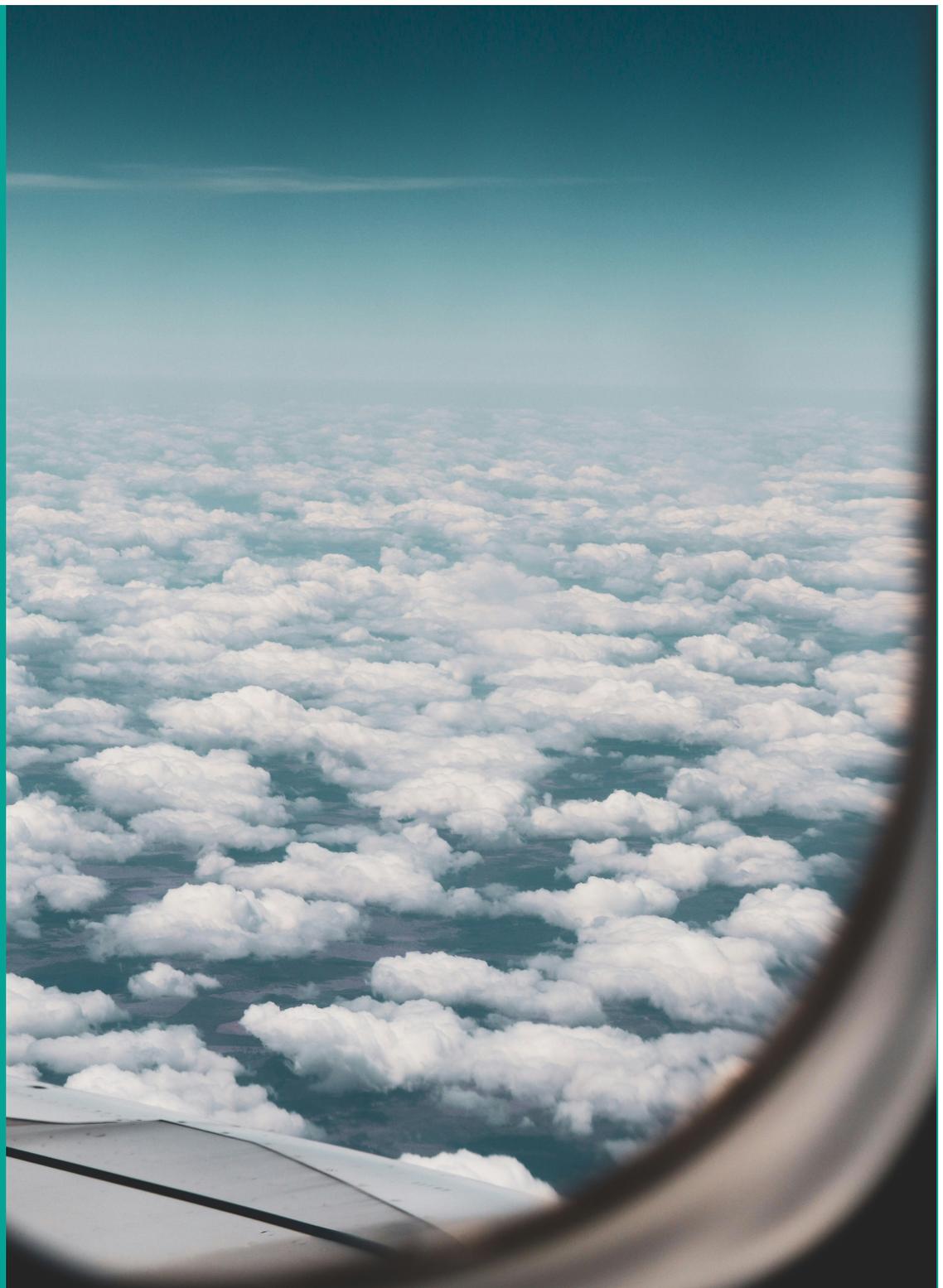




Global  
Bioenergies

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

24 January 2024



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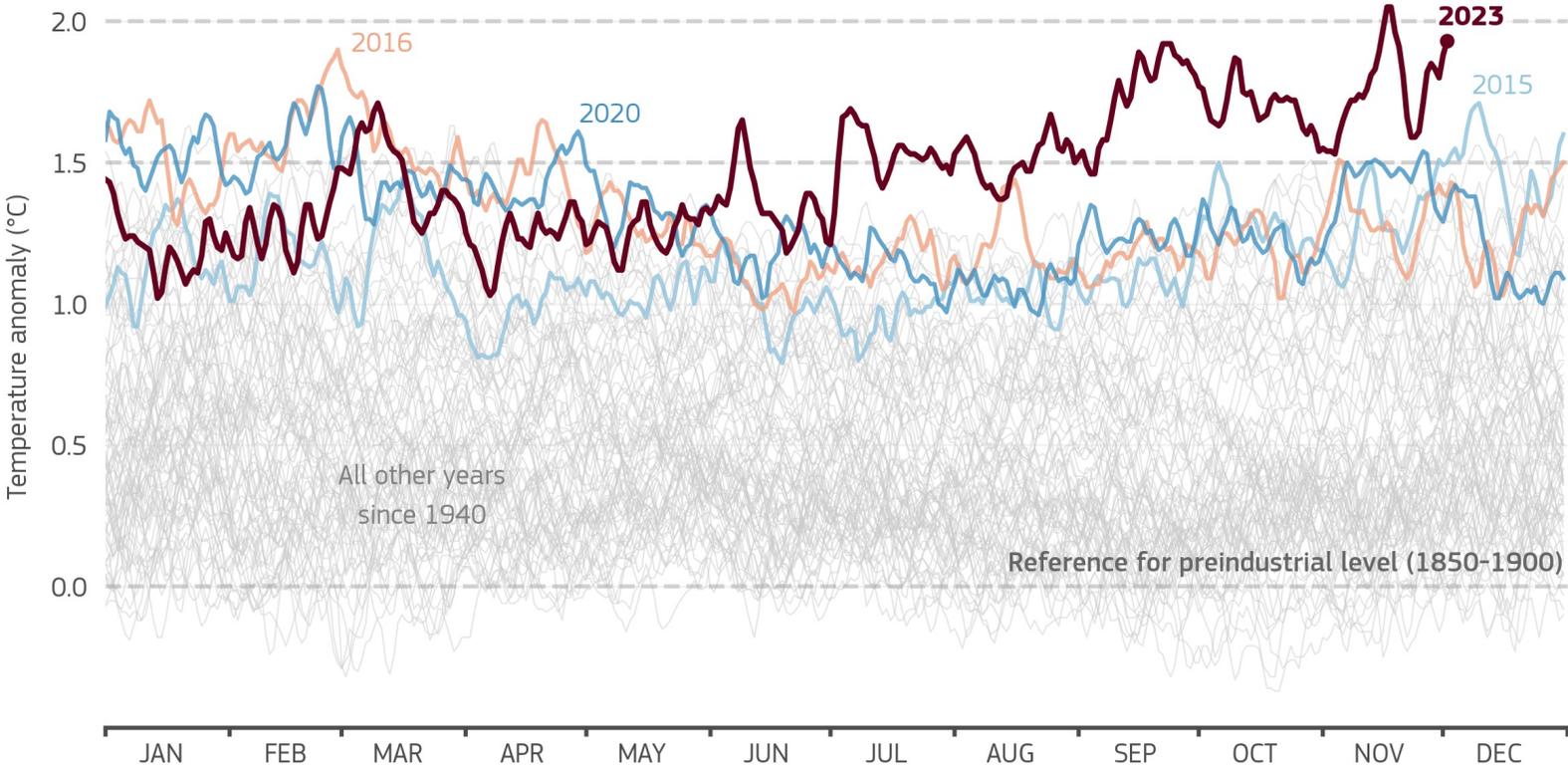
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# Global warming is accelerating

## DAILY GLOBAL SURFACE AIR TEMPERATURE ANOMALY

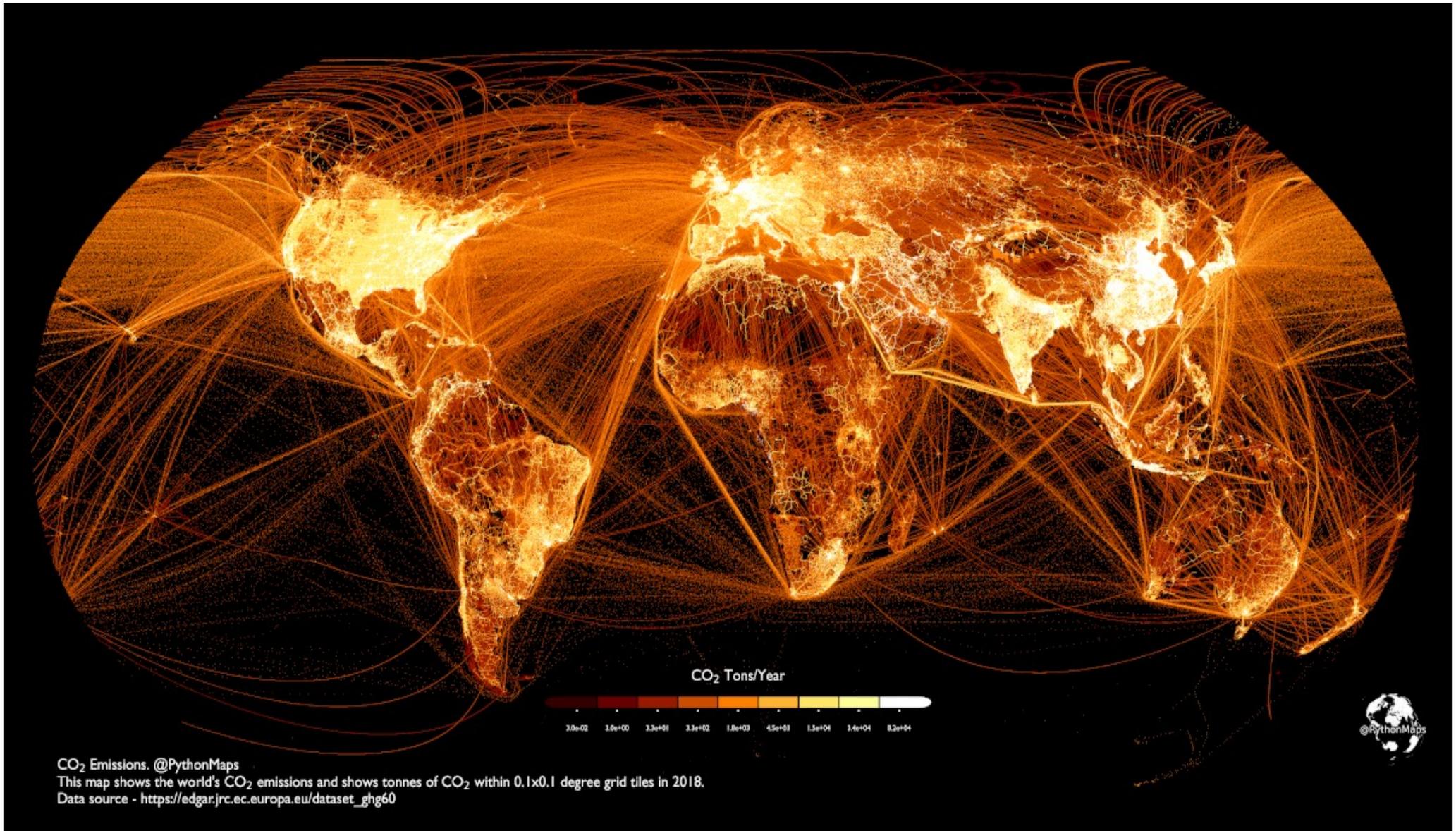
Data: ERA5 1940–2023 • Reference period: 1850–1900 • Credit: C3S/ECMWF



# Air transportation is responsible of a part of it

Where is the CO<sub>2</sub> emitted? Work by Adam Symington

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



# GBE at a glance

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## 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 CO<sub>2</sub> 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

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## **EUROPEAN UNION AND UK**

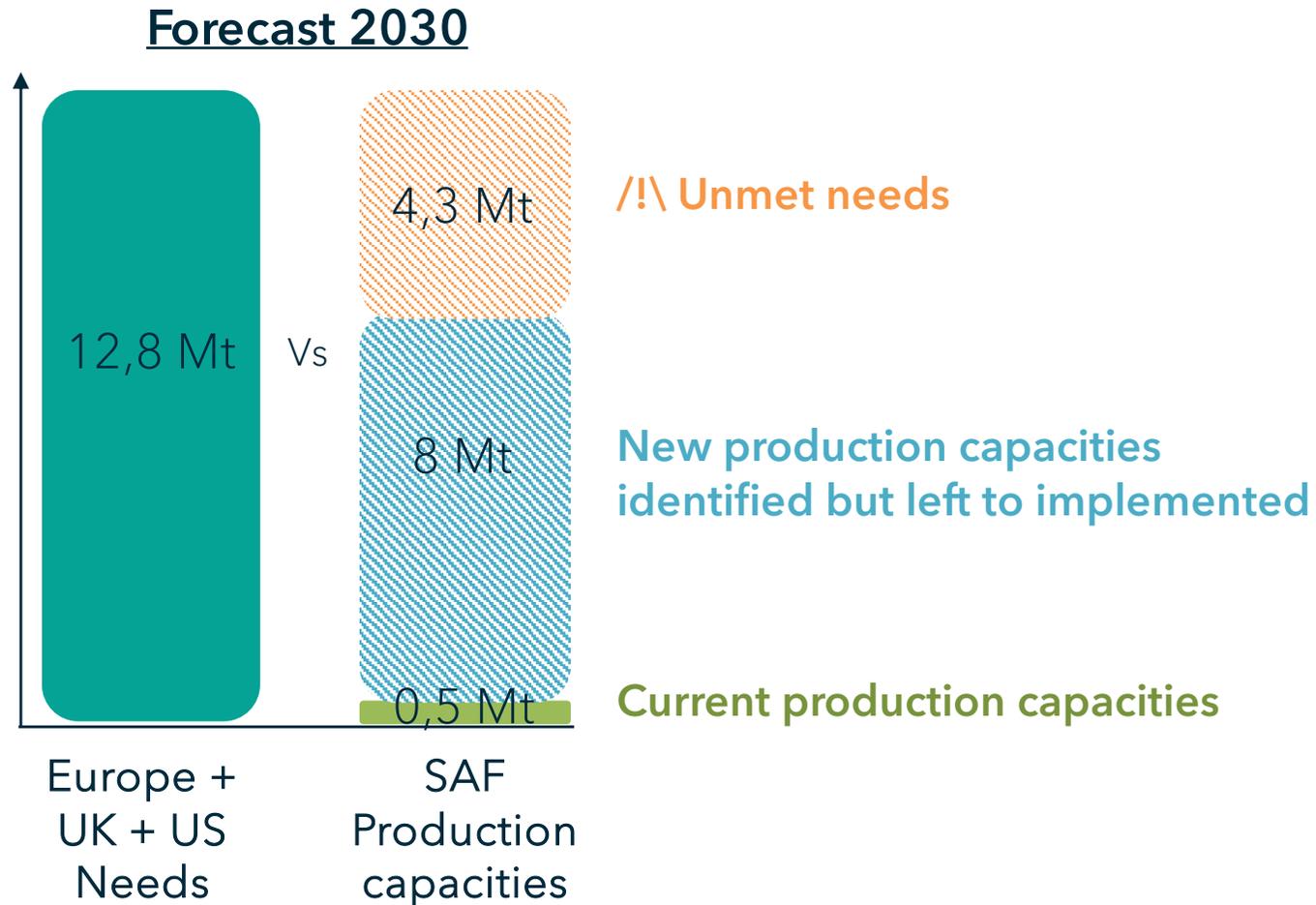
1. Mandated demand in both markets is expected to reach 4.2 Mt (1.5 Bgal) by 2030, excluding demand from voluntary commitments.

## **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.

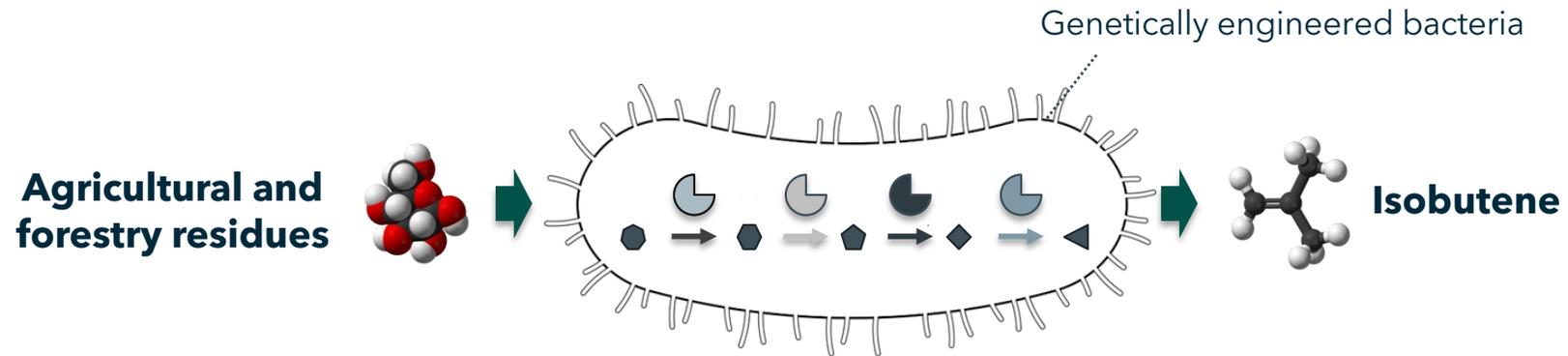
Source: SkyNRG 2023 report

# 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

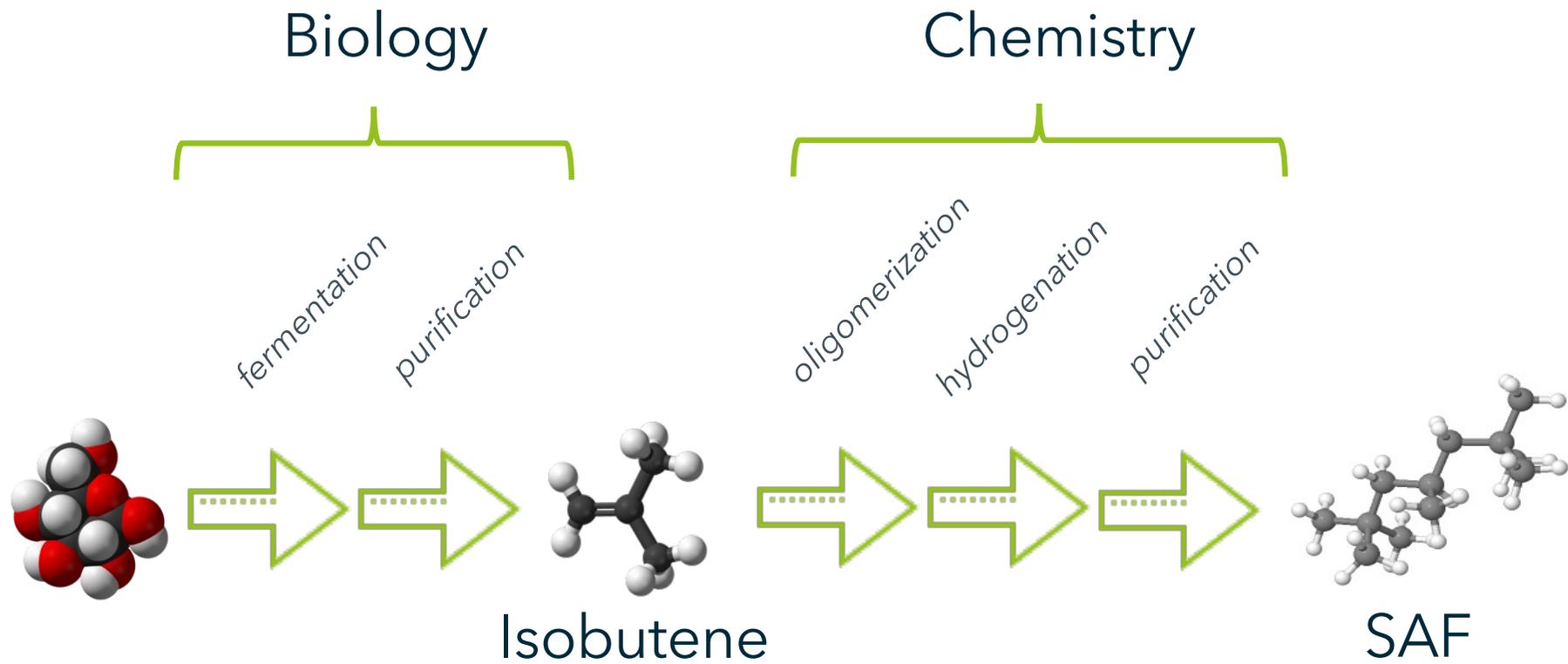
→ **unique artificial metabolic pathway** - huge technology barrier overcome ; long R&D effort

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

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

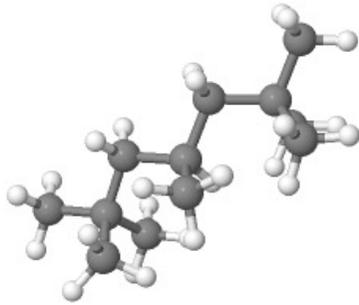
# Our process: global picture

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# Focus on the products

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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

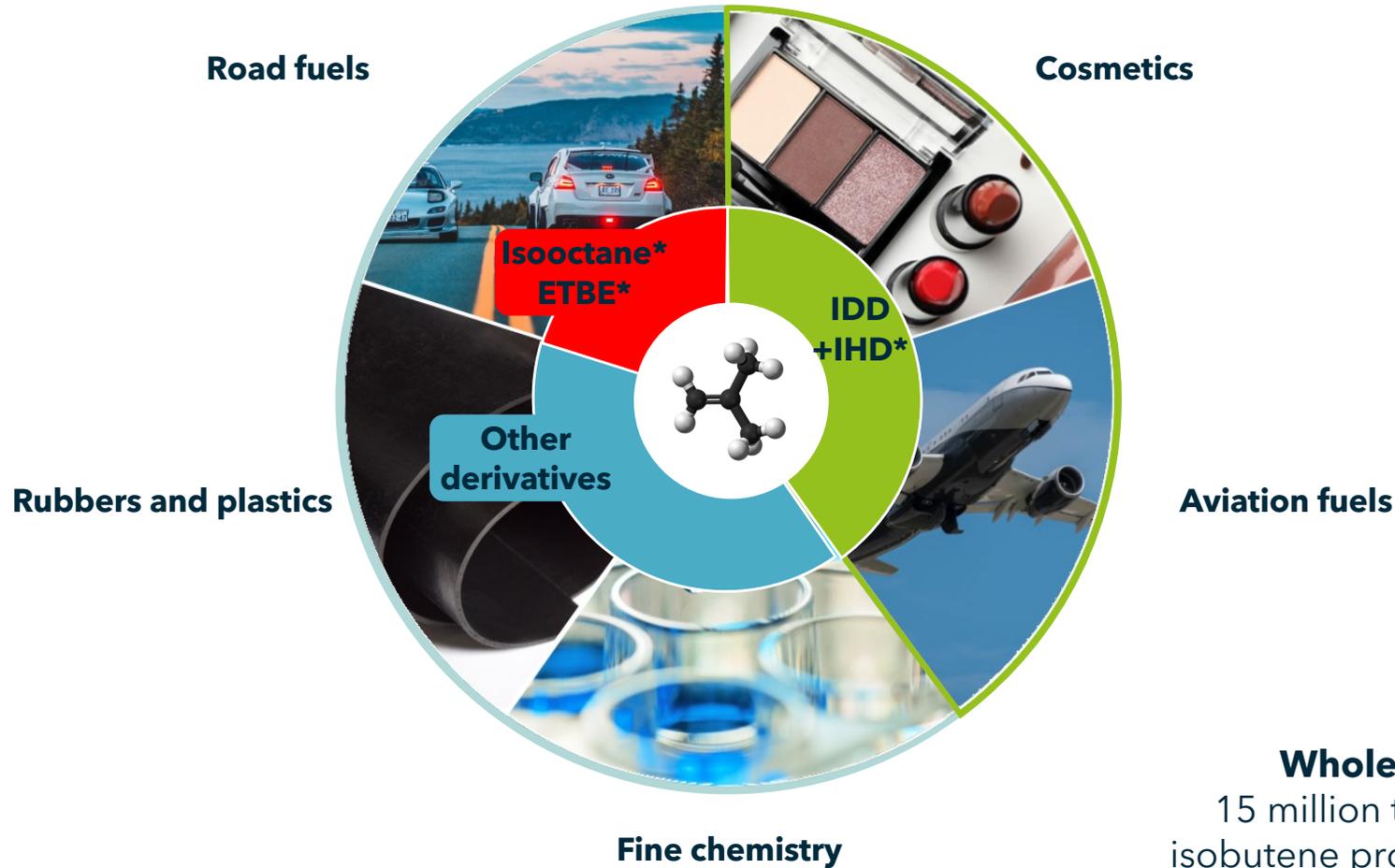
# GBE's « IBN-SPK » process

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Certified by  in summer 2023  
ASTM INTERNATIONAL

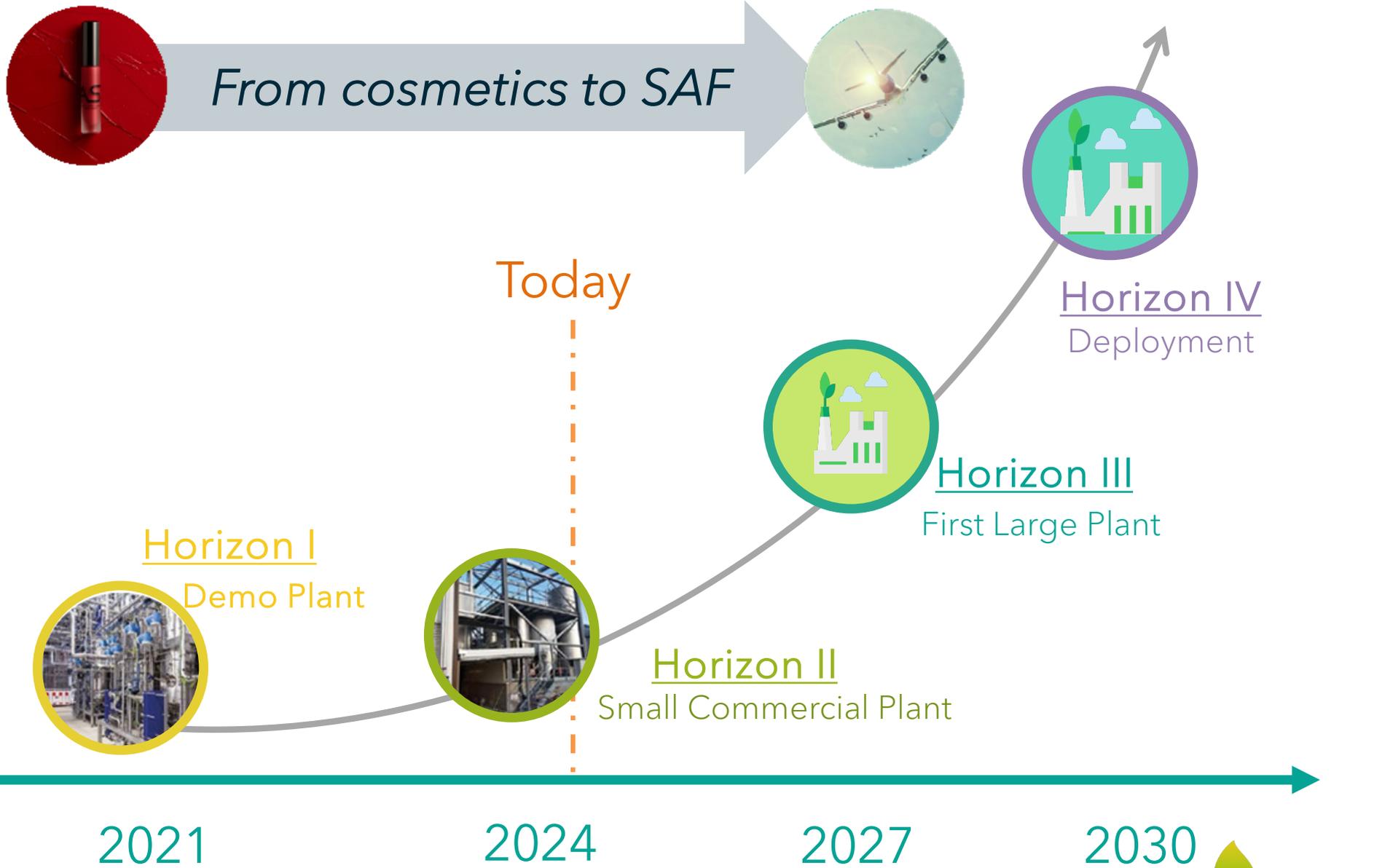
incorporated in the « ATJ section »

# Isobutene product tree (simplified)



\* 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

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Abundant first generation feedstocks:

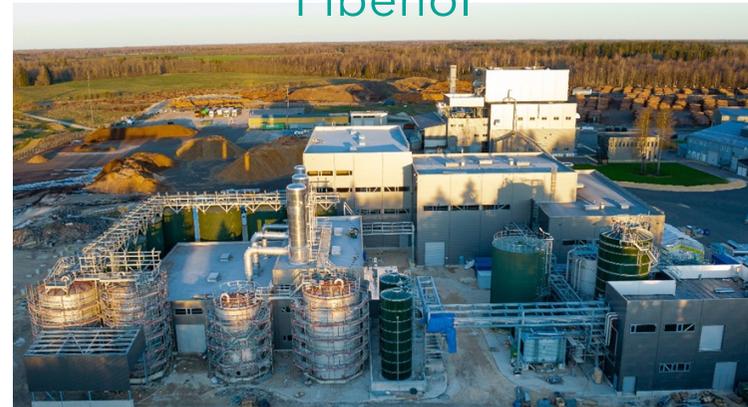
Sugar Beets, wheat and corn glucose...



Emerging second generation feedstocks:

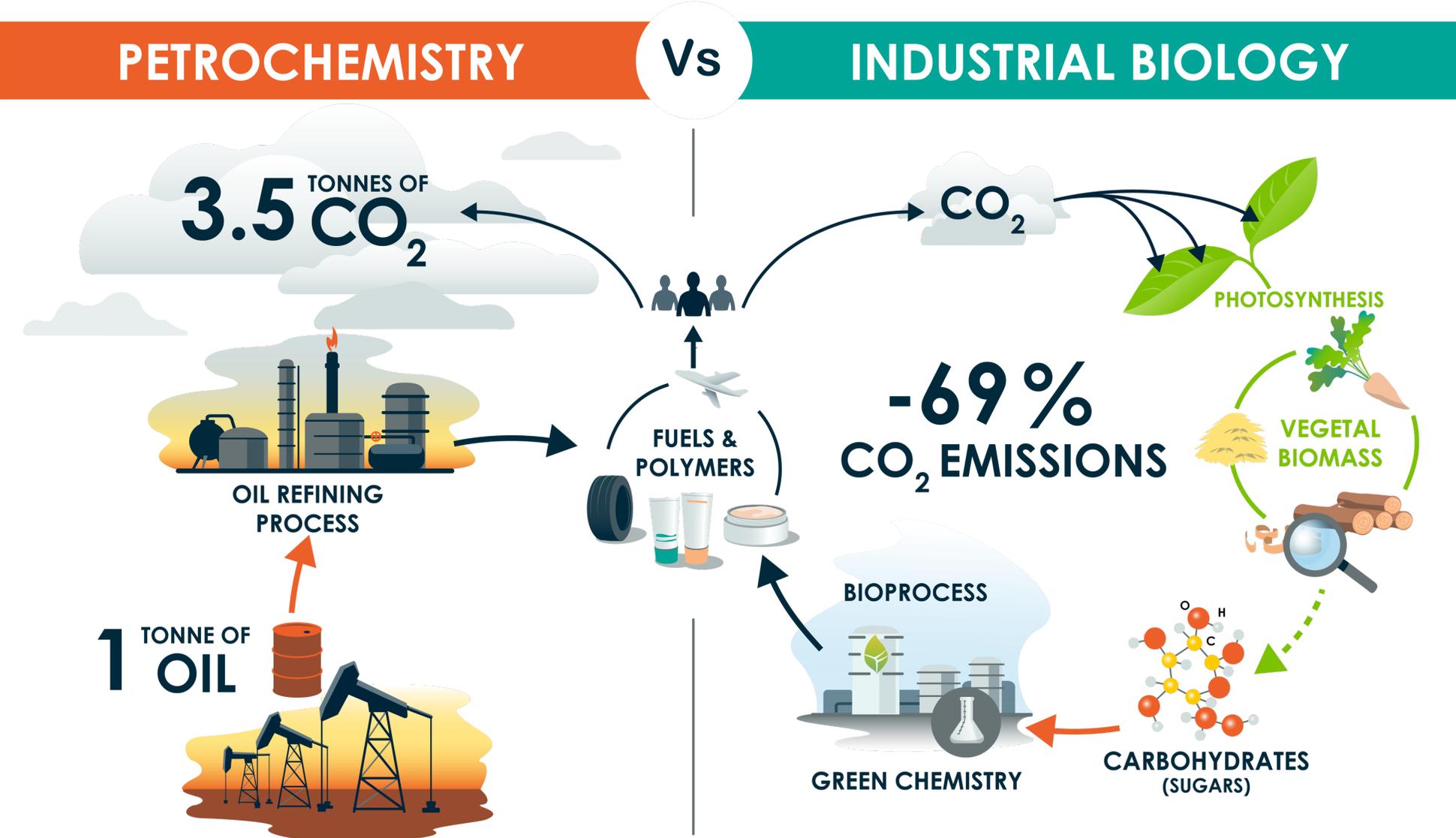
Wood chips

Fibenol



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

# Preliminary LCA analysis – carbon footprint



# Our ecosystem

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Financé par  
l'Union européenne  
NextGenerationEU



Global  
Bioenergies



L'ORÉAL  
PARIS



A white commercial airplane is flying through a blue sky with scattered white clouds. The plane is positioned on the left side of the frame, flying towards the right. The sky is a mix of light blue and white, with the clouds being soft and fluffy. The overall scene is bright and clear.

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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