



Global  
Bioenergies

A growing player of the  
environmental transition

*20 September 2023*

Euronext Paris: ALGBE





Our purpose

Foster the  
environmental  
transition through  
biosciences

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## Our vision



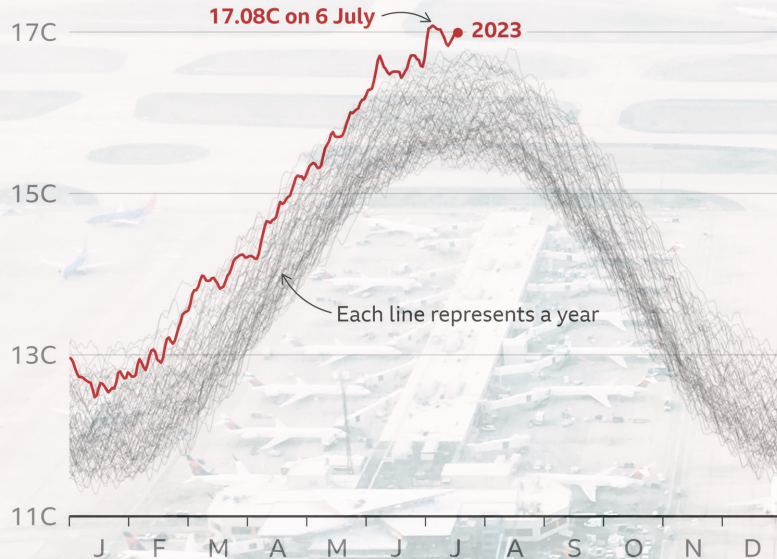
Marc Delcourt  
CEO & co-founder



Samuel Dubruque  
CFO

## Hottest day on record globally

Daily average air temperature, 1940-2023



Note: Temperature data for 19 July 2023 is preliminary

Source: ERA5, C3S/ECMWF

BBC

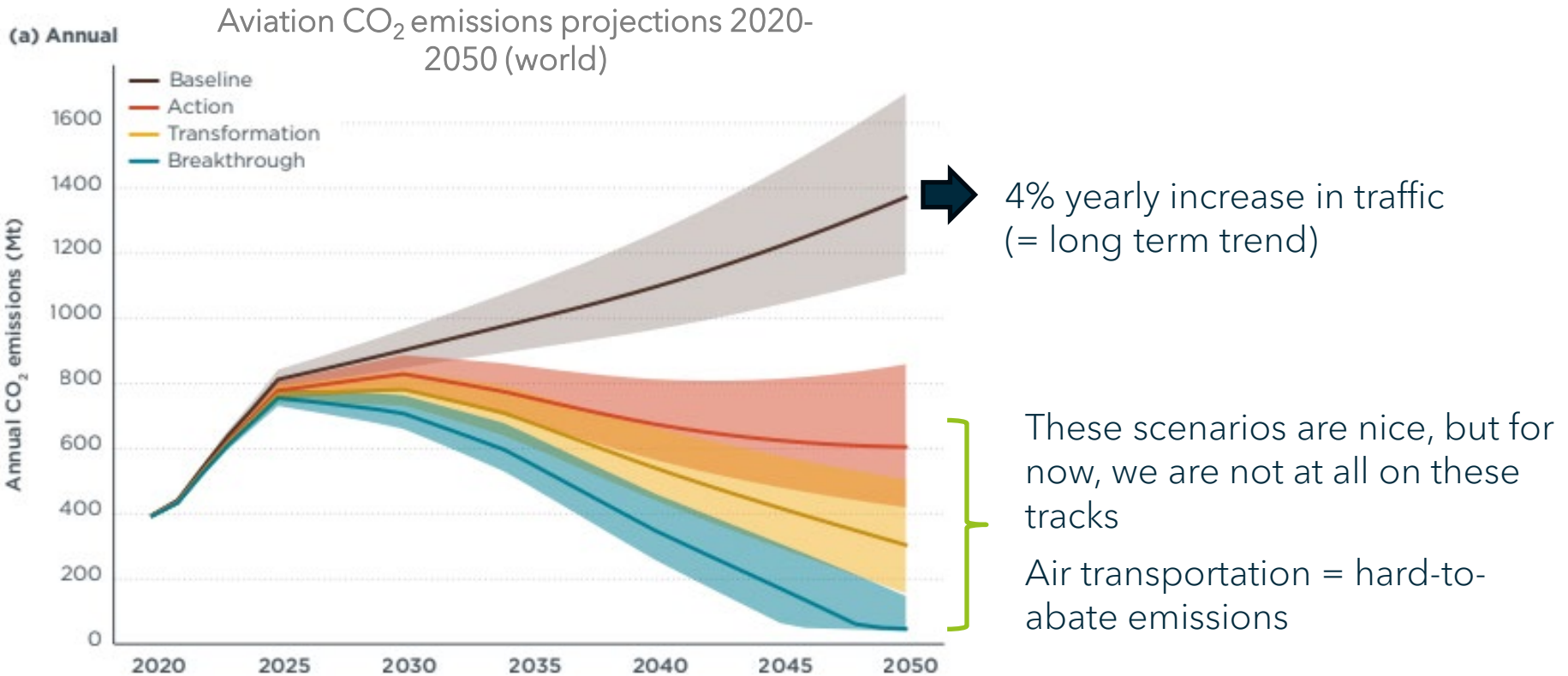
Surprisingly, 6 July 2023 also broke the number of flights in one single day

→ We witness the acceleration of global warming we don't act

# Air transport footprint - A major issue...

Today, air transportation accounts for ~3% of global CO<sub>2</sub> emissions

CO<sub>2</sub> + contrails → responsible of 6% of global warming



# Air transportation faces an existential crisis



=11 tons  
CO<sub>2</sub>

Annual carbon footprint  
of each European  
citizen



1 Paris-New York round trip  
= 2 tons CO<sub>2</sub>  
emissions per  
passenger



The first lever to  
reduce carbon  
footprint is cancel  
unnecessary  
flights








Anne Rigail, CEO at Air France, the largest Sustainable Aviation Fuels (SAF) purchaser worldwide:

« We hope that new technologies and SAF massification will limit the cost increase per travel, and thus prevent air transportation revert to niche market, as it was before the 90s. »

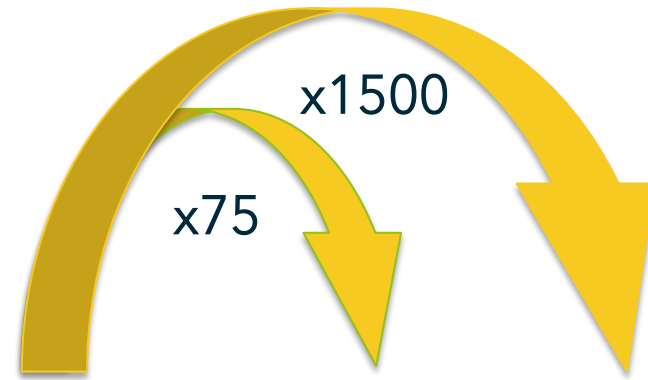
Interview to *L'Usine Nouvelle*, June 2023

# Solutions to reduce CO<sub>2</sub> emissions/km

	Technology	Feedstock	Maturity	Deployment	
SUSTAINABLE AVIATION FUELS	Hydrotreated Esters and Fatty Acids (HEFA)	Waste and residue lipids, vegetable oils, palm, and used cooking oil		Technology already implemented at large scale but not scalable due to feedstock availability & logistical constraints	2025
	Fischer Tropsch (FT)	Municipal solid waste, coal, ash, and sawdust		Financing of the first large scale plant projects ongoing	2030
	Fermentation: ATJ-SPK or IBN-SPK	Sugarcane, sugar beet, sawdust, plant dry matter (biomass)		Financing of the first large scale plant projects ongoing	2030
	Power-to-Liquid (PtL) E-fuels	CO <sub>2</sub> , water, renewable Electricity		First small scale pilot plants starting	2035
	Electricity and hydrogen	N/A		Not drop in : new equipment & new infrastructure needed → huge investments  Consensus in the aviation that it will not happen except for small planes/short haul maybe	2050+



# ...And an exponential demand



Million tons/yr	2019	2020	2021	2022
SAF output	0,02	0,05	0,08	0,24
Global Jet Fuel	288	157	182	254
% SAF	<0,01%	0,03%	0,04%	0,1%

Up to now

Only 0,1% of global fuel consumption  
 → Up to now, SAF are a drop in the ocean!

2030	2050
18	380
350	760
5%	50%

As of tomorrow

→ SAF upcoming needs are gigantic and require a complete change of scale

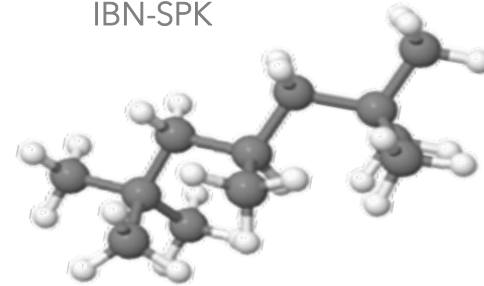
# Our solution: IBN-SPK a new, innovative SAF technology

## Technology

- ✓ Technical feasibility proven
- ✓ Small number of industrial steps
- ✓ Protected by 40 patent families
- ✓ Compatible with several feedstocks



IBN-SPK



## Product

- ✓ Cut CO<sub>2</sub> emissions & maintain performance  
→ *no compromise*
- ✓ Very good cold flow properties  
→ *does not freeze even at very low temperature*
- ✓ Very good combustion properties  
→ *potential reduction in particles, meaning less contrails and thus less global warming*

⇒ Best in class products obtained through the most direct technology

# What we have accomplished



Frédéric Ollivier  
Technology Director

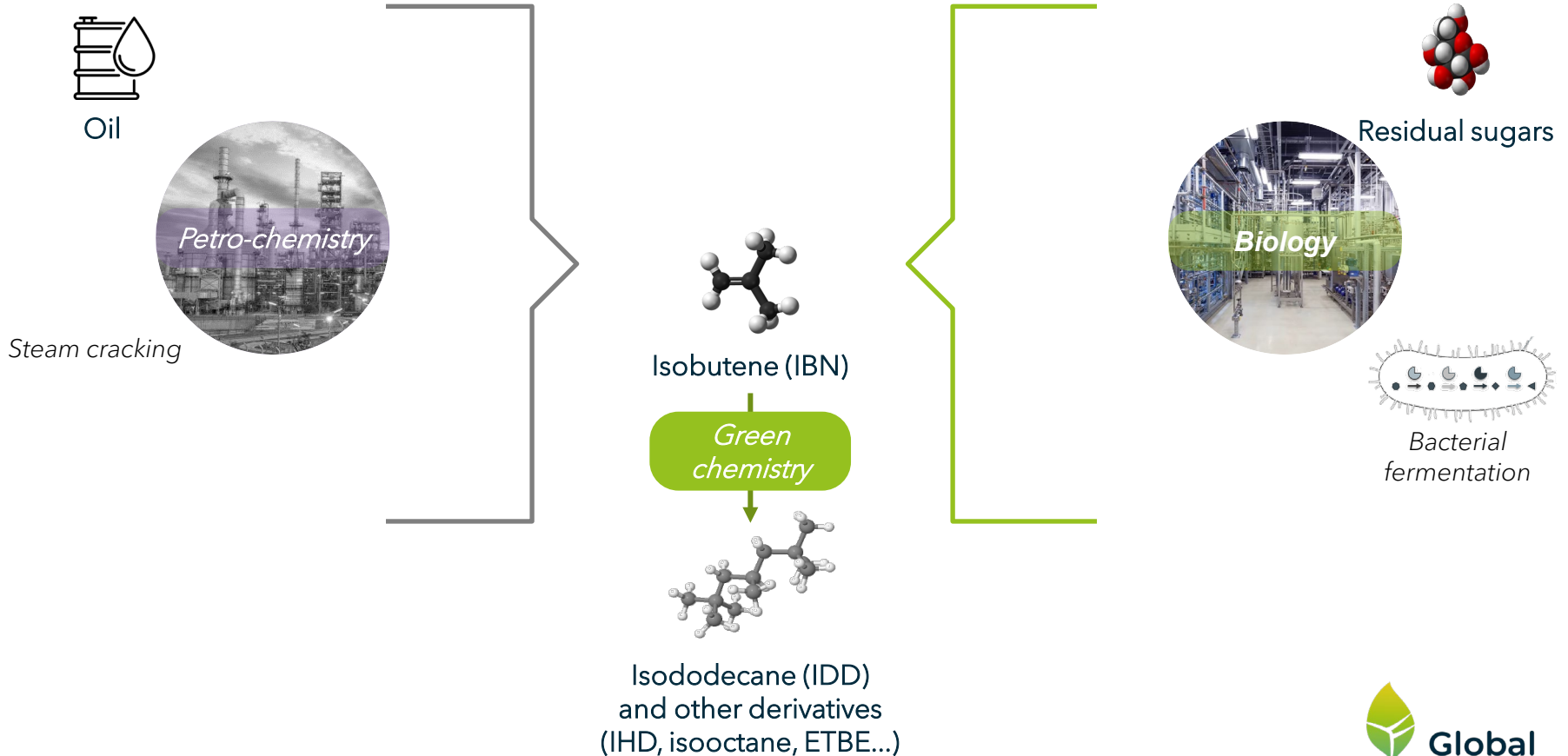
# Process

Current widespread process

VS.

GBE's bio-sourced process

*Unique technology protected by 40 patent families*



# Why isobutene?

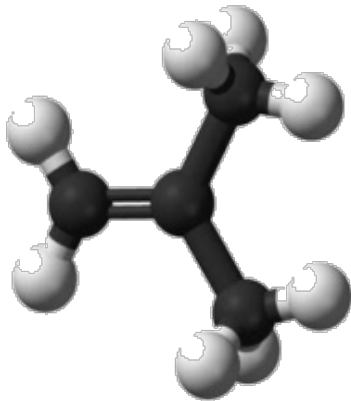
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The smallest branched (=non linear) carbon structure.

Gaseous

Easily converted into numerous compounds bringing various performances:

- octane rating for gasoline
- air tightness for elastomers
- volatility for cosmetic oils
- cold flow resistance for jet fuel
- ...

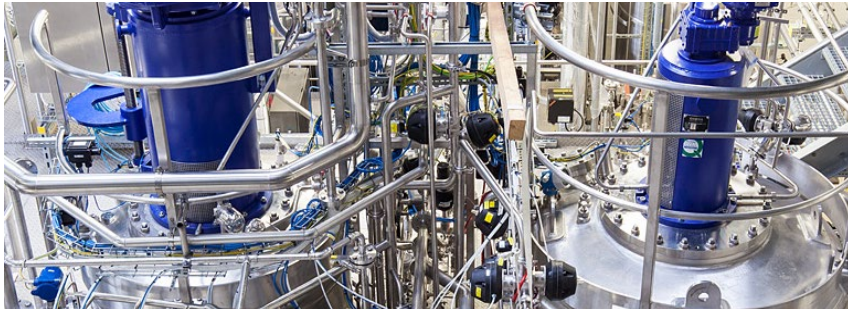


These performances directly rely on the branched structure of isobutene

Isobutene is not produced in Nature → our process is the only way to access these performances in a sustainable way

# Industrial scale

Demoplant  
(2017)



Leuna, Germany

&



Semi-works  
(2022)

Pomacle, France

Production sold on niche markets of cosmetic ingredients

**ISONATURANE®**

- ✓ Proprietary make up brand LAST®, first ever long lasting & natural ([www.colors-that-last.com](http://www.colors-that-last.com))
- ✓ Ingredients qualified by multiple major cosmetic players (brands, CDMOs, distributors)
- ✓ First tons sold and delivered to several clients among which L'Oréal

€ thousands	from 01/01/23 to 30/06/23	from 01/01/22 to 30/06/22	from 01/01/21 to 30/06/21
Revenue	3,102	144	33
Net profit (loss)	-4,084	-5,759	-7,621

# Infrastructure to reach SAF performances

A seasoned R&D team

powering a unique “gas-fermentation oriented”  
Laboratory

& a pilot plant to scale up improved versions of  
the process



## Objectives

Continuous productivity improvements

Bring cost as low as possible to  
address SAF markets (expected ~5€/kg)

# ASTM certification



ASTM certification is mandatory for all fuels used in the aviation industry

Very few SAF technologies have been certified so far  
-> *extensive and lengthy process reviewed by all the major players*

Global Bioenergies's process has been certified in June 2023

Technologies certified		
Oleochemical path	Biochemical path	Thermochemical path
HEFA-SPK (50%)*	ATJ-SPK (50%)	FT-SPK (50%)
HH-SPK (10%)	SIP (10%)	FTSPKVA (50%)
Co-processing HEFA (5%)	<b>IBN-SPK (50%)</b>	Co-processing FT (5%)
CHJ (50%)		



# What's next?



Marc Delcourt  
CEO & co-founder



Roland Desvignes  
Industrial Director

# 10kt plant

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Start of production 2027	Location France
Capacity 10k tons/year	Financing under process

## An evolutive plant

Potential to address several markets  
→ Starting in cosmetics, and moving up to SAF

Compatible with multiple resources:

- 1<sup>st</sup> generation feedstocks (sugar beet, starch...)
- Emerging 2<sup>nd</sup> generation feedstocks (sugars from wood chips, straw, bagasse...)

# Technology deployment

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The first large plant is the Showcase. High level of replicability



Compatibility with several feedstocks among various geographies



Discussions with numerous international stakeholders (investors, industrialists, offtakers...)



Flexible Business model from proprietary project development to joint-ventures and licensing...



Potential combination with other technologies such as e-fuels to enhance their performance



Additional potential markets left to be addressed: pneumatics, fragrances..

⇒ Huge technology deployment potential



# Markets



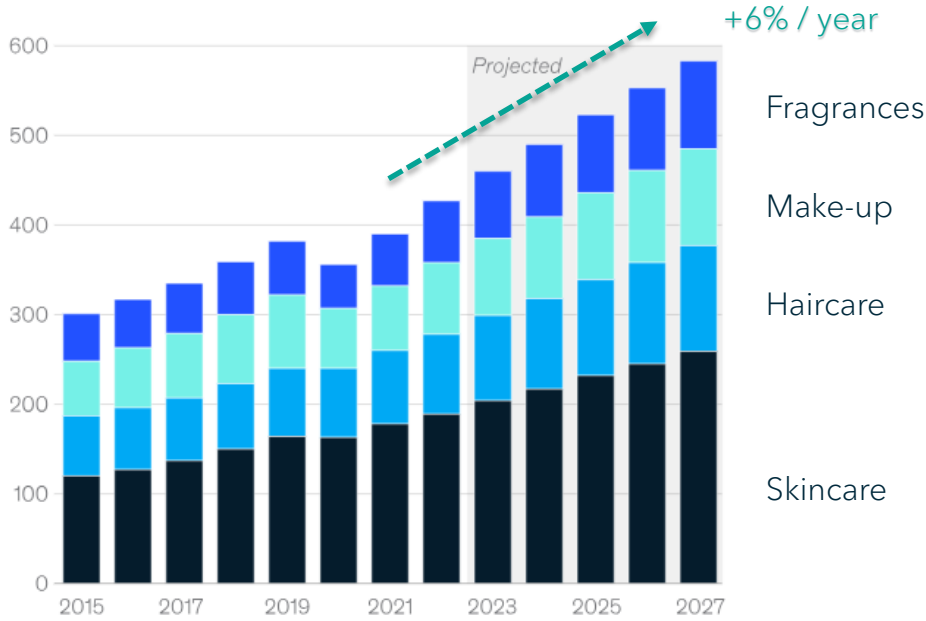
Daphné Galvez  
Head of Sales



Bernard Chaud  
Industrial Strategy  
Director

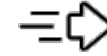
# Cosmetics

Global beauty market retail sales, by category, \$ billion



Source: Euromonitor; McKinsey analysis; McKinsey Global Institute analysis

Reliance on  
IDD/IHD



Fragrances

Make-up

Haircare

Skincare



A worldwide massive growing market (\$580 billion in 2027)

isobutene derivatives massively used in 4 of the 5 segments

naturalness is the key driver for a majority of consumers

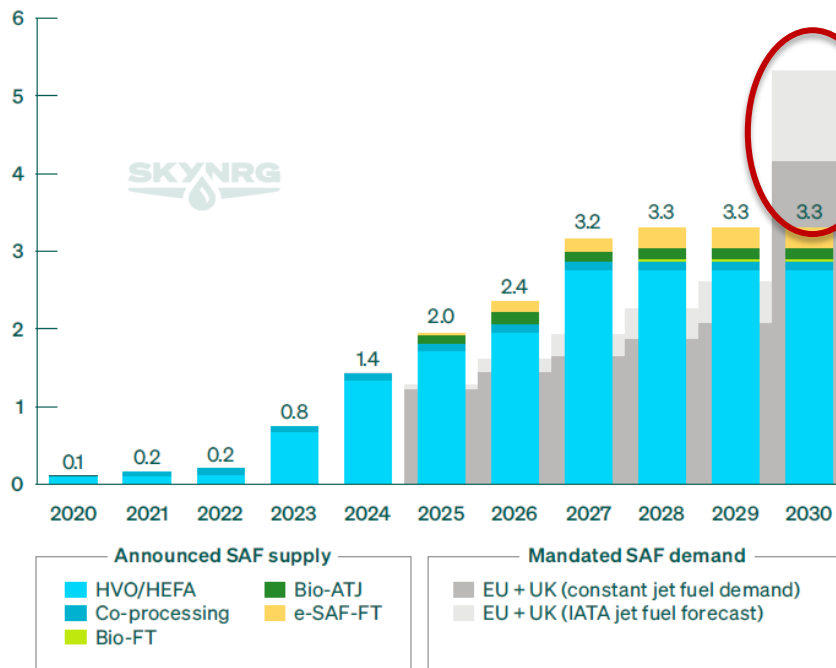
## ISONATURANE®

- ✓ First renewable IDD and IHD cosmetics quality
- ✓ 100% naturally derived (ISO 16 128)
- ✓ Key substitute to synthetic IDD/IHD and silicone D5
- ✓ Bring naturalness & maintain performance
- ✓ Significant market in the cosmetics : tens of thousand tons

# SAF in Europe

More announcements or imports are needed to close 'supply gap' in 2030\*

SAF capacity EU + UK (Mt)



Unmet need Europe 2030  
1 000 to 2 000kT

EU legislation: RefuelEU  
(voted in Sept 2023 at the  
European Parliament)

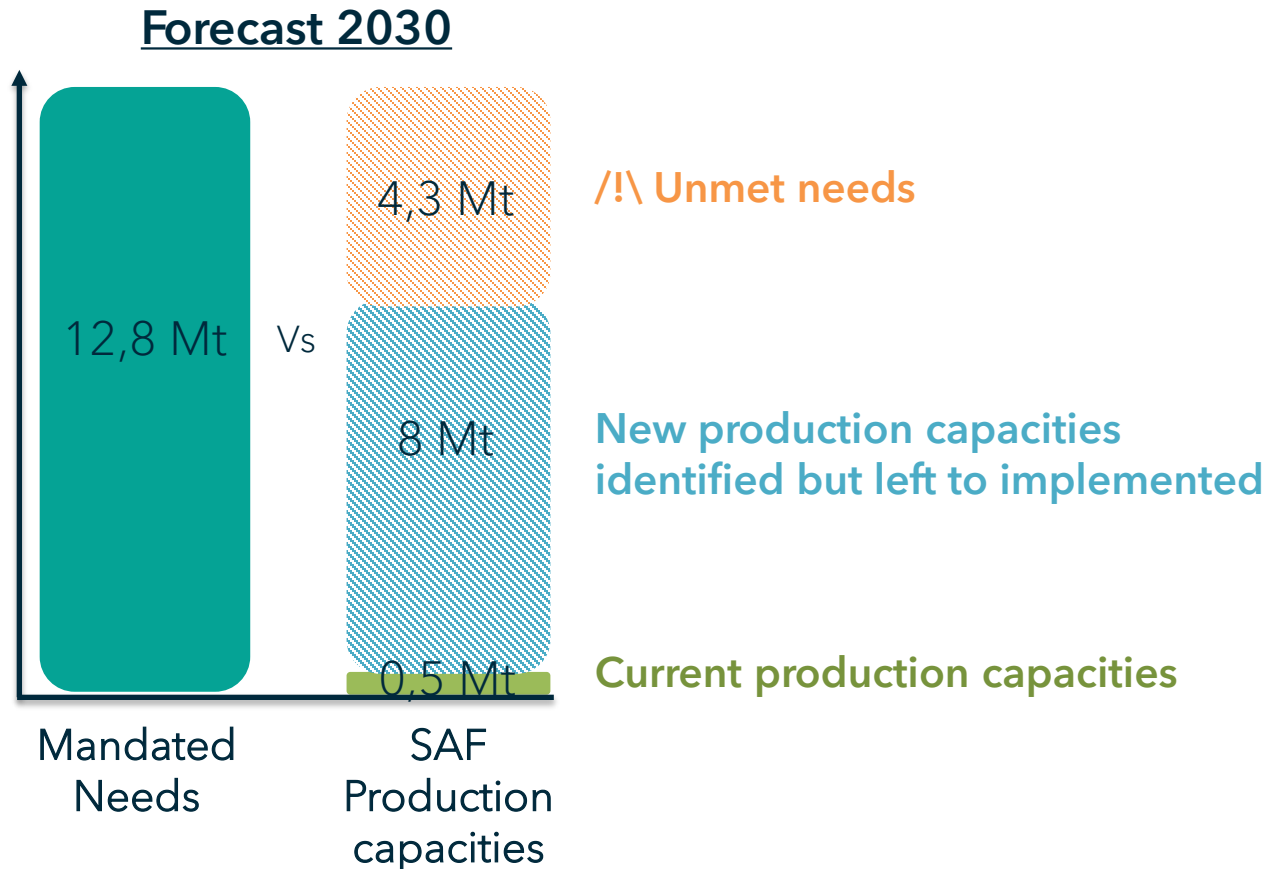
incorporation mandates

	2025	2030	2040	2050
SAF	2%	6%	34%	70%

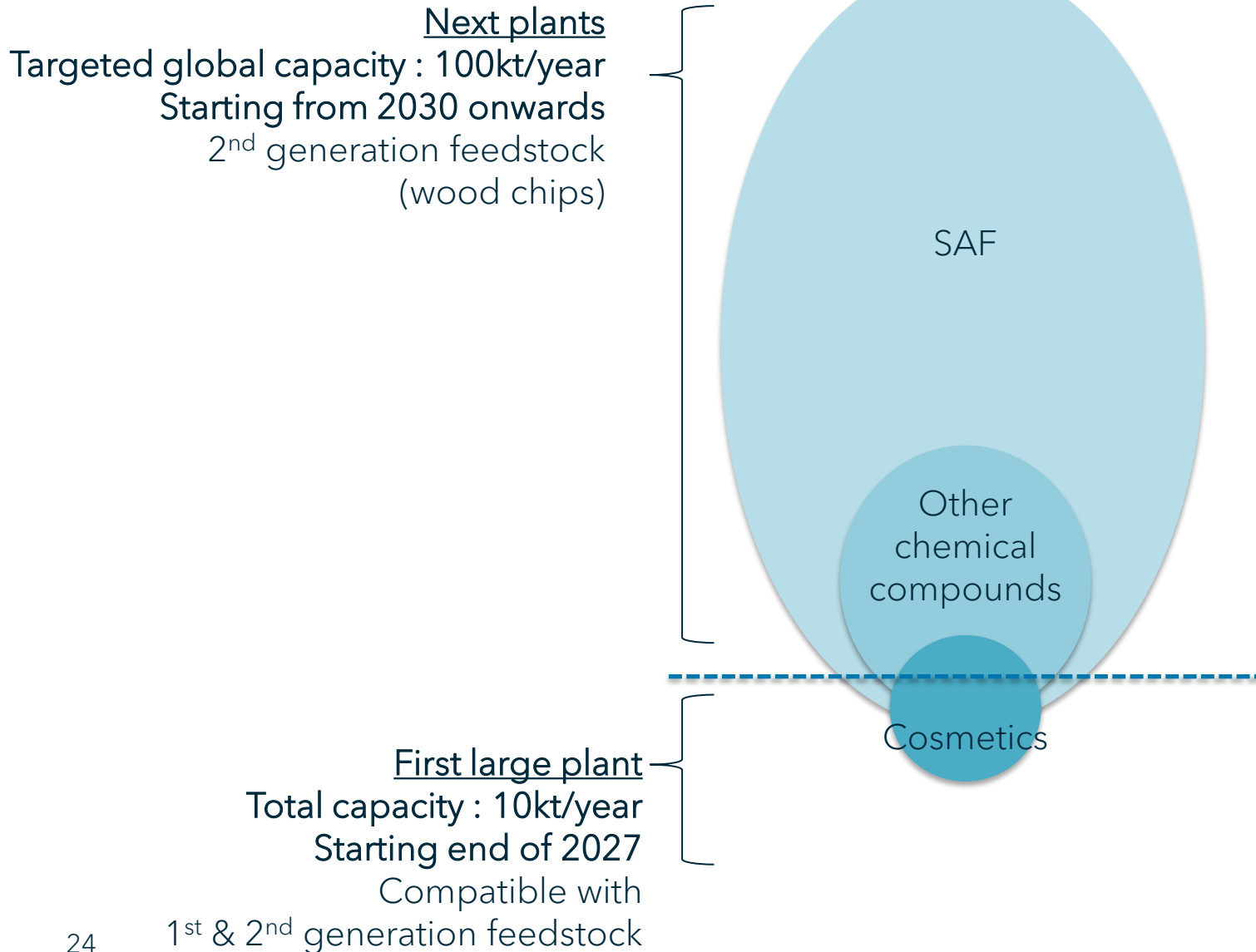
All SAF must rely on 2G  
ressources

Source : SkyNRG - Sustainable Aviation Fuel Market Outlook, May 2023

# SAF worldwide – additional opportunities for GBE



# Global Bioenergies' vision at 2030







Technology is key but will never be sufficient to curb global warming by itself

Sobriety comes first to fight climate change



# Contact

Global Bioenergies  
5 rue Henri Desbruères  
91000 Evry Courcouronnes



[invest@global-bioenergies.com](mailto:invest@global-bioenergies.com)



+33 1 64 98 20 50



[www.global-bioenergies.com](http://www.global-bioenergies.com)