ECOPLANTA PROJECT

Transforming waste to create value

October, 2026

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SOLUCIONS DE RECICLATGE MOLECULAR



Project description

Project objective

Transformation of municipal waste into renewable and circular methanol

Solution to two global problems

- ❑ Dependency on fossil fuels and the need to decarbonize
- ❑ Waste management according to EU waste hierarchy

Awarded with the IF (large-scale projects):

- ❑ First waste-to-fuel plant in Europe to implement molecular carbon recycling
- ❑ Support the development of circularity and renewable energy
- ❑ High scalability potential



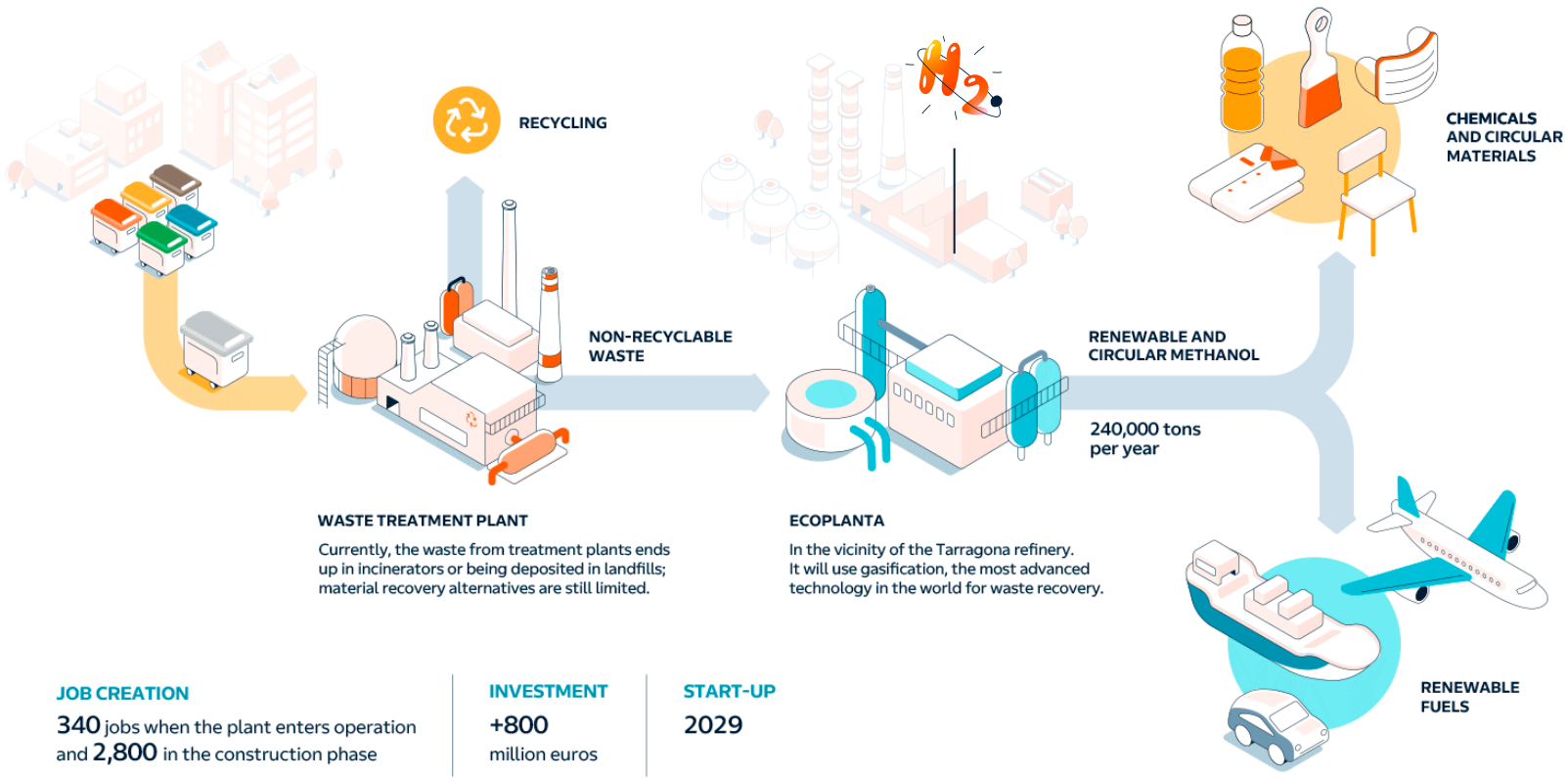


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Ecoplanta: renewable and circular methanol in Tarragona

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Transformation of municipal waste into renewable and circular methanol



JOB CREATION
340 jobs when the plant enters operation and 2,800 in the construction phase

INVESTMENT
+800 million euros

START-UP
2029

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Enerkem

400.000 t/year of non-recyclable municipal solid waste, which would otherwise be destined for landfill or incineration

240.000 t/year of renewable and circular methanol, raw material for the chemical industry and as a renewable fuel for transport

>70% of the carbon recovery from waste

3.4 million tons of CO_2 avoided in 10 years

+ 800 million euros

First of a Kind

Recipient of an EU **Innovation Fund grant**

Ecoplanta de Tarragona en la COP30: metanol renovable para descarbonizar el transporte

Ecoplanta is a hybrid technology (advanced biofuels, e-fuels and circular molecules) supporting strategic autonomy, efficient waste valorization and CO2 reduction of transport and chemicals

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International recognition

Energy transition advances when innovation is translated into concrete and measurable industrial projects

“Bright Spot” pioneer by the Mission Possible Partnership

MISSION POSSIBLE PARTNERSHIP

This recognition highlights Ecoplanta as one of the most innovative and impactful clean industrial projects worldwide

SB COP Awards

SUSTAINABLE BUSINESS COP30

Highlighted as a success story by Sustainable Business SB COP30

Included in the Global Project Tracker, which showcases real examples of industrial transformation worldwide



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Project schedule

A decade of milestones to turn pioneering technology into stable industrial operations

Innovation Fund award (2021 program)

Repsol entry into Enerkem shareholding

Enerkem

Final Investment Decision

Start of construction

Start of operation

Operational capacity consolidated

2021 2022 2024 2025 2026 2027 2028 2029 2031 2032+

Repsol entry into Ecoplanta

Permit granted

Start of earthworks

Module delivery to site

- Engineering Service Agreement
- Project Management Plan
- Basic Engineering Package
- Permit application

- Detailed Engineering
- Contingency Plan for technology de-risking
- Technical and personnel capabilities development
- Carbon footprint assessment
- On-site construction activities
- Final Commissioning

- Key parameters monitoring
- Performance consolidation
- Debottlenecking and fine-tuning
- Gradual ramp-up

- Long-term stable operation and technology de-risked

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Gasification strategic role

Combining waste recovery with renewable fuels production and circular methanol

Early adopter

Gasification is the only scalable chemical valorization option beyond existing treatments. Combined with selective collection, anaerobic digestion, and recycling, it **helps reduce landfill and incineration**.

Dual contribution: Waste & energy

It enables chemical conversion of waste into products, supporting **both waste recovery and decarbonization** of transport and products through local resource use.

Efficiency

The hybrid approach is the most efficient pathway for **producing e-fuels** and creates synergies with renewable H_2 for the production of advanced biofuels and chemicals.

High feedstock flexibility: security of supply

The process **accommodates significant variations in waste quality**, ensuring long-term adaptability. Local feedstock

Alignment with the current waste management model

Perfect fit for Ecoparcs: uses **rejects from MBT plants** helping meet recycling and advanced biofuels for transport production targets.

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Industrial transformation in Tarragona

A project designed to stringent **environmental standards**, supporting the transition toward a decarbonized industrial hub

Ecoplanta helps meet key European and national regulatory targets by contributing to:

- **Waste reduction, recycling and circular economy goals** (Waste & Landfill Framework Directive, Packaging Waste Regulations, and the 2nd Circular Economy Action Plan)
- **Renewable energy and decarbonization targets** (Spain's National Energy and Climate Plan, RED III, ReFuel Aviation and FuelEU Maritime)

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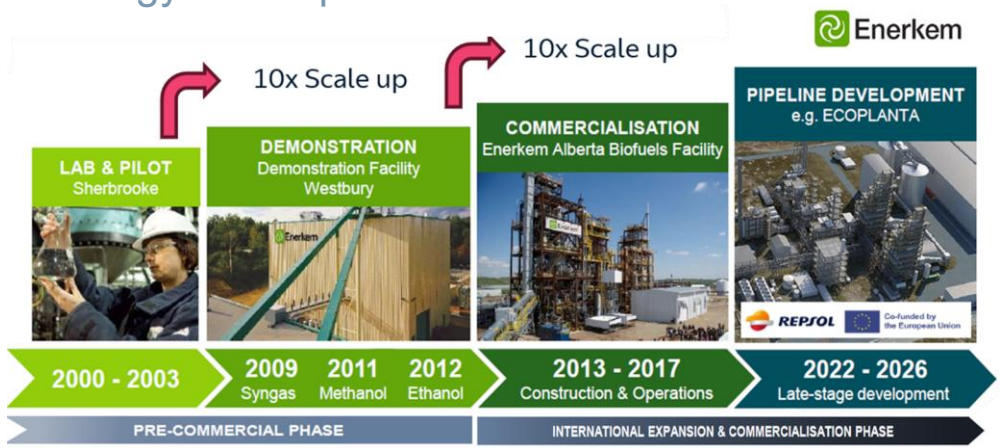
02 Technology

Enerkem gasification technology development

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Enerkem with more than 20 years of know-how in gasification technology development

Enerkem technology is the result of ***20 years of know-how development and design validation*** from Sherbrook labs and pilot, Westbury demo and Edmonton full scale plant experience



Enerkem capabilities with full support to Ecoplanta project

> 4 million liters of IMPCA grade MeOH (100% ISCC certified)

> 1 million liters of BC LCFS EtOH

> 15,000 hours of operation at scale

> 20,000 hours in pilot and demo

Laboratory: analytical methods for feedstock characterization and critical properties evaluation

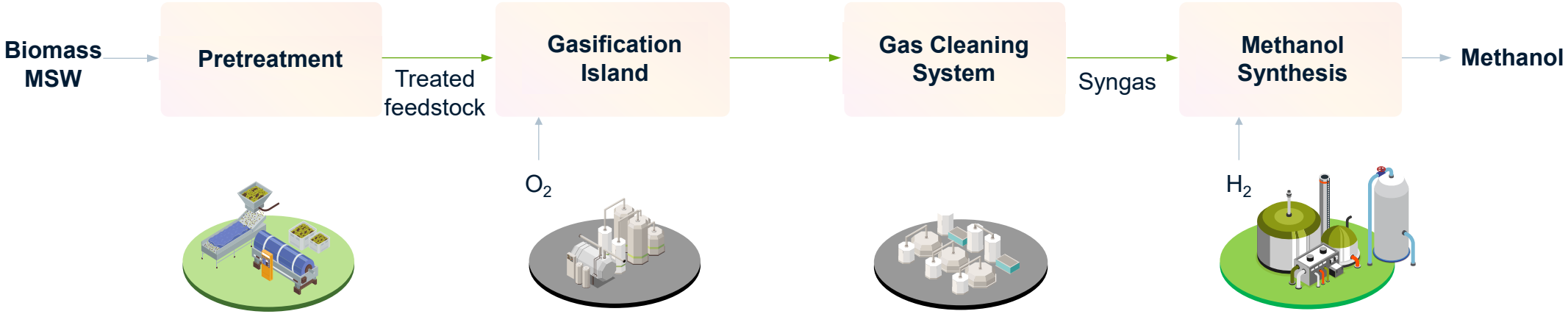
Engineering: process control systems and equipment improvement proposals

Maintenance and operation: performance monitoring and troubleshooting with the lessons learned during the Edmonton demo plant facility operation

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Technology description

Well-proven technology with a rigorous de-risking path to commercialization



Pretreatment the raw material to comply with the requirements of the gasifier

Thermochemical conversion of raw materials with high carbon content into a synthesis gas by partial oxidation

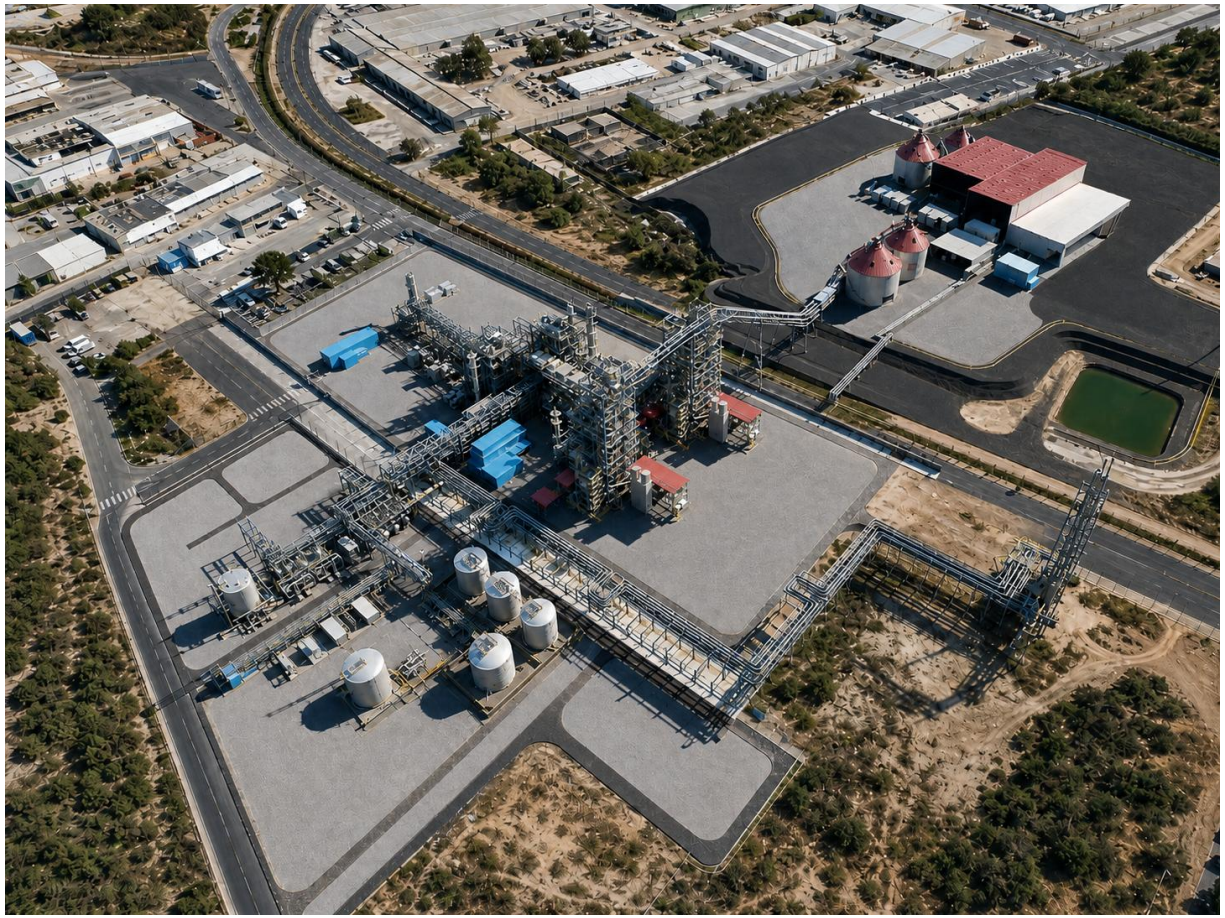
Gas conditioning and cleaning to achieve the required purity for methanol synthesis

Methanol is produced by catalytic hydrogenation of CO and CO2 using H2

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Ecoplanta design

3D model





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Synergies with existing operations

Integrated into the existing infrastructure within the industrial plant of Repsol's petrochemical complex

1

Tarragona will become a new renewable H2 hub, based on recovery of low-carbon, bio and green H2 production

2

Numerous synergies were identified to minimize infrastructure requirements for utilities and utilities: steam / condensate, O2 and N2 integration and water networks

3

Logistics solution established for the transport of methanol to the port of Tarragona, allowing easy access to several markets.

4

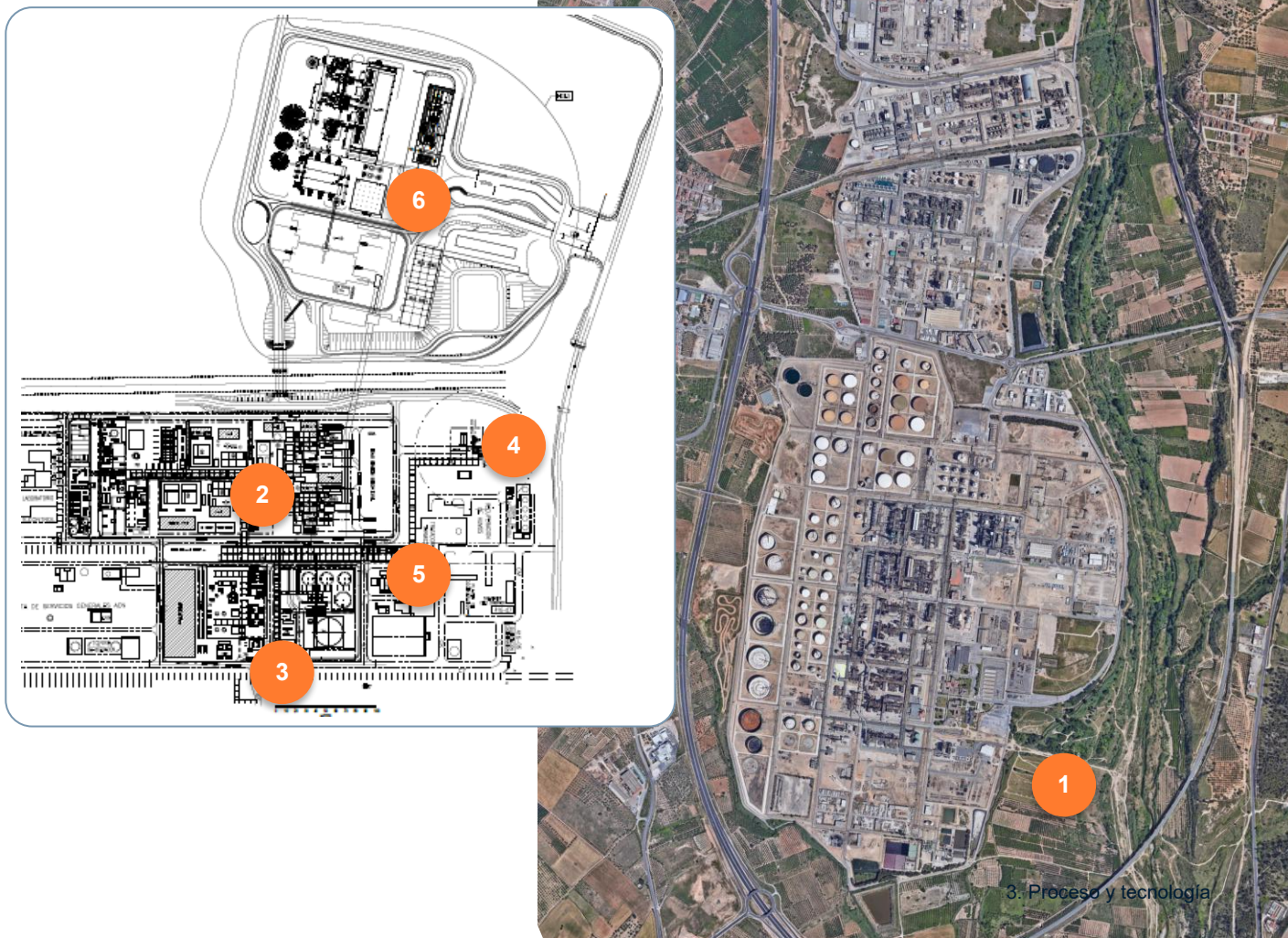
Seamless integration with Repsol's existing flare, significantly impacting the permit application process

5

Incorporation of Repsol outfalls into the facility for the management of aqueous effluents

6

Compatibility with current activity, requiring less land preparation work compared to a 100% greenfield project. No disruption to Repsol's operations during construction

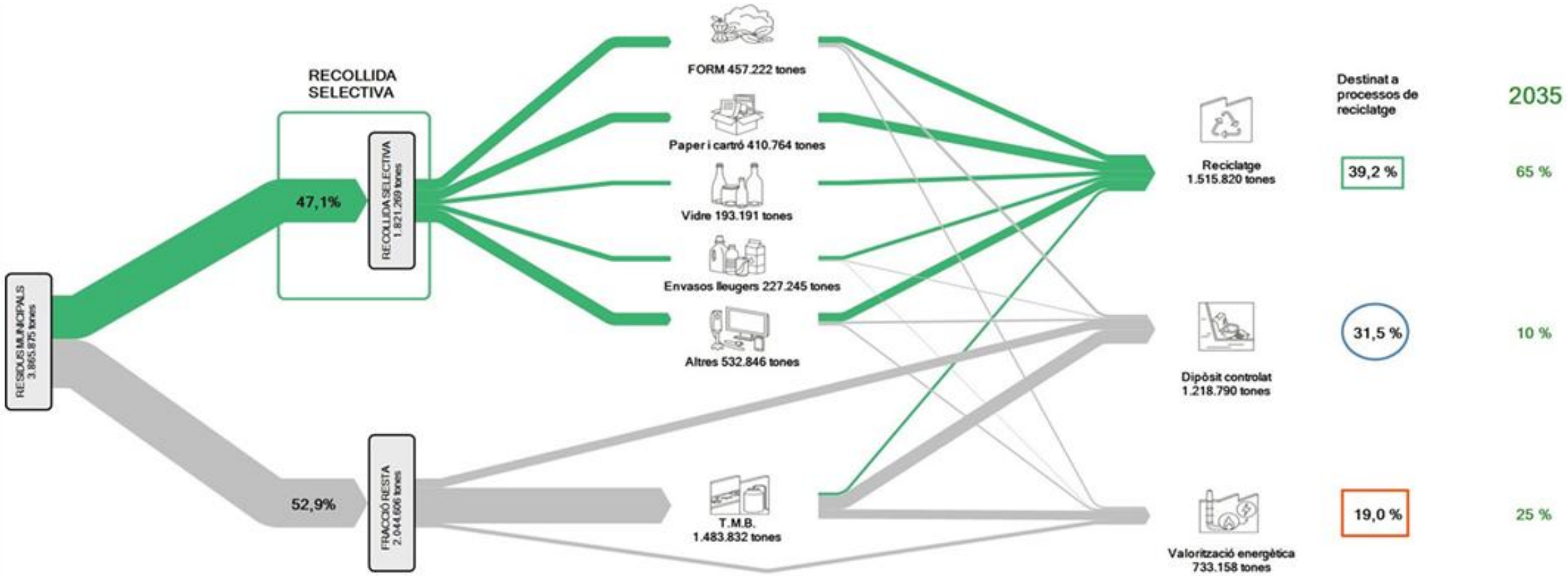


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03 Feedstocks

Commitment to the European Green Deal

Current municipal waste management in Catalonia (2024)



3.86 million tonnes of municipal waste generated
Residual (mixed) waste still accounts for 52.9% of total waste generation, and **32 % is landfilled** (1,2 million tonnes)

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https://residus.gencat.cat/web/.content/home/consultes_i_tramits_-_nou/estadistiques/residus_municipals/dades_residus_municipals_2024.pdf

Feedstock flexibility

Feedstock sourcing strategy



Waste Biomass

Biomass waste: bulky waste (b-wood) and forestry and agricultural waste.



RDF

Variable content of plastic waste and organic fraction (organic waste, paper, cardboard, textile).



OFMSW (CLO)

The organic fraction of mixed municipal solid waste.



ASR

Shredding of automobiles: mix of metals and shredder residue (glass, fiber, rubber, PU foams and plastics)



Plastic waste

Low-quality plastic waste

Can complement mechanical recycling



Used tires

25% of the tire has a biological origin (natural rubber)

Hybrid sourcing model: secured base load (JV with waste managers) + flexible complementary supply

Process flexibility is a critical competitive advantage

The gasification and pre-treatment configuration is designed to adapt to variations in raw feedstock composition

Enables stable operation despite evolving waste streams as recycling and selective collection increase

This flexibility allows

Integration of different waste fractions over time

Optimization of raw feedstock sourcing strategy (cost / availability / strategic streams)

Long-term alignment with changes in the waste system

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04 Products

Methanol market

Methanol, a key building block for the chemical industry and decarbonization

- Global methanol demand exceeds 100 million tons per year and is expected to grow, driven by traditional chemical applications, methanol-to-olefins (MTO), marine fuels and emerging methanol-to-X pathways
- The diversity of end markets results in an extensive regulatory framework, combining waste and circularity legislation with energy and decarbonization regulations

Technology pathways from methanol

Material uses

Direct use as a chemical
Solvent, antifreeze, …

Methanol to Olefins (MTO)
Olefins: polymers



Other circular products
Other routes to formaldehyde, acetic acid, acrylics, …

Fuel uses

Direct use in marine transport
Decarbonization
Maritime transport



Methanol to Kerosene (MTK)
Sustainable aviation fuels



MTBE and Methanol to Gasoline (MTG)
Advanced biogasoline



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Commercial model

Methanol, a key building block for the chemical industry and decarbonization

Product slate

The process enables **flexibility in the type of methanol produced** (advanced biofuel, RFNBO, RCF, circular) and the target markets by adjusting the biogenic content of the waste and the type of H_2 used, while always ensuring compliance with the required **sustainability criteria**, such as **carbon footprint reduction** or **life-cycle assessment**

Expected role of regulatory value / circular premium

Renewable fuels demand is driven by the different **regulatory mandates**, and methanol will compete with alternative products in each case based on its relative **abatement cost**

Demand for **circular products** is still driven more by **voluntary commitments** than by regulatory mandates, as circularity and recycled-content targets are not yet fully developed across all value chains. **Chemical recycling rules** remain nuclear, **bio-based targets** are absent

Certification

Methanol produced by Ecoplanta is expected to be certified under the **ISCC EU scheme**, ensuring full traceability and compliance with applicable **sustainability requirements across the supply chain**.

Sustainability, traceability and chain-of-custody requirements have been incorporated into the project design from the early development stage

End of waste status has been granted by the Permit

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Thank you

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