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HORIZON 2030

The Year 2021

Which investments will see the light in the biofuel industry?

What is the worldwide situation of the biofuel market in end-2020?

2020 was a challenging year for the whole biofuel industry, as we have seen an unprecedented acceleration of investments in the biofuel market.

On the biofuel supply side, more than 20 companies worldwide seriously announced an investment in a HVO factory to serve the European and US markets. On the feedstock supply side, we had a crisis on the feedstock supply fueled by covid-19. In some regions, feedstock supply was 30% down compared to 2019, where biofuels demand was only 5 to 10% down. This shortage of feedstock supply was a crash-test for actors, as we fear there will not be enough feedstock to meet HVO supply in the coming years.

Why such a popularity? Countries' mandates is above the blend wall pushing the use of alternatives of FAME and Ethanol. HVO is at this stage the only alternative to diesel biofuel FAME, and the number of diesel vehicles is so important (around 70%) in the EU, that distributors cannot bet on other alternatives non-diesel related to fulfill the mandates. Financially, HVO production makes more sense as for majors, margins are attractive, while cost per GJ remain in the same order of magnitude than FAME and UCOME costs. Finally, HVO production allows an actor to have a feet in the sustainable aviation fuel market, the bio-naphta market and the bio-LPG market, the three molecules being co-products of HVO production.

What are the risks? The main risk is about feedstock procurement, as it is not clear today how the capacity added in 2020 can secure feedstock considering the current pressure on the resources. The second risk concerns the blend wall definition. If B7 will remain the main biofuel used for diesel cars and B10/B30/B100 do not heavily penetrate the market, then HVO is safe in the short-term. In the long-term, the EU is shifting towards gasoline vehicles, meaning less diesel sales and in its wake probably less diesel biofuel sales.

2021 should probably be the year where companies are going to be down-to-earth, as investments will concretize. Players may realize that the task is harder than it seems, particularly on the operational side to secure waste-based and advanced feedstocks.

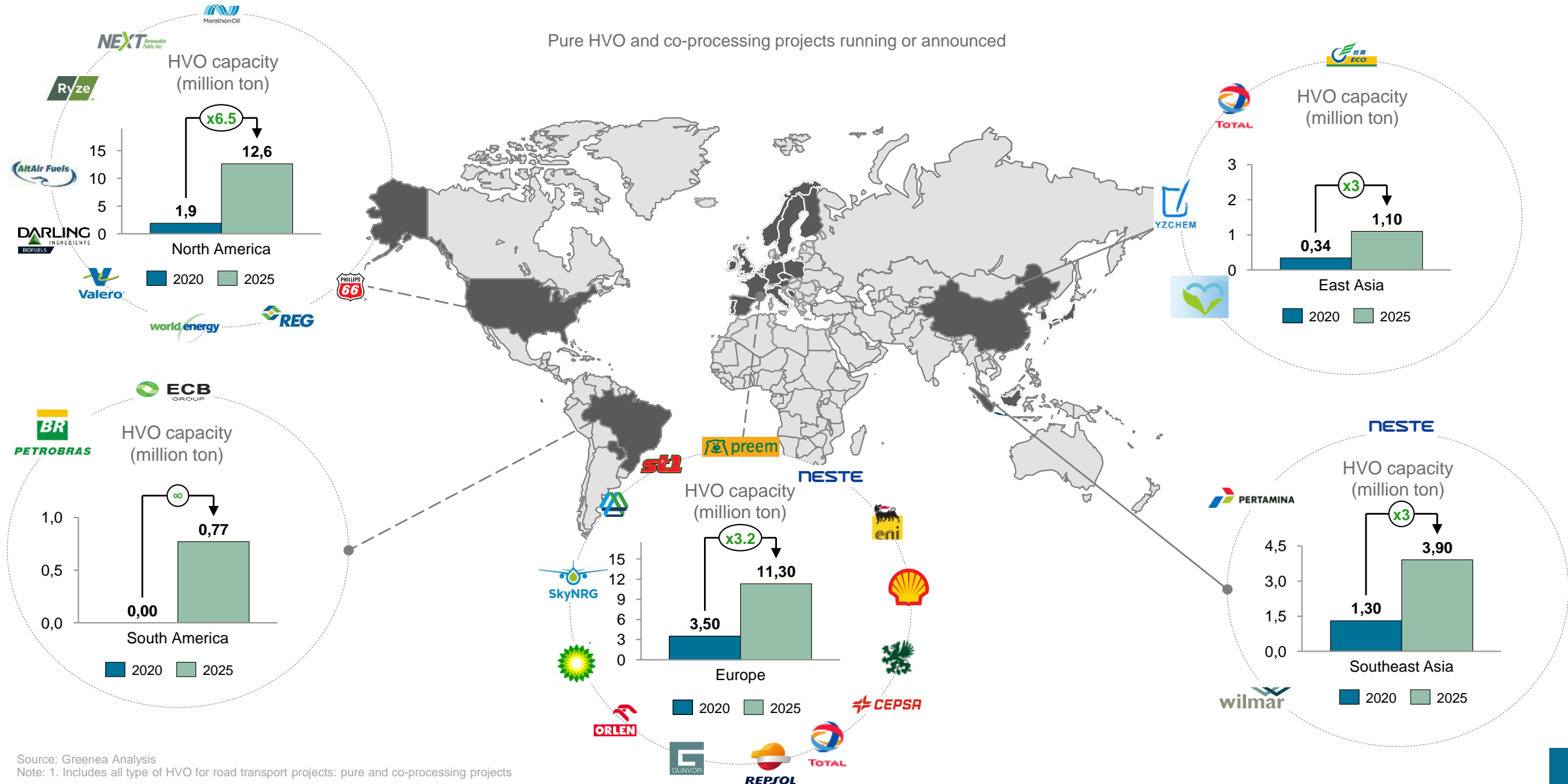
Regarding covid-19 impacts on supply and demand. Despite a complicated year, exports to the EU are increasing in the top exporters, making the EU more and more reliant on the outside. Regarding feedstocks, covid-19 barely hit exports from foreign countries to the EU. Since October 2020, most of the exporters are back to normal or better than in 2019, except China and Indonesia. Regarding diesel biofuels imports, China's UCOME exports to the EU increased by around 300kt, increasing always more the EU's dependance on fuels it soon won't be able to use.

Legislation. European countries have until end-Q2 2021 to translate REDII into national schemes, however some countries have already taken the leap, particularly in West and North Europe. For instance, the German Ministry of Environment has started the process of REDII transposition with an ambitious draft of law that projects to increase the GHG reduction mandate by 22% by 2030. In the UK, a cap of 4% 1G feedstock has already been proposed decreasing to 2030. Italy, Sweden, Netherlands, Spain have as well set some guidelines for the next decade.

More to see in the following presentation!

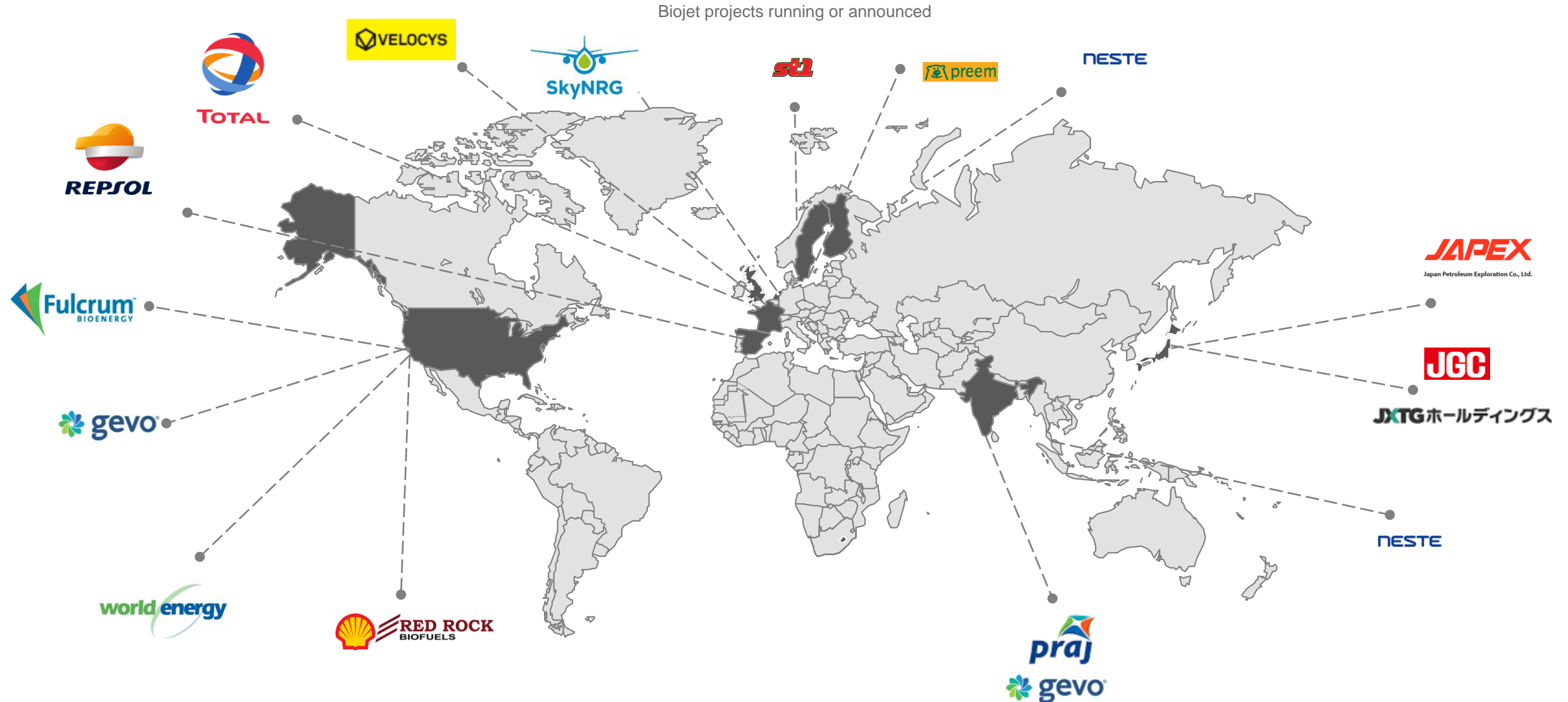
Everywhere in the world, new HVO¹ projects are projected to significantly increase by 2025, triple in the EU, six-fold in the US, and three-fold in Asia compared to 2020

Pure HVO and co-processing projects running or announced



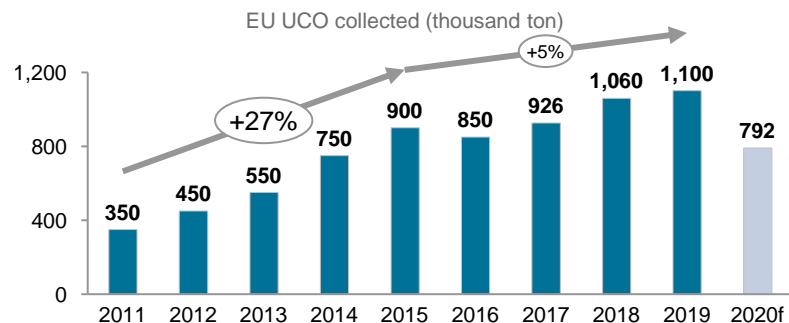
Source: Greenea Analysis
Note: 1. Includes all type of HVO for road transport projects: pure and co-processing projects

... and so are biojet fuels, mostly HVO-based, where most of the projects will see the light in 2025



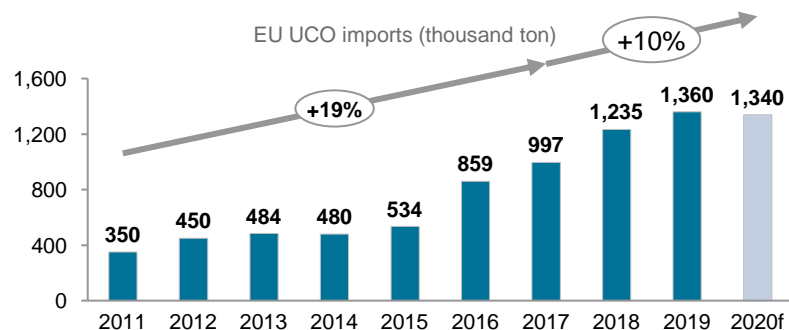
For 3 years, the EU has not been ensuring its own UCO collection to meet its UCO(ME) demand and therefore the EU has drastically increased UCO(ME) imports

The amount of UCO collected in Europe is slowing down since 2015...



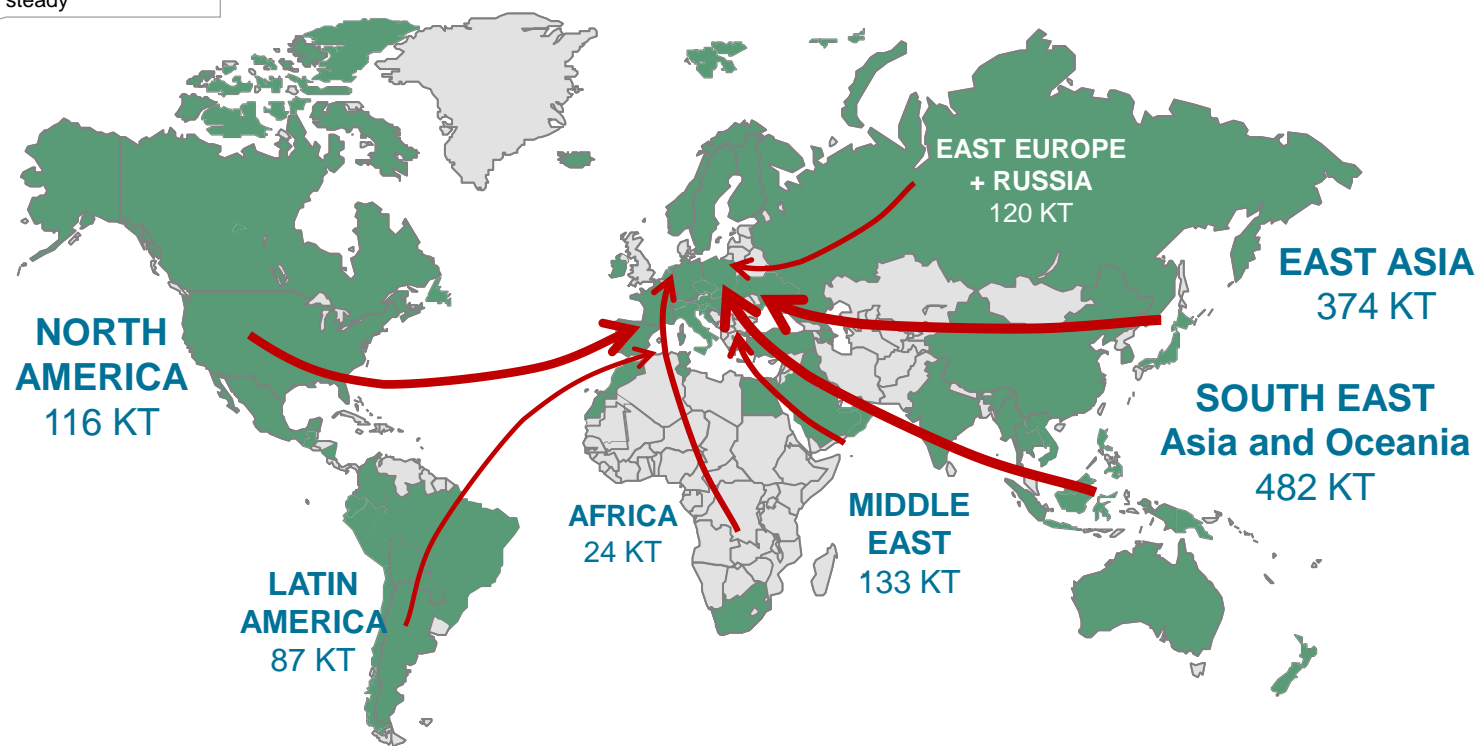
More UCOME/HVO from Asia was imported to compensate the gap and keep the biodiesel production steady

... and UCO imports have accelerated during the last three years due to the growing EU demand



Around 60% of the UCO supply comes outside EU, around 65% of the latter from Asia

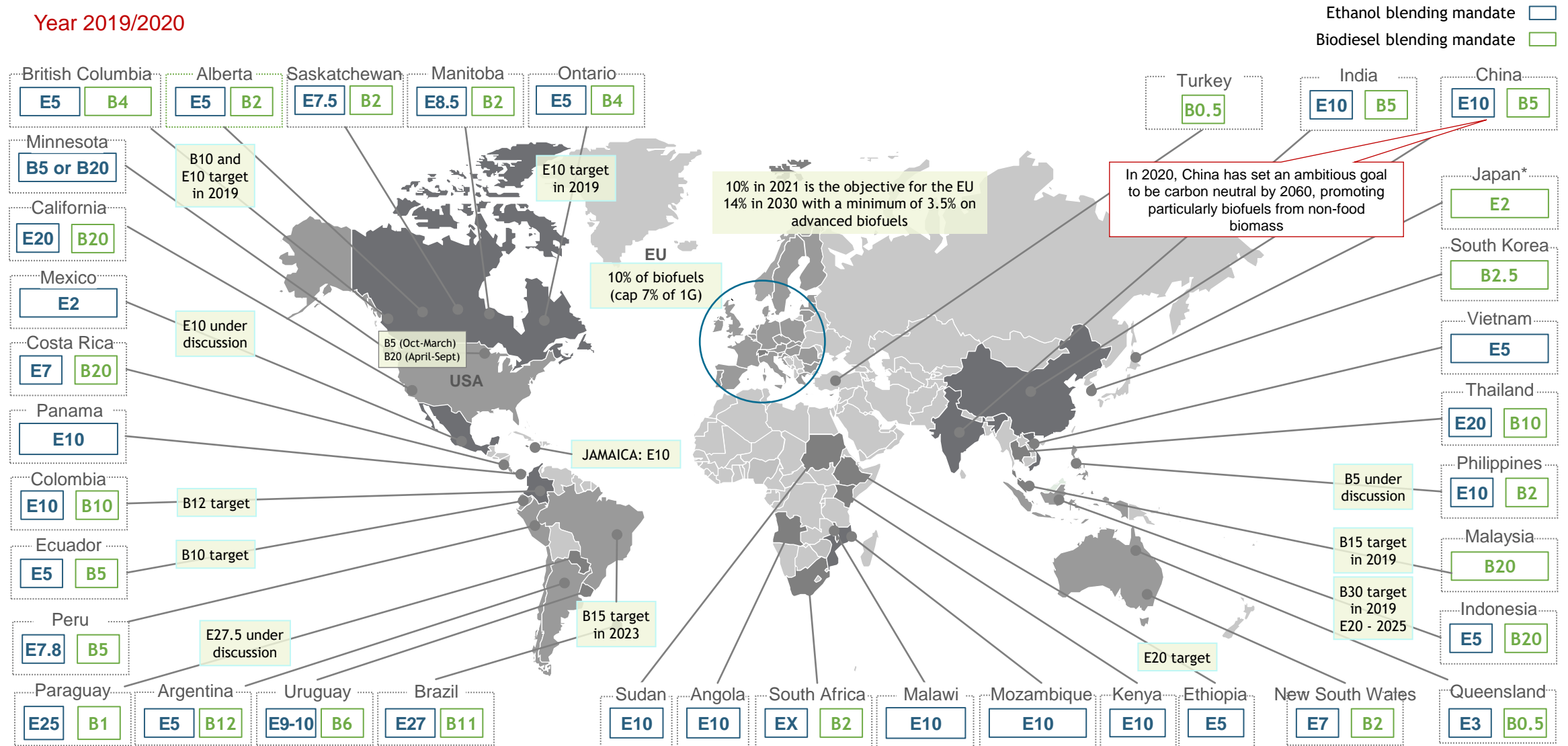
UCO exports to the EU-27 (2020f)



Waste-based in the EU: maturity was reached, and the surplus will rely on imports

The exporters of yesterday may be the consumers of tomorrow, particularly the biggest exporters such as China ...

Year 2019/2020



Source: Greenea Analysis, Governments websites

Note:

It is noticeable that most of the oil-producing - particularly from OPEP - have not implemented a biofuel mandate.

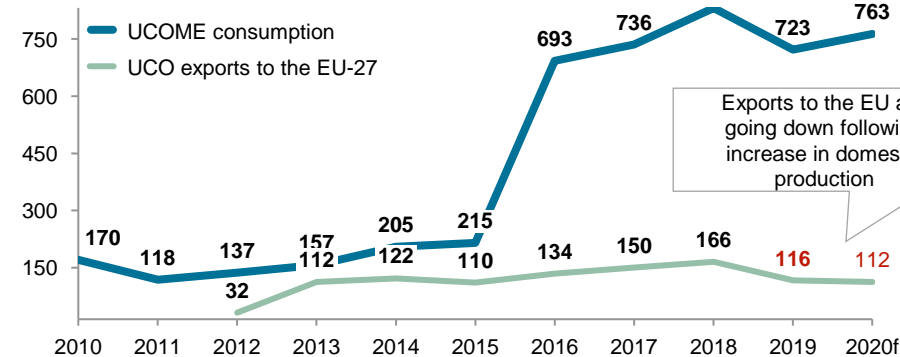
1. Turkey only has a mandate of 0.5% of biodiesel

... and the competition is becoming fierce ...

China is flooding the EU market with UCO/UCOME and US diesel UCO-based biofuels demand grows – to satisfy the CA¹ mandate

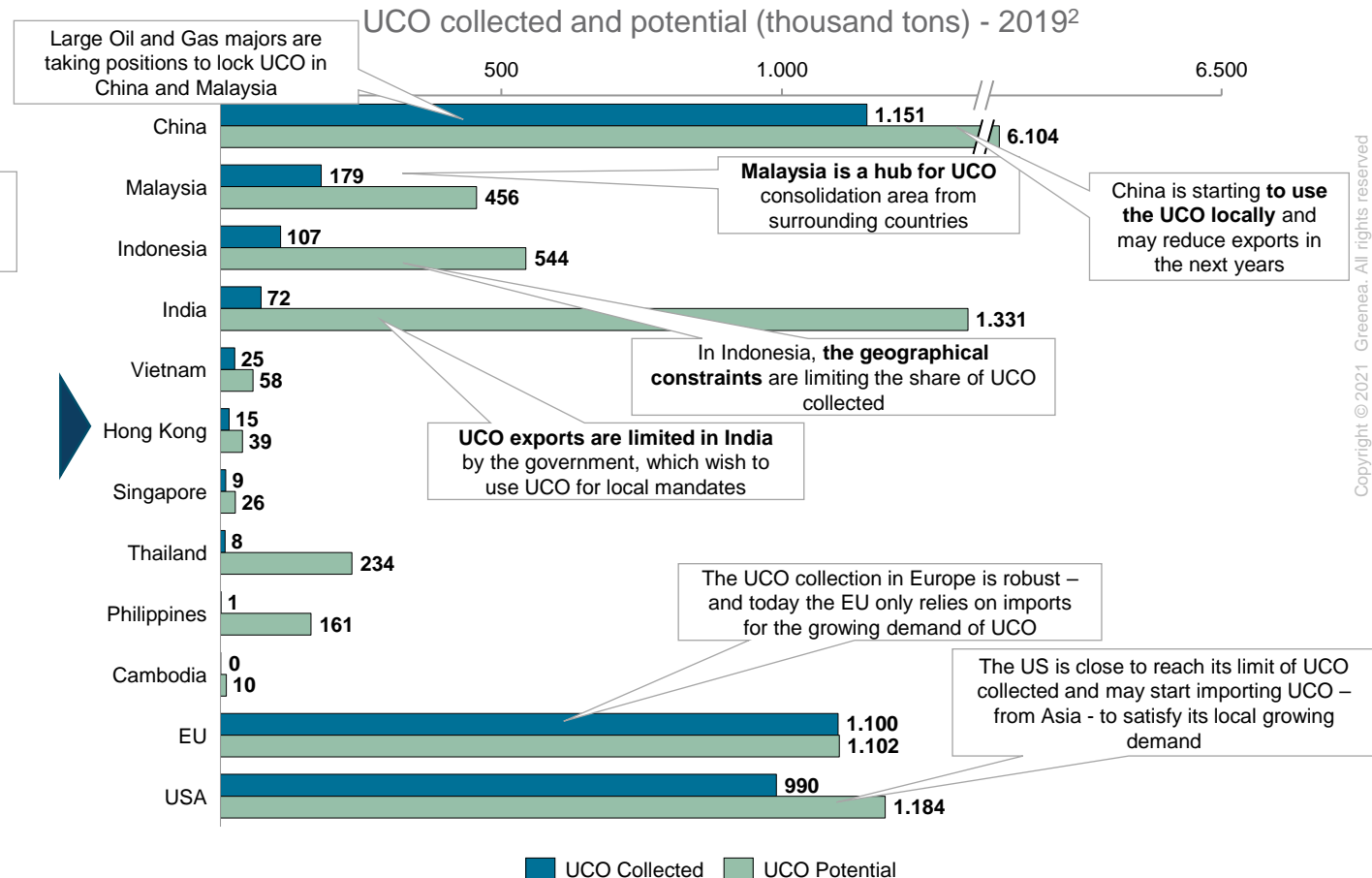
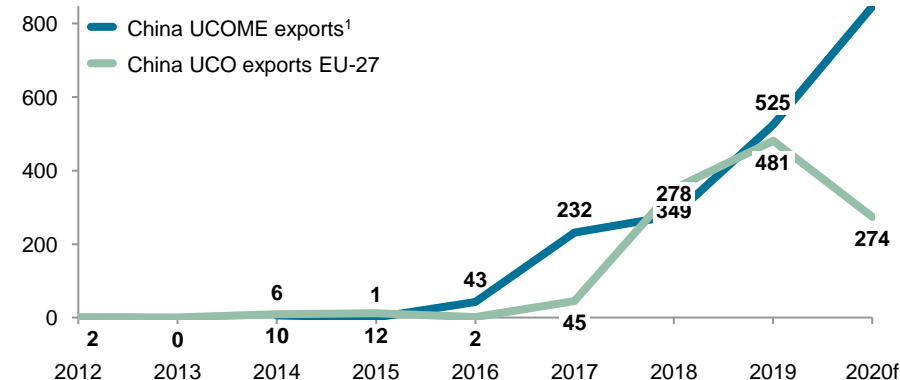
Most of the southeast Asian countries collect less than 30% of their UCO potential, however the UCO is locally used or locked for further local projects

USA diesel UCO-based biofuels **domestic** production (thousand ton)



Exports to the EU are going down following increase in domestic production

Chinese exports to Europe (thousand ton)



Large Oil and Gas majors are taking positions to lock UCO in China and Malaysia

Malaysia is a hub for UCO consolidation area from surrounding countries

China is starting to use the UCO locally and may reduce exports in the next years

In Indonesia, the geographical constraints are limiting the share of UCO collected

UCO exports are limited in India by the government, which wish to use UCO for local mandates

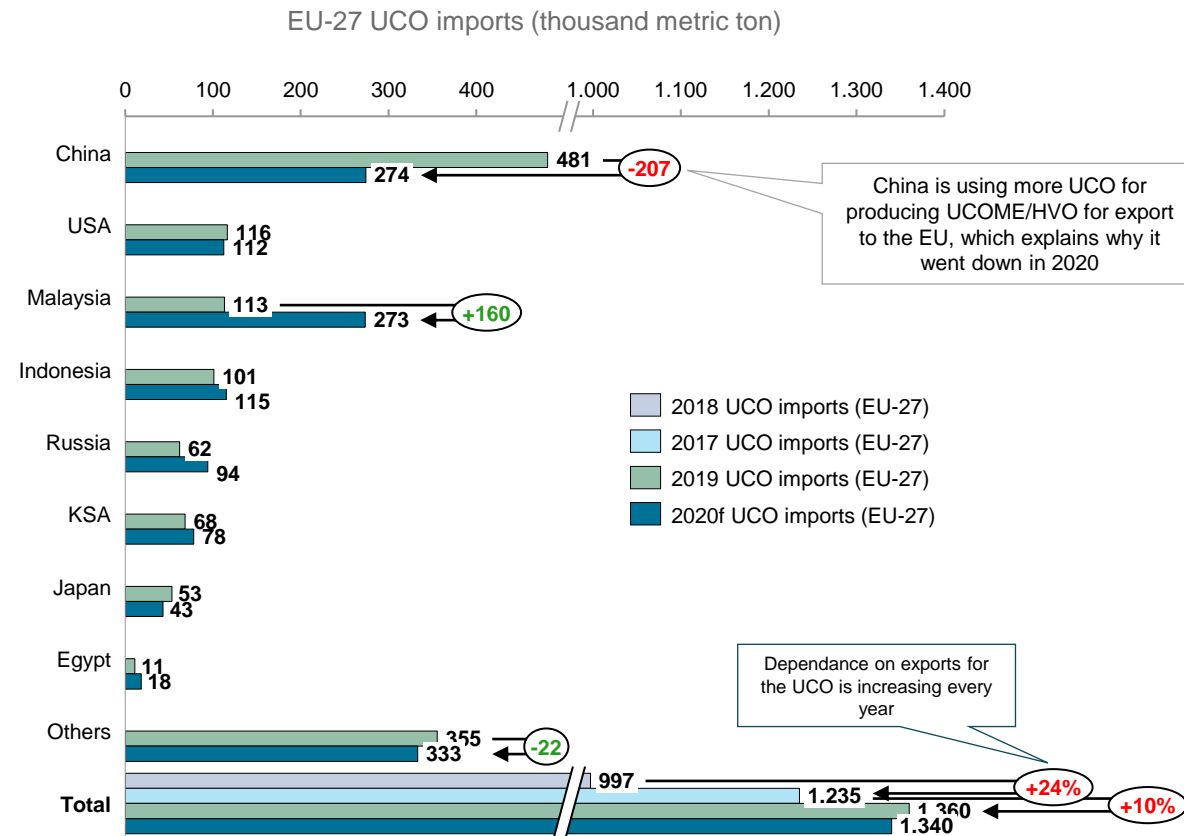
The UCO collection in Europe is robust – and today the EU only relies on imports for the growing demand of UCO

The US is close to reach its limit of UCO collected and may start importing UCO – from Asia - to satisfy its local growing demand

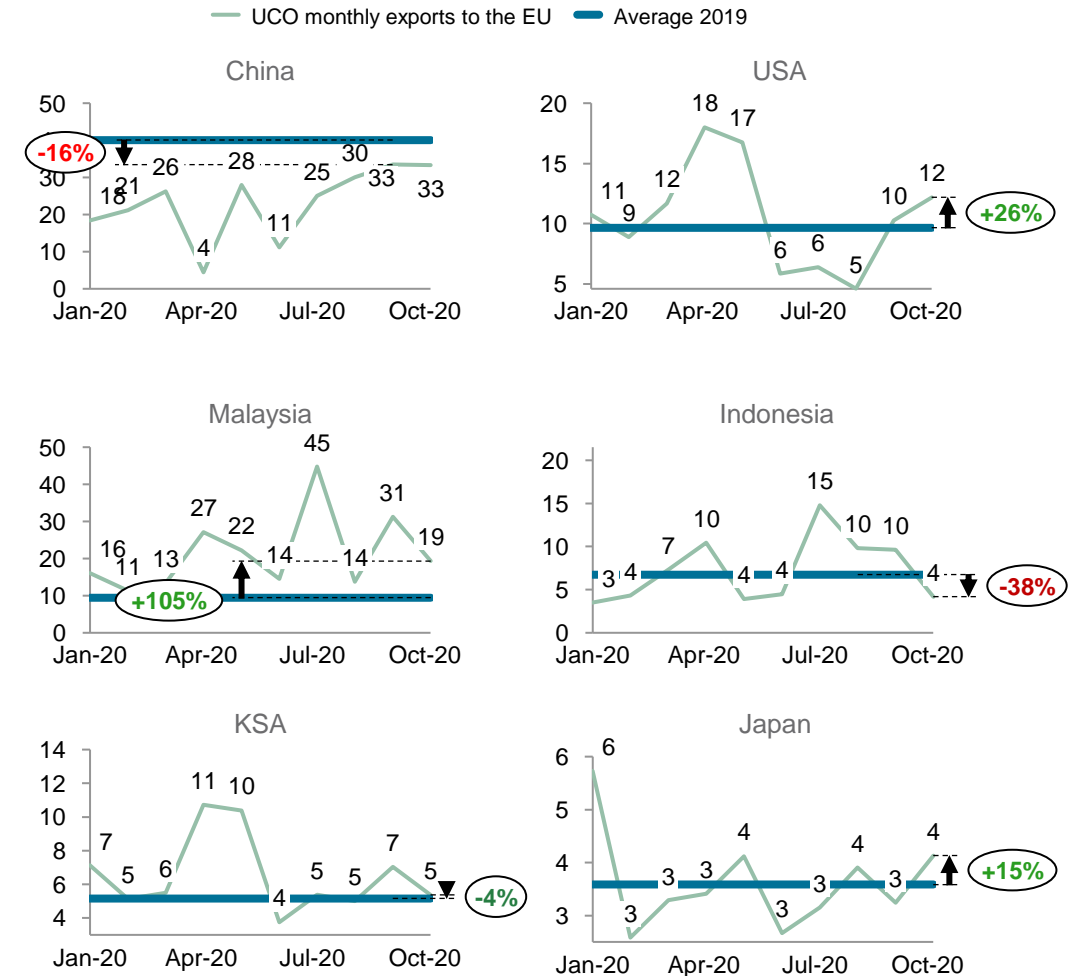
Conclusion: Less UCO and more UCOME available for European actors?

The EU is still dependent on foreign countries, the total accounting for 1.4mt in 2020,...

Imports to the EU-27 are growing in most UCO-collecting countries, gravity center shifted from China to Malaysia and to non-traditional exporters



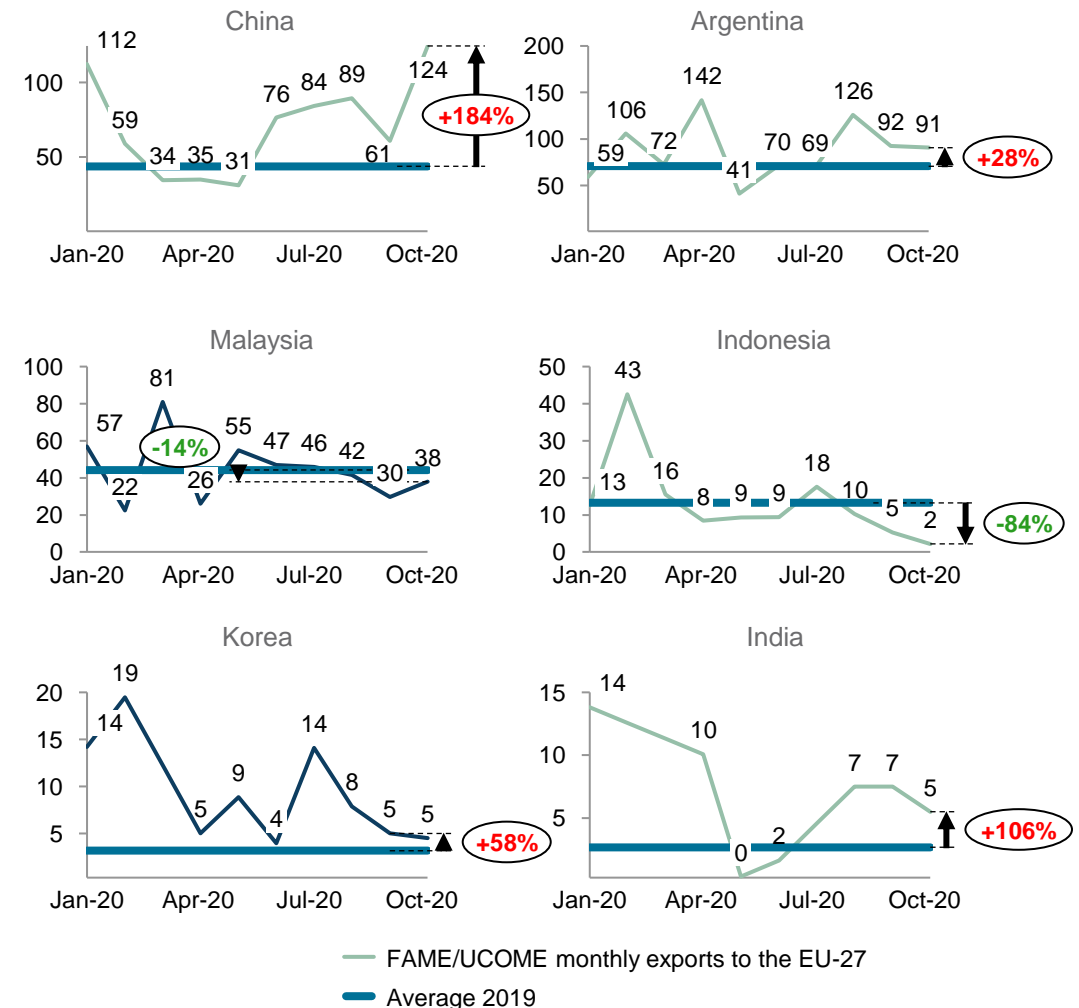
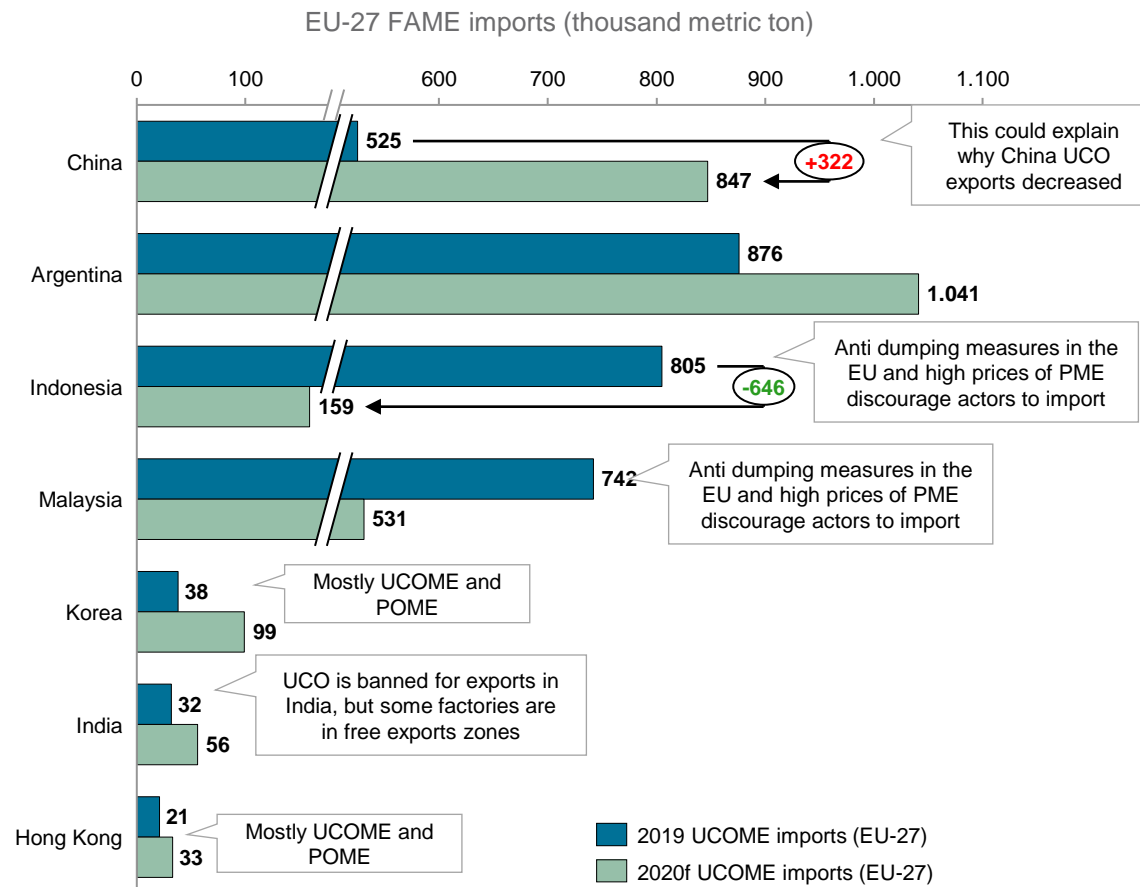
Covid-19 impact barely hit exports. Most of the exporters are back to normal or better than 2019 in October 2020, except China and Indonesia



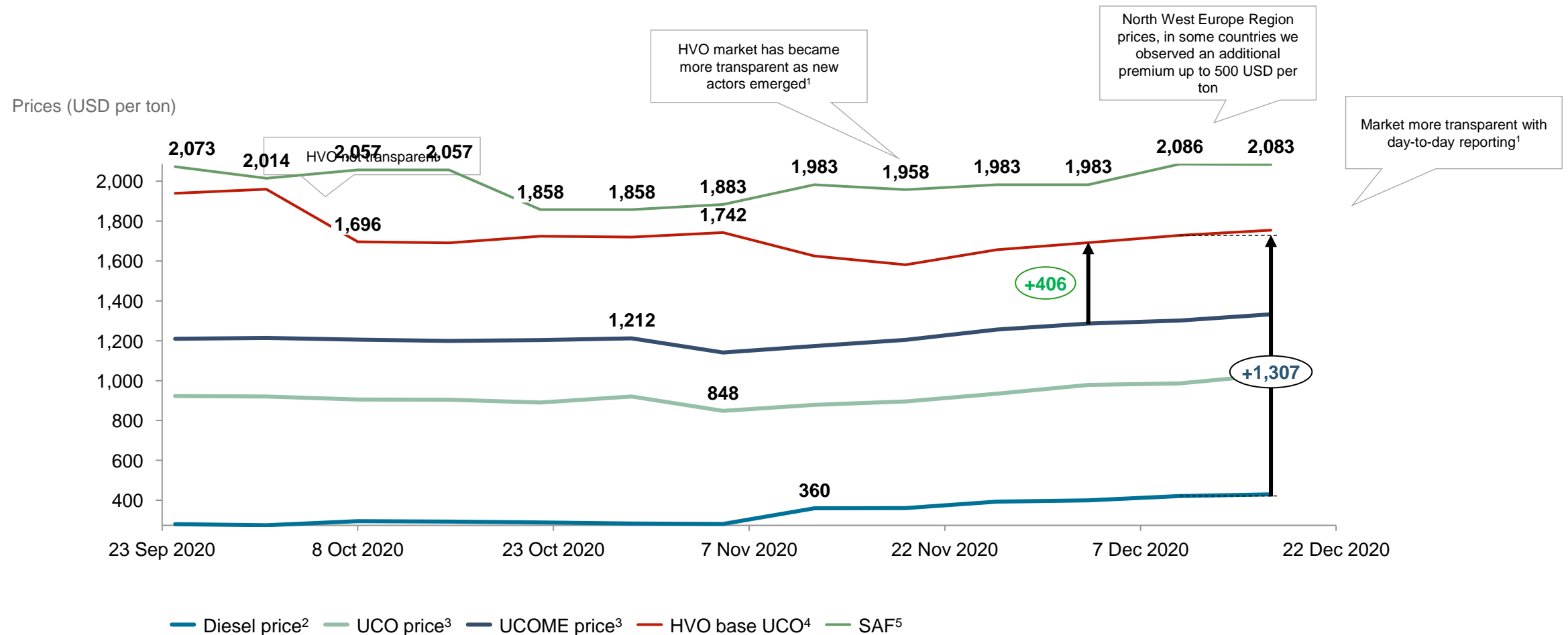
FAME/HVO dependance on imports exploded in the year 2020, covid-19 was a catalyst, as the EU-27 economy was not producing enough domestically

China's UCOME increased by around 300kt and PME imports decreasing since EU government are not promoting it, and palm oil boomed

Covid-19 may have increased dependencies for diesel biofuel imports, particularly from China



HVO prices have become more transparent in 2020 as HVO producers are increasing, despite covid-19 crisis, spreads remain constant



Source: Greenea Analysis

Notes:

1. Since beginning September 2020, market transparency has increased.
2. UCO DDP North West Europe (USD per ton)
3. T2 FOB ARA (USD per ton)
4. T2 FOB ARA (USD per ton) North West Europe
5. Hydrotreated Esters and Fatty Acids (HEFA) Synthetic Paraffinic Kerosene North West Europe

Countries have until end-Q2 2021 to translate REDII into national schemes, however the following countries have already taken the leap...

Biofuel Legislations for the most biofuel-consuming EU countries



In France, the Parliament is currently discussing the draft of the 2021 budget law, which article 15 notably the ban of palm oil and soybean oil in 2021. **No GHG mandate will be included in the law before 2022.**



The German Ministry of Environment has started the process of REDII transposition with **an ambitious draft of law that project to increase the GHG reduction mandate by 22% by 2030**



In Italy, major changes from 2023 are in the making: the ban of palm and soy oil for biofuels eligibility + the separation of the blending obligation for diesel and gasoline. A proposition to put a cap of 2.5% cap on used cooking oil was proposed by the government and to include biogas in the advanced sub-target. New advanced sub-targets have been published on March 2, 2018, **for which biomethane account for 75%**, the remaining 25% being covered with biofuels made from Annex IX Part A feedstocks.



Spanish authorities have drafted a Royal Decree to increase the biofuels blending obligation to 9.5% and 10% e.c in 2021 and 2022, respectively.



The focus is on a linear path with indicative levels for 2030 of 28% for petrol and 66% for diesel, with a control station in 2022". It also confirmed its willingness implement a biojet obligation (0.8% GHG from 2021 or 2022) but delays linked to the coronavirus situation were announced. The draft of law is still not available.



It is unlikely that the Netherlands will put a cap on waste-based mandates since biofuel mandates are high.

Country examples (non-exhaustive)

MANDATE	2019	2020	2021
EC biodiesel	7.9%	8%	8%
EC biogasoline	8%	8.2%	8.6%

MANDATE	2019	2020	2021
GHG	4%	6%	6%
Advanced	-	0.05%	0.10%

MANDATE	2019	2020	2021
Biofuels	8%	9%	10%
Advanced	-	1%	1.5%

MANDATE	2019	2020	2021
Biofuels	7%	8.5%	9.5%
Advanced	-	0.1%	0.1%
GHG	-	6%	?

MANDATE	2019	2020	2021
Biodiesel	20% GHG	21% GHG	25.3% GHG
Biogasoline	2.6% GHG	4.2% GHG	5.6% GHG

MANDATE	2019	2020	2021
Biofuels	12.5%	16.4%	17.5%
Advanced	0.8%	1%	1.2%
GHG	4%	6%	6%

How does this translate into demand in supply in the year 2030?

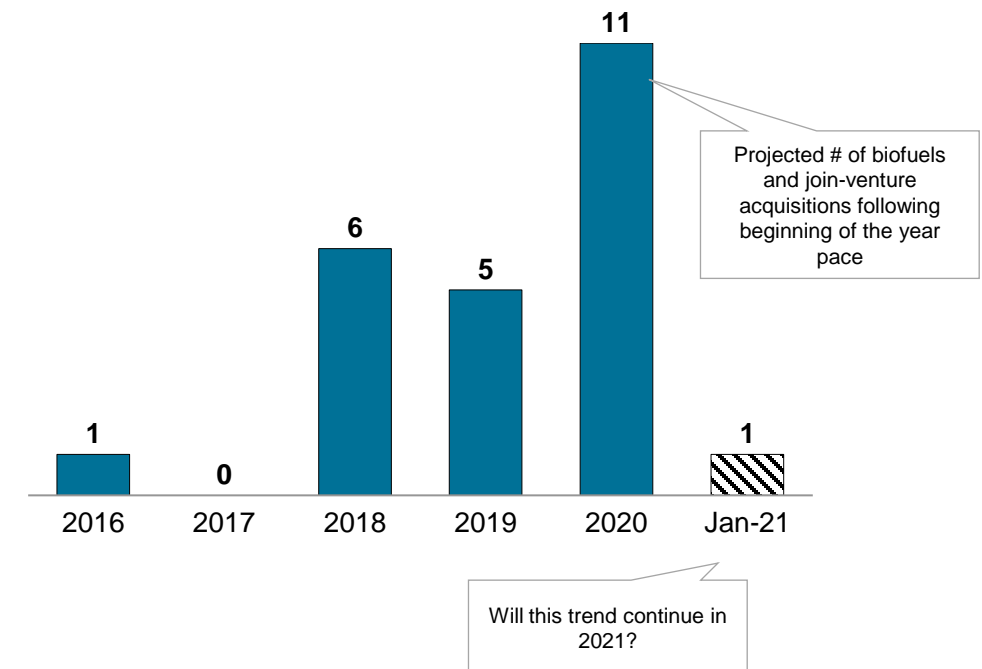
High competition on 1.5G and 2G feedstocks pushed companies to directly acquire feedstock collectors and engage in ventures – the trend is accelerating with an increasing pace

Biofuel producers and waste-based feedstocks joint-ventures and acquisitions in the last three years, mostly from Holland

Buyer	Seller	Country	Biocomponent	Time	Type	Capacity
Neste	Alterra Energy	USA	Plastic waste liquefaction	Jan 2021	Equity	
Gevo	Praj	India	Biojet	Q4 2020	Join Venture	
Shell	Red Rock	USA	Biojet	Q4 2020	Join Venture	
Neste	Bunge Loders Croklaan	Holland	Storage / refinery	Nov 2020	Acquisition	
Shell	World Energy	USA	Biojet	Q3 2020	Join Venture	
Neste	Count Terminal	Holland	UCO	May 2020	Acquisition	
Muenzer	Rotie	Holland	UCO	Apr 2020	Acquisition	120 kt
Neste	Mahoney Environmental	USA	UCO	Mar 2020	Acquisition	
Quatra	Collecto Leo	France	UCO	Mar 2020	Acquisition	2.5k tons
JGC	JXTG	Japan	Biojet	Q1 2020	Partnership	
Hahn & Co.	SK Chemical	Korea	1.5G FAME	Feb 2020	Acquisition	120k tons
Finco Fuel	Goodfuels	Holland	HVO / Biofuels Distribution	Jan 2020	Acquisition	-
BP	Bunge	Brazil	1G Ethanol	Dec 2019	Join Venture	-
Sunoi	Kampen	Holland	1.5G FAME	Oct 2019	Acquisition	150k tons
Verbio	Atlantic Biodiesel	Canada	Biodiesel 2G	May 2019	Acquisition	150k tons
Gunvor	Bionor	Spain	1.5G FAME	Feb 2019	Acquisition	200k tons
Quatra	Roti	Holland	UCO	Jan 2019	Acquisition	-
Greenergy	Rexon Energy	Singapore	UCO	Sep 2018	Acquisition	150k tons
Parcom Capital	Simadan	Holland	Biodiesel / UCO	Jul 2018	Acquisition	
NordEster	Oleovia	France	Biodiesel / UCO	Jul 2018	Acquisition	
Argent Energy	BDA	Holland	TME	Jul 2018	Acquisition	120k tons
Greenergy	Oiltanking	Holland	1.5G FAME	Jul 2018	Acquisition	200k tons
Neste	Demeter	Holland	UCO / AF	May 2018	Join Venture	
Neste	Electrawinds	Holland	Biodiesel	Dec 2016	Acquisition	

Biofuel producers and waste-based feedstocks joint-ventures and acquisitions have been booming since 2018

Biofuel producers and waste-based feedstocks suppliers # acquisitions/ventures



Biofuel producers and waste-based feedstocks joint-ventures and acquisitions is becoming trendy

Regarding 2G, supply must be multiplied by five by 2030 to reach targets

Country examples (non-exhaustive)



MANDATE	2019	2020	2021
GHG	4%	6%	6%
Advanced	-	0.05%	0.10%



MANDATE	2019	2020	2021
EC diesel	7.9%	8%	8%
EC gasoline	8%	8.2%	8.6%



MANDATE	2019	2020	2021
Biofuels	8%	9%	10%
Advanced	-	1%	1.5%



MANDATE	2019	2020	2021
VOL diesel	8.25%	9.25%	10.1%
Advanced	0.1%	0.2%	0.5%
GHG	4%	6%	-



MANDATE	2019	2020	2021
Biodiesel	20% GHG	21% GHG	25.3% GHG
Biogasoline	2.6% GHG	4.2% GHG	5.6% GHG



MANDATE	2019	2020	2021
Biofuels	12.5%	16.4%	17.5%
Advanced	0.8%	1%	1.2%
GHG	4%	6%	6%



MANDATE	2019	2020	2021
Biofuels	18%	20%	18% not DC
Advanced			
GHG		6%	

Around **15 kt of Ethanol from Bagasse** were consumed in 2019 and **100 kt of biomethane**

Around **50 kt of Ethanol from wine lees** in 2019

Around **300 kt of biodiesel from POME** were consumed in 2019

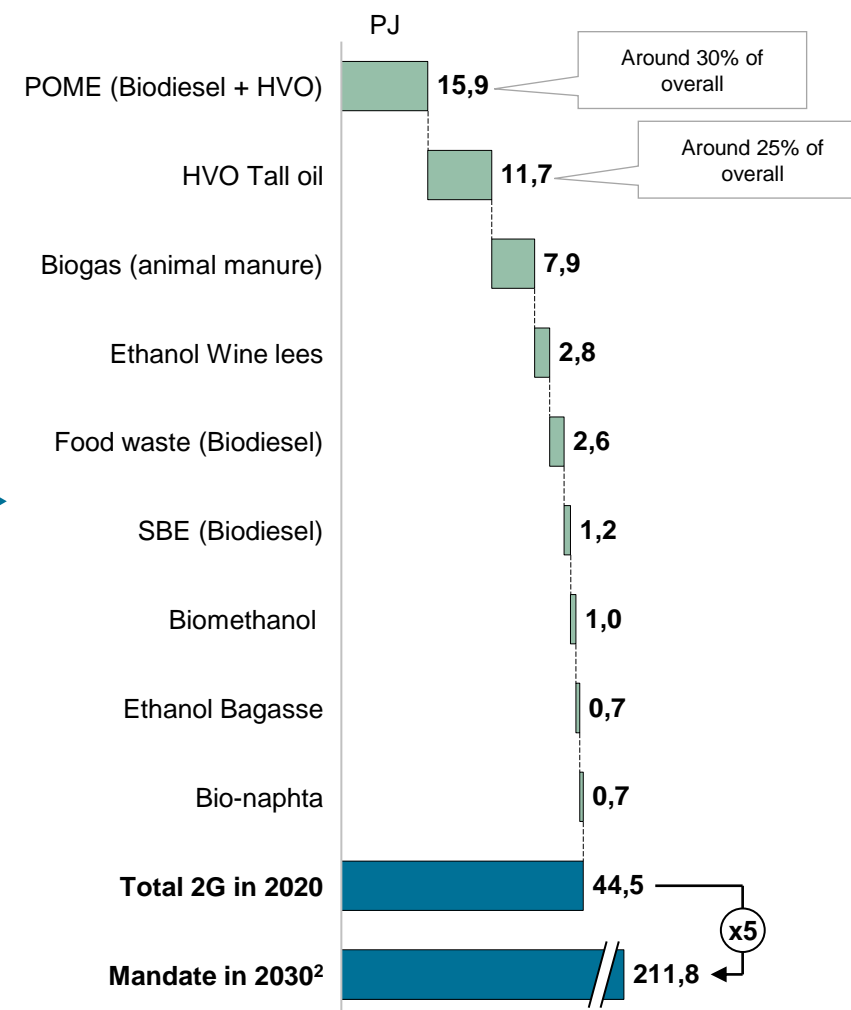
Around **15kt of POME, 100kt of acid oils** in 2019

Around **150 kt of biodiesel from tall oil** consumed in 2019

50kt of 2G biodiesel mainly from POME, tall oil and SBE consumed in 2019

Around **80kt of biodiesel from tall oil** consumed in 2019

Biofuel consumed in the EU (PJ¹) from different mix of feedstocks in the annex 9A (2019)



2021: The year where HVO/UCOME players will start considering the below elements...

Elements to consider before low carbon final investment decision ...

Global feedstocks deposits are stretched...

Global waste-based feedstock deposit in 2030 (million ton)

Decline of diesel and diesel biofuels in the wake

Investors will start taking more in consideration the consumption change between diesel vs gasoline fuel and the market penetration of vehicle electrics

Reducing trading margins

At least 3 new Trading Desks for Biofuels & Feedstocks starting in Europe & Asia making more pressure on trading margins

Local legislation increase

Local legislation is not promoting HVO, rather promoting biogas, B100, hydrogen and renewable electricity

Alternative fuels boost

Several EU States support the biogas or biomethanol for the 2G market in order to have local approaches and avoid dependence on SBE, POME, UCO

Talented traders out

The feedstock and biofuel trader market is limited, making it hard for new entrants to attract experienced traders

Increasing dependance for imports

Does not make sense for States to rely on feedstocks from outside the EU, as waste-based feedstock imports is now close to 70%

UCO quality unpredictable

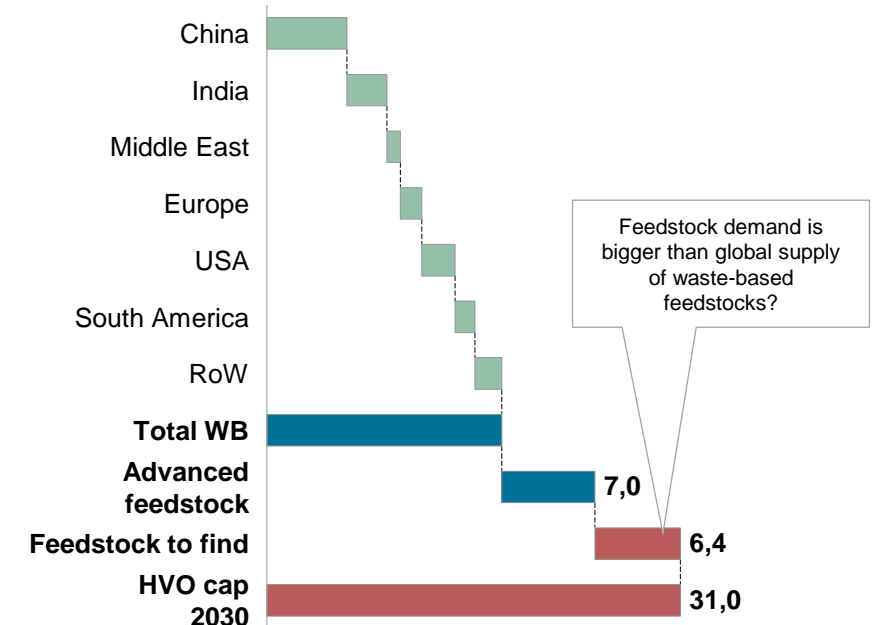
Expected issues on UCO quality due to limited UCO supply, impacting UCOME production yields and increasing factories maintenance costs

1G FAME prices up thanks to palm oil phase-out

The ban of palm oil & soybean oil starting in EU states will keep increasing pressure on the biodiesel price, the former is forecast to increase

Threat of higher blend walls

B10, B20, B30, B100, E85 are penetrating the market making HVO demand at risk in the EU and California



Will 2021 be the year of questioning government policies, often very euphoric on biofuels and renewables in general, but the market reality will always be there to put things back in place

GREENEA is a consulting firm specialized in low carbon strategy



Our Services

- 1 Market entry in the businesses of low carbon activities
- 2 Custom-tailored support for drafting low carbon strategy
- 3 Due-diligences for corporates, private equity and banks
- 4 Environmental, Social and Governance assessments
- 5 Energy & Resource Optimization
- 6 Feedstock procurement and trading risks
- 7 Transport, Logistics of Low Carbon Feedstocks
- 8 Companies resilience against climate change



A multi sector approach



AGRICULTURE



BIOFUELS



RENEWABLE FUELS



MOBILITY / TRANSPORT



RECYLCING



BIOPLASTICS



GREEN FINANCE



LEGISLATION

14

YEARS OLD

70%

S&P 500
CLIENTS

100+

MISSIONS
WORLDWIDE

45+

COUNTRIES WERE
WE HAVE WORKED

GREENEA, two complementary activities helping you overcome your sustainability challenges



**Pioneer in brokerage of
waste-based biofuels**



Prices



Logistics &
operations



Negotiation



Regulations



Production



**Offering independent and objective analyses
in low carbon strategy**



Transformation



Marketing
& Sales



Growth



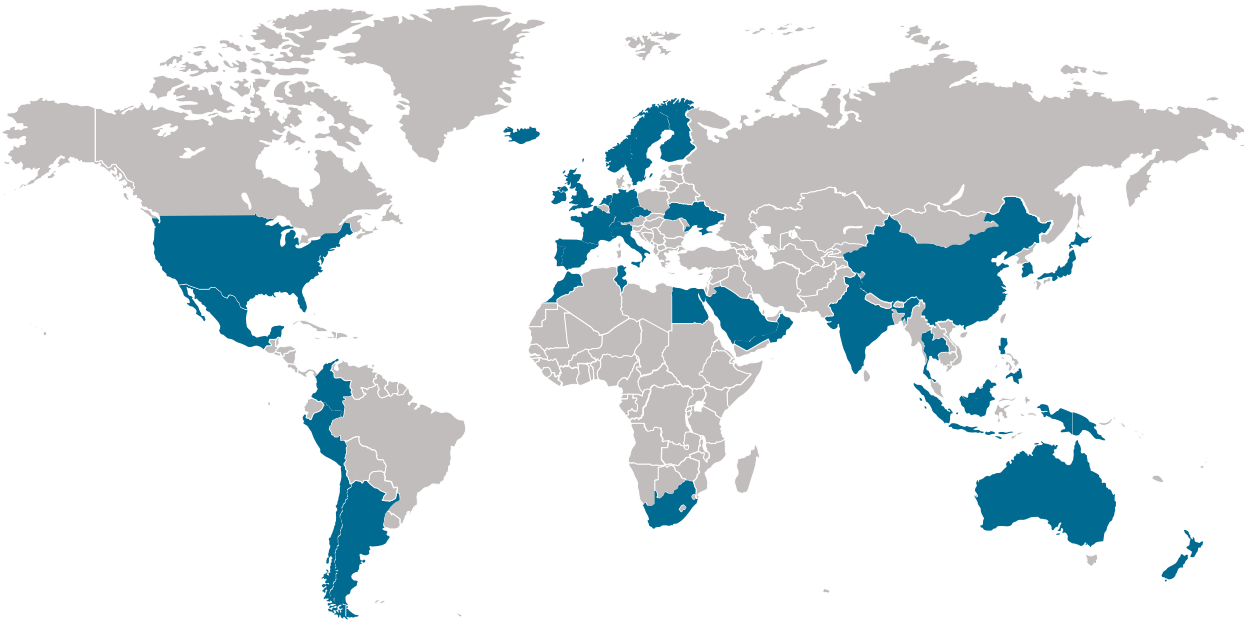
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WASTE BASED
FEEDSTOCK SUPPLIERS

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AUTOMOTIVE
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ENERGY
DISTRUBUTORSBIODIESEL AND
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AIRLINES

RENEWABLE ENERGY
PRODUCERSBIOMASS
PRODUCERS

TRANSPORTATION & LOGISTICS



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CITIES AND INSTITUTIONS

Ask anything to our core team



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CREATING VALUE ...

from downstream units to
upstream activities for majors or
financial institutions



RECOGNIZED EXPERTISE ...

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Energy Risk Commodity Rankings
since 2016



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strong network in Europe,
Middle East & in Asia

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