



Low Carbon Day

Driving the Refining transformation

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The Repsol Commitment
Net Zero Emissions
by 2050



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What is next? Our Pathway to 2030



**The Repsol Commitment
Net Zero Emissions
by 2050**



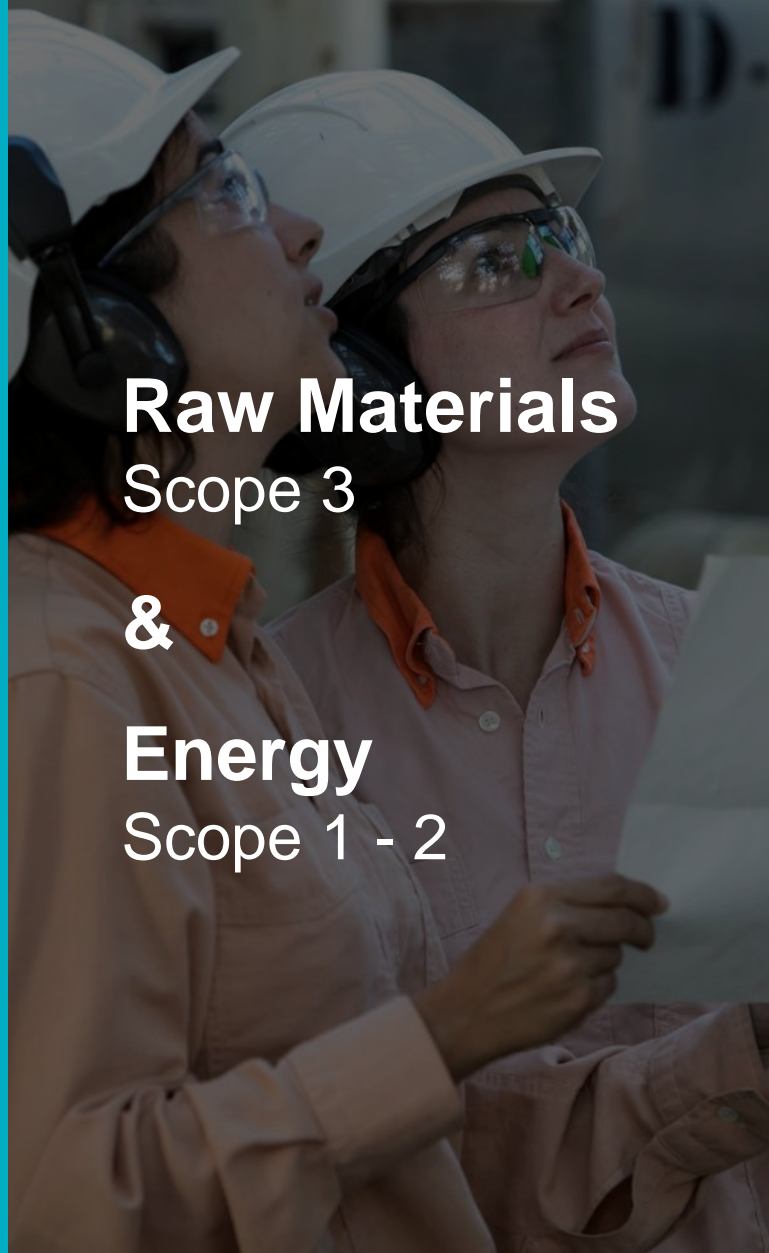
01.

Low Carbon Fuels Framework



The Repsol Commitment
Net Zero Emissions
by 2050





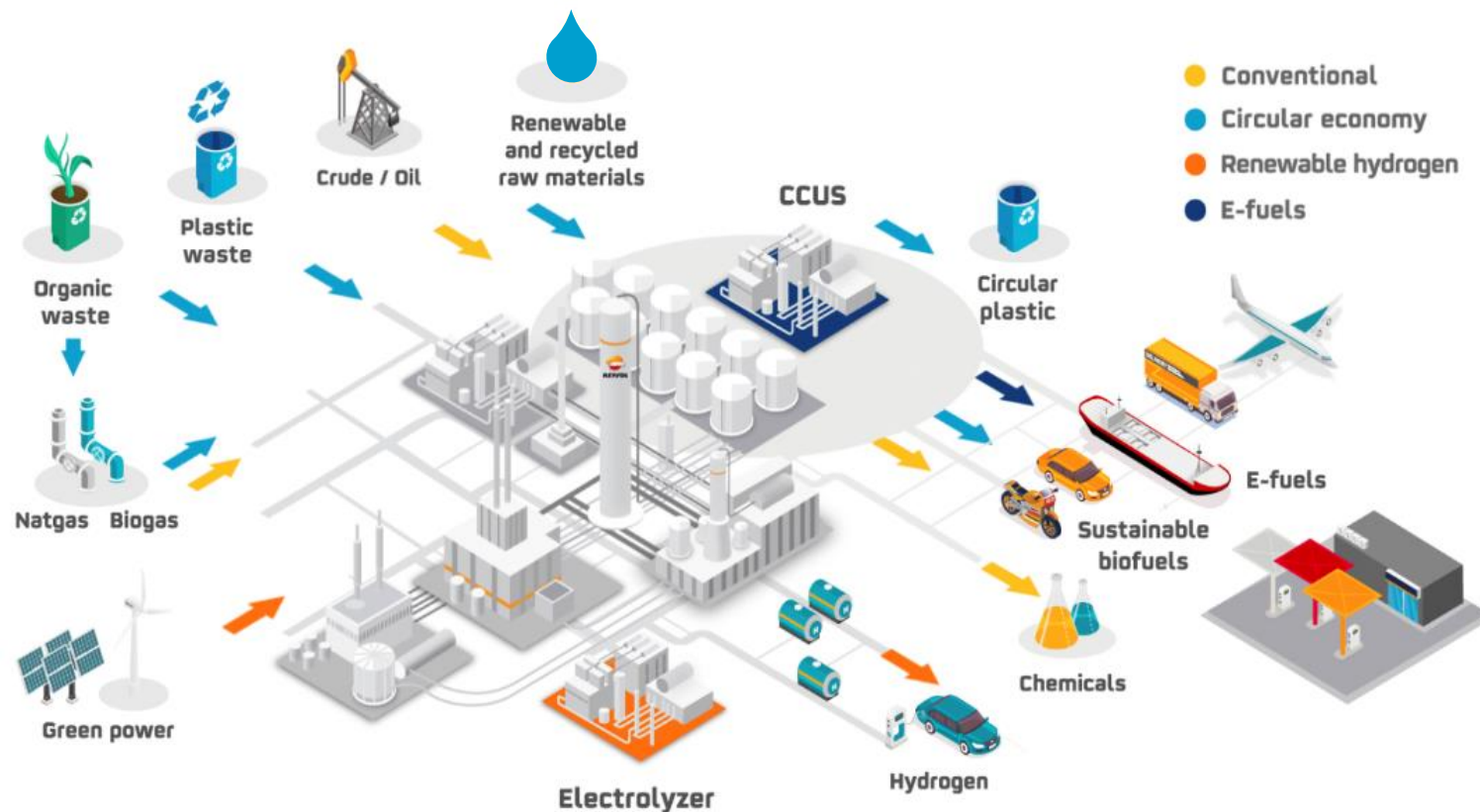
Raw Materials
Scope 3

&

Energy
Scope 1 - 2

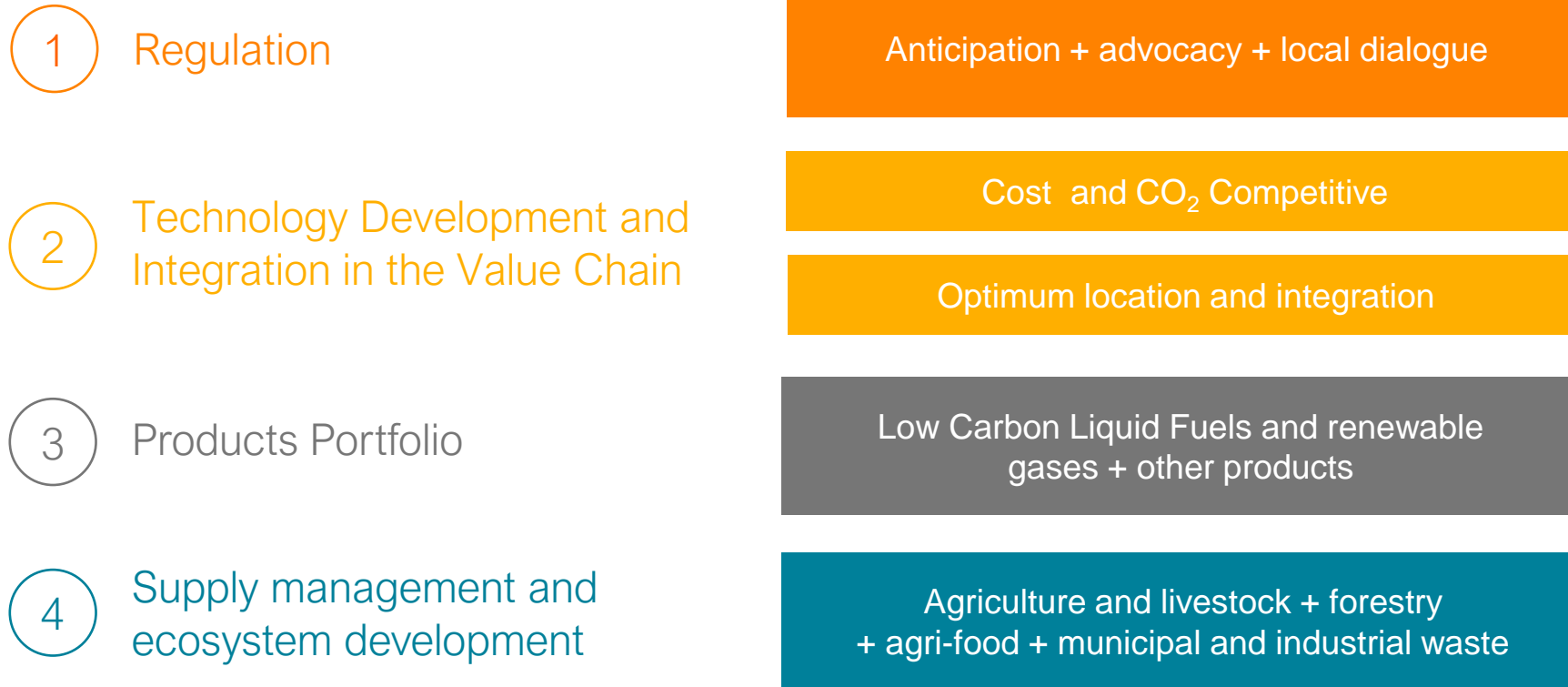
01. Low Carbon Fuels Framework

Transforming our business model



01. Low Carbon Fuels Framework

Transforming our business model

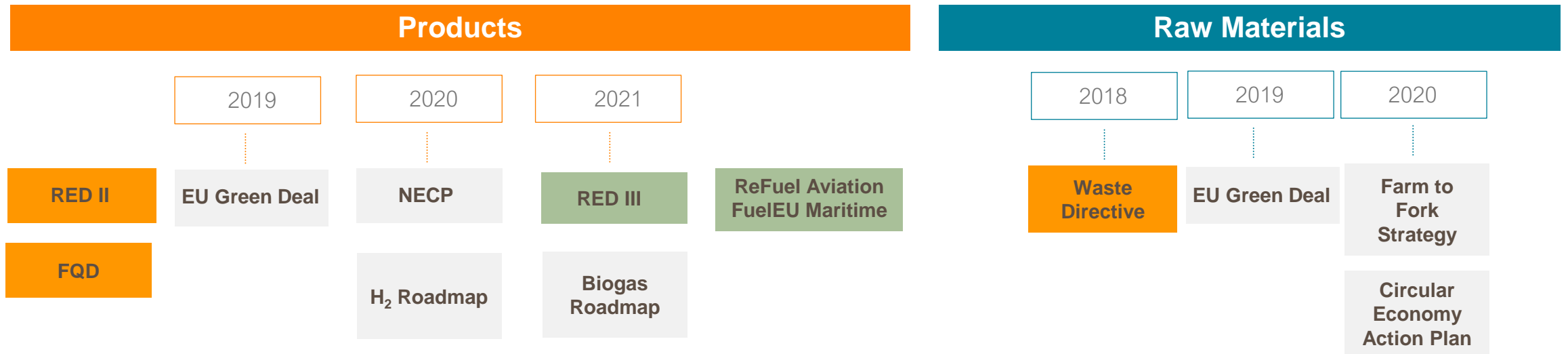


New Business Model

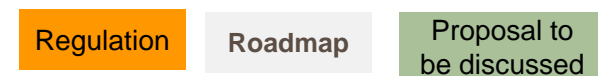


01. Low Carbon Fuels Framework

Regulation increases demand and promotes the development of raw materials

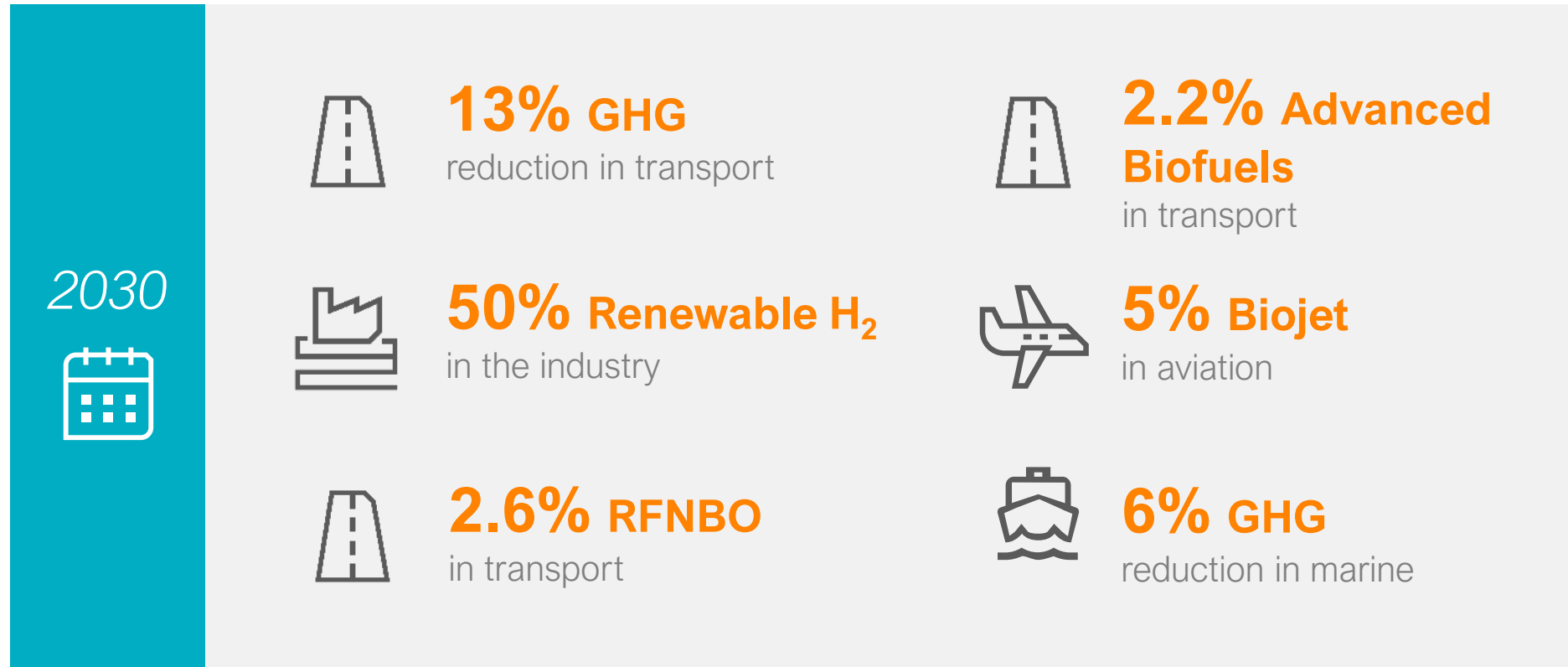


The regulatory framework in EU and Spain is promoting low carbon fuels and renewable gases as a decarbonization alternative for transport and other industries.



01. Low Carbon Fuels Framework

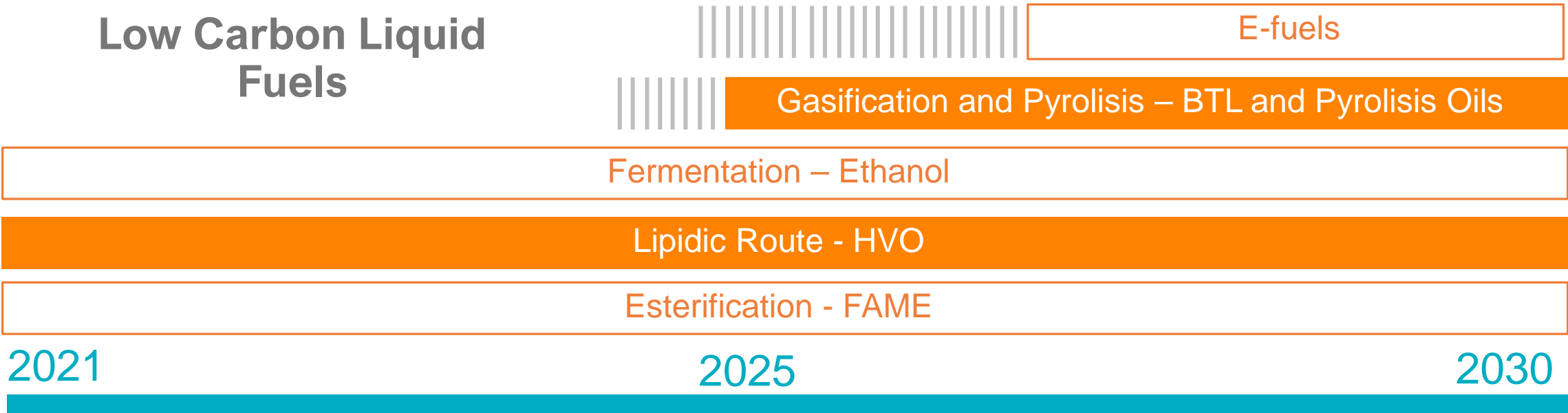
Regulation can significantly boost the development of low carbon products market



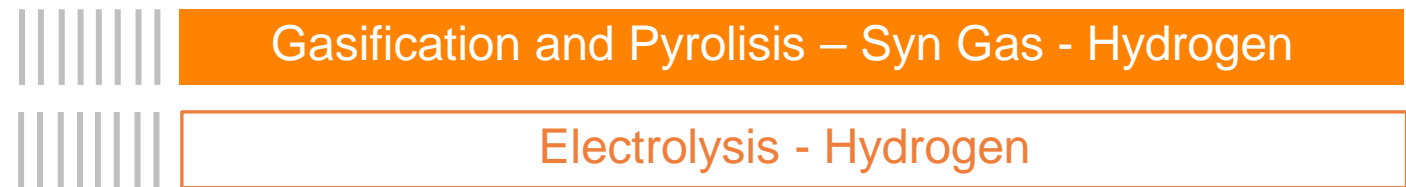
* Proposal for the revisions and initiatives linked to the European Green Deal climate actions and in particular the climate target plan's 55 % net reduction target presented under the Fit for 55 package published on 2021 July 14

Technology Routes

Low Carbon Liquid Fuels



Renewable Gases

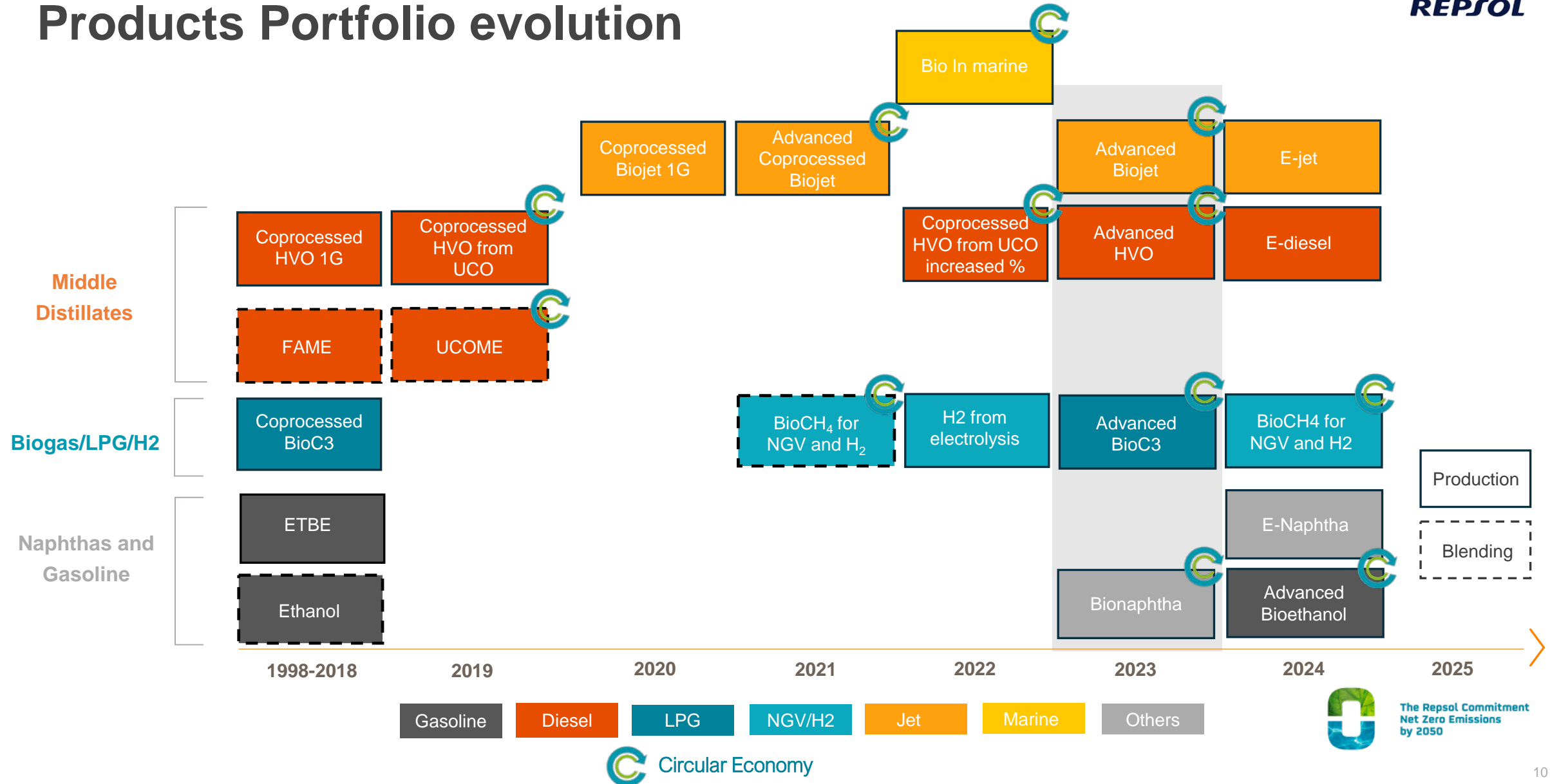


Anaerobic Digestion - Biomethane

01. Low Carbon Fuels Framework



Products Portfolio evolution



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Net Zero Emissions
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02.

Providing Short Term Value



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Net Zero Emissions
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02. Providing Short-Term value

Low Carbon Fuels. A reality



Already a **leading HVO and bio-ETBE producer in Iberia**, and **first biofuels marketer in Spain**

Producing bio ETBE since 1998 and HVO since 2011



Boosting production of Bio Jet

- **Puertollano:** 1st co-processed biojet batch produced in Spain. 7,000 Tn in July 2020
- **Tarragona:** Co-processed biojet batch production. 10,000 Tn in January 2021
- **Petronor:** 1st advanced co-processed biojet batch produced in Spain. 5,300 Tn in July 2021



Testing more than **40 wastes and technologies** for advanced biofuels and circular plastics

H₂

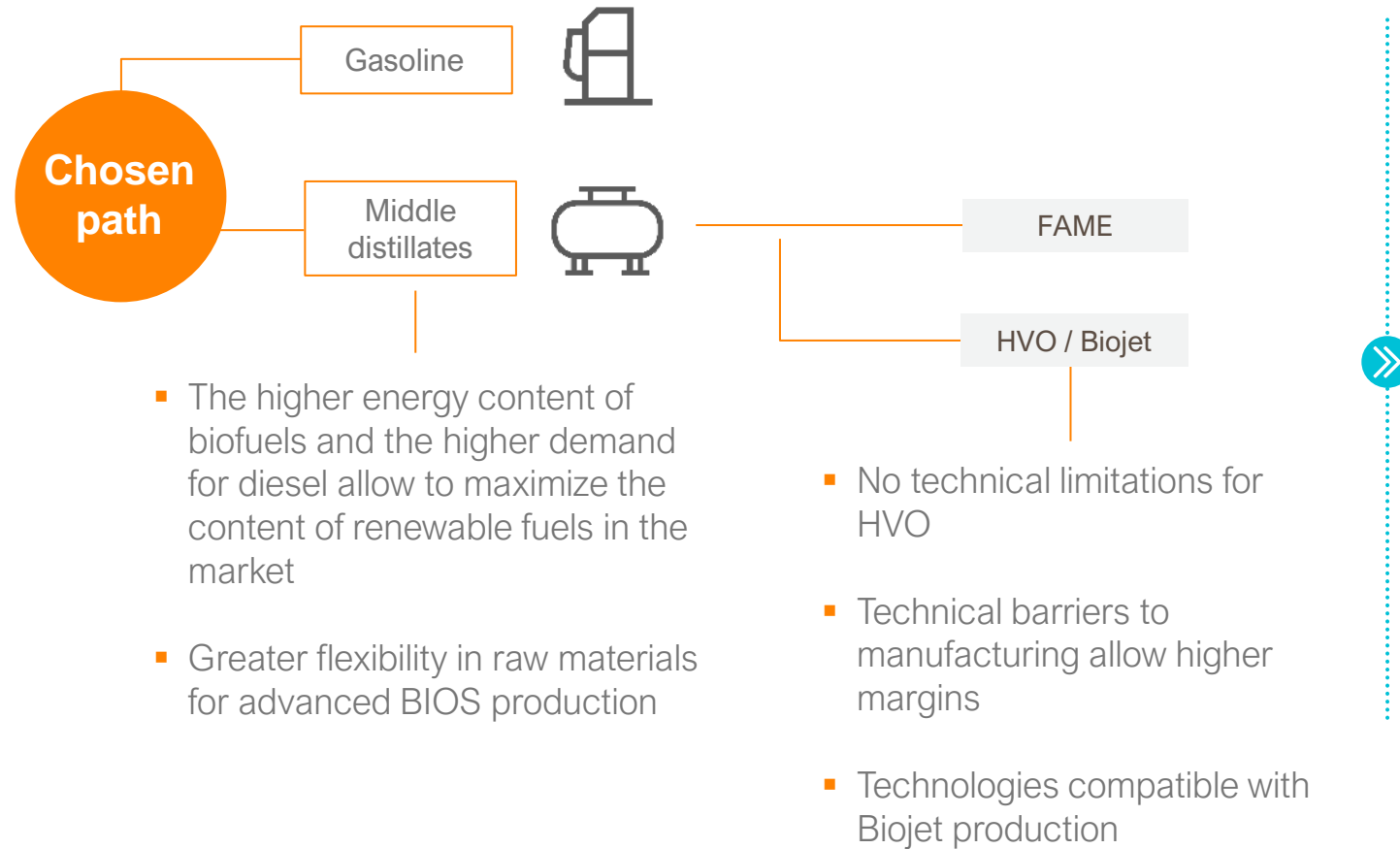
Leaders in renewable hydrogen: First production from biomethane in Cartagena steam reforming in October 2021



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02. Providing Short-Term value

HVO, the best short-term route to grow in biofuels generating value



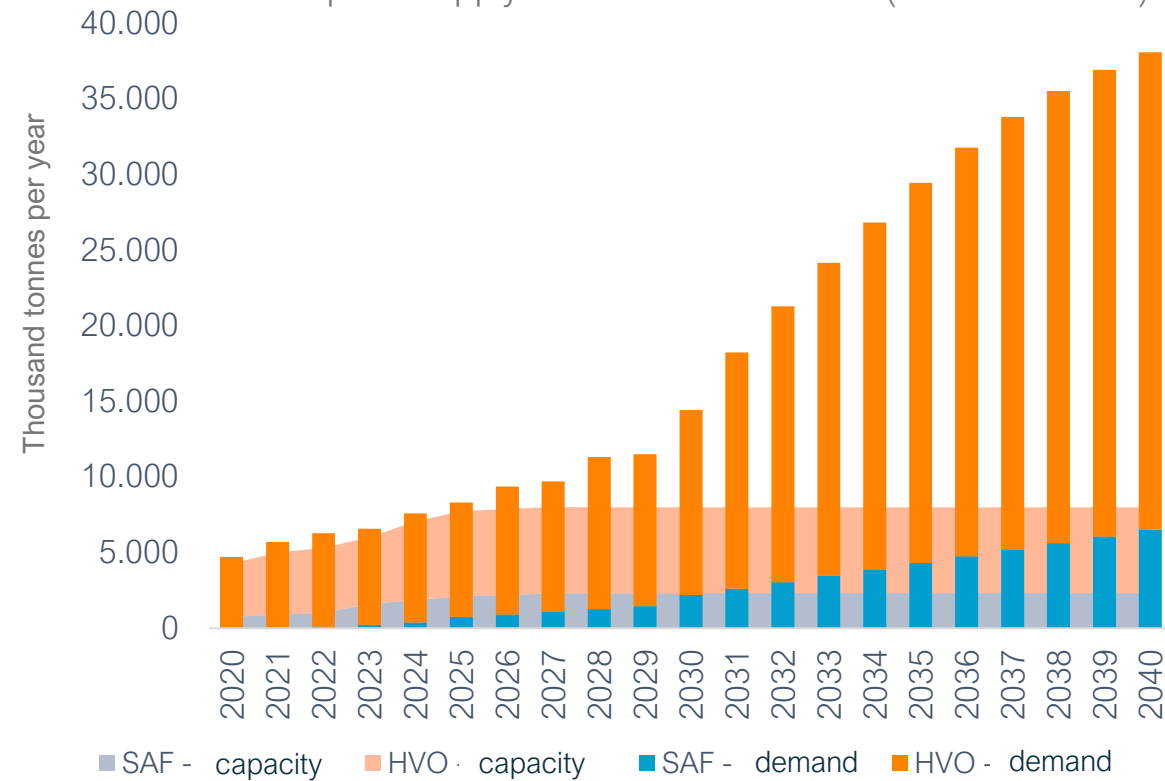
Production of advanced HVO is **the best option to comply with the legislation and grow in biofuels** generating value

02. Providing Short-Term value

HVO and SAF demand

From 2025 additional drop-in biodiesel and biojet production is needed to comply with biofuels mandates

European supply and Demand Balance (1G+ Advanced)



Source: Argus Consulting. REDII Based. June 2021

03. Our Pathway to 2030

HVO+SAF



Regulation

Renewable Energy Directive (RED)
ReFuel Aviation
FuelEU Maritime

Technology

Hydrogenation - *Commercial*
New units or retrofiting

Raw Material

Sustainable Vegetable Oils
UCO + animal fats
Other lipidic residues included in Annex IX Part A RED Directive

Final Uses

Transport (Road, Aviation and Marine)
By-Products for:
Renewable Hydrogen
Chemical Industry



Initiatives



Current Margin
250-750€/tep

Forecasted Margin
950-1,550€/tep

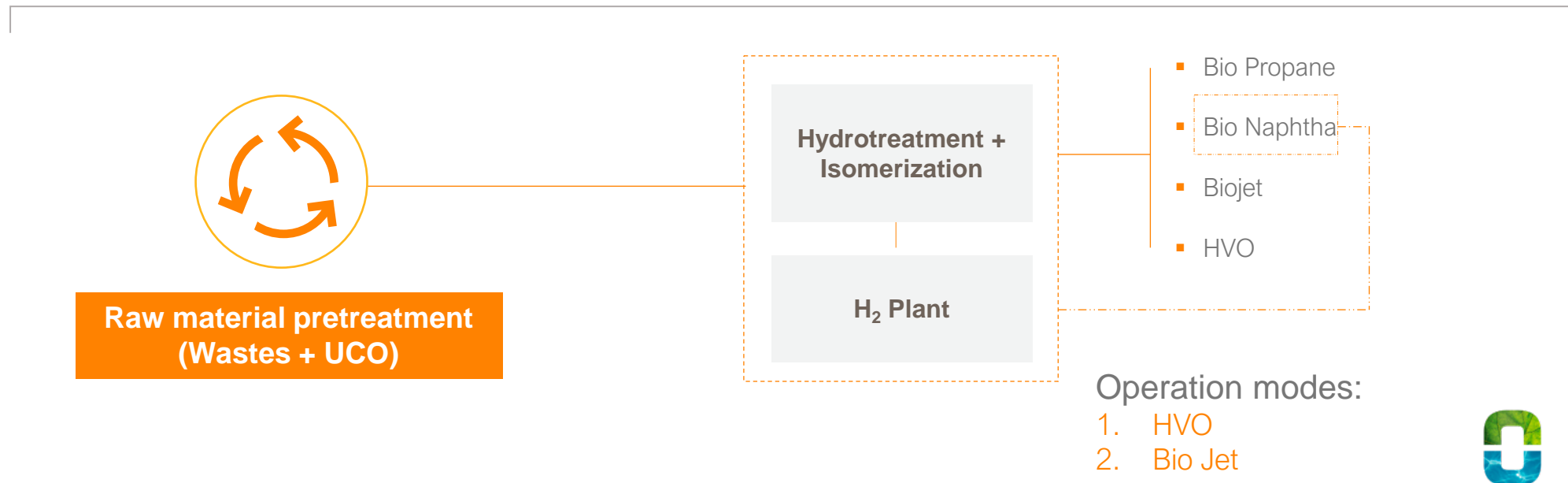


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02. Providing Short-Term value

New Advanced Biofuels Plant in Cartagena

Investment	Capacity	Start - Up	Emissions Reduction
€188 M	250 kty Low Carbon Fuels	1Q 2023	- 900 kt/y CO ₂ Emissions
	300 kty Waste and Residues Input		

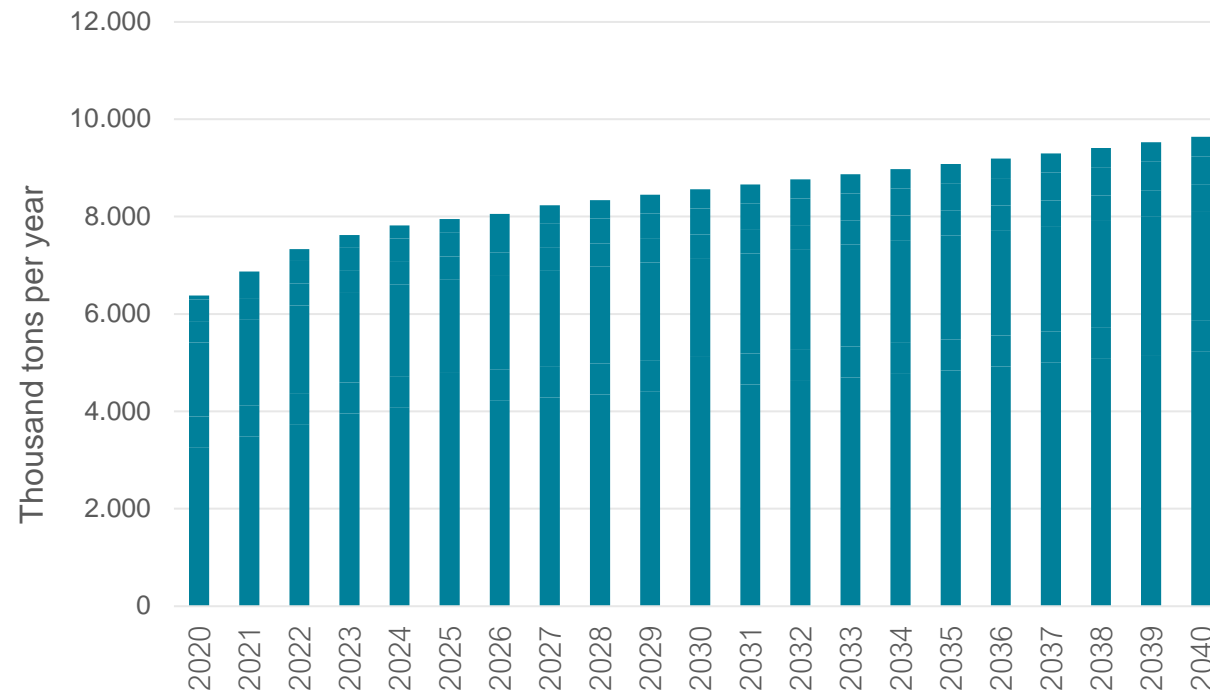


02. Providing Short-Term value

Wastes availability. Lipidic Route



Advanced lipids and greases European Availability



Source: Argus Consulting. June 2021

To go further in this route, raw material availability is key.

Already closing raw material agreements locally and internationally

The demand for these raw materials will stimulate its availability.

Before exhausting this route we are exploring others.



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03.

Our Pathway to 2030



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03. Our Pathway to 2030

Additional potential from solid wastes and CO₂

There is enough sustainable biomass (organic waste from any kind) in Europe for obtaining the expected advanced biofuel demand in 2050*.

To realise this potential, additional R&D would be required as well as the implementation of improvement management strategies. The supply chain would need to be developed to mobilise all these resources.

* Fuels Europe Clean Fuels for All Scenarios.

Source: Sustainable biomass availability in the EU to 2050. Imperial Collage 2021

Waste availability for energy uses (Mty)		
Type of Waste	2030	2050
Municipal & Industrial Bio-waste	44 – 80	33 – 61
Forestry Waste	204 – 370	215 – 408
Agriculture Waste	272 – 410	291 – 447

+ CO₂

03. Our Pathway to 2030

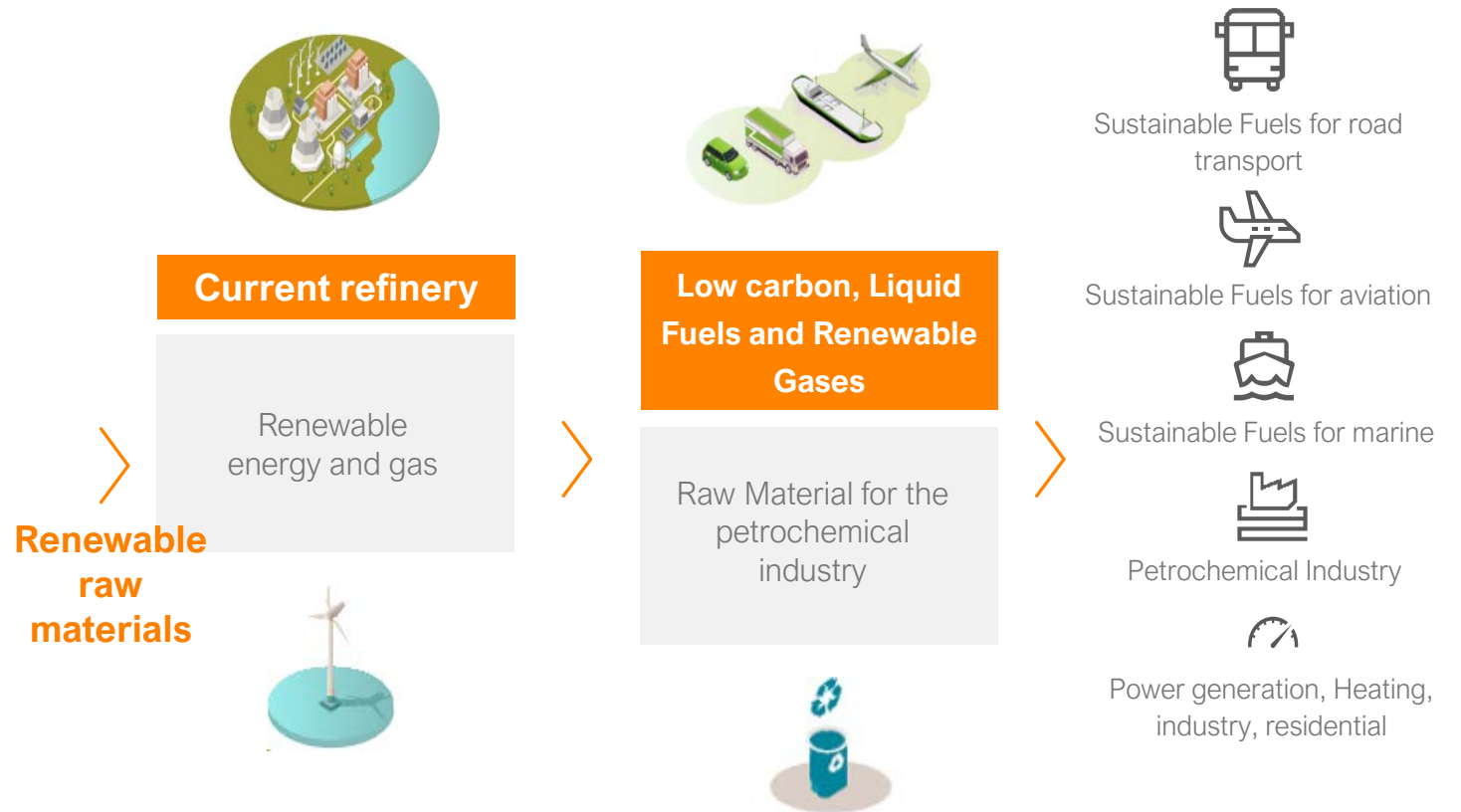
Integration with the refineries



Secondary Conversion >

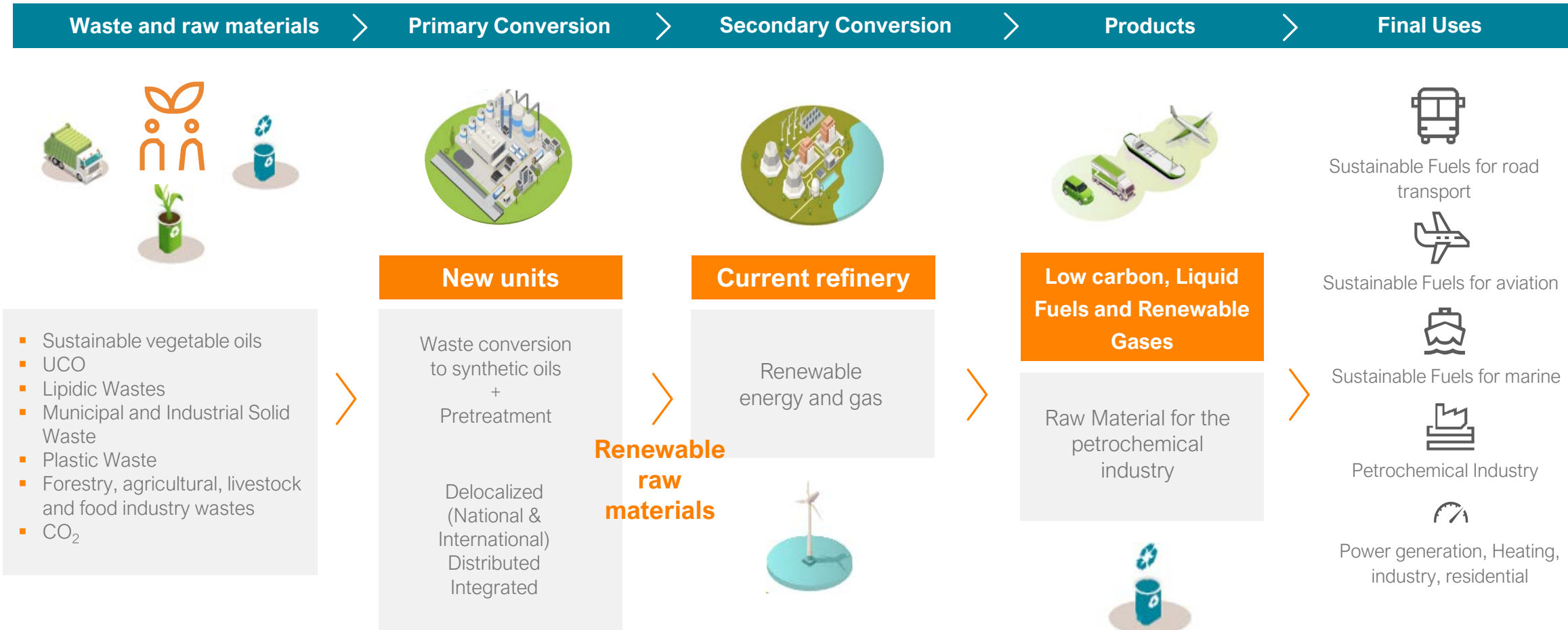
Products >

Final Uses



03. Our Pathway to 2030

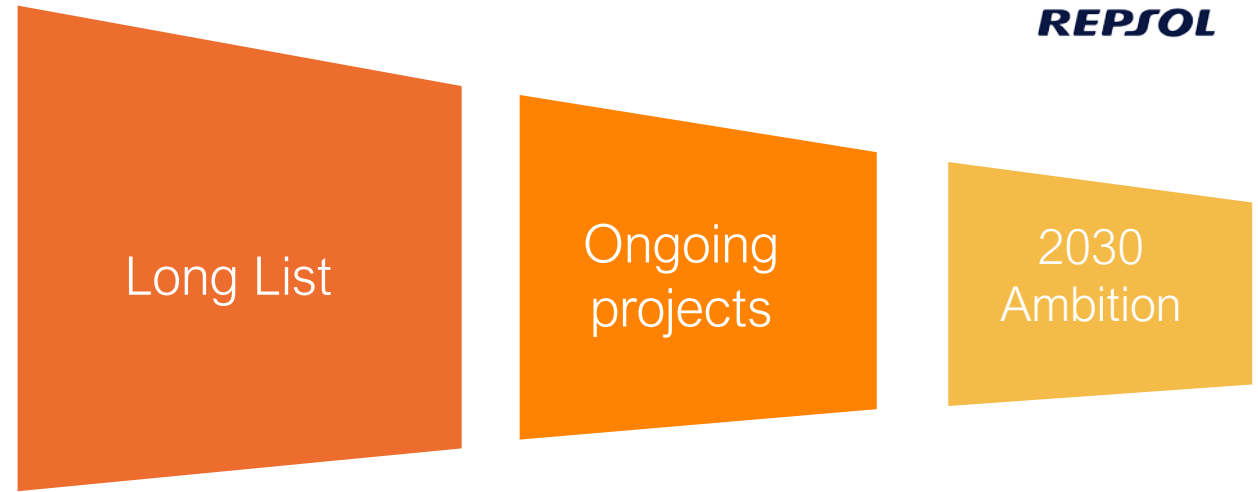
Integration with the refineries



03. Our Pathway to 2030

We are ready

The development of a wide pipeline of projects allows us to be ready to achieve our ambition adapting in the way to regulation, raw materials and technology.



Low Carbon
Fuels
Production
Capacity

3.5+ Mty



2 Mty

60+ Initiatives

Multitechnology. Raw materials flexibility. Competitive

Making use of the organization know-how and capabilities



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03. Our Pathway to 2030

BTL and Pyrolysis Oils

2025

2030

Demo

Scale-up

+130 kta

Regulation

Renewable Energy Directive (RED)
ReFuel Aviation
FuelEU Maritime
Waste Directive
Farm to Fork Strategy

Raw Material

Municipal Solid Waste (MSW)
Agriculture and forestry residues

Technology

Gasification + Chemical
synthesis/FT + Upgrading
Pyrolysis + Upgrading

Final Uses

Transport (Road, Aviation,
Marine)
Feedstock for chemical industry



Initiatives

4



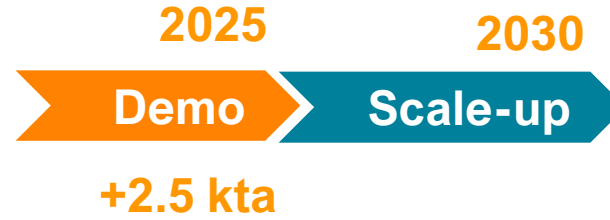
Est. Gross Margin
200 – 2,000 €/tep



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03. Our Pathway to 2030

E-Fuels



Regulation	Raw Material
Renewable Energy Directive (RED) ReFuel Aviation FuelEU Maritime	CO ₂ Renewable Hydrogen
Technology	Final Uses
Reverse Water Gas Shift – Under dev + FT + Upgrading - Commercial	Transport (Road, Aviation, Marine) Feedstock for chemical industry



Initiatives



Est. Gross Margin
0 – 4,000 €/tep



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03. Our Pathway to 2030

Advanced Ethanol



Regulation

Renewable energy Directive (RED)
Waste Directive
Farm to Fork Strategy

Technology

Fermentation –
Scaling up

Raw Material

Organic MSW
Agriculture residues

Final Uses

Transport (Road)
Intermediate Product for:
Renewable Hydrogen
Jet production



Initiatives



Est. Gross Margin
1,100 – 1,800 €/tep



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03. Our Pathway to 2030

Biomethane

2030

Commercial

400+ GWh/a

Regulation	Raw Material
Renewable Energy Directive (RED) FuelEU Maritime Guarantees of Origin Waste Directive Farm to Fork Strategy ETS	Organic MSW Agriculture + Livestock residues
Technology	Final Uses
Anaerobic Digestion + Upgrading – Commercial	Transport (Road and Marine) Hydrogen production Industry – Heat, Power Residential



Initiatives



Est. Gross Margin
450 – 750 €/tep



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03. Our Pathway to 2030

Renewable Hydrogen

Regulation

Renewable Hydrogen EU Strategy
Renewable Energy Directive (RED)
ETS

Raw Material

Renewable power and water
Biomethane
Biogas
Bionaphtha

Technology

Electrolysis - Scaling - up
Steam Reforming - Commercial

Final Uses

Intermediate for fuels production
Transport
Industry
Residential



Initiatives



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03. Our Pathway to 2030

Maximizing Value through partnerships

We have over 45 partnerships in the whole value chain to develop decarbonization projects.

The partnership model is flexible including co-investing, long term contracts, etc.



Raw material sourcing and pretreatment

Technology & Operation

Final Use

Waste management and pretreatment
Biomass sourcing
Agriculture and livestock producers

Technologist and licensors
Technology Centers
Biomass plants operators

Airlines
Shippers
Fleet Operators
OEMs

Demo plants

Public Funding



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Summary

Repsol is the **leading HVO and bio-ETBE producer in Iberia**, and **first biofuels marketer in Spain**.

We incorporate biofuels in our products since 1998.

Clear pipeline to 2025 with **Cartagena advanced biofuels plant** as main project ready in 1Q23.

Wide pipeline of initiatives to achieve our 2030 goals:

- Application of different technologies
- Flexibility in raw materials
- Strategic partnerships

Applying **strengths** and **know how** of the traditional business to new developments: Competitiveness, integration and flexibility.





Low Carbon Day

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