

Roundtable discussion on financing advanced biofuels production

Part I: The EU policy and technology landscapes

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Ecosystem

For a successful *ecosystem* for advanced biofuels, the nexus of:

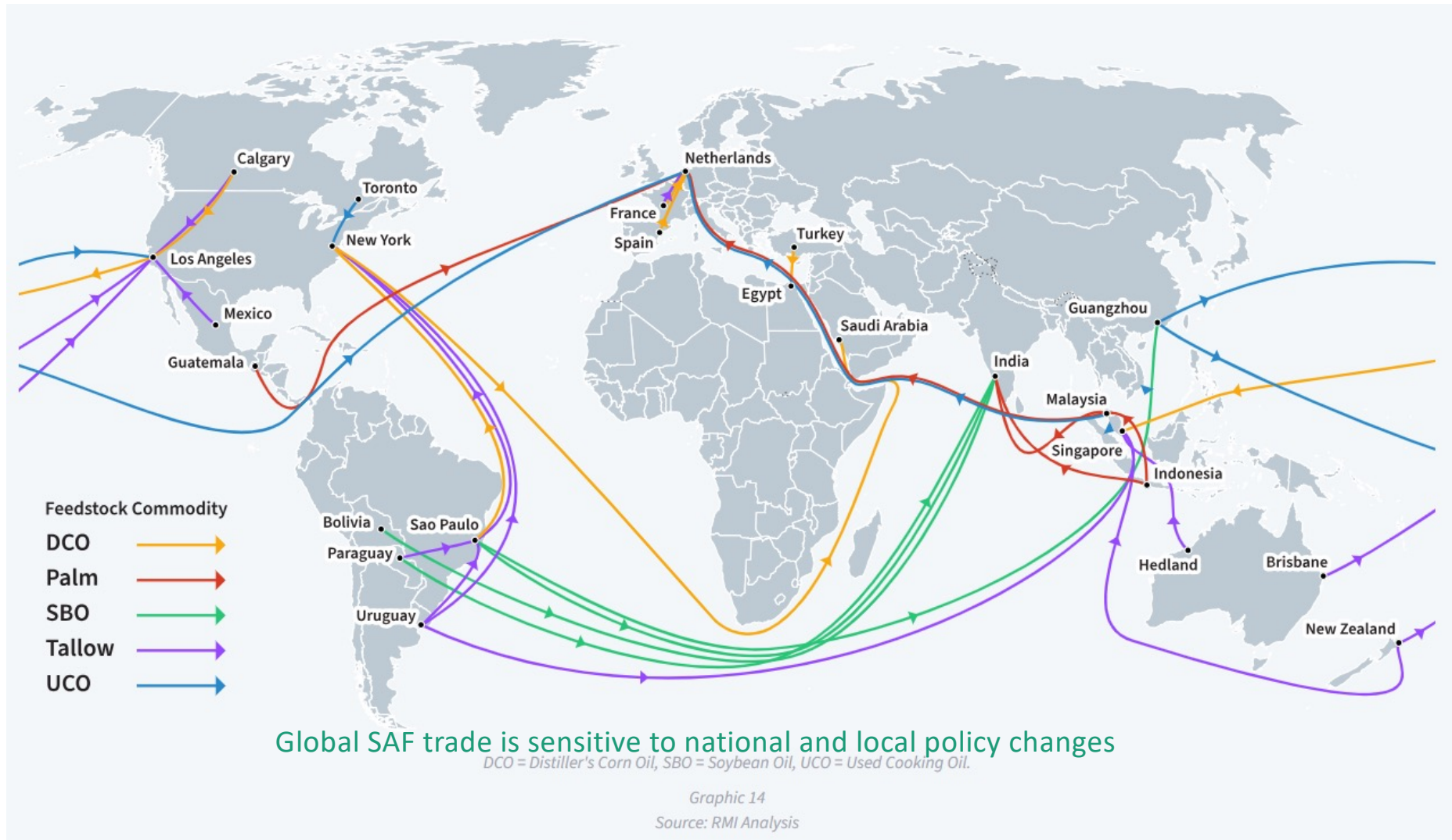
- ✓ stable long-term policy,
- ✓ reliable technology
- ✓ viable value chains
- ✓ strong industry engagement and leadership
- ✓ adequate and not complex to obtain financing
- ✓ operational market, and,
- ✓ social acceptance

must come together at a certain time and place.

The concept of *ecosystem* only recently became a jargon in EU policy....
it has been actively endorsed and stimulated in other countries like India.

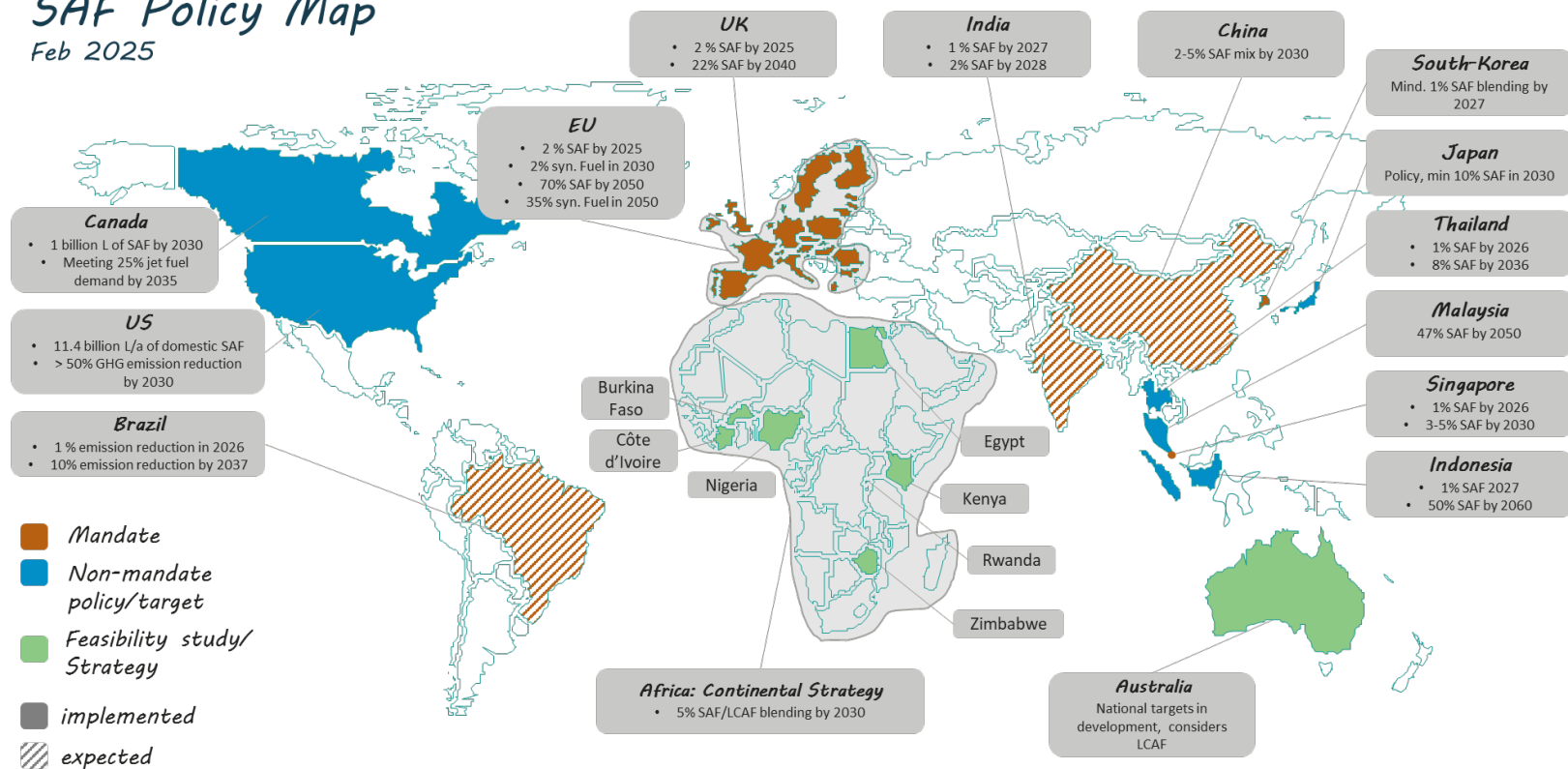
An *ecosystem* can only be developed under the initiative and strong leadership of a government.

Biofuels is a global industry and market



SAF Policy Map

Feb 2025

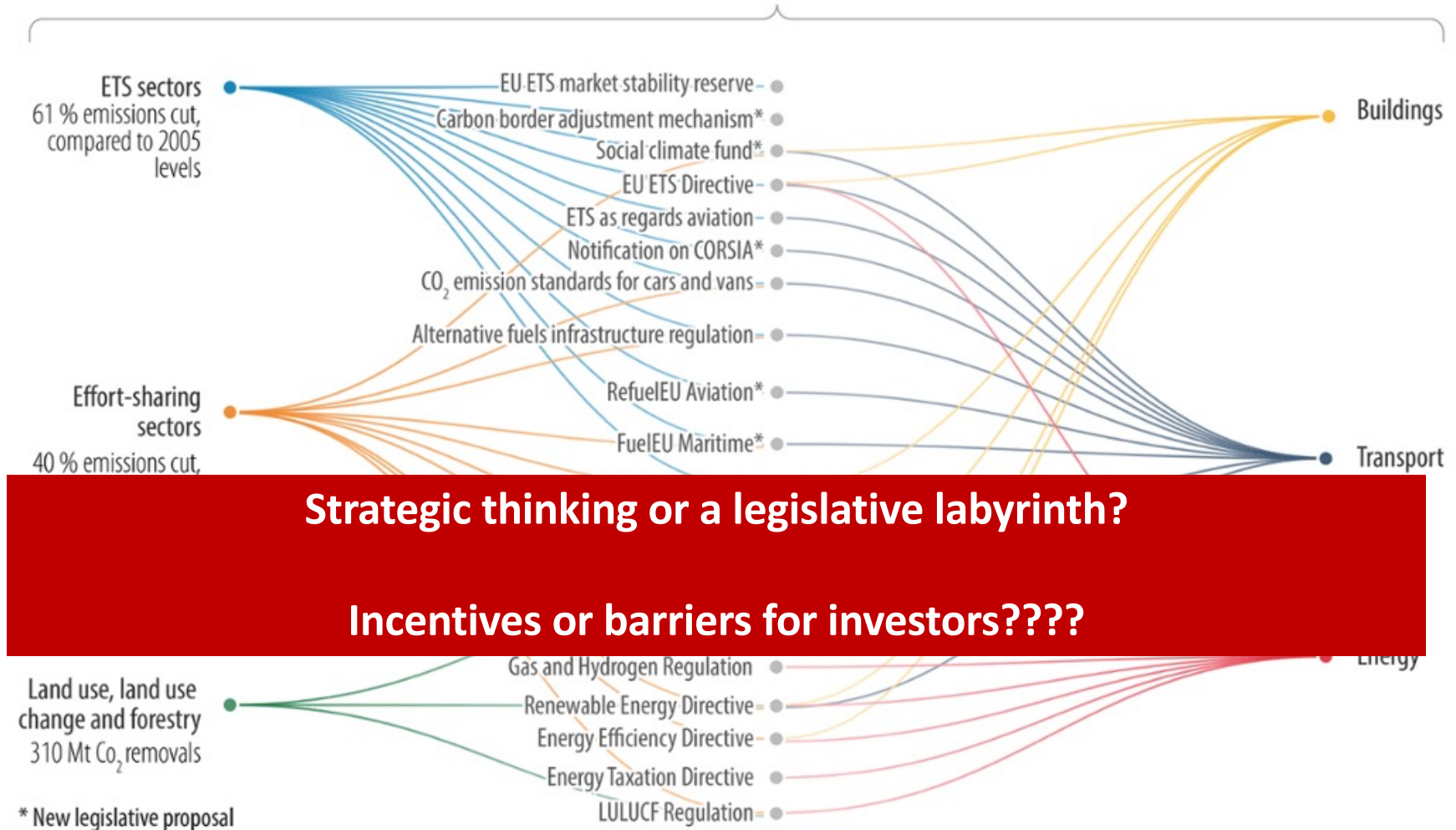


Source: Maniatis, Hegel and Viver, 2025. ICARUS report, Deliverable 1.7: SAF Policies 2025 Update

European Climate Law

55 % net emissions cut by 2030, compared to 1990

Climate neutrality by 2050

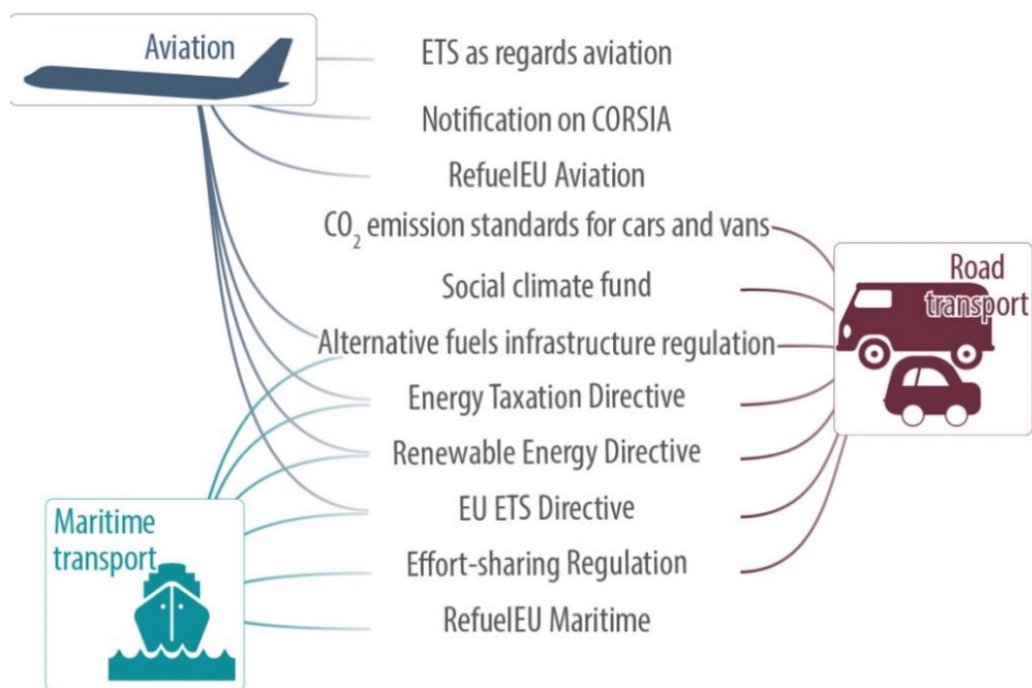


Strategic thinking or a legislative labyrinth?

Incentives or barriers for investors???

Transport: a challenging sector for climate action

6 legislative proposals to reduce transport emissions



EPRS | European Parliamentary Research Service

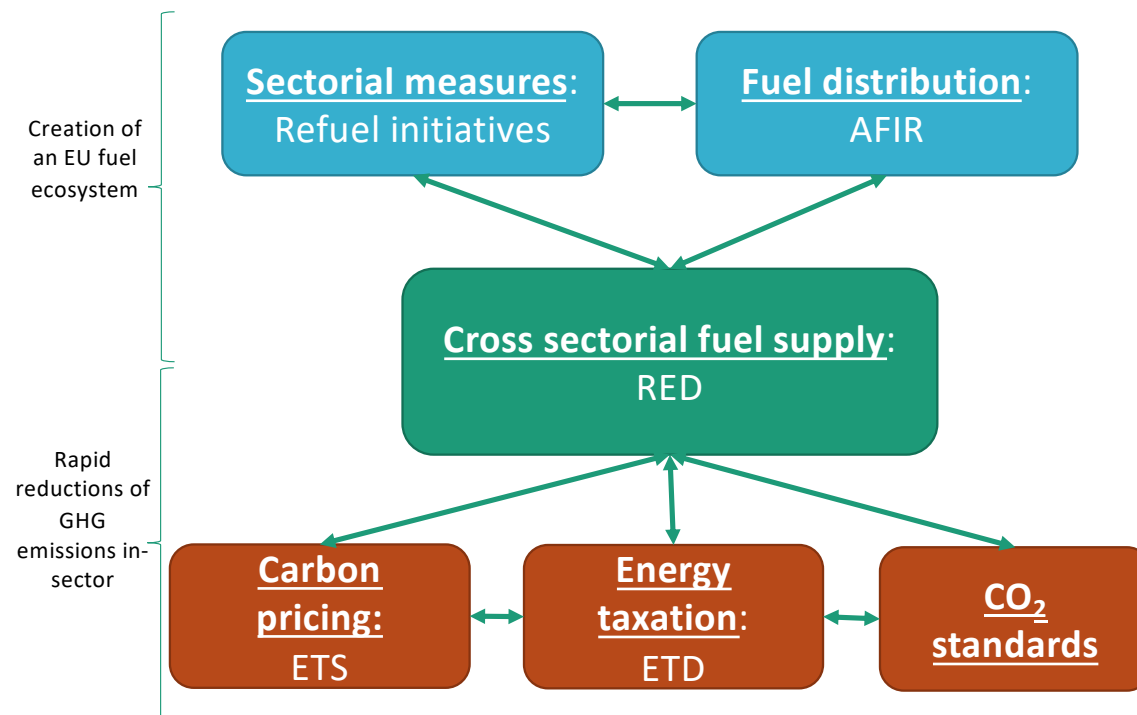
EU Court of Auditors, December 2023:

*The EU has failed to give sufficient policy stability to the biofuel sector and that more stringent categorisation of **truly advanced feedstock** is needed, and more transparency in reporting.*

It is remarkable that an EU body responsible for EU institutions' financial transparency and accountability raises such significant concerns on the EU's biofuel policies.

<https://www.eca.europa.eu/en/publications/SR-2023-29>

Key measures in EU legislation for decarbonisation of transport



Source: slide from presentation by Mrs. Maria Georgiadou

Legislative barriers to advanced biofuels production

Complexity of legislation, often with contradictions.

Ever changing legislation resulting in instability.

The Commission is always *hearing* the industry but rarely *listen* to what is being said, the case of E20/25 (see next slide).

Annex IX.

Restrictions on the use of food-based biofuels.

Minimum 60% GHG reduction.

The EC and EU always aim for the *best future solution* rather than what is *readily available at present* and drive for global ethical leadership.

The case of Clariant and Biochemtex/Versalis and the CEN E20/25 standard

Under the tender contracts of DG ENER I supported 3 R&D projects with CEN on E20/25 and a fourth one was supported jointly with RTD in Horizon 2020 aiming to answer the reservations of the car industry. The results were positive, as expected.

However, DG CLIMA blocked the Commissions Mandate to CEN for E20/25 on the basis that road transport for passenger cars will be electrified and the E20/25 was redundant.

The Biochemtex plant was taken over by ENI-Versalis and is still in use while the Clariant had to be closed.

Other technology developers, Chempolis, and Praj continue the deployment of cellulosic ethanol in India where there is a market. Lanzatech too with the gas fermentation process.



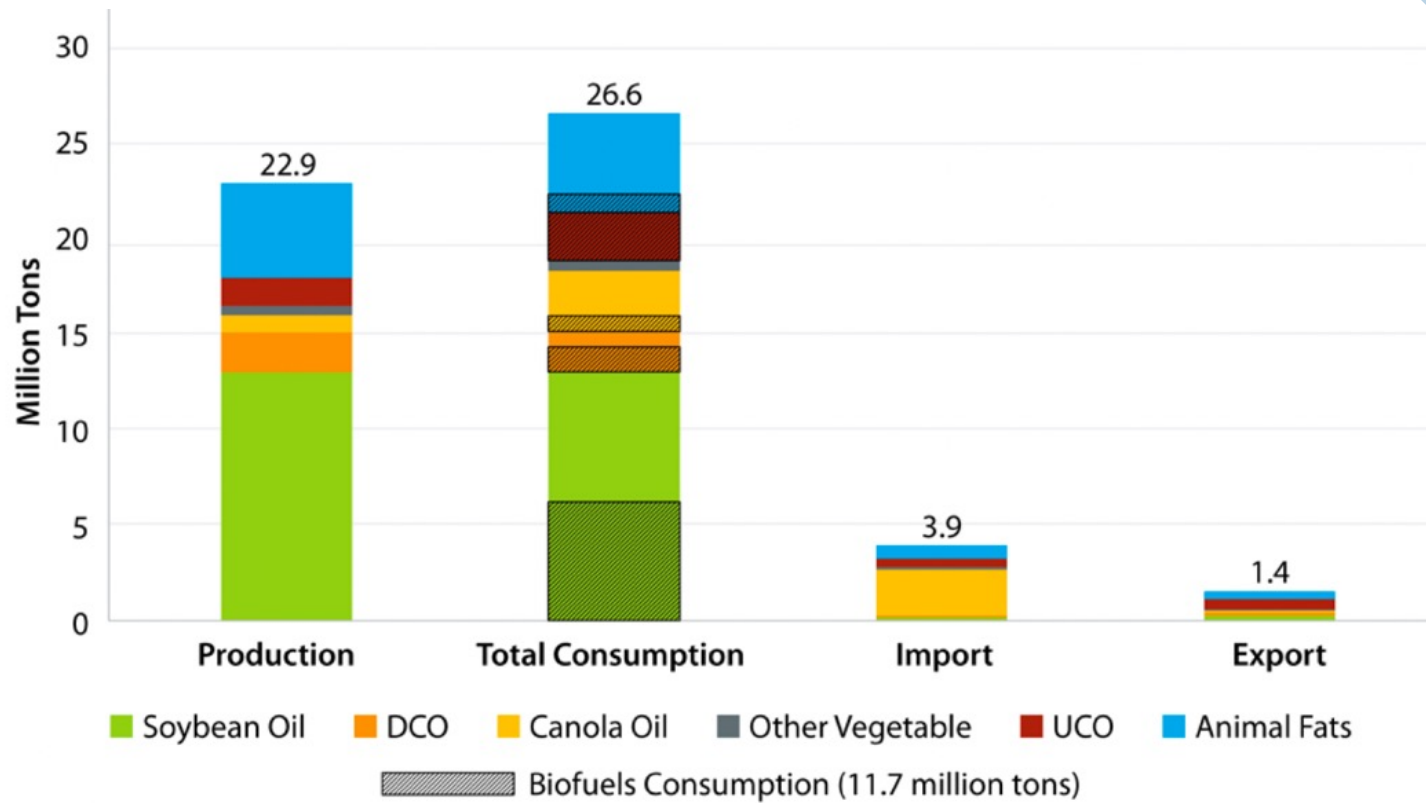
Clariant's cellulosic ethanol plant
Craiova, Romania

At present no chance to develop cellulosic ethanol in the EU, it only makes sense for EtJ which is very expensive compared to sugar/grain ethanol.



Biochemtex/VERSALIS
Cresentino plant, Italy
1st build on a global scale

HVO feedstock supply and demand in the U.S. (2022)

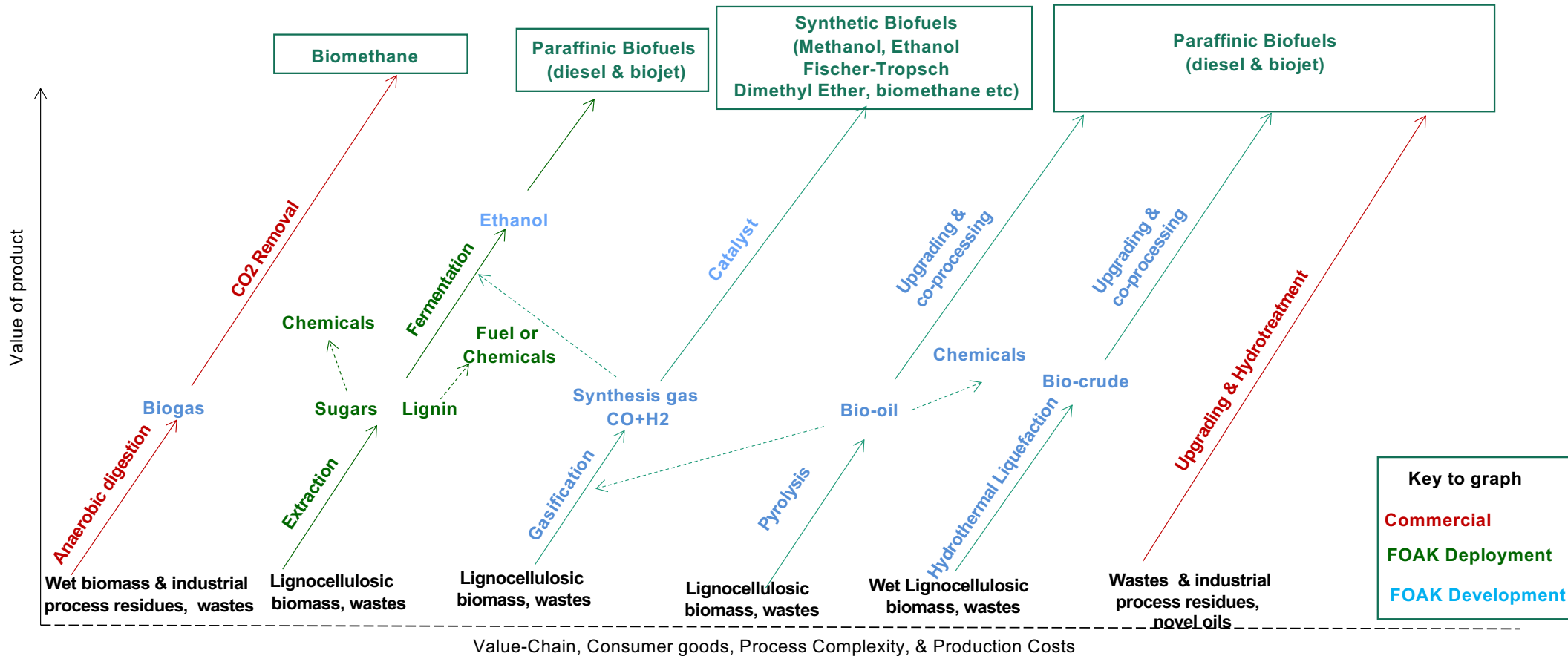


NREL, July 2024, Sustainable Aviation Fuel State-of-Industry Report: Hydroprocessed Esters and Fatty Acids Pathway,
<https://www.nrel.gov/docs/fy24osti/87803.pdf>

Available technologies for advanced biofuels

Biological Processing

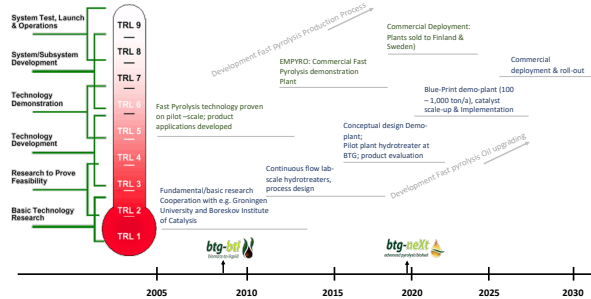
Thermochemical Processing



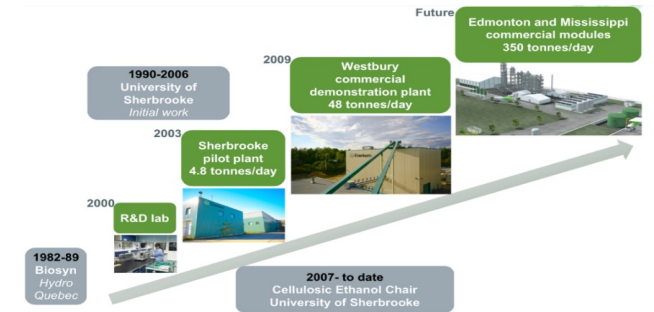
Adding value to biomass by processing to advanced biofuels and to biochemicals

It takes a long time to bring a technology from lab scale to First-of-a-Kind and market deployment

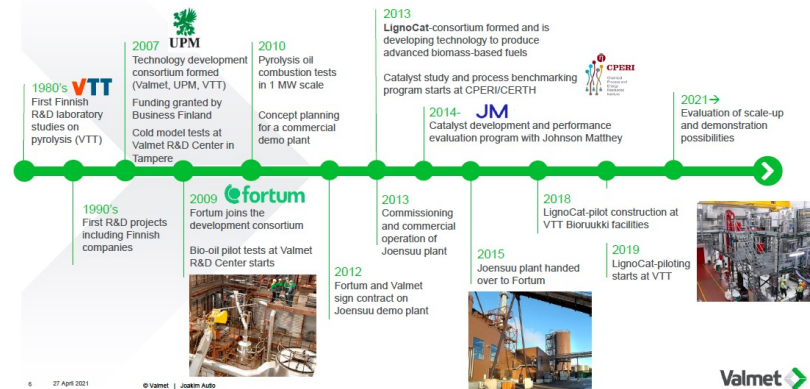
BTG Fast pyrolysis



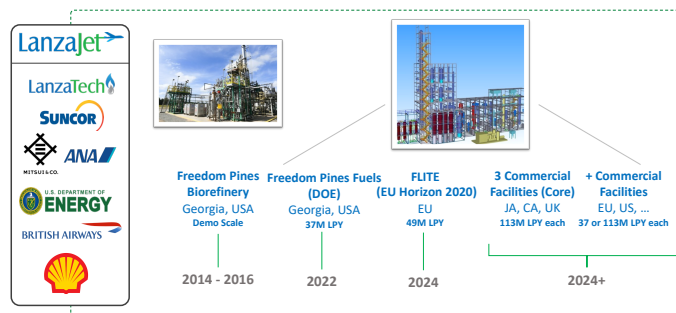
ENERKEM Gasification to ethanol/methanol



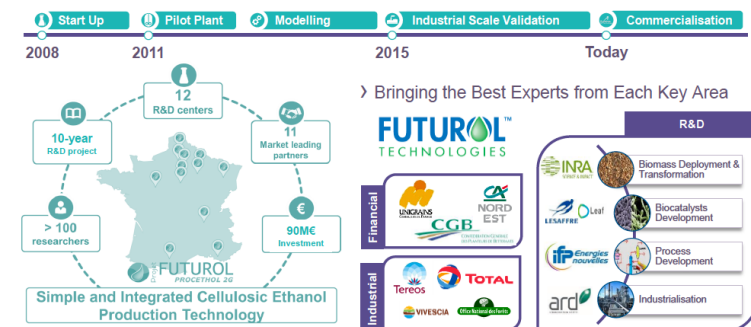
Valmet's Pyrolysis R&D, in co-operation with partners



Commercial Scale-up of Sustainable Aviation Fuel

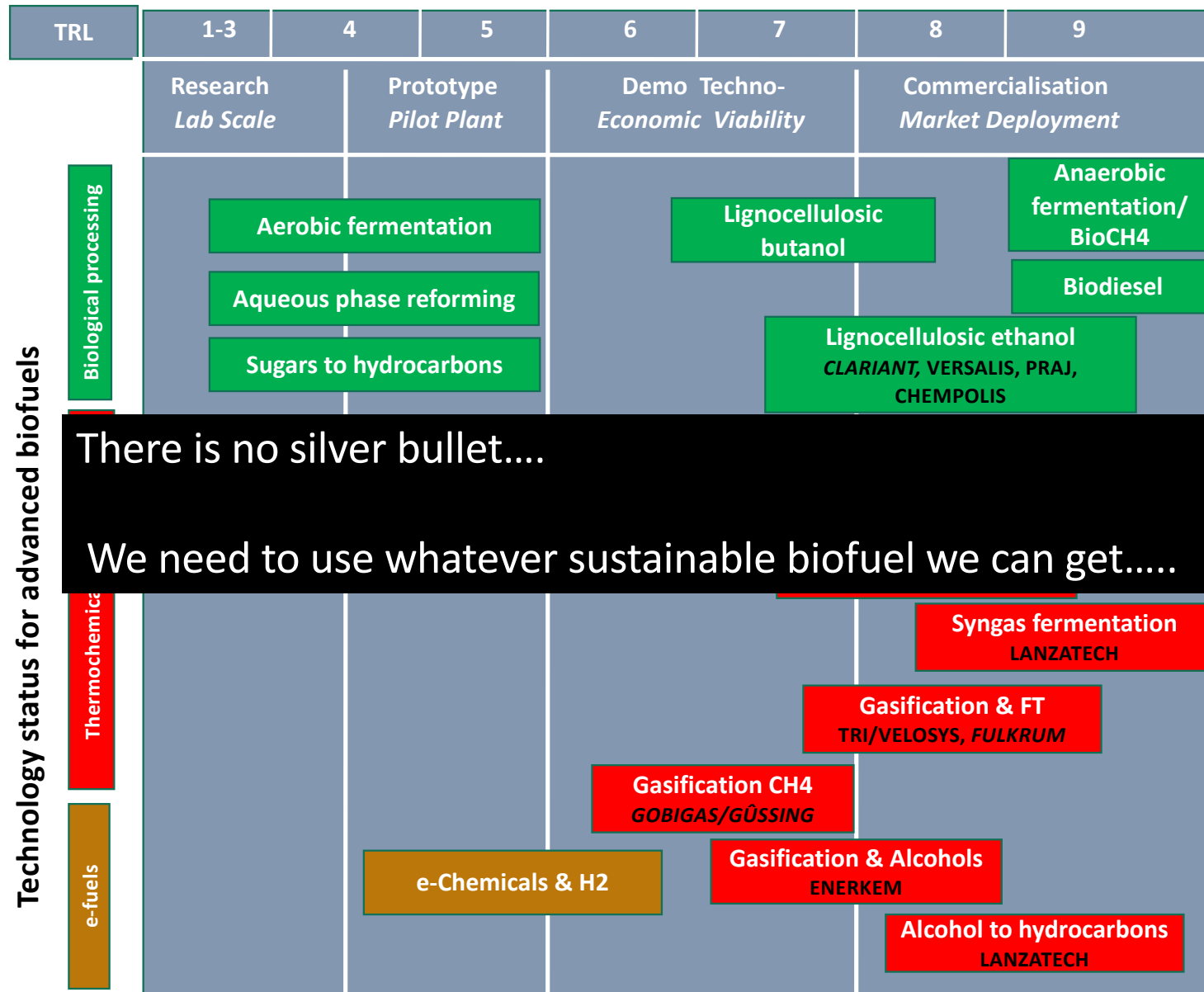


Development & Commercialisation of Futuro™

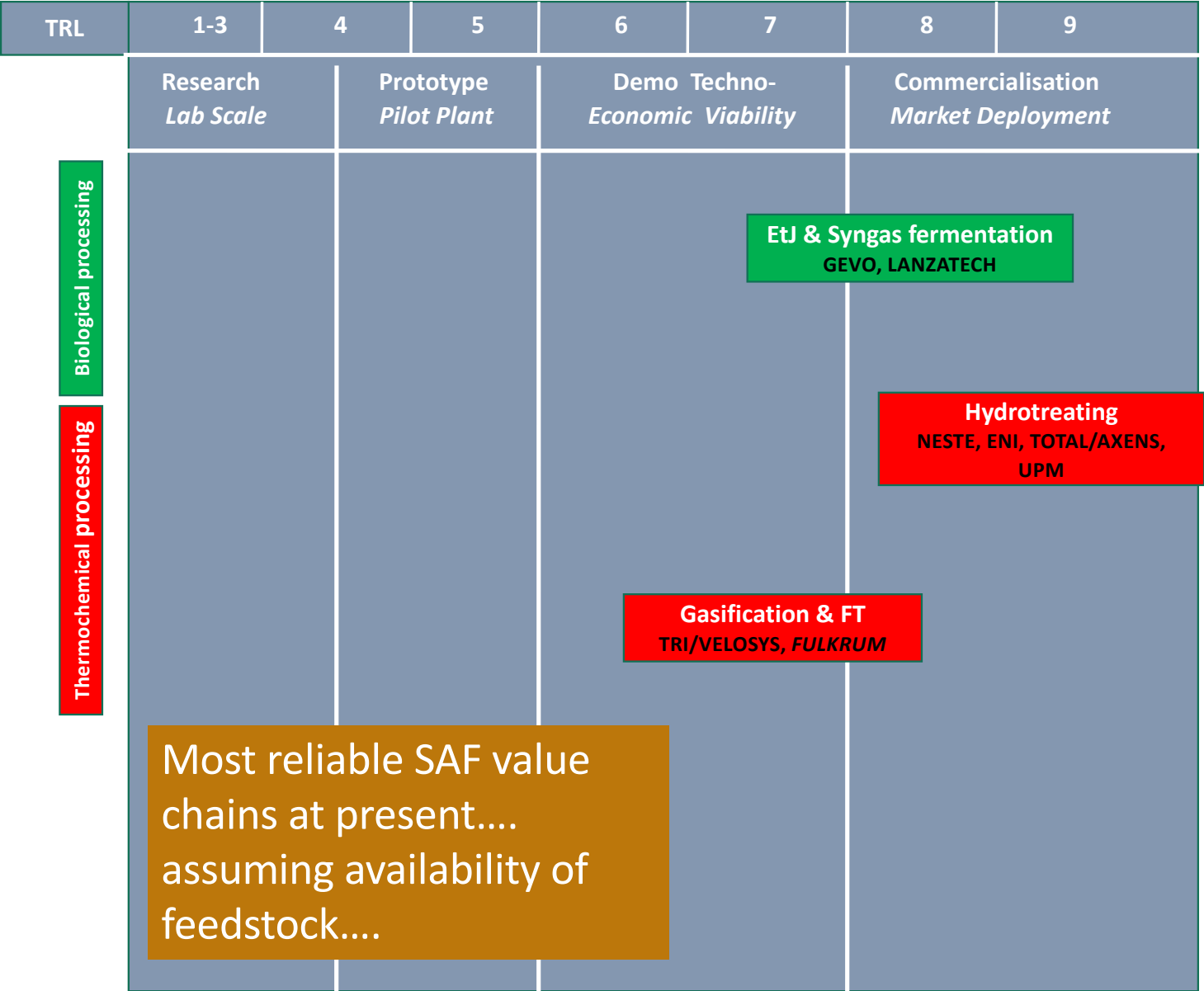


It takes on the average 2-3 years to build such a commercial facility

Status of advanced biomass conversion technologies based on their TRL level

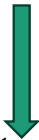


Status of advanced SAF biomass conversion technologies based on their TRL level



Available technologies for advanced biofuels: Hydrotreated oils

NESTE's HVO biorefinery, Poorvo, Finland



NESTE's HVO plant, Rotterdam



NESTE is global leader
(2,700,000 t/y)

UPM tall oil, works on
Brassica carinata oil
(100,000 t/y)

UPM's Lappeenranta Biorefinery plant



ENI's Green Refinery Project, Venice



ENI: 375,000 t/y

TOTAL's La Mède Biorefinery



TOTAL: 500,000 t/y

Available technologies for advanced biofuels: Cellulosic ethanol

Biochemtex/VERSALIS
Crescentino plant, Italy



Clariant's development plant,
Germany



Clariant's cellulosic ethanol plant
Craiova, Romania



ST1 Kajaani sawdust plant,
Finland



The SEKAB plant Sweden



The AXENS FUTUROL pilot
plant at Pomacle, France



Available technologies for advanced biofuels: Pyrolysis

BTG's Empyro plant, Netherlands



BTG/Preem-Setra in Gävle, Sweden
Coproprocessing



BTG/Green Fuel Nordic, Joensuu, Finland



Pyrolysis oils for boiler and CHP applications is commercial.

Serious efforts in co-processing pyrolysis oils in refineries and upgrading.

Available technologies for advanced biofuels: Gasification

GoBiGas plant in Gothenburg



Göteborg Energi
BioCH₄ from wood

AXENS BioTfuel pilot plant in Dunkerque



Torrified biomass
to BTL

Enerkem Plant in Edmonton, Canada



Sorted MSW to
methanol/ethanol

LTU Green Fuels' plant in Piteå



Black liquor to
bioDME

Only ENERKEM & AXENS at present are active in commercial deployment. Little commercial activity for the demo plants.

Fischer-Tropsch production still in progress

Thank you for your attention

