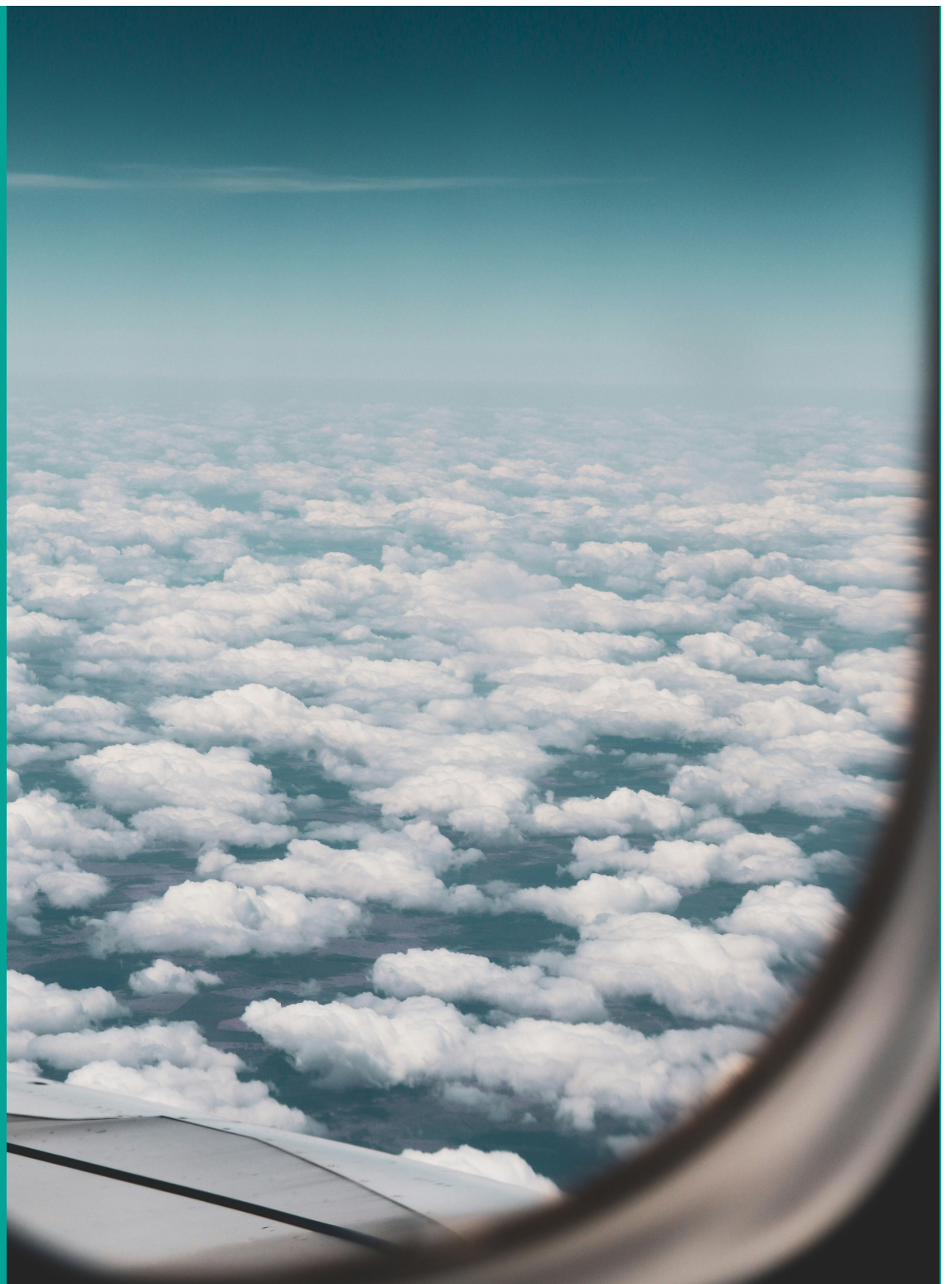




Global
Bioenergies

IBN-SPK: a new, ASTM-
certified route to SAF

24 January 2024



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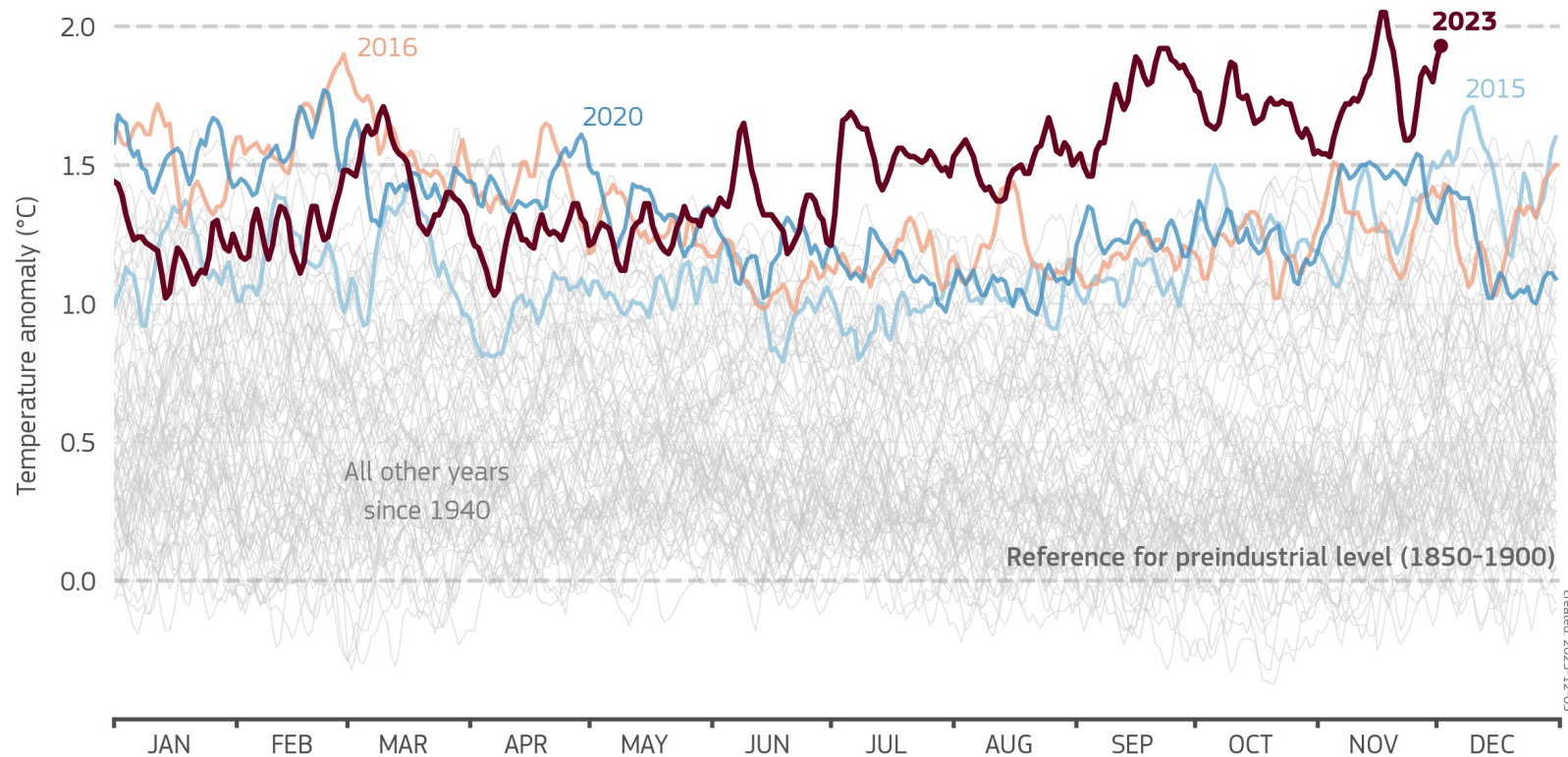
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Global warming is accelerating

DAILY GLOBAL SURFACE AIR TEMPERATURE ANOMALY

Data: ERA5 1940–2023 • Reference period: 1850–1900 • Credit: C3S/ECMWF



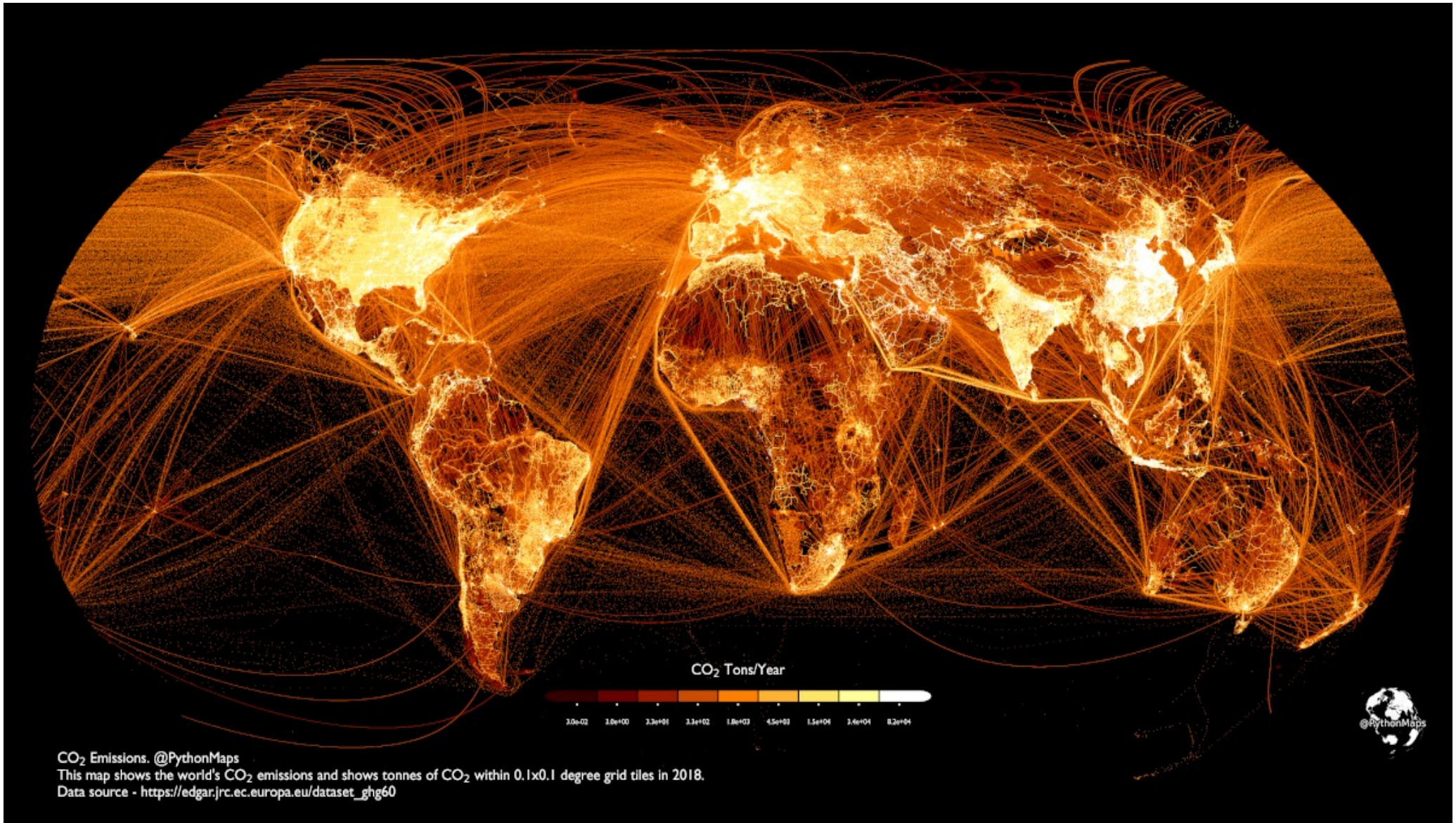
PROGRAMME OF
THE EUROPEAN UNION



Air transportation is responsible of a part of it

Where is the CO₂ emitted? Work by Adam Symington

<https://www.visualcapitalist.com/cp/mapped-carbon-dioxide-emissions-around-the-world/>



GBE at a glance

Our Company

- ✓ Founded in 2008
- ✓ ~50 employees in the Paris area
- ✓ IPO in 2011 - listed on Euronext Growth

Our Bio-Isobutene Process

- ✓ A unique & disruptive gaseous fermentation process
- ✓ Synthetic Biology x Green Chemistry = Deeptech
- ✓ Aim to significantly contribute to cutting CO₂ emissions
- ✓ First commercial plant up and running since S2 2022

Our Purpose

'To foster the environmental transition through biosciences'

Our Products

First renewable isobutene and derivatives

Niche market in the cosmetics

At the core of the transition to sustainable cosmetics

Partnership with L'Oréal



Sustainable Aviation fuels

ASTM-certified



SAF market

EUROPEAN UNION AND UK

1.

Mandated demand in both markets is expected to reach 4.2 Mt (1.5 Bgal) by 2030, excluding demand from voluntary commitments.

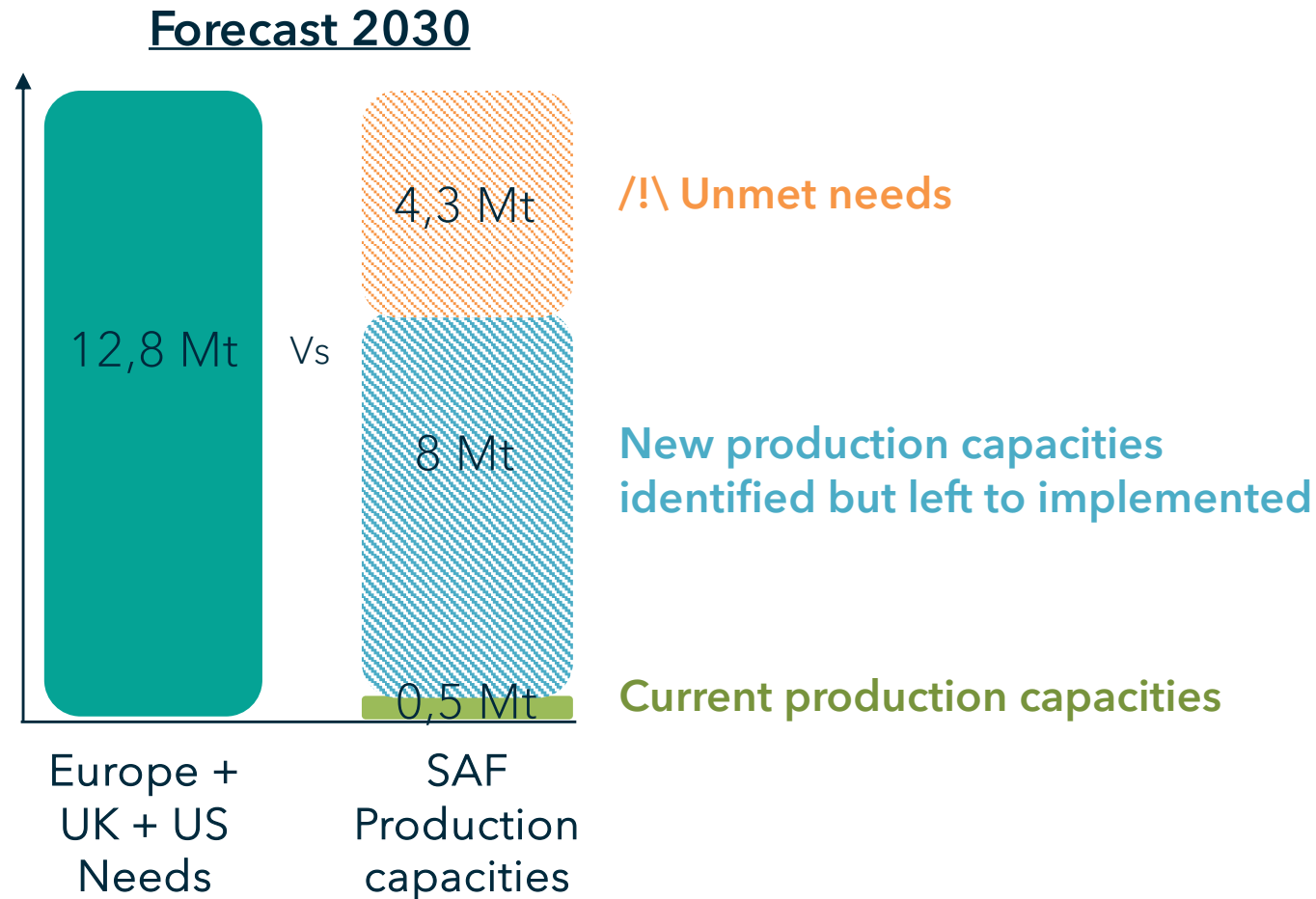
UNITED STATES

1.

Aspirational production of SAF in the United States is 3 Bgal (8.5 Mt) by 2030 and 27–35 Bgal (77–100 Mt) by 2050. Getting on track to meeting these 2050 goals requires a more stable and long-term policy climate for SAF that delivers investment certainty.

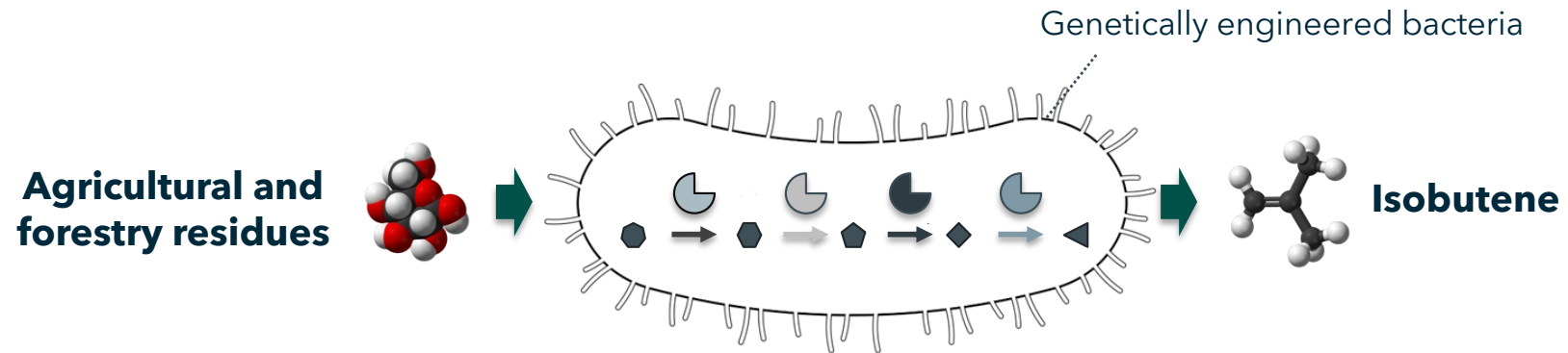
Source: SkyNRG 2023 report

SAF worldwide – additional opportunities for GBE



Source: SkyNRG 2023 report

Our innovative biological process to Isobutene



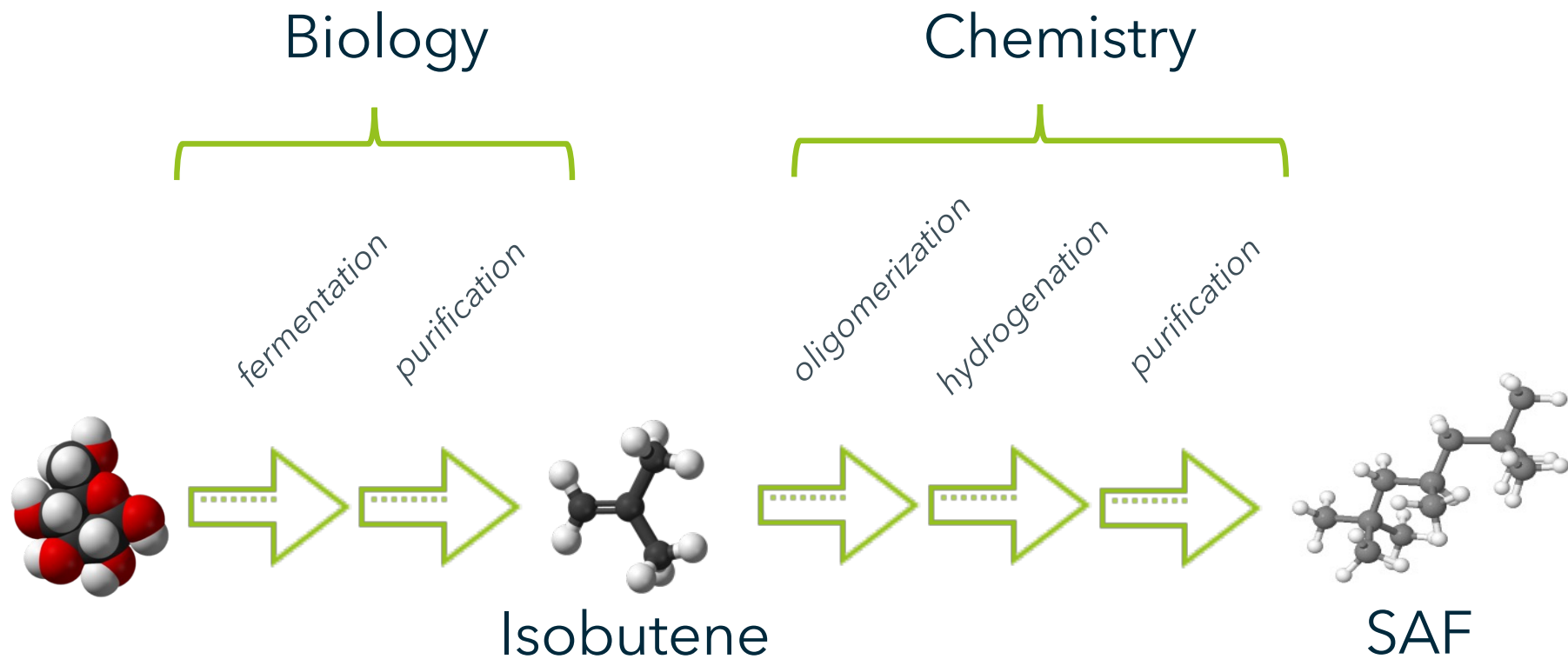
No biological starting point because IBN is not produced by Nature

→ **unique artificial metabolic pathway** - huge technology barrier overcome ; long R&D effort

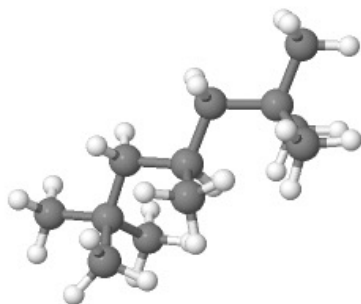
First ever fermentation process to a gas, with solid advantages translating in economics

IP : exclusive rights on a portfolio of >30 patent families

Our process: global picture



Focus on the products



C12/C16 isoalkanes
(= isoparaffins)



Very good cold flow properties
(= does not freeze at low temperature)

Very good combustion properties
(= probably less particles, and thus less contrails. To be further validated)

Branched molecules are very good components for SAF

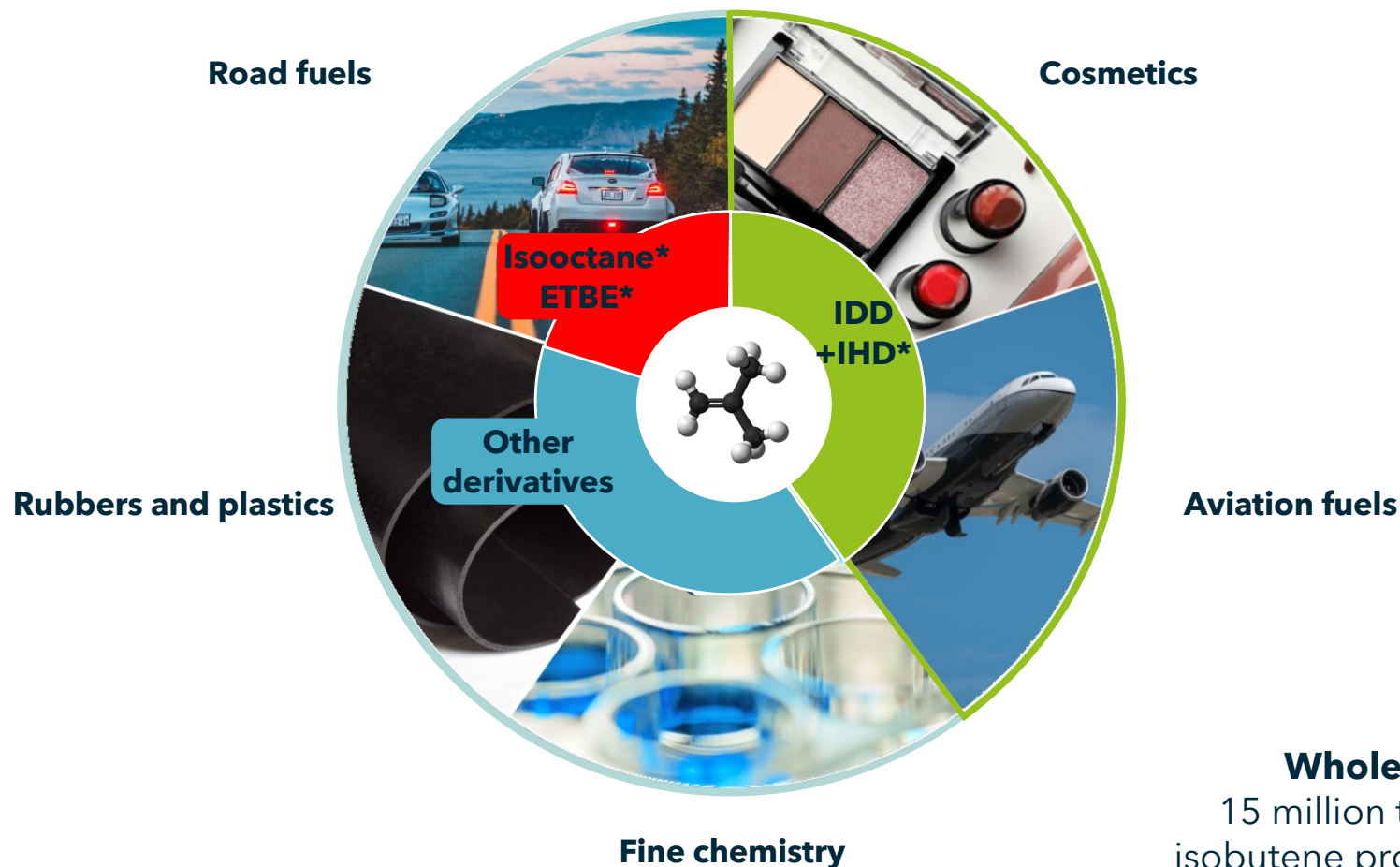
GBE's « IBN-SPK » process

Certified by  in summer 2023

ASTM INTERNATIONAL

incorporated in the « ATJ section »

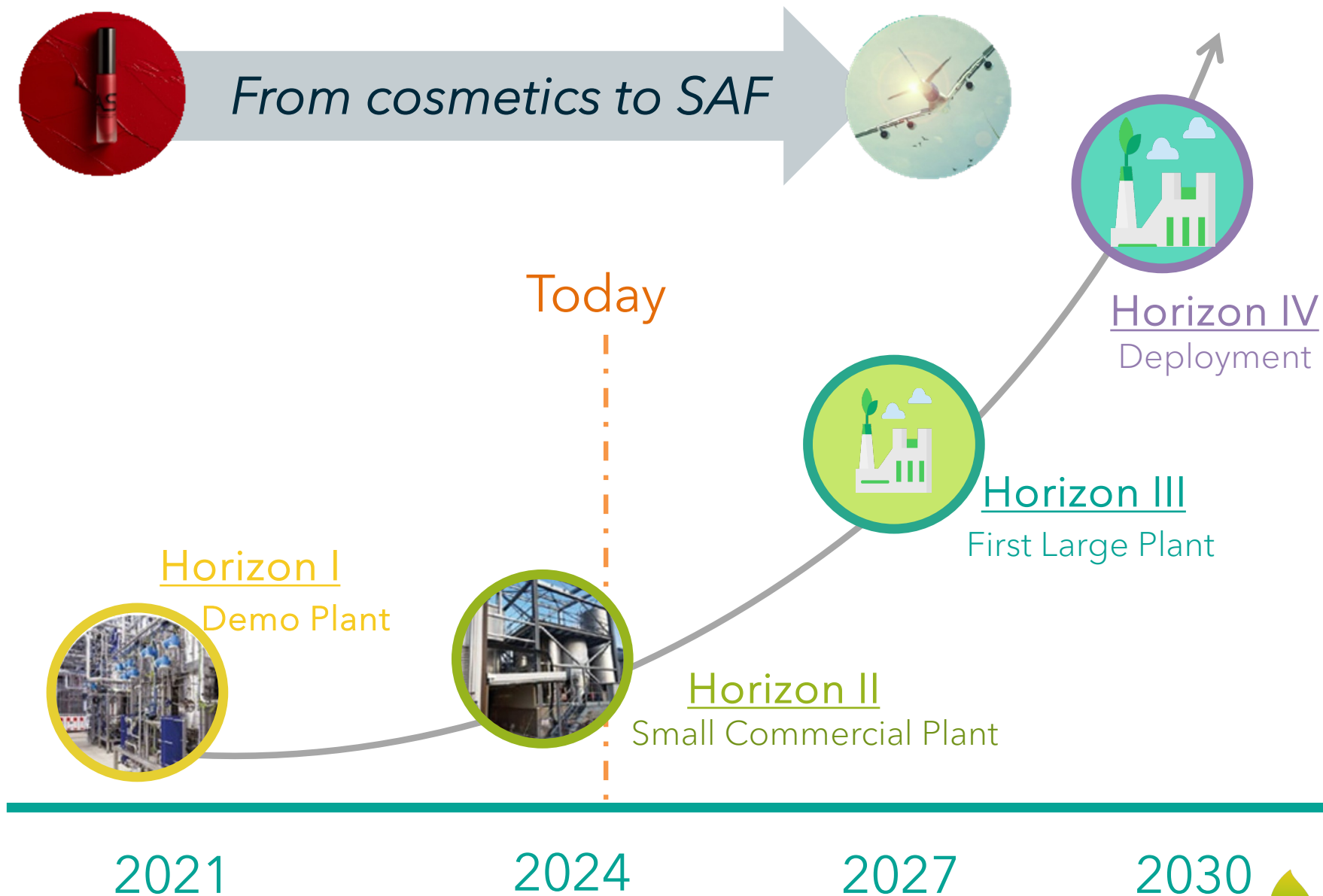
Isobutene product tree (simplified)



Whole market:
15 million tons per year
isobutene produced from oil

* IDD, or isododecane, is obtained by combining isobutene molecules 3 by 3
IHD, or isohexadecane, is obtained by combining isobutene molecules 4 by 4
Isooctane is obtained by combining isobutene molecules 2 by 2
ETBE is obtained by combining isobutene with ethanol

Roadmap



Feedstocks

Abundant first generation
feedstocks:

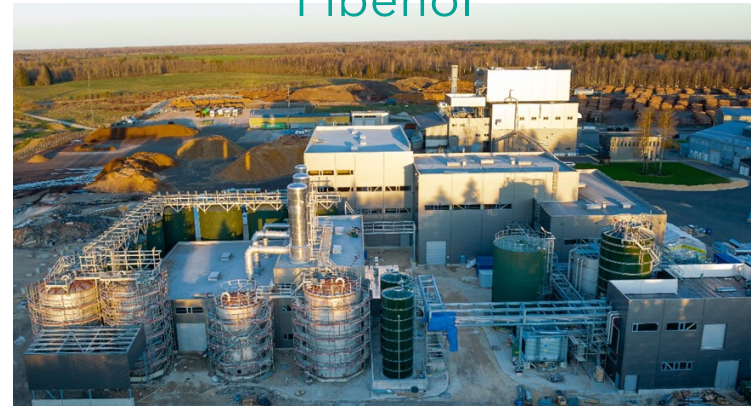
Sugar Beets, wheat and
corn glucose...



Emerging second generation
feedstocks:

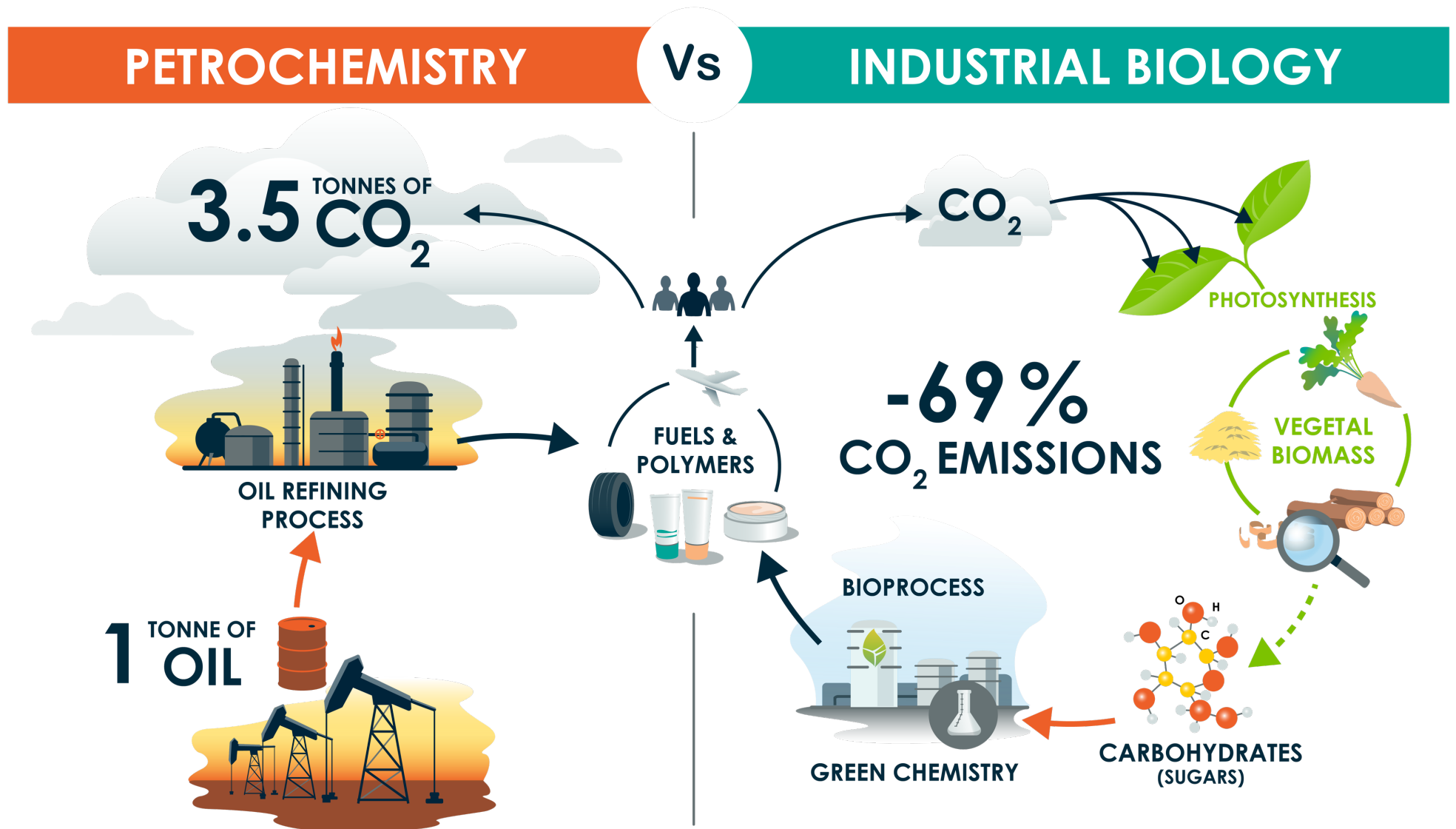
Wood chips

Fibenol



Capacity: 24 kt/y
Start of operation: Q1 2023
Location: Estonia

Preliminary LCA analysis – carbon footprint



Our ecosystem



Financé par
l'Union européenne
NextGenerationEU



Global
Bioenergies



L'ORÉAL
PARIS

CRISTAL UNION





Technology is key but will not be sufficient
to curb global warming by itself

Sobriety comes first to fight climate
change



Thank you for your attention



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