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01. Repsol Chemical Business Overview

02. Repsol Chemical Business Strategy

03. Chemicals Transformation - Circularity
   - Targets
   - Roadmap
   - Projects and value chain

04. Executive summary
01. Repsol Chemical Business Overview
# Repsol Chemical Business Key figures

<table>
<thead>
<tr>
<th>Number</th>
<th>Description</th>
<th>2015-2020</th>
<th>2021</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Main highly integrated &amp; flexible petrochemical sites in Iberia</td>
<td>~550 M€/y</td>
<td>~900 M€/y</td>
<td>~35 %</td>
</tr>
<tr>
<td></td>
<td>Average EBITDA</td>
<td>Projected EBITDA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2,800</td>
<td>kt/y</td>
<td>~20%</td>
<td>~35 %</td>
<td>~1,700 M€</td>
</tr>
<tr>
<td></td>
<td>Sales</td>
<td>Average ROACE</td>
<td>Projected ROACE</td>
<td>Capital employed</td>
</tr>
<tr>
<td>&gt;1,000</td>
<td>Relevant customers</td>
<td>~2,000 Staff</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>High complexity production &amp; logistics</td>
<td>~85 countries</td>
<td>~15th</td>
<td></td>
</tr>
<tr>
<td></td>
<td>~350 different grades / lean production / multi-modal delivery</td>
<td>Sales</td>
<td>World producer high value products (PO/ Polyols, EVA)</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>JV Dynasol</strong> 50/50 strategic Alliance between Repsol and KUO (Mexico) in synthetic rubber business plants in Europe, LATAM and China</td>
<td>~100 M$/y</td>
<td>~100 M$/y</td>
<td>310 kt/y</td>
</tr>
<tr>
<td></td>
<td>Average EBITDA</td>
<td>Projected EBITDA</td>
<td></td>
<td>Sales</td>
</tr>
<tr>
<td></td>
<td>2016-2020</td>
<td>2020</td>
<td>2020</td>
<td>2020</td>
</tr>
</tbody>
</table>
01. Repsol Chemical Business Overview

Diversified Portfolio committed with improving Life Standards and with Energy Transition

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

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

**Repsol Química EBITDA (M€/y)**

| Year     | BAU | Including Dynasol and Repsol Química initiatives | ROACE
|----------|-----|-----------------------------------------------|------
| 2018-2020| 350 | 330                                           | 8%   |
| 2025     | 700 | 350                                           | 13.3%|

**Cum. CAPEX 2021-25 (B€)**

- 0.6 BAU¹
- 0.4 Transform
- 0.6 Alba
- 0.1 Integrate (Rest)²
- 0.1 Adj / Eff
- 1.5 Total Repsol

**Executive Summary**

- **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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1. Business as usual; 2. Including Dynasol and Repsol Química initiatives; 3. ROACE is calculated after taxes.
03. Chemicals Transformation Circularity
**03. Chemicals Transformation - Circularity**

**Targets**

**License to Operate and Business Opportunity**

<table>
<thead>
<tr>
<th>Legislative, social, competitive and technological environment</th>
<th>Recycled polyolefins growth. New market for recycled polyols</th>
</tr>
</thead>
</table>

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

### Recycled Polyolefins (kt/yr)

<table>
<thead>
<tr>
<th>Year</th>
<th>Mechanical Recycling</th>
<th>Chemical Recycling (Pyrolisis)</th>
<th>Chemical Recycling (Gasification)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020</td>
<td>6 kt/yr</td>
<td>30 kt/yr</td>
<td>20% Over Production</td>
</tr>
<tr>
<td>2025</td>
<td>80 kt/yr</td>
<td>135 kt/yr</td>
<td>11%</td>
</tr>
<tr>
<td>2030</td>
<td>225 kt/yr</td>
<td>360 kt/yr</td>
<td>85 kt/yr</td>
</tr>
</tbody>
</table>

Total Polyolefins:
- 2020: 1.150 kt/yr
- 2025: 1.355 kt/yr
- 2030: 1.800 kt/yr

### Notes

- **License to Operate**
- **Business Opportunity**
Polyolefin Market in Europe will be growing at healthy rates (both Virgin and Recycled) over next decade

**Polyolefins Demand in Europe (2020-2030)**

<table>
<thead>
<tr>
<th>Year</th>
<th>Virgin Polyolefins</th>
<th>Mechanical Recycled Polyolefins</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020</td>
<td>30</td>
<td>25</td>
</tr>
<tr>
<td>2021</td>
<td>28</td>
<td>30</td>
</tr>
<tr>
<td>2022</td>
<td>26</td>
<td>40</td>
</tr>
<tr>
<td>2023</td>
<td>24</td>
<td>50</td>
</tr>
<tr>
<td>2024</td>
<td>22</td>
<td>60</td>
</tr>
<tr>
<td>2025</td>
<td>20</td>
<td>70</td>
</tr>
<tr>
<td>2026</td>
<td>18</td>
<td>80</td>
</tr>
<tr>
<td>2027</td>
<td>16</td>
<td>90</td>
</tr>
<tr>
<td>2028</td>
<td>14</td>
<td>100</td>
</tr>
<tr>
<td>2029</td>
<td>12</td>
<td>110</td>
</tr>
<tr>
<td>2030</td>
<td>10</td>
<td>120</td>
</tr>
</tbody>
</table>

**CAGR (%)**
- Virgin Polyolefins: 1.5%
- Mechanical Recycled Polyolefins: 4.6%
- Total Growth (Mt/y): 3.7

**Recycled Polyolefins Demand in Europe (2020-2030)**

<table>
<thead>
<tr>
<th>Year</th>
<th>Chemical Recycled Polyolefins Waste</th>
<th>Mechanical Recycled Polyolefins</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>2021</td>
<td>10</td>
<td>16</td>
</tr>
<tr>
<td>2022</td>
<td>8</td>
<td>20</td>
</tr>
<tr>
<td>2023</td>
<td>6</td>
<td>24</td>
</tr>
<tr>
<td>2024</td>
<td>4</td>
<td>28</td>
</tr>
<tr>
<td>2025</td>
<td>2</td>
<td>32</td>
</tr>
<tr>
<td>2026</td>
<td>0</td>
<td>36</td>
</tr>
<tr>
<td>2027</td>
<td>0</td>
<td>40</td>
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<tr>
<td>2028</td>
<td>0</td>
<td>44</td>
</tr>
<tr>
<td>2029</td>
<td>0</td>
<td>48</td>
</tr>
<tr>
<td>2030</td>
<td>0</td>
<td>52</td>
</tr>
</tbody>
</table>

**CAGR (%)**
- Chemical Recycled Polyolefins Waste: 1.5%
- Mechanical Recycled Polyolefins: 4.6%
- Total Growth (Mt/y): 9.9%
03. Chemicals Transformation - Circularity

Roadmap to reach our targets

- **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

**Processing pyrolysis oil in our refineries**
- Start-ups: 2015, 2020

**ISCC PLUS certification in Tarragona, Puertollano and Sines**
- Start-up: 2020

**TOTAL CAPEX:**
- ≈€1,400 M
- (Repsol Equity €665 M - unlevered)
## Projects and value chain

<table>
<thead>
<tr>
<th>WASTE</th>
<th>TECHNOLOGY</th>
<th>PRODUCTION</th>
<th>MARKET</th>
</tr>
</thead>
<tbody>
<tr>
<td>RECICLEX® Mechanical&lt;br&gt;High quality post-consumer waste</td>
<td>Mechanical Recycling</td>
<td>Repsol Compounds Plants: Monzón PP &amp; Puertollano PE&lt;br&gt;Reciclex compounds production in ACTECO</td>
<td>Polyolefins that incorporates recycled material&lt;br&gt;Usual polyolefin market (packaging, auto, etc.). Currently sales to 20 customers</td>
</tr>
<tr>
<td>RECICLEX® Circular&lt;br&gt;Plastic mix High quality CSR</td>
<td>Chemical Recycling&lt;br&gt; PYROLYSIS</td>
<td>Crude processing in Puertollano and free allocation to products by mass balance.&lt;br&gt;In project: Pyroplast; FCC Puertollano; Tarragona’s crude; Direct Styrene.</td>
<td>Circular polyolefins with ISCC PLUS certification (3 certified complexes)&lt;br&gt;Currently sales to 10 customers</td>
</tr>
<tr>
<td>ECOPLANTA®&lt;br&gt;Urban solid waste</td>
<td>Chemical Recycling&lt;br&gt; GASIFICATION</td>
<td>Ecoplanta integrated in Tarragona site&lt;br&gt;The extension of the model to other sites is in the conceptualization phase</td>
<td>Methanol: RED II fuels; Chemical Industry, Marine fuels&lt;br&gt;Methanol-to-Olefins under evaluation</td>
</tr>
<tr>
<td>RECPUR&lt;br&gt;Industrial/ Clients residues Mattress foam waste</td>
<td>Chemical Recycling&lt;br&gt; ACIDOLYSIS</td>
<td>New plant at Puertollano for production of polyols</td>
<td>Polyols incorporating recycled material for the foam market in the comfort sector in Europe.&lt;br&gt;Agreement with 6 key customers for product homologation and formulation adjustment.</td>
</tr>
</tbody>
</table>
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

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

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

Partners:

- Sines
- Tarragona
- Puertollano
- Alicante

The Repsol Commitment: Net Zero Emissions by 2050
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.

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 ISSC Plus certified with mass balance
- 100% recyclable
- Low carbon footprint

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.

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

Tarragona
Puertollano
Germany
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**
- Technology leader
- 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

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**ECOPLANTA® locations**

RPSOL 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
Low Carbon Day

Investor Relations
investor.relations@repsol.com

#RepsolLowCarbonDay
www.repsol.com