
# BLOOM

## The future does not exist.

## We design it.

By transforming natural materials found in biomass, we create a true alternative to petroleum

# Executive Summary


## What we do

- Run a platform technology to produce sustainable chemicals from biomass with up to 96% decrease of $CO_2$ emissions
- Meet high quality of petro-based benchmarks at price parity
- Unlock lignin valorisation to high value markets is highly profitable (vs. bioethanol plants)
- Address global markets in green chemical valued at €200B by 2029 with a CAGR of >10%.[1]

## Where we stand

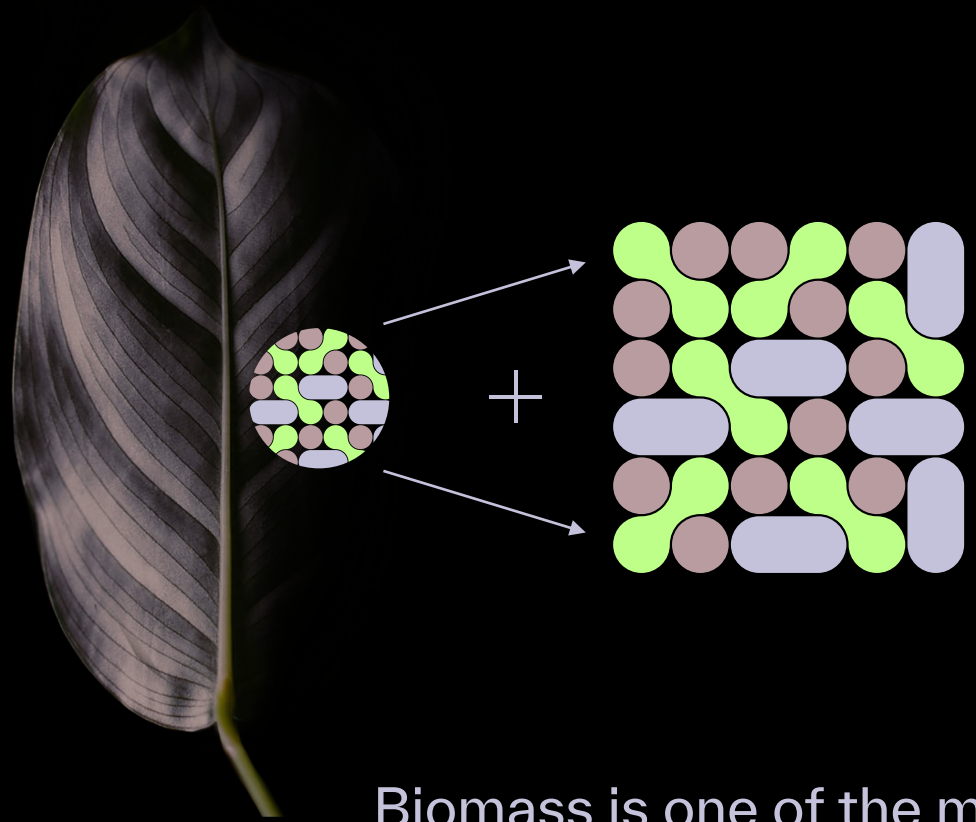
- Over €8M raised since 2018
- Standardized production at pilot scale (50t/a) with 6 patent families
- Team of 20 experts in chemistry, engineering and industrialisation
- Conceptual design of 1kt demonstration plant validated
- Validation of >€10M market value by 2028. 32% of the OPEX of the demonstration unit are already covered by off-takes

## What is next

- Series A is open
- De-risk the markets at scale
- Construction of demo-plant
- Delivery on off-takes
- Regulatory registration
- €10M equity
- Lead €5M
- Closing October 2023
- Sell 1'000t of proprietary chemicals

[1] *Green Chemicals Markets Report 2022-2029: Focus on Industrial & Chemical, Food & Beverages, Pharmaceuticals, Packaging, Construction, Automotive Industries, BUSINESS WIRE.*

# Biomass is renewable carbon





Lignin 20%

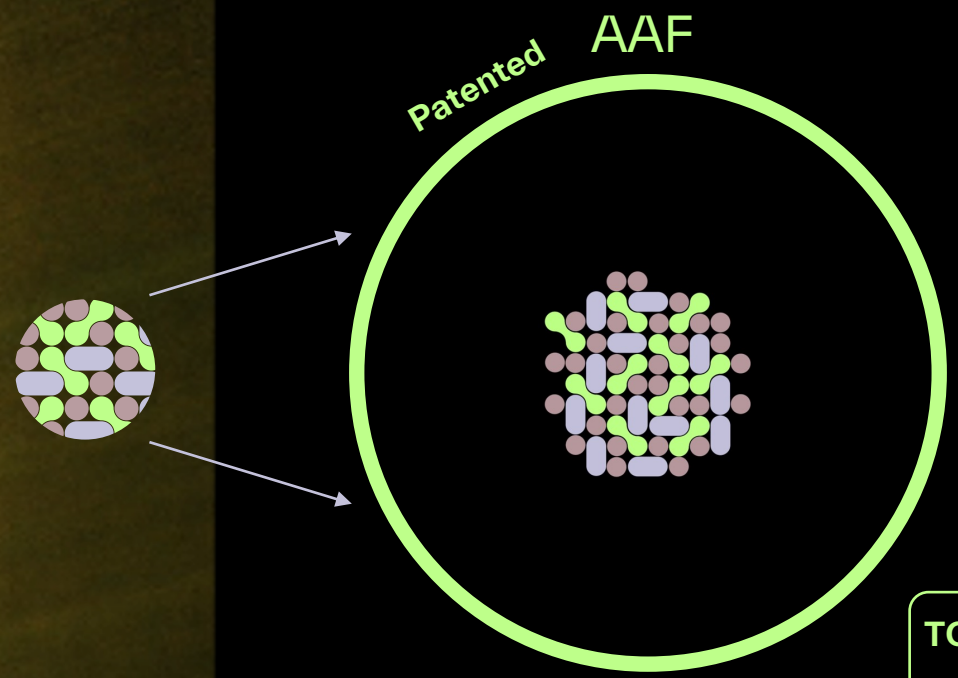
Hemicellulose 15%

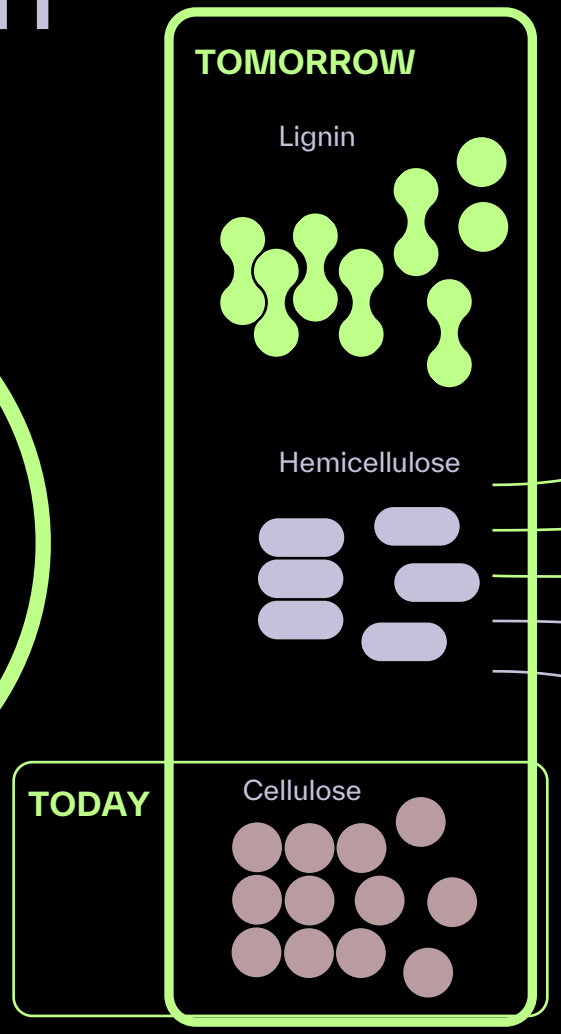
Cellulose 40%

Biomass is one of the most accessible source of circular and renewable carbon.

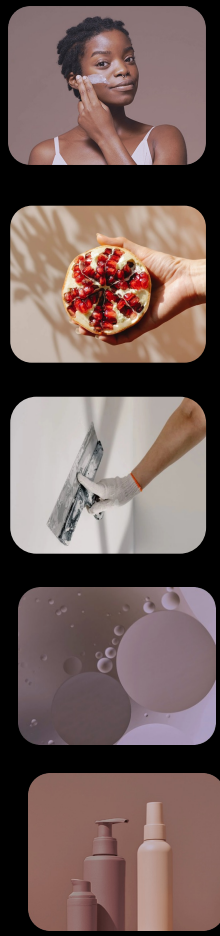
# Maximal valorisation

Aldehyde Assisted Fractionation (AAF)




Everyday products

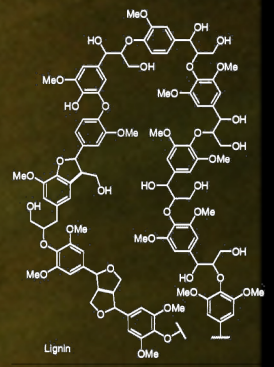


Shuai et al., **Science 2016**, 354, 6310, p. 329-333.
Formaldehyde stabilization facilitates lignin monomer production during biomass depolymerization.
Cited 960x since 2016

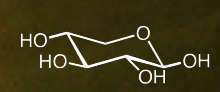
# Chemistry is our differentiator

Aldehyde Assisted Fractionation (AAF)

Biomass → AAF intermediates → AAF products



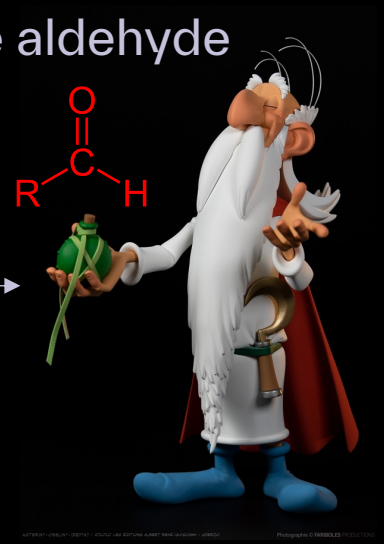

Lignin Polymer

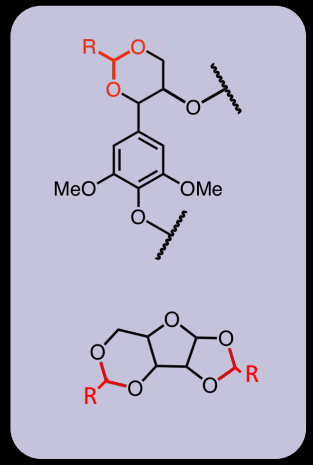


Hemicellulose

$

The aldehyde




Patented

Future-proof aromatic building blocks

Future-proof solvent & plastics

Value ($$$)

Shuai et al., **Science 2016**, 354, 6310, p. 329-333.
Formaldehyde stabilization facilitates lignin monomer production during biomass depolymerization.
Cited 900x since 2016

# A new era of biorefining

## Bloom products are future-proof by design

### High performance

Drop-in with properties matching market's standard

New products with improved properties

### Circular, safe & sustainable

64-96% decrease CO2-eq

Sustainable supply, circular by design and control over end of life

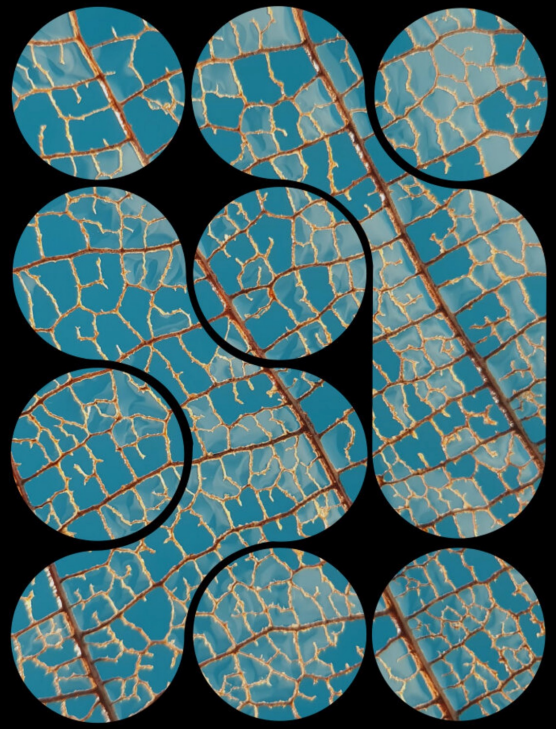
### Scalable & cost competitive

Projected price parity with incumbent fossil-based benchmarks

# Competition

| | High performance | Circular, safe & sustainable | Scalable & cost competitive |
|---|---|---|---|
| **Fossil industry**<br>BP, ExxonMobil | ✓ | × | ✓ |
| **Pulping industry**<br>UPM, Stora Enso, Borregaard | × | ✓ | ✓ |
| **New bio-based players**<br>Annellotech, Virient, GF Biochemicals, CIMV, Gevo, Afyren, Lignol, BTG, Vertoro, Fibenol | (×) | ✓ | × |
| BLOOM | ✓ | ✓ | ✓ |

# Environmental benefit

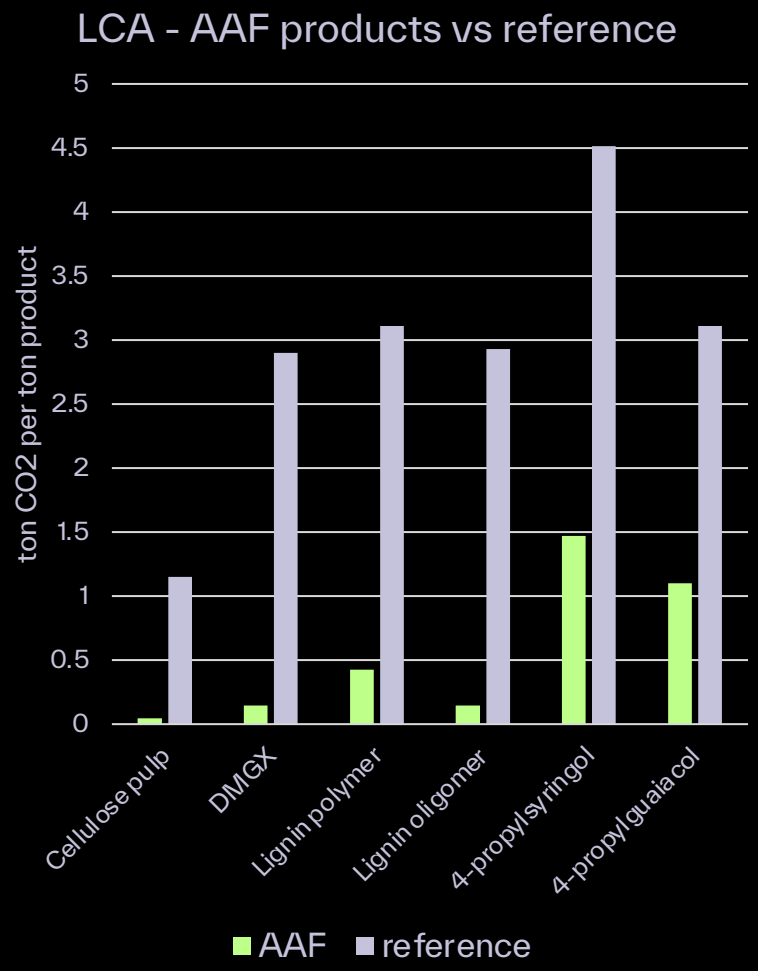


average footprint with carbon benefit:

**0.156** ton $CO_2$/ton product

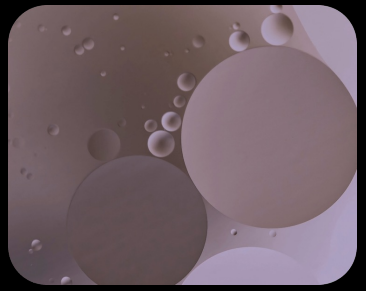
Reduction of $CO_2$-eq compared to reference product:

**64-96%**



# Validated product-market fit

5 key customers
>20 in the pipeline

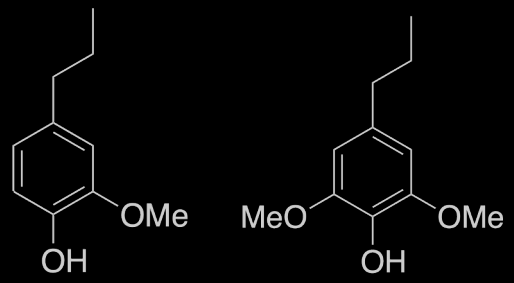
| | Fine chemicals | | Bulk chemicals | | |
|---|---|---|---|---|---|
| **Market** | Fragrances | Antioxidants | Polyurethanes | Fuels | Plastics |
| |  |  |  |  |  |
| **Global market size** | US$2.8 Billion | US$4.4 Billion | US$25 Billion | US$250 Billion | US$355 Billion |
| **AAF fraction** | Lignin monomers | Lignin monomers | Lignin oligomers | Lignin oligomers | Hemicellulose |
| **Status** | JDA | PoC | JDA | PoC | JDA |
| **Off-takes** | €7.5M by 2027 | Negotiating | >€10M by 2028 | EU project | Negotiating |

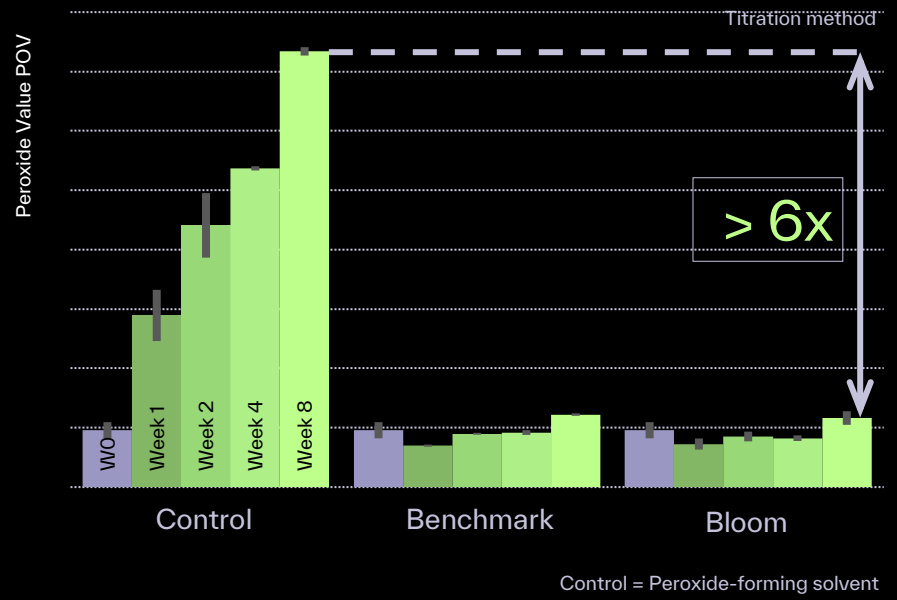
Selected project

# Fine chemicals

dsm-firmenich

● Lignin monomer




## Cosmetics & Homecare

Lignin to fragrances and antioxidants

Fraction: Lignin monomers
Type: New & drop-in
Active partners: 3
Market size: USD 800M

**JDA with Off-take value: €7.5M by 2027**

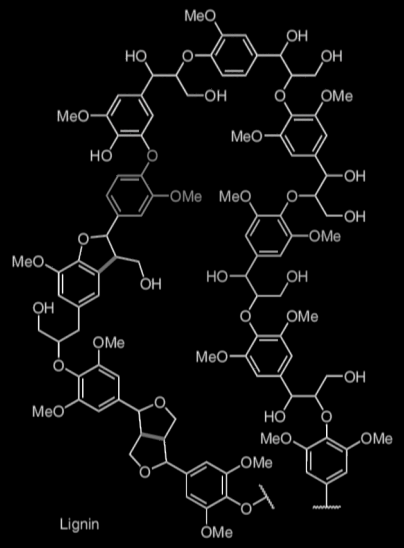
### USPs

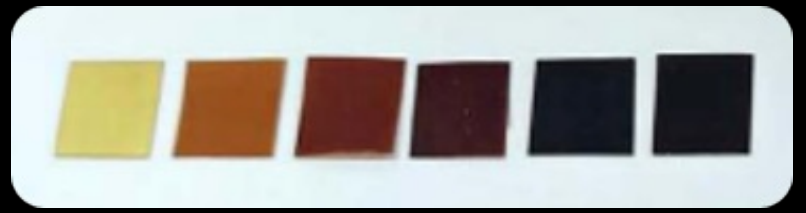
- Match antioxidant performance
- Equal olfactive performance
- Lower $CO_2$ footprint
- Biodegradable
- Biobased

Selected project

# Construction resins

Lignin oligomers



10% 100%

## Polyurethanes

Lignin to materials

Type: New
Status: PoC
Market size: USD >1B

USPs

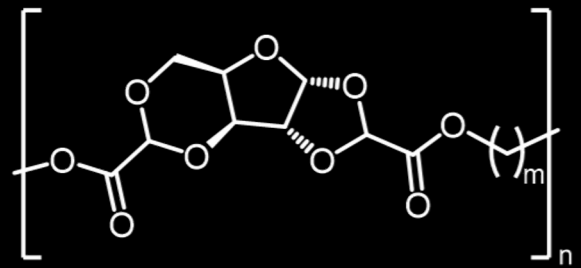
- Up to 100% polyol replacement
- Good processability (viscosity)
- Matching properties
- Lower $CO_2$ footprint
- Biobased

JDA with off-take value: €10M by 2028

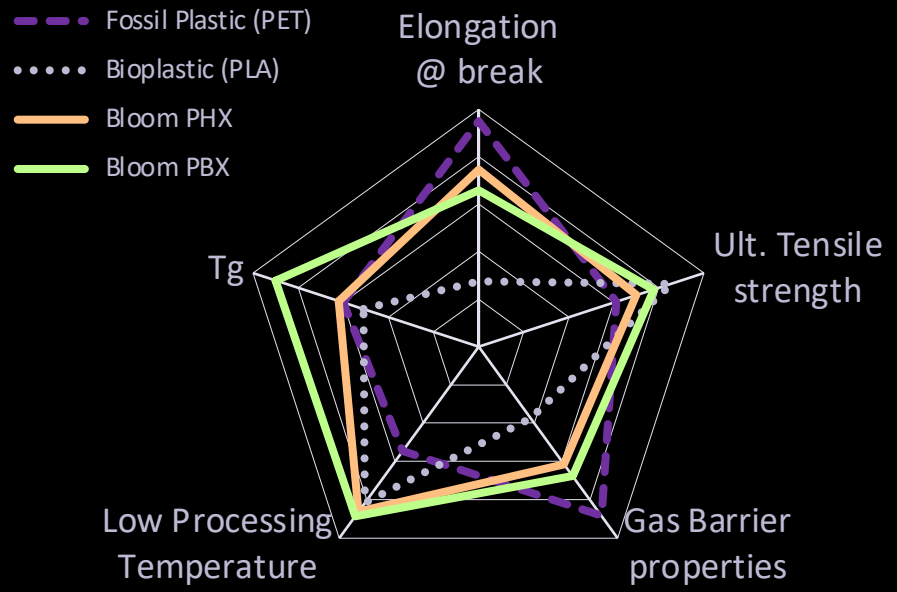
Selected project

# Packaging

Hemicellulose




PAX




## Bioplastics

Xylose to polyester (PAX)

Key USP: Good barrier property, biodegradable, bio-based
Fraction: Hemicellulose
Type: New & drop-in
Status: Running pilots
Active partnerships : 3
Market size: USD 10B

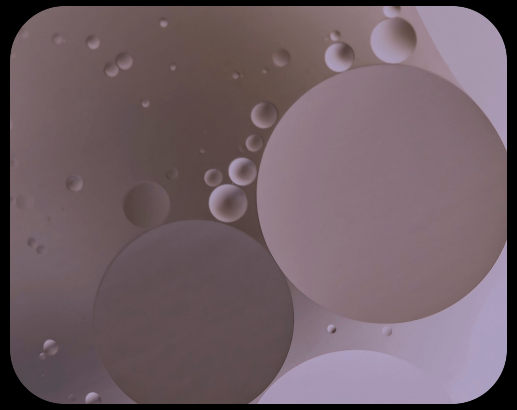
**Currently writing a JDA**

### USPs

- Excellent mechanical properties
- Good barrier properties
- Good processability (Tg)
- Non-persistent in nature
- Lower $CO_2$ footprint
- Biobased

Selected project

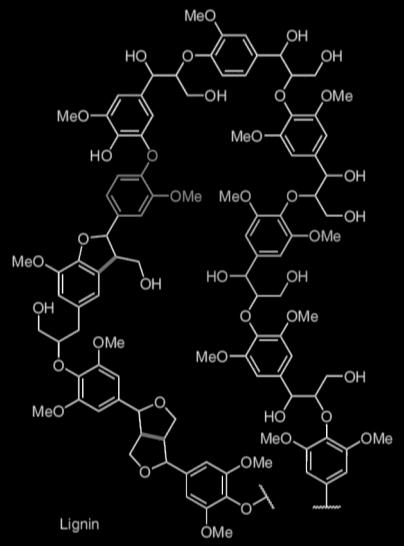
# Biofuels



## Jet & Marine

Lignin to aromatic

Lignin oligomers

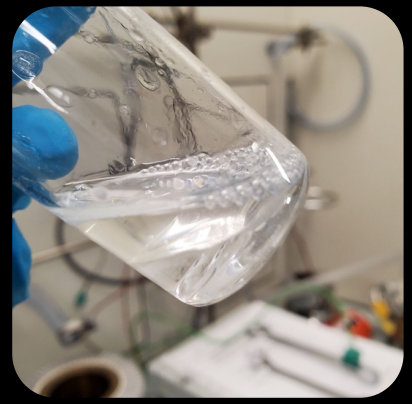



Key USP: High carbon density, aromatics
Fraction: Lignin
Type: New & drop-in
Status: Running pilots
Market size SAF: USD >15B by 2030

**Currently running a EU project**

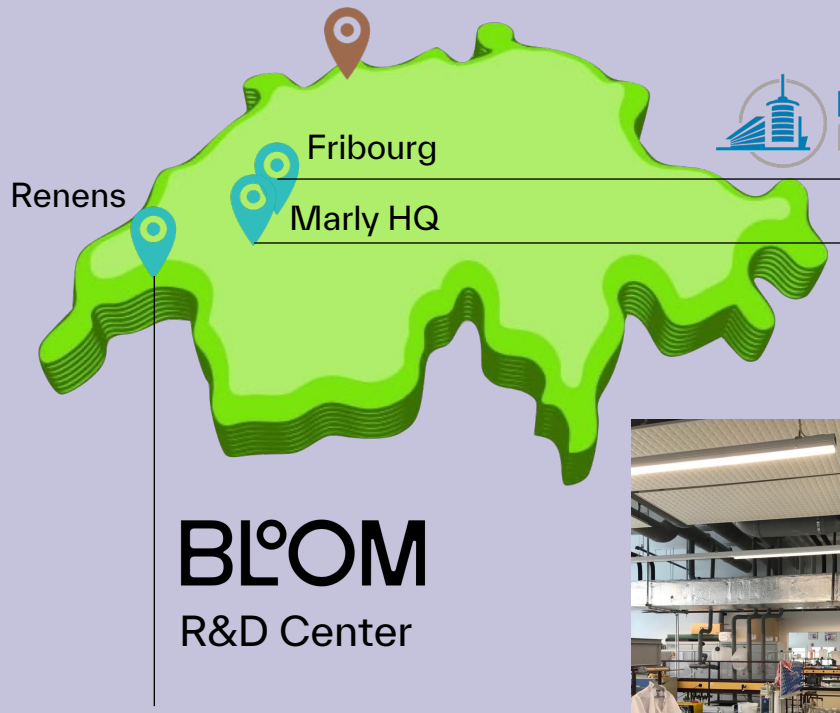
Oligomers for bio-HFO


Oligomers for SAF



**USP:** Bloom's AAF process can be processed to bio-HFO for bunker fuels and to Paraffinics (SK) and Aromatics (SAK) found in Jet A Fuels

# Locations




HEIA-FR
HTA-FR

MARLY
INNOVATION
CENTER

BLOOM
R&D Center

Potential location of the Bloom Plant

The company is active on 3 sites in Switzerland, covering lab-scale to industrialisation sites and working with De Smet, one of the world leading engineering companies in biorefining

# Process meets industrial standards

## Piloting capacity

Reactor capacity: 250L

## Milestones achieved:

- Production of 10kg scale samples
- Validation of technical feasibility
- Full energy and mass balance
- Characterisation of key products
- Standardisation of production

# The first AAF biorefinery (1kt)

DE SMET
ENGINEERS & CONTRACTORS


Conceptual design of the demo-plant was delivered by DeSmet

## Demonstration unit

Capacity: 1’000t/y
Output: 897t of products
Location: Switzerland
Status: conceptual design

**32%** of the OPEX already covered by current off-takes

# Team

**BOARD**

**FOUNDERS**

**MANAGEMENT**


Prof. Jeremy Luterbacher


Dr. Florent Héroguel
Co-CEO


Dr. Remy Buser
Co-CEO


Matthias Währen


Dr. Sophie Rouzeau


Dr. Gaetan Bonhomme

EPFL · Givaudan · MARS · Breakthrough Energy

## R&D


Jean Behaghel *
CSO


Maxime Hedou*
Head of biomaterials


Lorenz Manker*
Scientist

## Product innovation


Dr. Philip Scholten
CIO


Justine Charmillot
Scientist


Praveen Kumar
PhD Student


Dr. Kelly Tran
Scientist*


Alessandro Cattaneo
Engineer*

## Industrial production


Dr. Ydna Questell
CTO


Chloé Wegmann
Lab Assistant


Luca Mayoraz
Lab technician


Antoine Bourgeois
Lab Assistant


Kalai Puvanenthiran
PhD student


Marie Jones*
PhD student

## Business & Administration


Jörg Hinderer
CFO

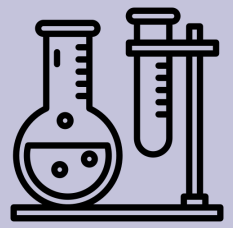

Dr. Jean-Emile Zanetto
Business Developer


Ismael Menale
Assistant Accountant

* Hired by partners: EPFL or HEIA

# Timeline

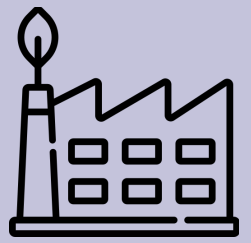
Proof of concept
1g



Lab-scale
1kg

Pilot
50t/y

Demo
1000t/y



Commercial
80'000t/y

2018 | 2020 | 2022 | 2024 | 2026 | 2028

Founded

Seed Round
€3.9M

Breakthrough Energy

Series A Round
€10M

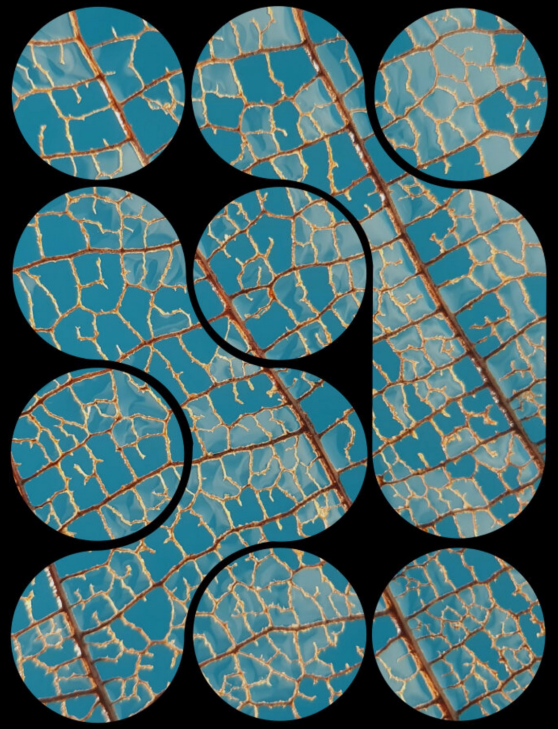
extantia

YOKOGAWA

Open: Q1 2023
Close: end Q4 2023

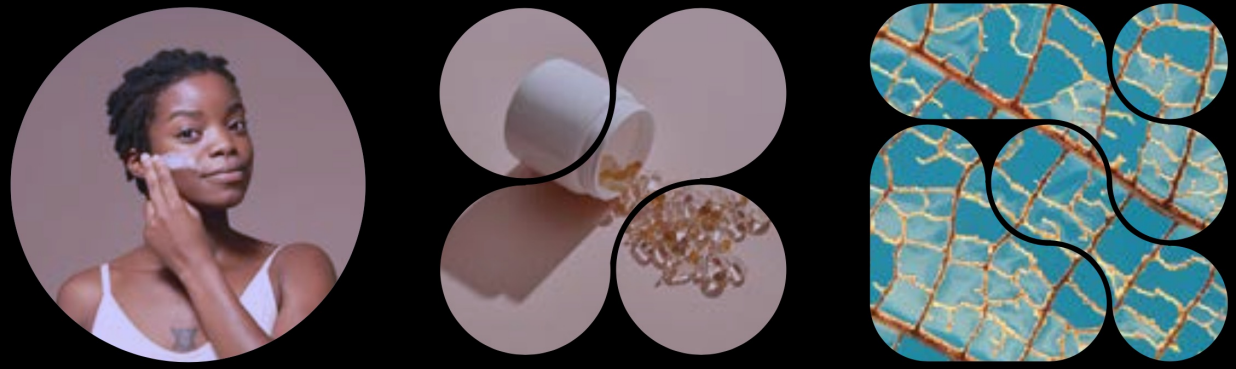
Series B Round

# Structure of Series A



## Deal structure

- Equity round: €10M
- Minimal ticket size €1M
- Lead investment: €5M
- Committed €1.3M
- Soft committed >€7M
- Closing October 2023



# The Future is not.
# We design it.

By transforming natural materials found in biomass, we create a true alternative to petroleum

Why invest in Bloom?

- Breakthrough technology
- Strong Intellectual Property
- Knowhow with team ready to deliver
- Commercial & technical validation

Contact us
info@bloombiorenewables.com