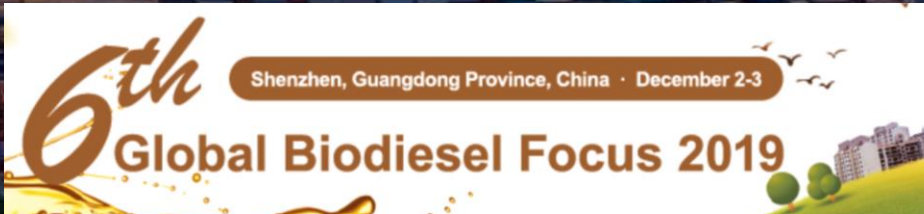
A BIOFUEL CONSULTING AND BROKERAGE COMPANY

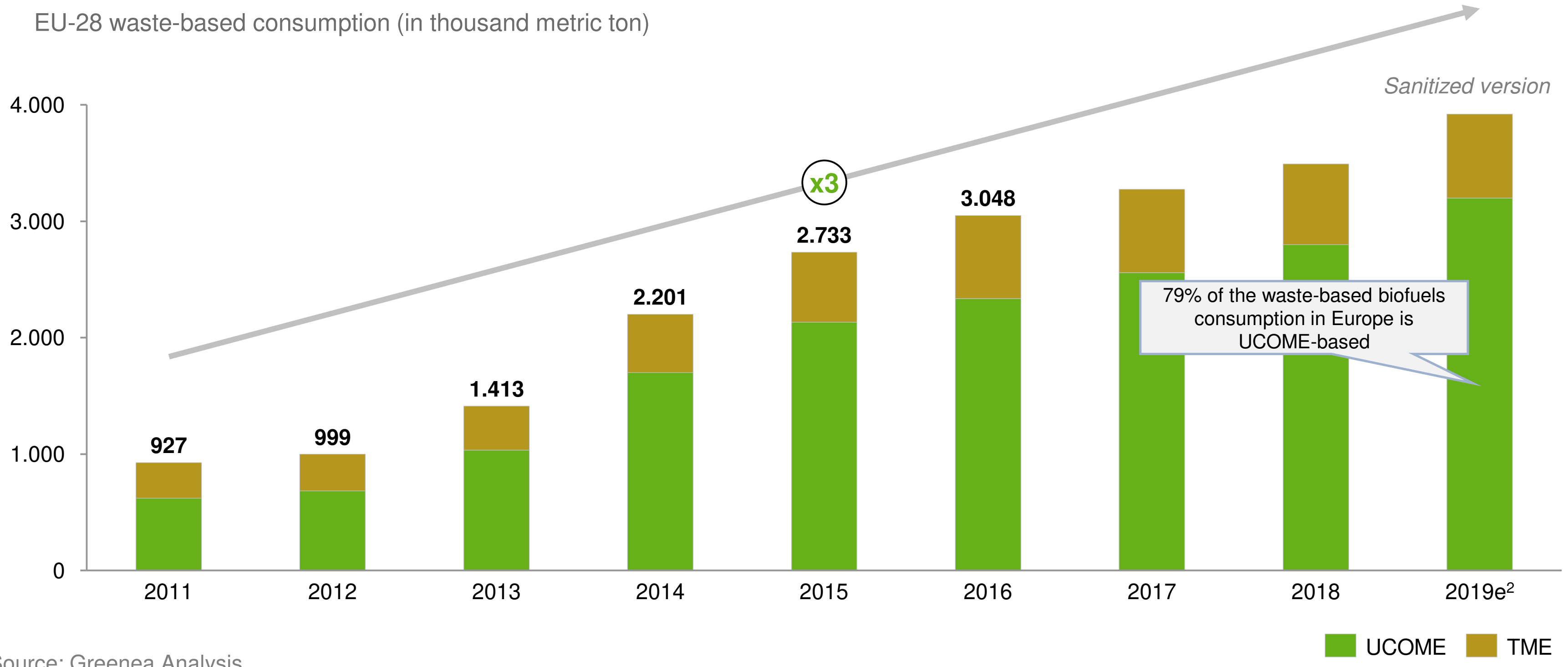
Who are tomorrow’s waste-based biofuels buyers?

December 2, 2019



The European waste-based[1] biofuels consumption - mostly relying on UCOME - has tripled in the last 8 years…

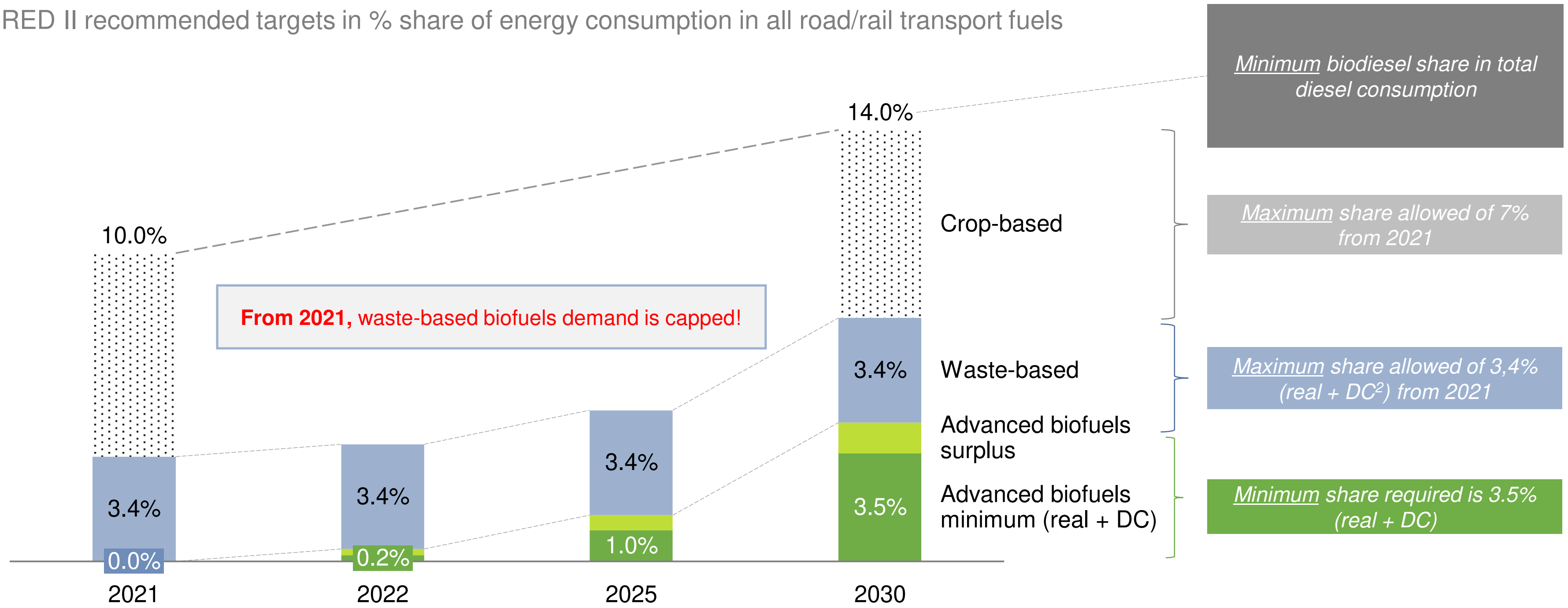
EU-28 waste-based consumption (in thousand metric ton)



Source: Greenea Analysis
Notes:
1. We only considered UCOME and TME accounting for the vast majority of the waste-based biodiesel demand in the EU
2. EU-28 consumption in 2019 is a forecast

…but from 2021, REDII[1] will reshuffle the EU waste-based biofuels market cards…

RED II recommended targets in % share of energy consumption in all road/rail transport fuels

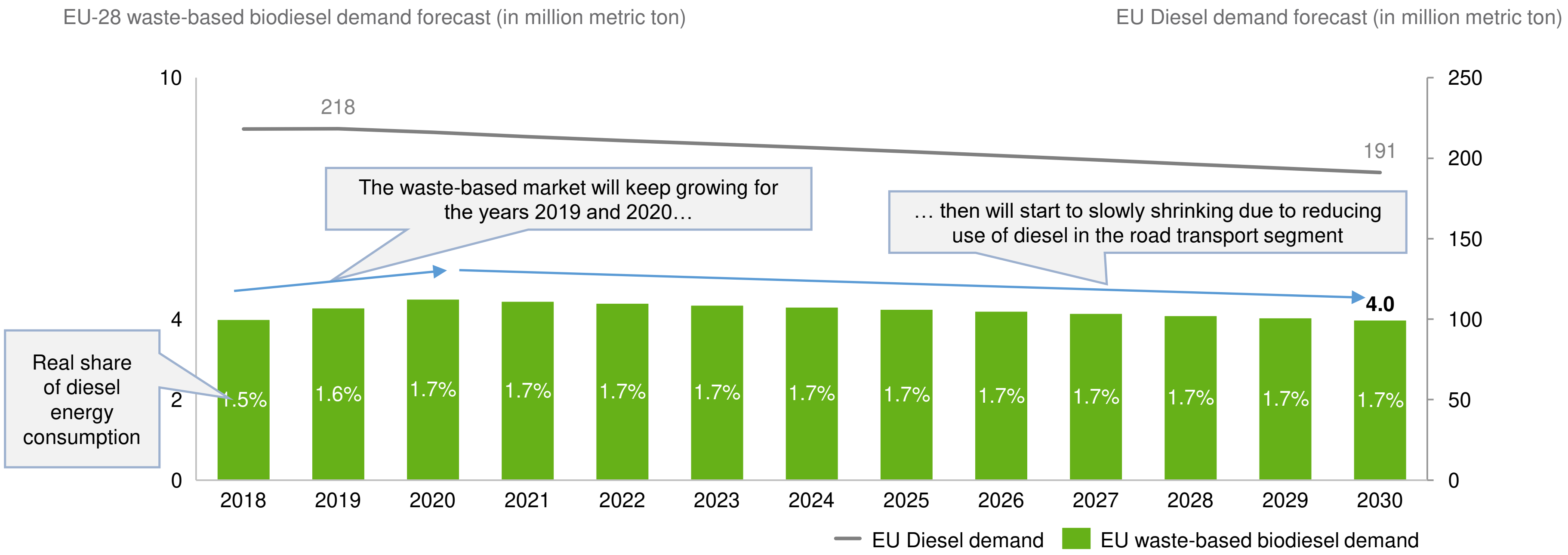


Source: European Commission, Greenea Analysis
Notes:
1. Renewable Energy Directive II
2. Double Counting

Waste-based biodiesel demand will reach 1.7% REDII cap no later than 2020, followed by a steady decline onwards

Waste-based biofuel consumption **shall not exceed 1.7%** of the road transport diesel consumption

Sanitized version



Source: Greenea Analysis

B7 is expected to remain FAME/waste-based ME[1] blend limit in Europe until 2030

The B7 blend caps the biodiesel (FAME + waste-based) blend with diesel at 7% ...

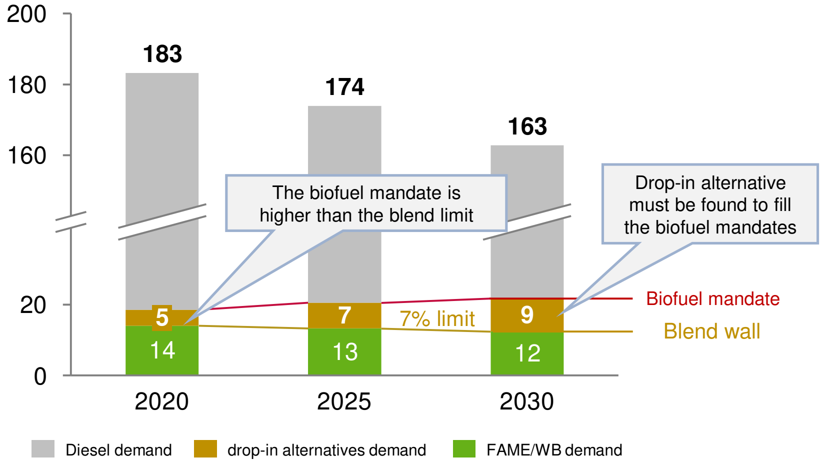
A B7 blend wall means:

- vehicles engines should be compatible with, or at the very least tolerant of, a blend of up to 7% biodiesel in fossil diesel fuel.
- This excludes 'drop in' forms of biodiesel, which can be blended at much higher proportions as their characteristics are essentially the same as fossil diesel.

Increasing the biodiesel blend wall beyond B7 is not considered worthwhile because of the engineering challenge associated with making engines that use biodiesel blends higher than B7 compatible with Euro-VI air quality requirements.

... meaning drop-in alternatives must be found to respect the European biofuel mandates

Breakdown of EU diesel demand per type (in million metric tons)



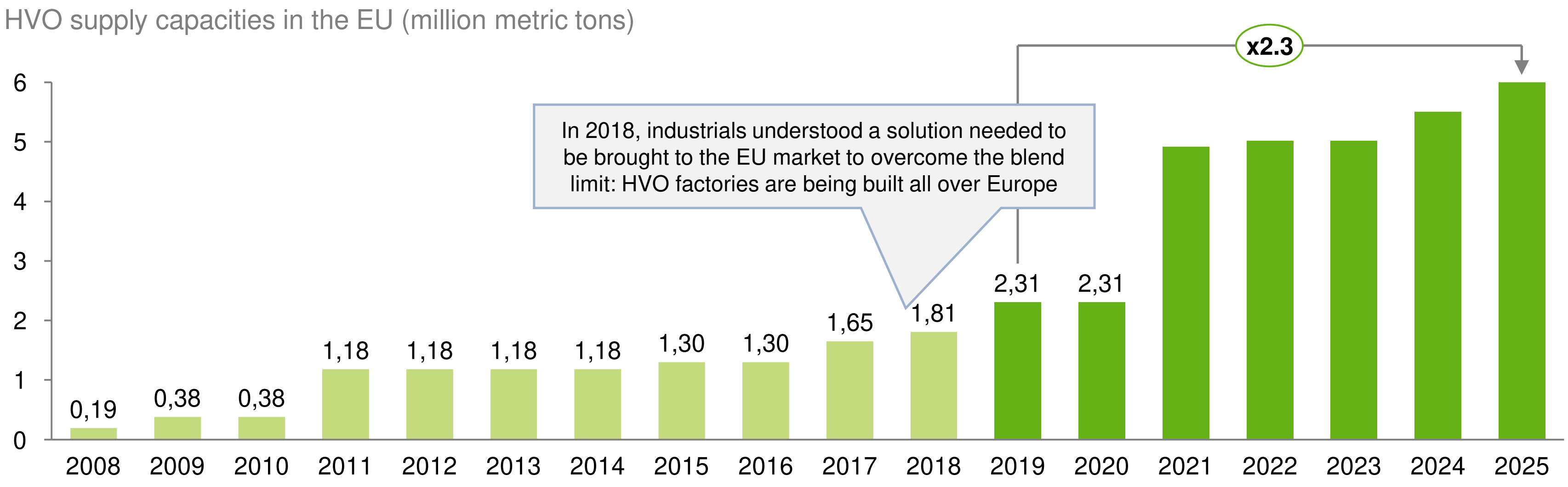
As biofuel mandates are higher than the blend limit, drop-in alternatives will well evolve

Source: Greenea Analysis, E4tech
Note: 1. Methyl Ester

HVO is the set to be the winning drop-in alternative to FAME to go beyond the blend limit

HVO supply in Europe will double by 2025

Sanitized version



What feedstock for European HVO producers?

Source: Greenea Analysis
Note: This graph only includes pure-HVO factories projects planned before 2019

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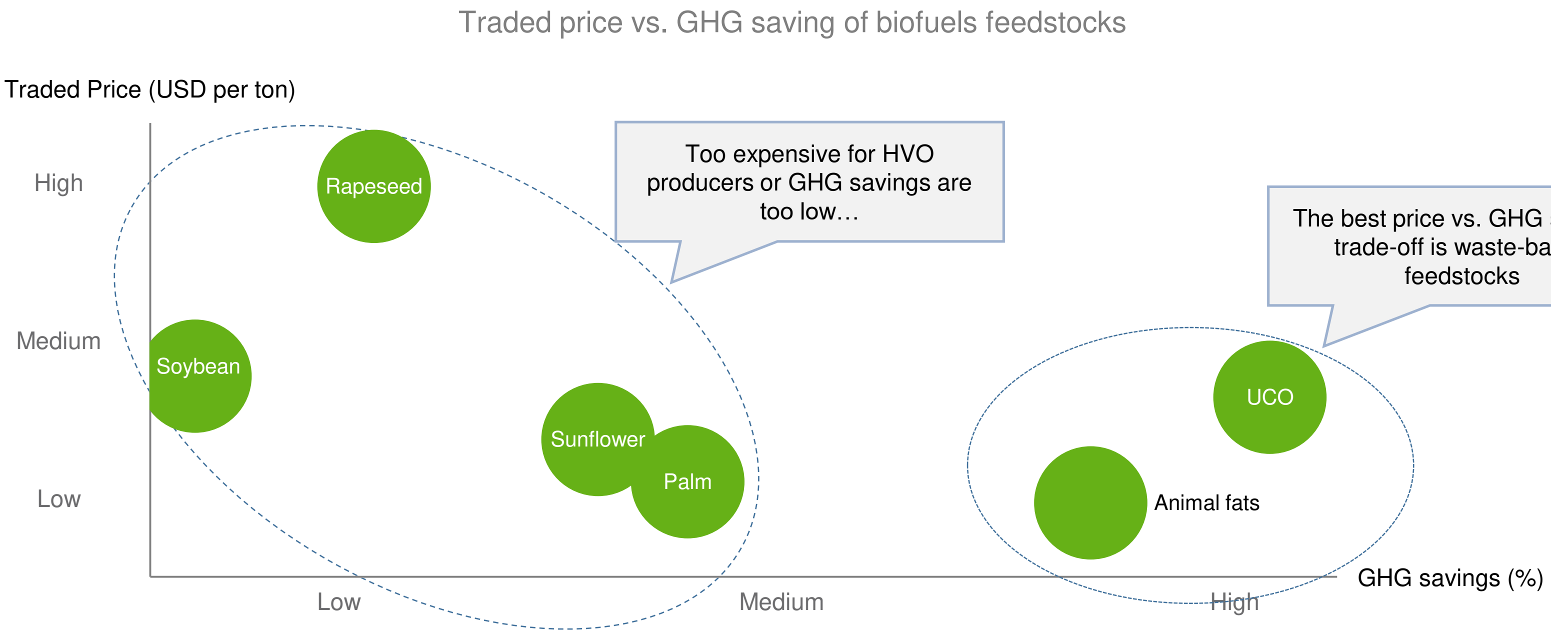
HVO producers will look at high GHG savings feedstocks at lower prices

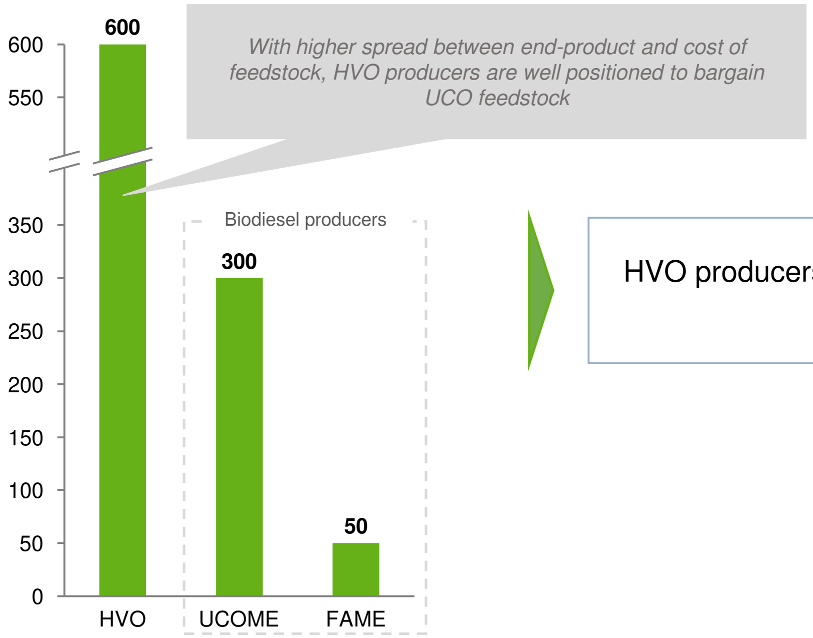


UCO will be the feedstock of choice for HVO producers due its GHG saving it provides

Source: Greenea Analysis

HVO producers have much higher margins compared to FAME / waste-based producers

Average Spread[1] between end-product and feedstock (USD/ton)



HVO producers seem the best positioned to buy UCO feedstock at a much higher price compared to FAME/waste-based producers

Source: Greenea Analysis

Note: 1. Spreads are averaged on a yearly basis based on quarterly data from the last quarter

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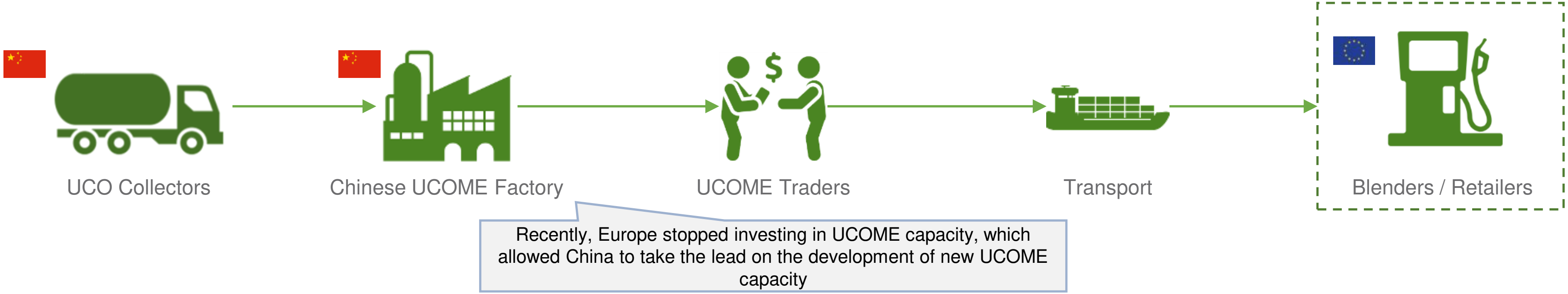
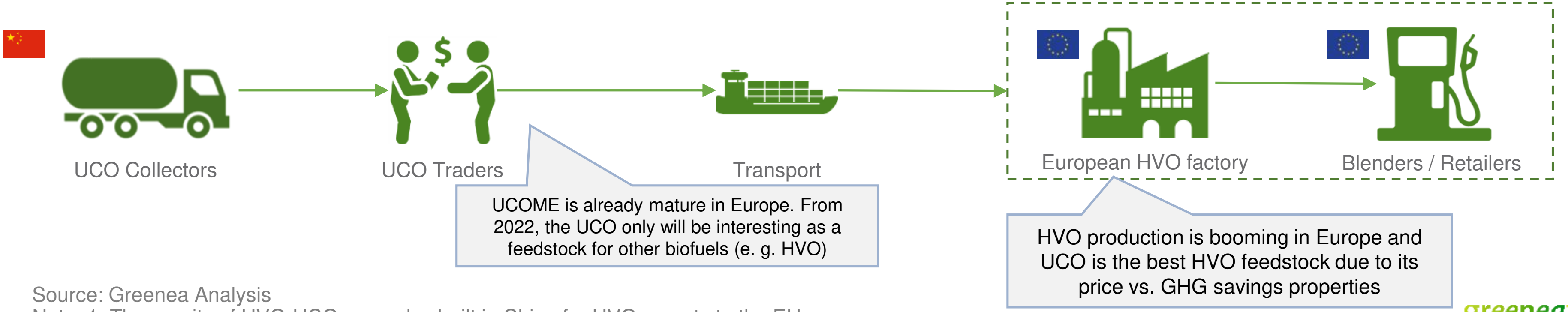
From 2022, trading between China and Europe will shift from UCOME to UCO[1]

In the recent years, **UCOME** was traded between China and EU for **blenders**/ **fuels retailers** needs



From 2022, the **UCO** feedstock is going to start being directly sourced by **HVO** producers



Source: Greenea Analysis
Note: 1. Three units of HVO-UCO were also built in China for HVO exports to the EU

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Takeaways

The European waste-based biofuel sky-rocketing demand has been brutally stopped due to:

1. The new REDII legislation **is capping waste-based biofuels demand** in the European Union
2. The FAME / waste-based ME blend limit has already been reached preventing blenders from incorporating more FAME or waste-based ME

→ **From 2021, Europe will not continue to import further quantities of ME, particularly UCOME**

Mandates limit the European countries to have a 14% biofuel mandate - more than the 7% blend wall - meaning drop-in alternatives must be found. HVO supply will skyrocket in Europe and therefore is the best candidate for fulfilling the EU biofuel mandate. Two consequences:

1. HVO producers will choose feedstock with the highest GHG saving → UCO is the best candidate
2. HVO have much higher margins compared to ME producers → They have the purchasing power to acquire UCO

→ **The buyers of tomorrow are HVO producers: They will prefer and can afford UCO acquisition for HVO production**

Source: Greenea analysis

In this context, Greenea is helping the industry to navigate in the biofuels market

"We help our clients make significant investment decisions in the EU, by bringing biofuels expertise, market visibility and latest updates, crucial in the decision making process and allowing them to understand biofuels maket mechanisms."

Since 2007, pioneer on the market of waste-based feedstock and biodiesel

12
years of experience

Active in
50
countries

35+
consulting projects

Greenea Consulting helps global and regional oil & gas players define their biofuel strategy

Feedstock procurement strategy

Legislation EU / Global

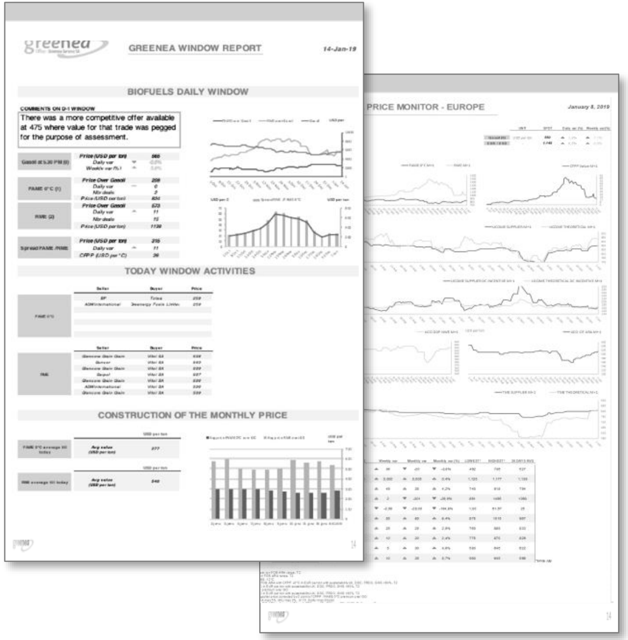
Competition Analysis on the biofuel sector

Biodiesel demand

Transport and Logistics

Greenea Brokerage gets you deals on waste-based feedstock and biofuels

Greenea publishes on a **daily-basis the latest biodiesel-market prices** and drivers updates



Greenea team cumulates **+20 years of experience** in biofuels and brokerage

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Managing Director of GREENEA

Biofuels & Feedstock Broker

- 10+ years of experience in biofuels and waste-based feedstock brokerage & consulting (Ex-biofuels expert at BCG)

Olivier Madiot

Partner & Biofuels Broker

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