



## Ecoplanta Project: a technology-driven business opportunity

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The Repsol Commitment  
Net Zero Emissions  
by 2050

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Repsol's ambition and context

# 02.

Gasification technology and Repsol

# 03.

Enerkem and Repsol fit

# 04.

Ecoplanta Project







# 01.

## Repsol's ambition and context

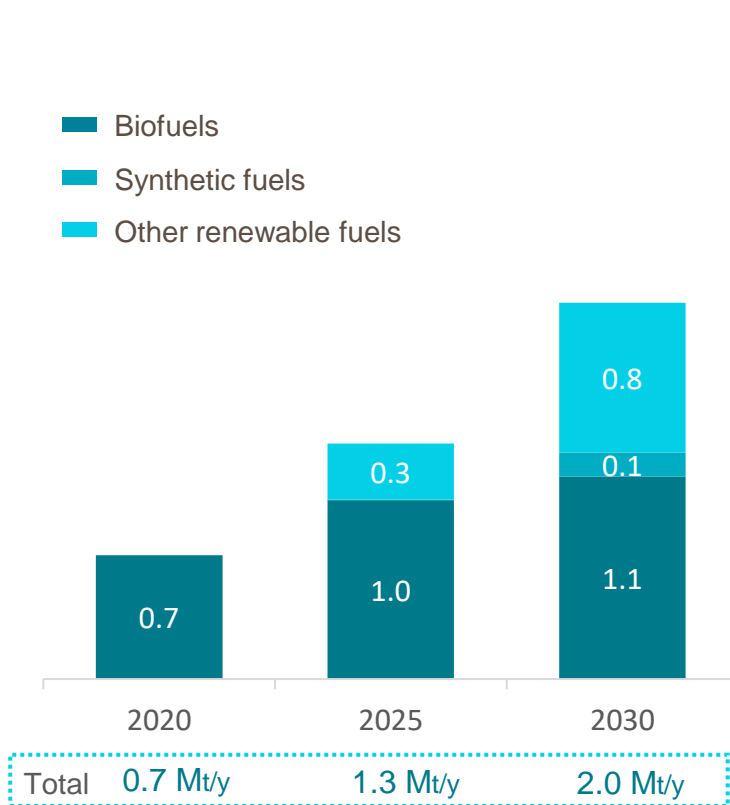


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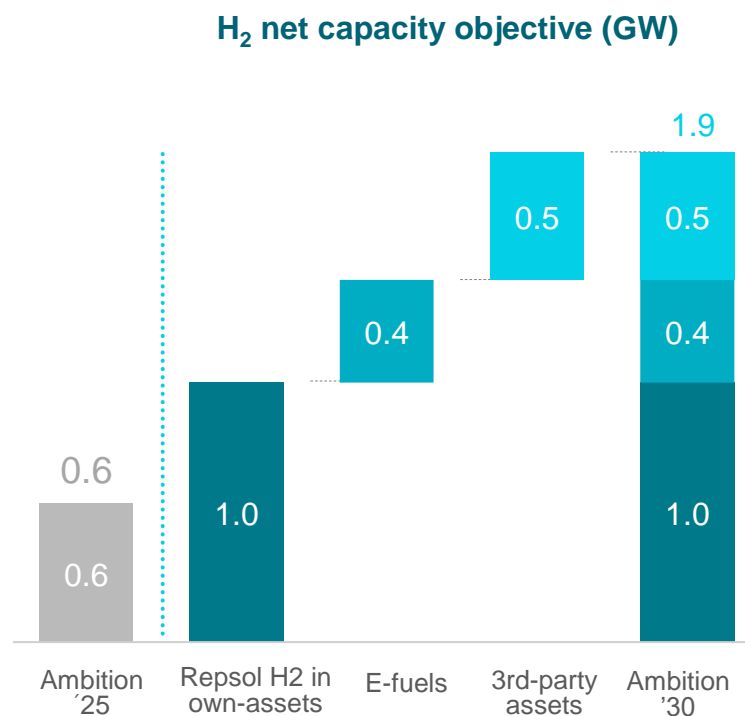


## 01. Repsol's ambition and context

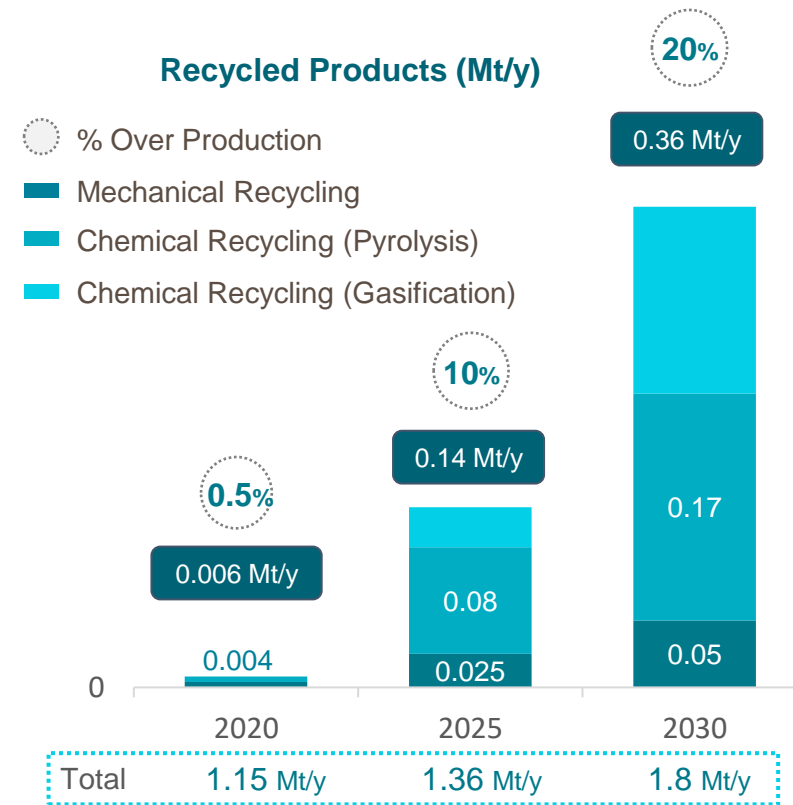
# Renewable fuels and circular economy targets



**Renewable fuels:** Increase our Low Carbon Fuels Production Capacity to 2Mt/y by 2030



**Hydrogen:** Goal to reach a H<sub>2</sub> capacity of 552 MW equivalent in 2025 and 1.9 GW in 2030



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

## 01. Repsol's ambition and context

# In the current context, four main trends are encouraging the development of sustainability fuels and materials for Europe and Spain

### Energy transition and independence

- Decarbonization: **Fit for 55** sets targets to reduce greenhouse gas emissions by at least 55% through different regulatory proposals, including:
  - **RED II revision (RED III)**
  - **ReFuelEU aviation**
  - **FuelEU maritime**
  - **Energy Taxation Directive (Directive 2003/96/EC)**
- European energy independence: **REPowerEU** accelerates energy transition to decrease dependency of fossil fuels coming from Russia

### Circular economy regulatory push

- Circular economy regulatory measures will stimulate a feedstock market to be recycled or recovered:
  - **Waste Framework Directive** (under revision) to ban landfilling
  - **Packaging and Packaging Waste Directive** (under revision)

### Client demand

- Relevant companies in airlines and chemicals sectors are pledging to become net zero and demanding sustainable products such as **renewable fuels** (i.e. SAF, methanol) and **sustainable chemicals** in response to customer demands and to shareholders' pressure
- Circular plastics have a low impact on final end customer manufactured goods prices

### Commodity prices

- Natural gas prices could remain structurally higher than historical values in the long term due to substitution of Russian pipelined natural gas by LNG
- CO2 emission prices have also significantly increased and will increasingly play a relevant role in production costs and make profitable technologies to reduce emissions (that were not viable with historical prices)



# 02.

## Gasification Technology and Repsol

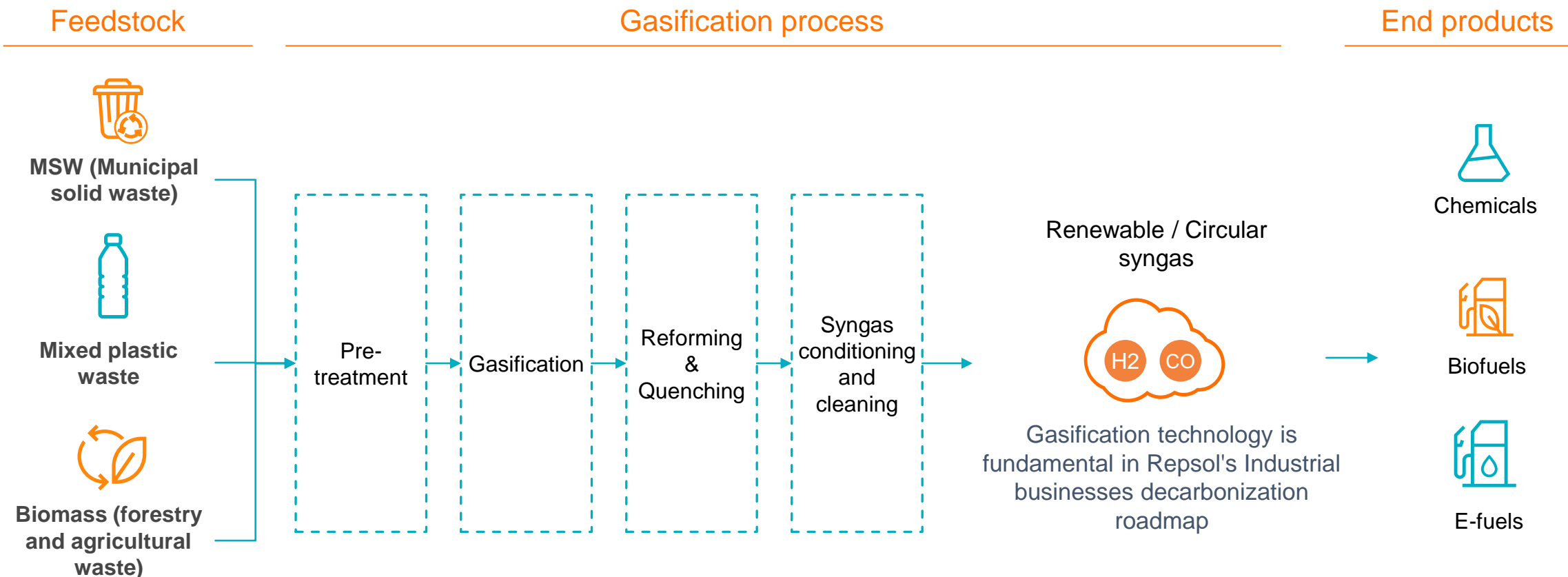


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## 01. Gasification Technology and Repsol

# Gasification role in Repsol's Industrial decarbonization roadmap





## 01. Gasification Technology and Repsol

# Gasification main features

### 1. Flexibility

High flexibility to process heterogenous feedstocks (e.g. MSW low purity requirements and contaminants).

### 2. Versatility

Syngas production from waste has a large potential to decarbonize industrial processes as well as transportation and chemical applications due its flexibility.

### 3. Efficiency

Key in the hybridization pathway as the most efficient way to produce E-fuels, and synergies with renewable H2 for chemicals production.

### 4. Maturity

Higher maturity and utilization of the technology for greater short-term value capture.

### 5. Scalability

### 6. Sustainability

EU Green Deal and Fitfor55 goals.

- Transportation → (advanced bios)
- Chemicals → (circularity/bios)



# 03.

## Enerkem and Repsol fit

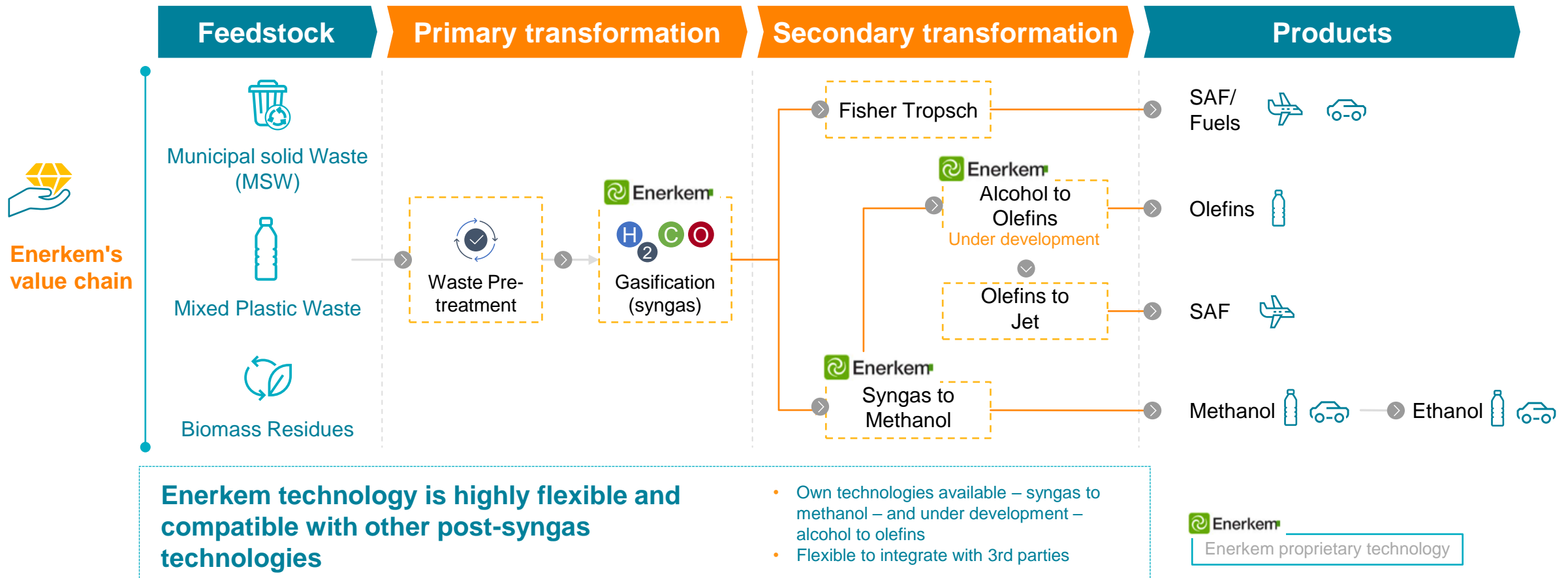


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## 02. Enerkem and Repsol fit

# Enerkem is the preferred gasification technology





## 02. Enerkem and Repsol fit

# Enerkem as the preferred gasification technology

### Most mature gasification technology

- 6 years of experience operating and developing technology at large scale
- High waste pre-treatment flexibility and process stability

Large experience in **adapting the feedstock** to maximize yields

Demonstrated capacity to improve syngas production and **integrate new downstream technologies**

Strong recognition by several agencies and partners – e.g. selected for European Commission Innovation Fund (Ecoplanta project)

Commercial deployment roadmap in place, with a strong project pipeline. Partnering with top players for plants development

## 02. Enkern and Reppol fit

# Enkern and Reppol fit

**In April 2022 Reppol invested C\$170 million in Enkern (C\$75 million in equity and C\$95 million in convertible debt) becoming a strategic shareholder**



### What did Enkern seek in Reppol?

Reppol can speed up Enkern's project rollout in Iberia.

- Reppol is the main H2 producer and Iberia has competitive renewable energy for green H2
- Well positioned in the waste ecosystem
- Industrial asset base and operation
- Offtake integration → leader in trading and marketing
- Experience licensing proprietary Technology to third parties
- Strong track-record of world-scale projects



### What did Reppol seek in Enkern?

Enkern, a good partner to meet Reppol's decarbonization goals.

- Preferential access to advantageous technology
- Access to new projects in Iberia
- Early investment in a technology company with value upside potential
- Opportunity to develop competitive advantages in a new technology
- Technologist of choice for joint developments





# 04. Ecoplanta Project



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## 03. Ecoplanta

# Highly innovative waste-to-methanol process (I/II)



## The project

Located in El Morell, Tarragona. It would be the first plant in Spain to transform non-recyclable municipal solid waste into renewable/circular methanol to be used in the manufacturing of new materials and advanced biofuels.

This plant, which is expected to be in operation by 2026, will process around 400,000 tons of non-recyclable municipal solid waste from "ecoparks" — waste recovery and treatment plants — from surrounding regions.

The waste will be used to produce around 240,000 tons of renewable/circular methanol, a compound that serves as a raw material for the production of circular chemical products and advanced biofuels.



## The technology

By subjecting non-recyclable municipal solid waste to specific pressure and temperature conditions, the molecules are broken down into their essential compounds. This process transforms it into a synthetic gas (syngas) that, once cleaned, can be transformed into renewable/circular methanol.

It is a highly innovative technology and will be a first of a kind plant. The process will allow to treat high volumes of waste (~400kt/y) with high flexibility in terms of composition.



## GHG emissions reduction

- Achieve a reduction of 3.4 Mt CO<sub>2</sub>eq of greenhouse gas (GHG) emissions during the first ten years of operation.
- Recycle more than 70% of the carbon present in the waste.

### 03. Ecoplanta

# Highly innovative waste-to-methanol process (II/II)



## Waste to landfill reduction

Ecoplanta will process the **non recyclable waste** from Ecoparks that currently end up in landfills.

The project is aligned with the EU and national directives in terms of reduction of waste to landfill and increasing recycling rates. The EU Waste Directive (2008/98/CE amended by 2018/581) sets **ambitious goals**:

|                                      | 2030 | 2035 |
|--------------------------------------|------|------|
| <b>% waste to landfill reduction</b> | 20 % | 10 % |
| <b>% material recycling</b>          | 60 % | 65 % |



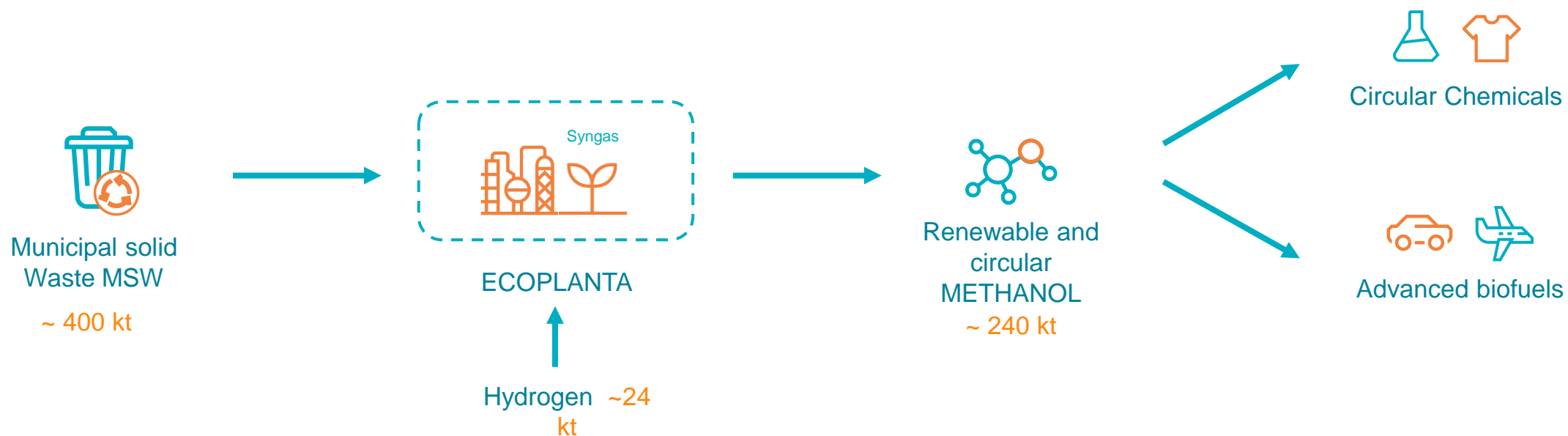
## The product

The process will **produce around 240,000 tons of renewable/circular methanol**, that can be used for:

- Production of **circular chemical products**: material valorization to manufacture chemical products (paints, resins...) and circular plastics (through the production of circular ethylene)
- **Advanced biofuels**: according to the EU REDII directive, the biomethanol produced will be considered an advanced biofuel used initially for road transport. Additionally, methanol can be used to decarbonize “hard-to-abate” sectors such as maritime transport and aviation with further processing.

### 03. Ecoplanta

## Project summary



- ✓ Startup in 2026
- ✓ Investment of ~800 M€ including the electrolyzer
- ✓ 3.4 Mt CO<sub>2</sub>eq of greenhouse gas (GHG) emissions reductions over the first ten years of operation.
- ✓ Recycling over 70% of the carbon present in the residual waste.

### 03. Ecoplanta

# Calendar





### 03. Ecoplanta

## Ecoplanta is aligned with EU policies

### Innovation Fund Program Co-funded by the European Union

Ecoplanta has been selected by the European Union commission to be funded through the Innovation Fund program.

It is **one of the seven projects chosen** out of more than 300 applicants.

Ecoplanta is the only large-scale project awarded in Spain.

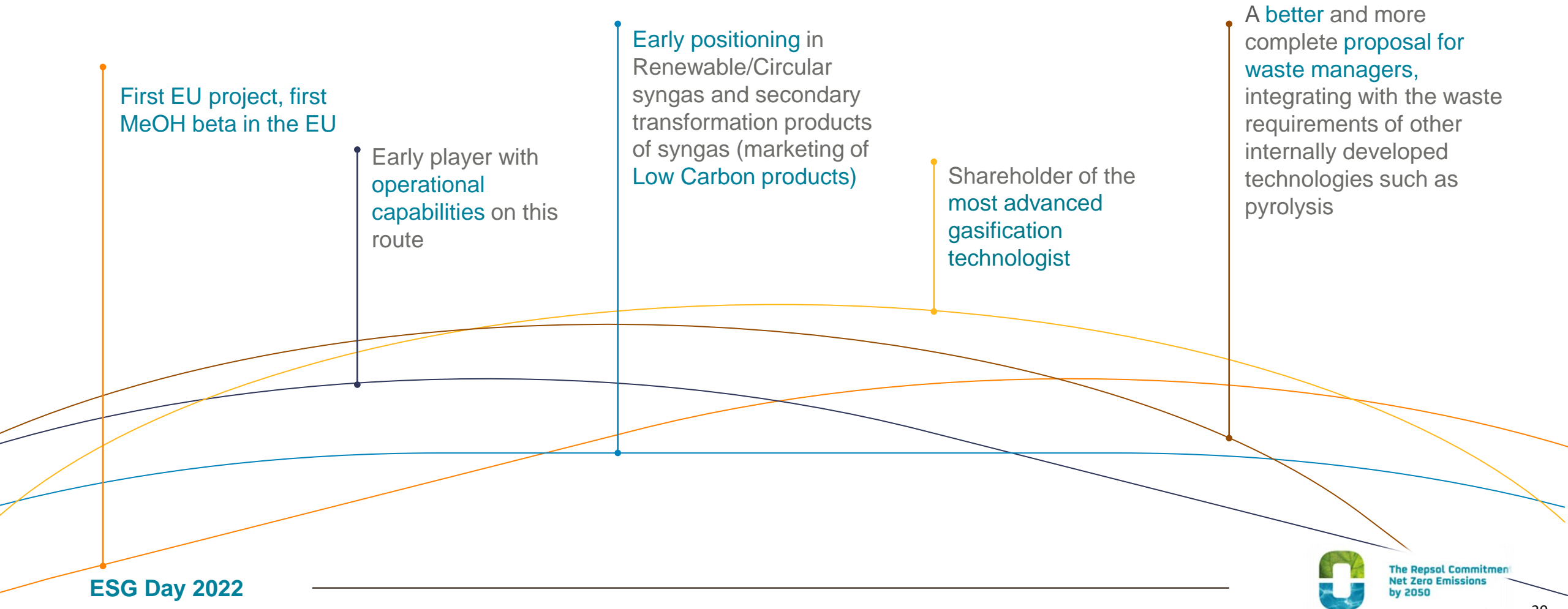
The Commission has highlighted the **innovative technology**, the **decarbonization** obtained with the process and the possibility of **scalability**.

### EU Taxonomy eligibility

**Advanced bio methanol production and material recovery of non-hazardous waste** are Ecoplanta's eligible activities for climate change mitigation.

### 03. Ecoplanta

## Repsol, partner of choice due to Enerkem & Ecoplanta



# ESG Day

October 4<sup>th</sup>, 2022



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