



REPSOL

QUIMICA

Circularity & Low Carbon STRATEGY

Chemicals

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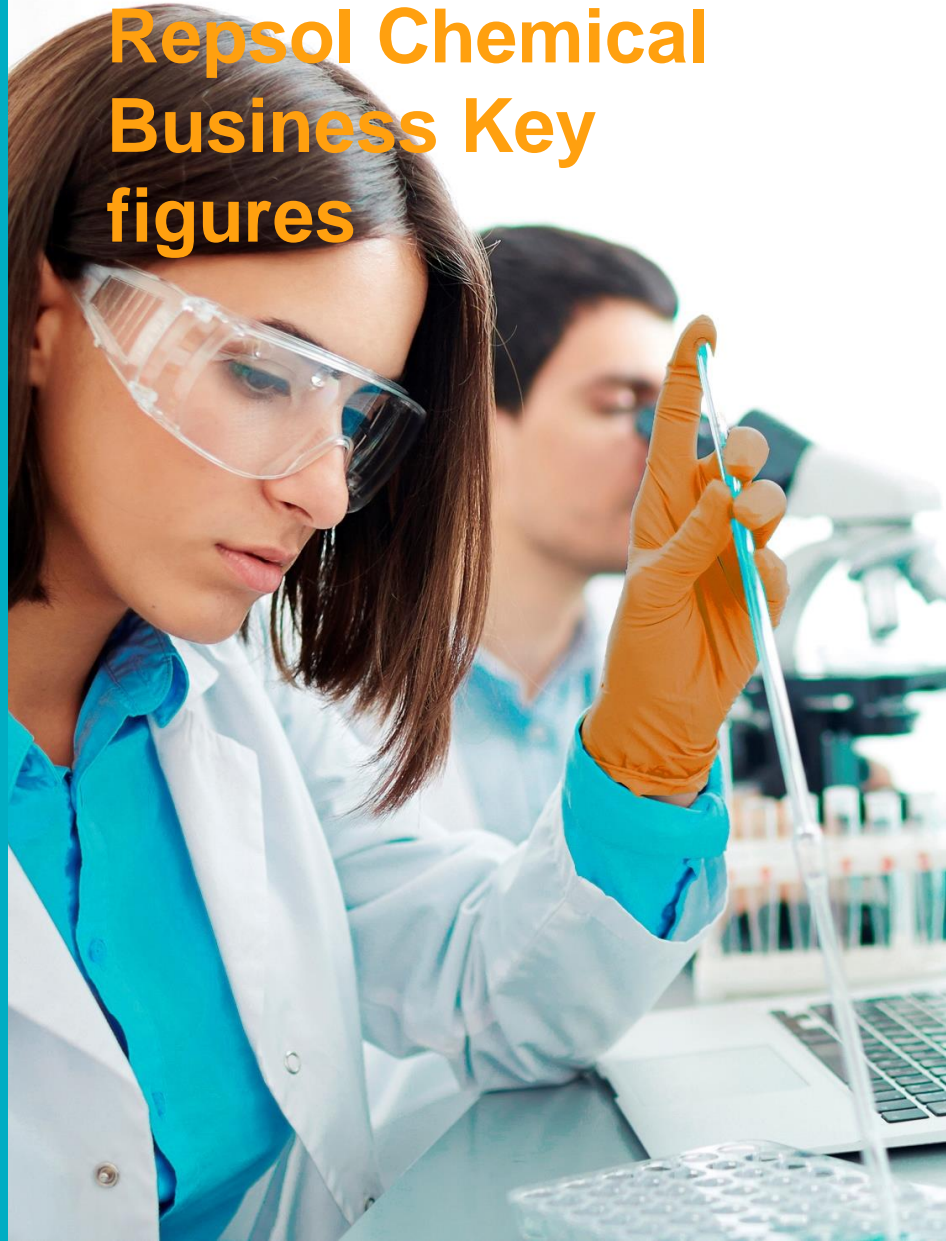
01.

Repsol Chemical Business Overview



01.

Repsol Chemical Business Key figures



3

Main highly integrated & flexible petrochemical sites in Iberia
2,800 kt/y

Sales

~550 M€/y

Average EBITDA 2015-2020

~20%

Average ROACE 2015-2020

~900 M€/y

Projected EBITDA 2021

~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

1. 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



01. Repsol Chemical Business Overview

Diversified Portfolio committed with improving Life Standards and with Energy Transition



| Ethylene | Propylene | Butadiene | Benzene |
|--|---|--|-----------------------|
| <p>Polyethylene</p> <p>High Density Polyethylene (HDPE), Metallocene PE</p> <p>Blow moulding, fiber, pipe, cable, layers, film</p>  <p>Low Density Polyethylene (LDPE)</p> <p>Film, agriculture, coating, pipe, cable</p>  | <p>Polypropylene</p> <p>Polypropylene (PP)</p> <p>Injection, fiber, film, pipe, compounds, auto, pharma</p>  <p>Polyols / Glycols</p> <p>Polyols Applications, POLYURETHANES</p> <p>Flexible foam, rigid foam, non-celullar Polyurethanes</p>  <p>MPG USP/ EP applications</p> <p>Pharmaceutical applications, food, feed, cosmetics</p>  | <p>Styrene</p> <p>DERIVATIVES: Polystyrene, Rubber, UPR Resins and Copolymers</p> <p>Cover of electrical appliances, packaging, construction, toys and household, automotive</p>  <p>Rubber</p> <p>Rubber</p> <p>Asphalt modifiers, waterproofing, adhesives and sealants, plastics modification, technical compounds, footwear...</p>   | <p>Benzene</p> |

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% |
|--------------------|-----|

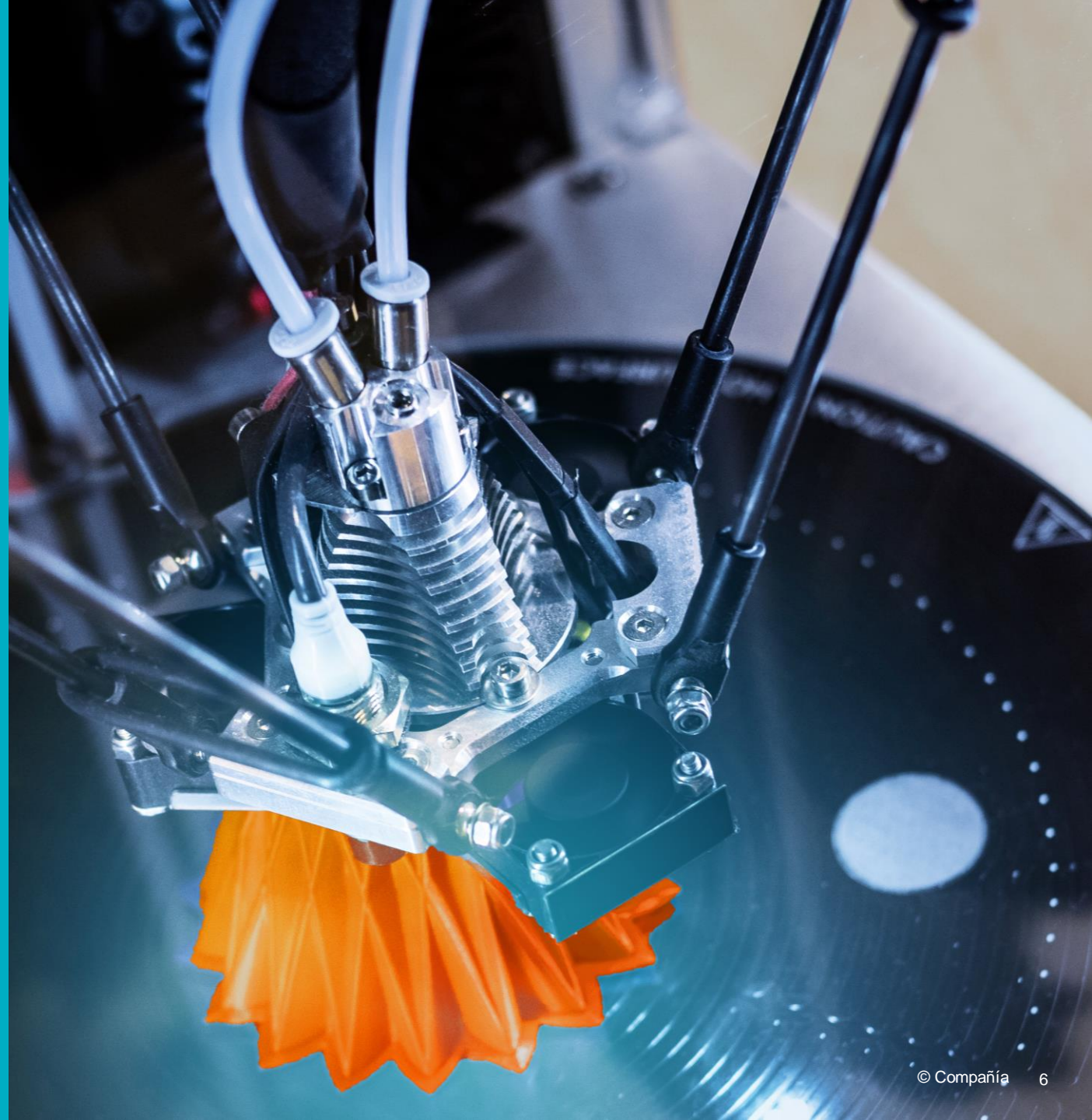
CO2 emissions reduction in each area due to the use of chemicals; weight on total Study "The essential role of chemicals", ICCA





02.

Repsol Chemical Business Strategy



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

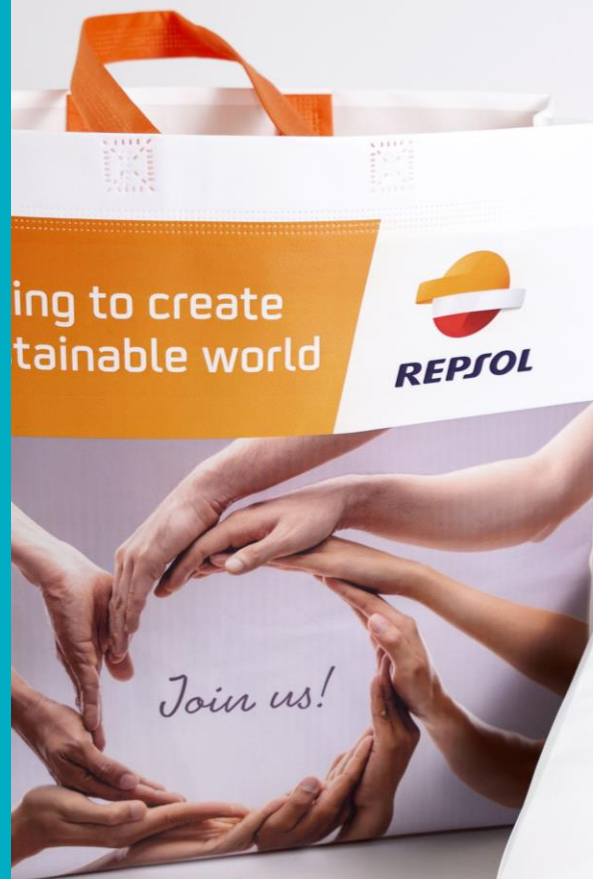
Safety & Environment





03.

Chemicals Transformation Circularity



03. Chemicals Transformation - Circularity

Targets

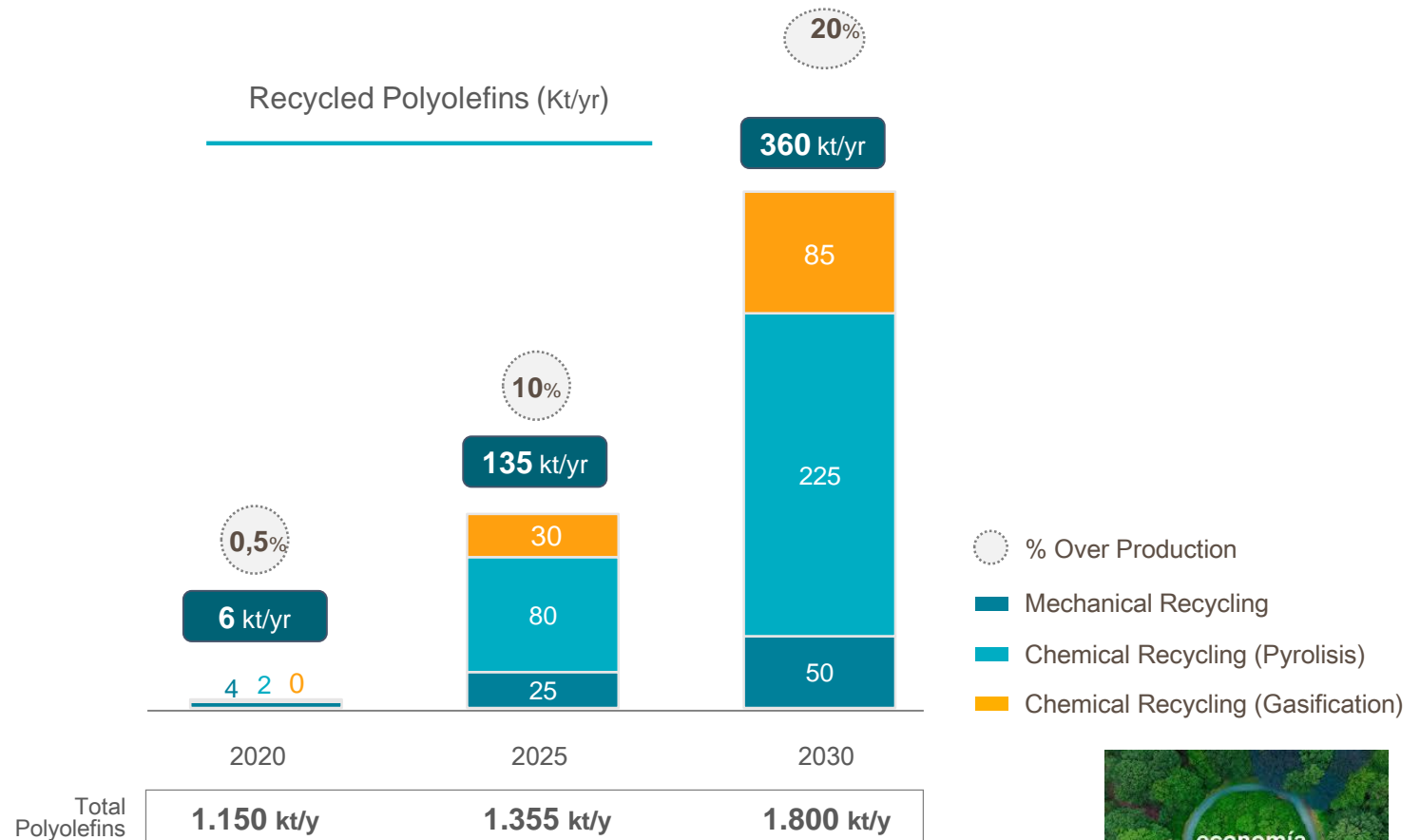


Target: Recycling a 20% of our polyolefins production by 2030

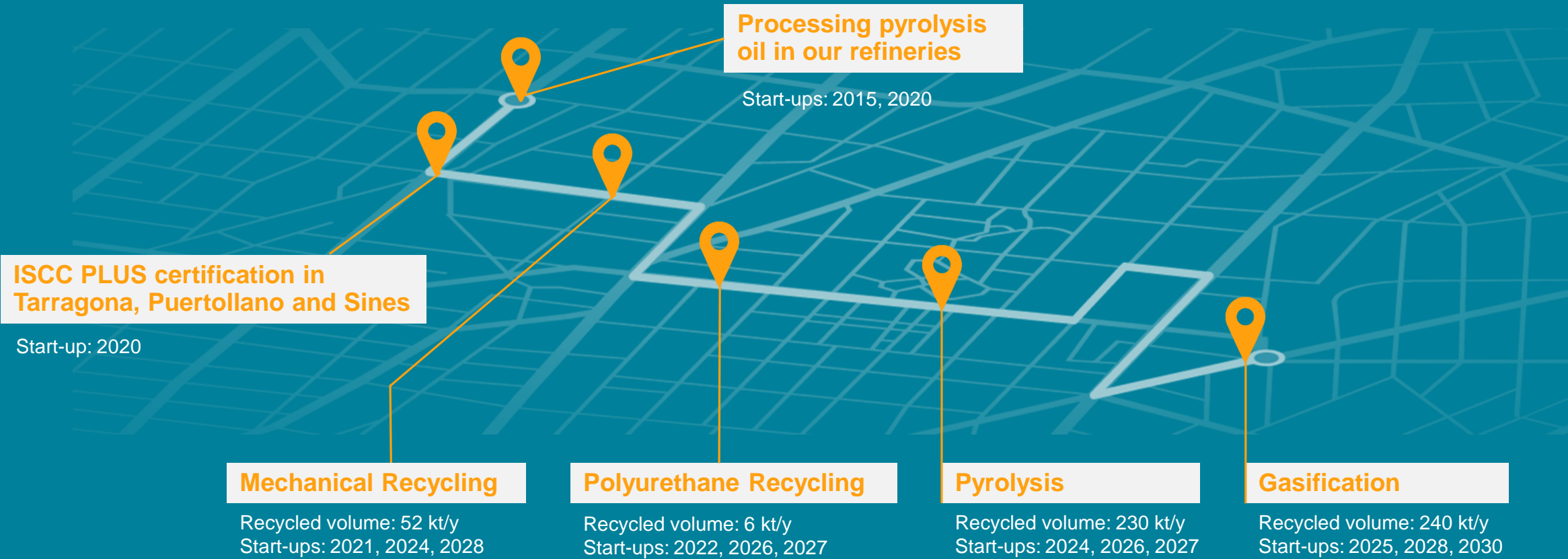


Target:

Recycling equivalent of 20% of our polyolefin production by 2030



Roadmap to reach our targets



TOTAL CAPEX:
≈1.400 k€







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 |
| Polyols | 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 |
| | 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 recycle content) of Reciclex Compounds by 2030



New product properties



Up to 70% recycling
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

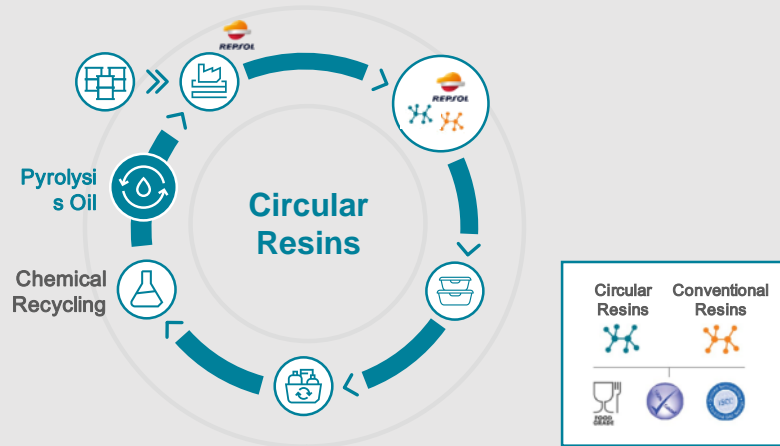


03. Chemicals Transformation - Circularity

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.



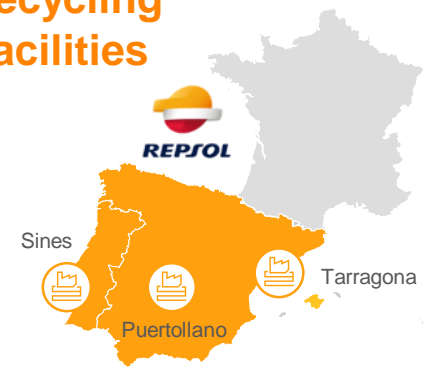
TARGET
 Recycle **225 kta of plastic waste** into pyrolysis oil for the development of circular polyolefin by 2030.



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



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 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

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

Innovative and proven technology

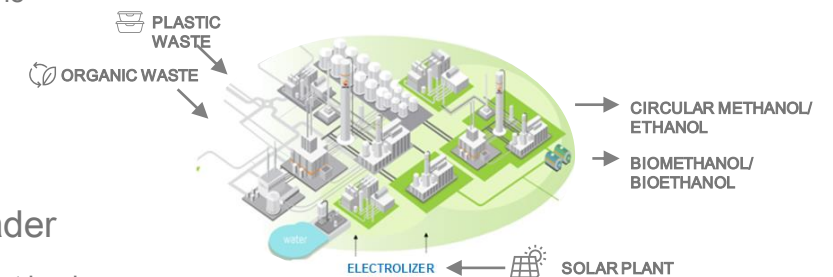
- Gasification technology
- Most developed technology in waste to chemicals

Circular and Bio products

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

Option of Green 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



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



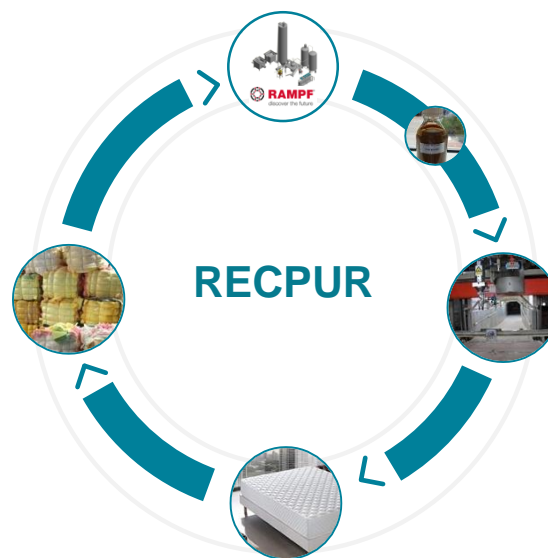
Achieve 15% of polyols for the Comfort Market with recycled origin by 2028.

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.

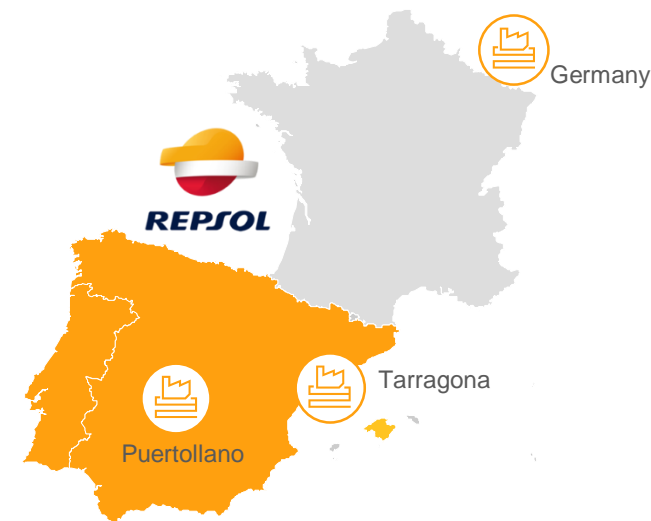


Partnerships



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

RECPUR locations



Executive summary



CIRCULARITY is going to be a MUST for the chemical industry:

- The European virgin polyolefins market grows at 0,8% and the recycled at 12% CAGR
- Repsol is well positioned for recycling as our petrochemical sites are well integrated
- Repsol has 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
- Repsol has a clear road map with four main projects to invest 1.400 k€ with different technologies and partners, and continue developing new projects to reach the 2030 recycling goals
- Collaborations must be fundamental to develop a sustainable Repsol Circularity business.
- Circularity and Low carbon Emissions productions go ahead together in a non stop way





**THANK
YOU**

