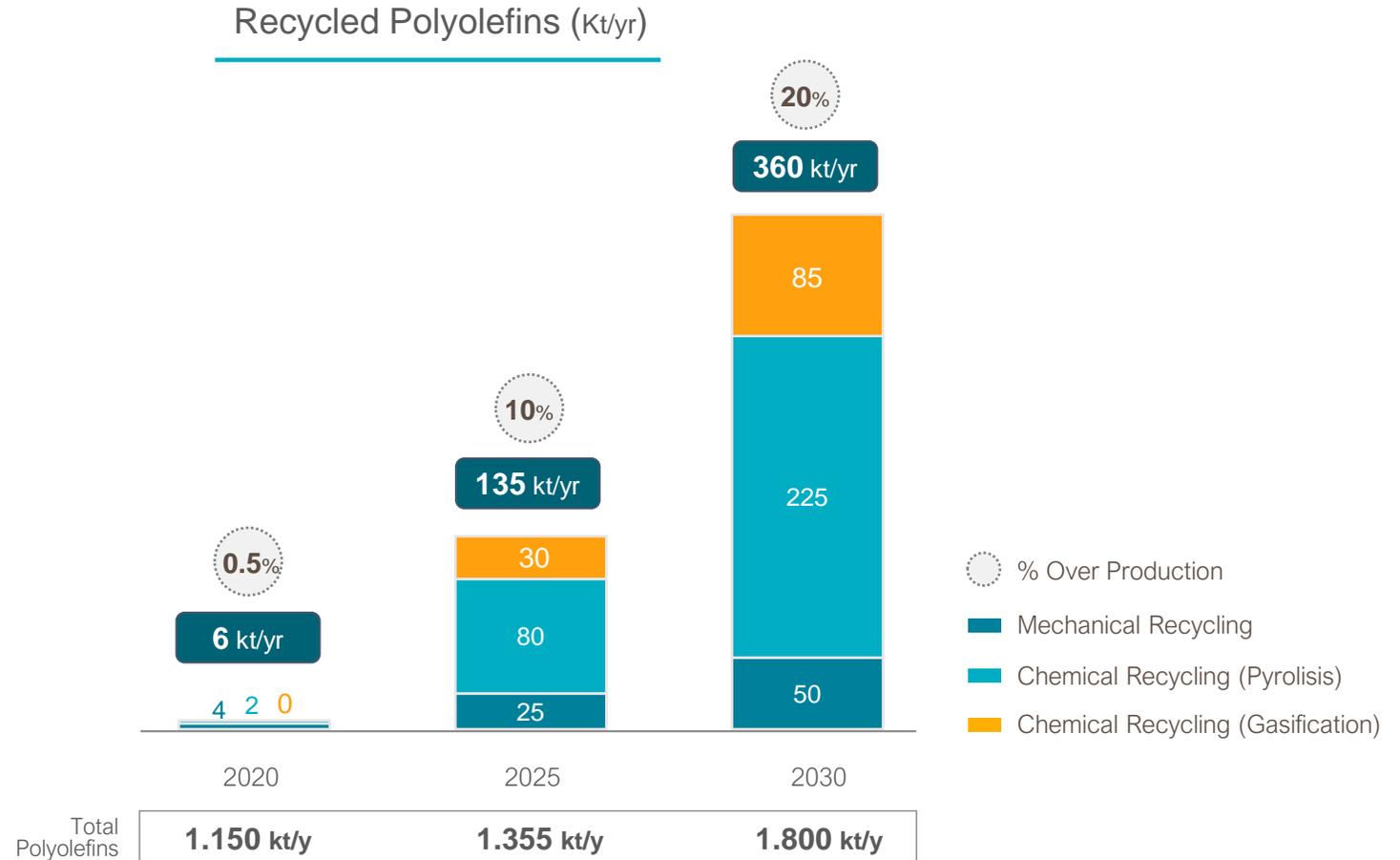
### 03. Chemicals Transformation - Circularity

## Targets

# License to Operate and Business Opportunity



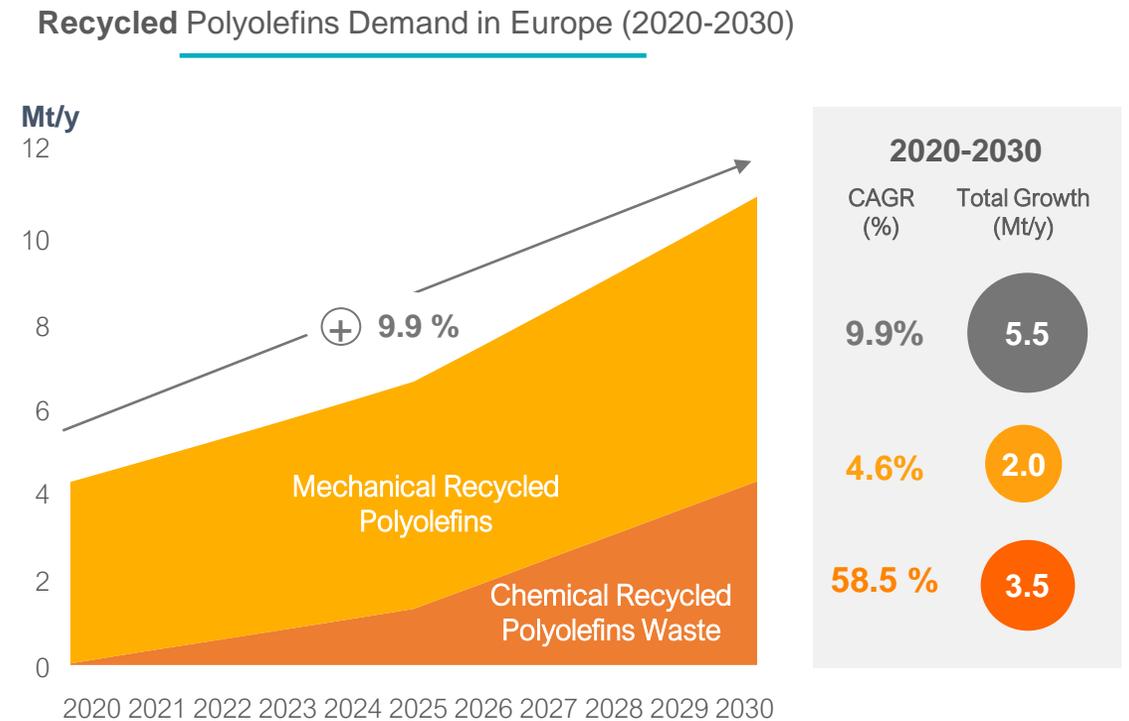
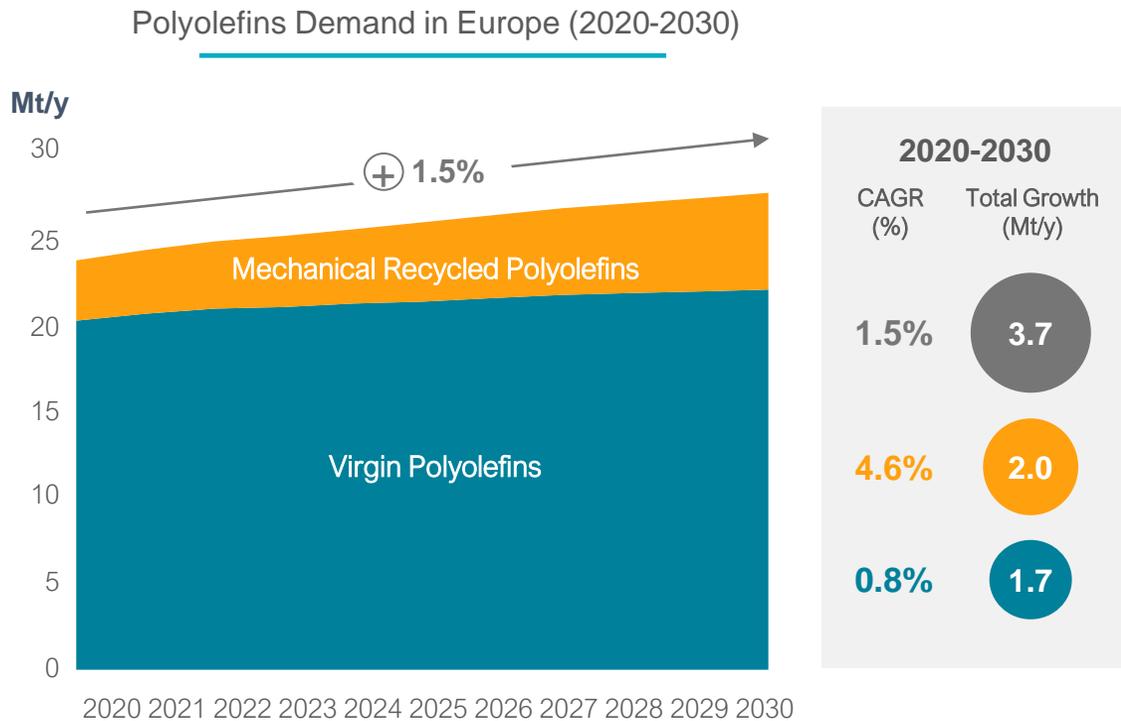
**Target:** Recycling equivalent to 20% of our polyolefins production by 2030



### 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)

### 03. Chemicals Transformation - Circularity



## Projects and value chain

Polyolefins & Polystyrene

Polyols

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

### 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



## 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.



### 03. Chemicals Transformation - Circularity

# 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.



## 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 | Pyroplast Project

Repsol, Axens and IFP developed and patented process to enhance the chemical recycling of plastic waste - **Rewind™ 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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### 03. Chemicals Transformation - Circularity

# 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

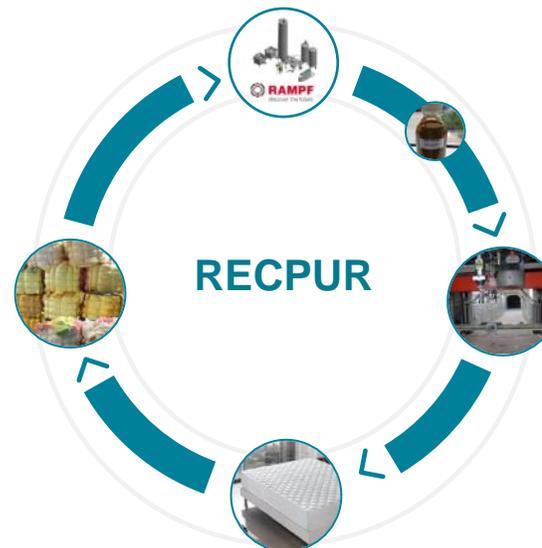
Achieve 15% of polyols for the Comfort Market with recycled origin by 2028.

Being a "First Mover"



## 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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### 03. Chemicals Transformation - Circularity

# Waste-to-Chemicals ECOPLANTA®

## Description

Repsol will join the Ecoplanta® project, together with the technology leader Montreal-based firm Enerkem 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 CO<sub>2</sub> 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

- Enerkem** ▪ Technology leader
- Agbar** ▪ Waste management leader

#### Innovative and proven technology

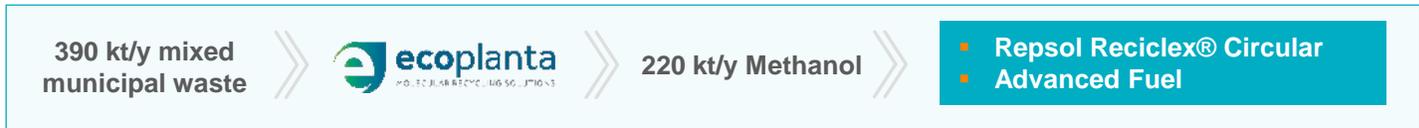
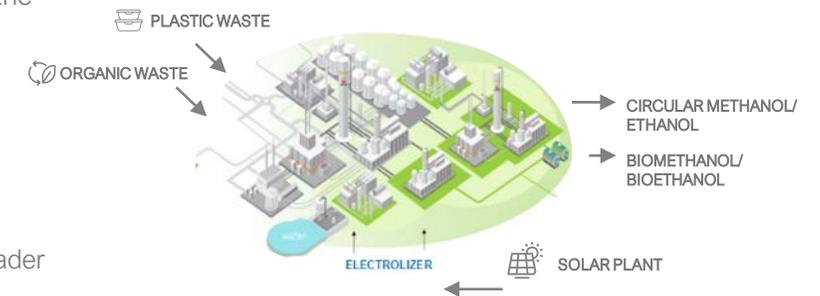
- Gasification technology
- Most developed technology in waste to chemicals

#### Circular and Bio products

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

#### Option of Green H<sub>2</sub>

- Requirement of 2.7 t/h H<sub>2</sub>
- Opportunity for green H<sub>2</sub> project
- Low carbon footprint



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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