



Global
Bioenergies

A growing player of the
environmental transition

27 July 2023





Our purpose

Foster the
environmental
transition through
biosciences

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Our vision



Marc Delcourt
CEO & co-founder



Samuel Dubruque
CFO



04/07/2023
Hottest day ever recorded on Earth

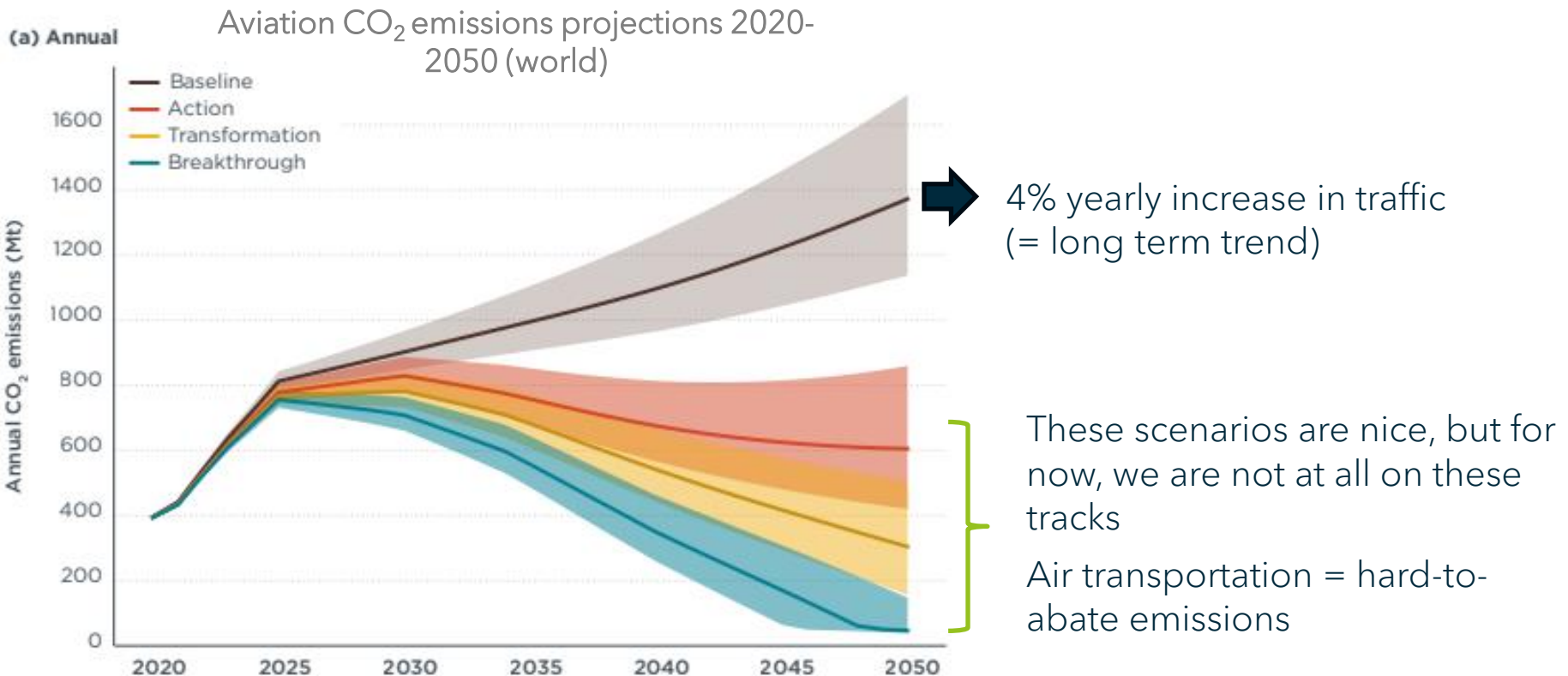
06/07/2023
Record-breaking number of flights in one day

→ We witness the
destruction of our
planet, and we don't act


Air transport footprint – A major issue...

Today, air transportation accounts for ~3% of global CO₂ emissions

CO₂ + contrails → responsible of 6% of global warming




A few figures




**=11 tons
CO₂**

Annual carbon footprint
of each European
citizen



1 round trip flight
Paris-New York
**= 2 tons CO₂
emissions**
i.e. 20% of average
yearly emissions



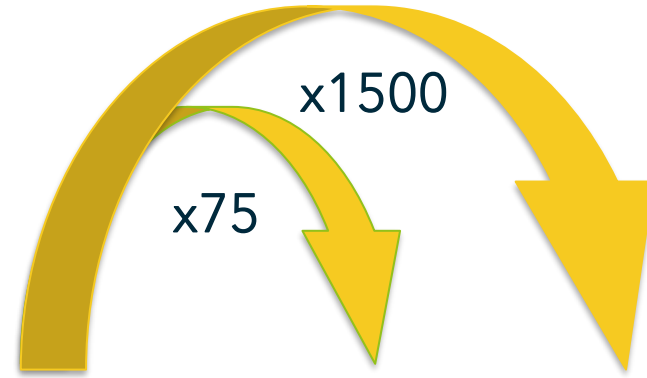
The first thing
one does
when willing to
reduce its
footprint is to
stop flying

- If we want to stay below 1.5°C, we need to decrease our emissions from 11 to 2 tons CO₂/yr
- Flying less km and/or emitting less CO₂/km

Solutions to reduce CO₂ 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
	Alcohol-to-Jet (AtJ)	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 ₂ , 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



Mt	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%

2030	2050
18	380
350	760
5%	50%

Up to now

Only 0,1% of global fuel consumption
 → SAF have been a drop in the ocean!

As of tomorrow

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

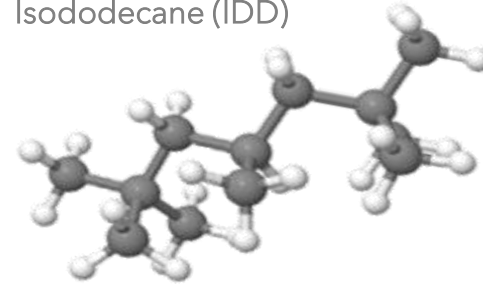
Our solution

Technology

- ✓ Technical feasibility proven
- ✓ Protected by 40 patent families
- ✓ Compatible with several resources



Isododecane (IDD)



Product

- ✓ Cut CO₂ 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*

⇒ Potentially, the best in class SAF technology

What we have accomplished



Frédéric Ollivier
Technology Director

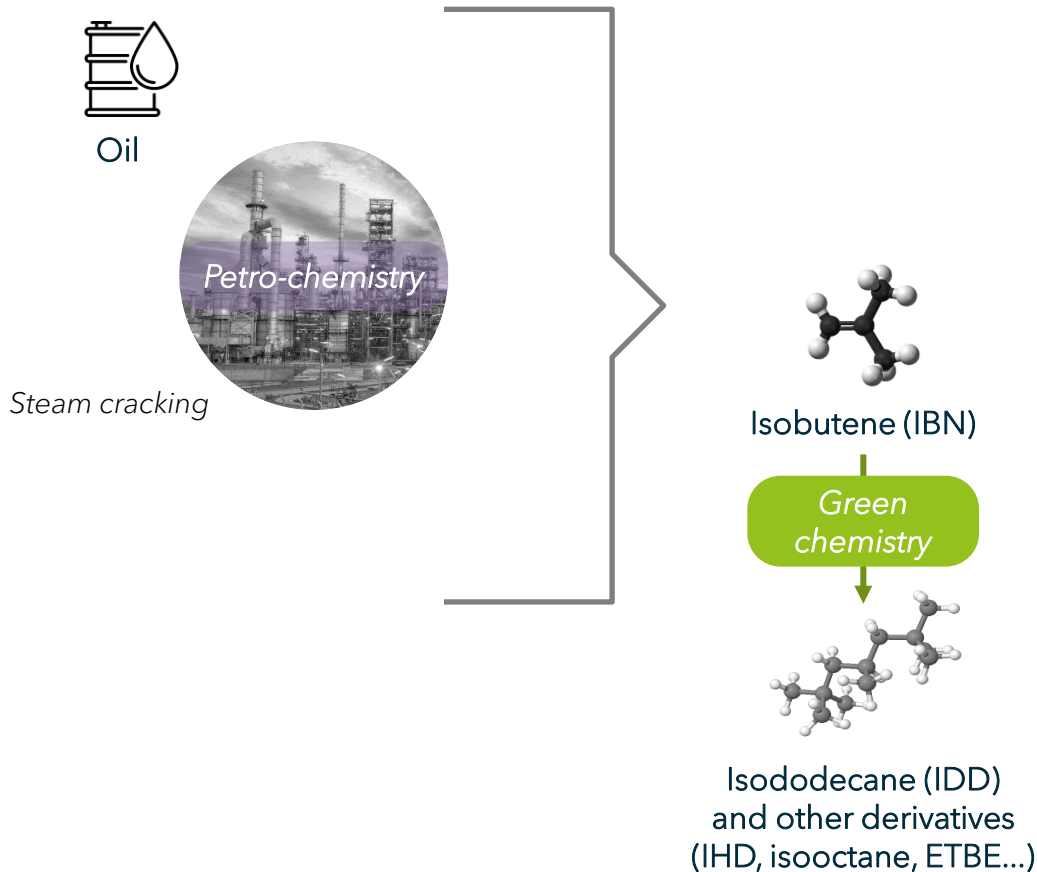
Process

Current widespread process

VS.

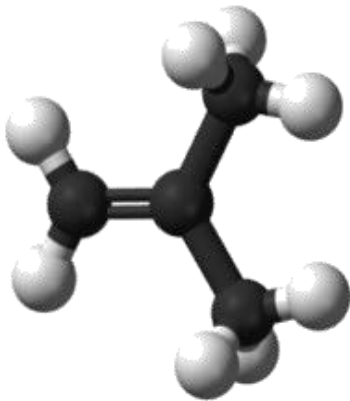
GBE's bio-sourced process

Unique technology protected by 40 patent families



Why isobutene

The smallest branched carbon structure (4 carbons, gaseous)



A double bond allowing the conversion of isobutene into numerous high-performance compounds: octane rating for gasoline; air tightness for elastomers; volatility for cosmetic oils...

These performances directly rely on the branched structure of isobutene, and isobutene is not produced in Nature → our process is the only way to access these performances in a sustainable way

Scale

Demoplant
(2017)



Leuna, Germany

&



Semi-works
(2022)

Pomacle, France

Commercial production
under brand name

ISONATURANE®

- ✓ Integrated in our own make up brand LAST® rewarded for the quality of its products and its breakthrough innovation (www.colors-that-last.com)
- ✓ Ingredients approved by multiple major cosmetic players (brands, CDMOs, distributors) after tests and sampling
- ✓ First tons sold and delivered to several clients among which L'Oréal

Infrastructure to reach SAF performances

An experimented 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 below 4€/kg to
address SAF markets

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%)	IBN-SPK (50%)	Co-processing FT (5%)
CHJ (50%)		

What's next?



Marc Delcourt
CEO & co-founder



Roland Desvignes
Industrial Director

10kt plant

Start of production 2027	Location France
Selling volumes 10k tons/year	Financing under process through industrials, investors, debt & grants

An evolutive plant

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

Compatible with multiple resources:

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

Technology deployment



Replicability of the model



Compatibility with several feedstocks among various geographies



Discussions with international industrialists



Flexible Business model: project developer, joint-ventures, 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



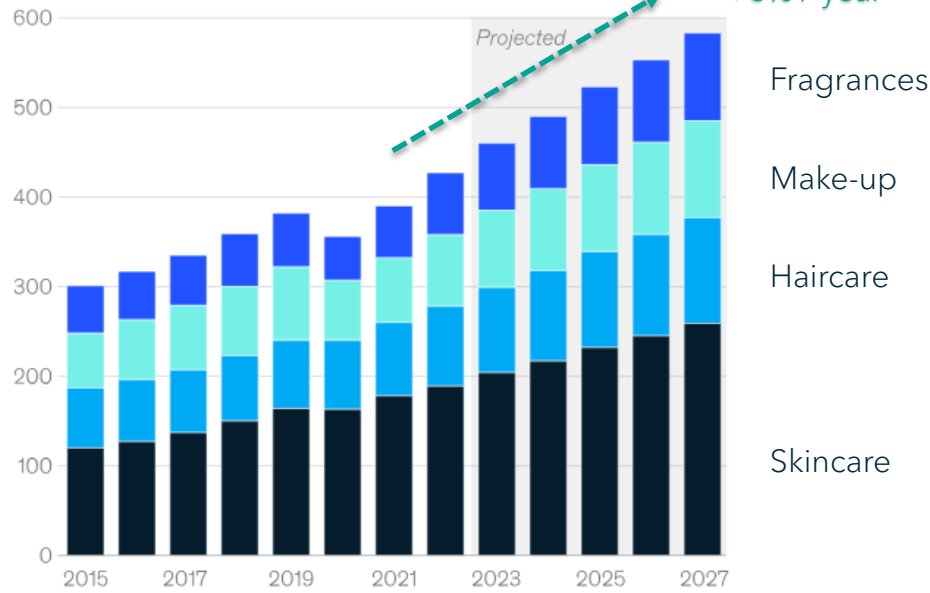
Daphné Galvez
Head of Sales



Bernard Chaud
Industrial Strategy
Director

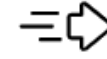
Cosmetics

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



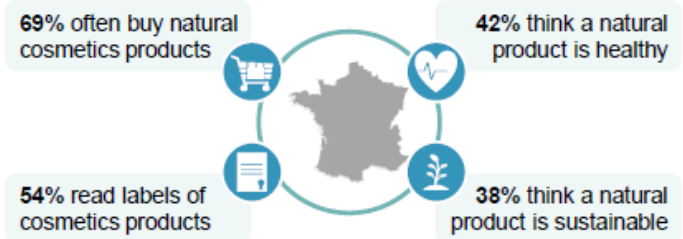
Source: Euromonitor; McKinsey analysis; McKinsey Global Institute analysis

Reliance on
IDD/IHD



A worldwide massive growing market (\$580 billion in 2027) where isobutene derivatives are used in almost all segments & in which naturalness is a key growing driver for a majority of consumers

Attractivity of cosmetics for French people
(Treatwell survey, April 2022)



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
- ✓ Very large market in the cosmetics : tens of thousand tons

SAF

EU legislation: RefuelEU

Imposed incorporation mandates from 2025 onwards

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

SAF must rely on 2G resources

US legislation: Inflation Reduction Act

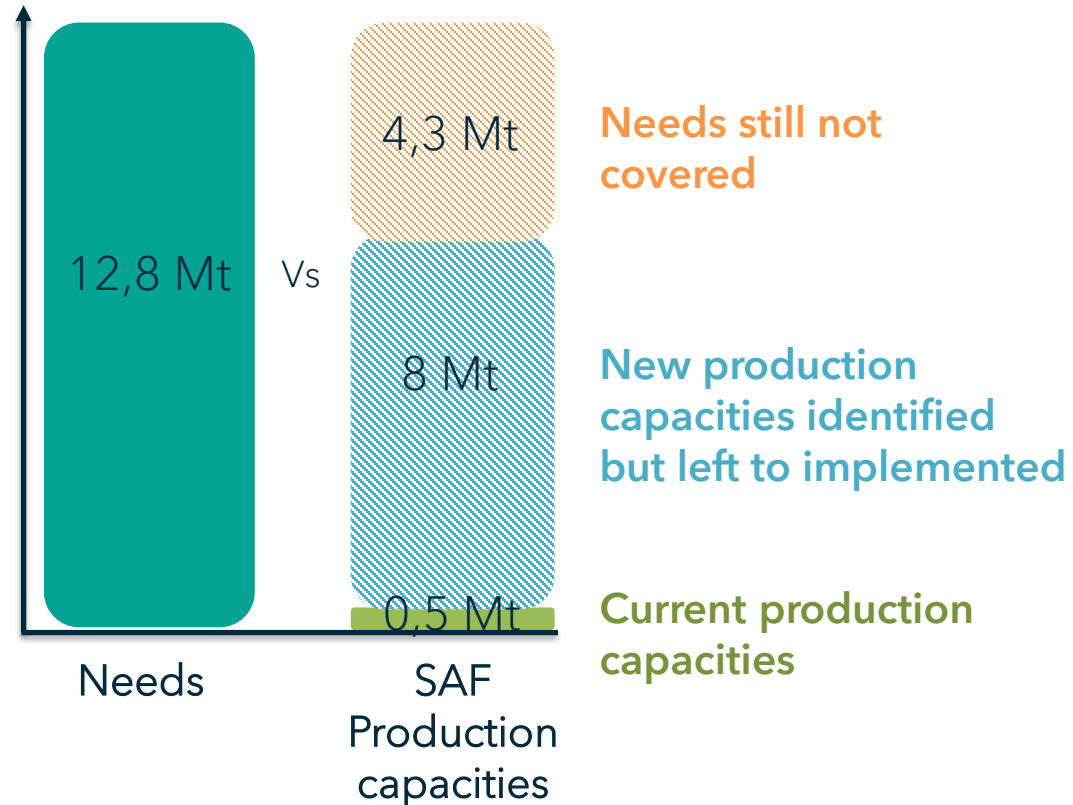
Incentives through significant tax credits



\$1.50 up to \$2 per gallon of SAF

SAF must reduce GHG emissions by at least 50%

Forecast 2030



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



Sobriety comes first to fight climate change



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