

# LanzaTech

Nasdaq: LNZA

*Recycling carbon with biology*

Capturing Carbon, Creating Value

Steven F. Stanley, PhD  
Chief Commercial Officer  
October 19, 2023

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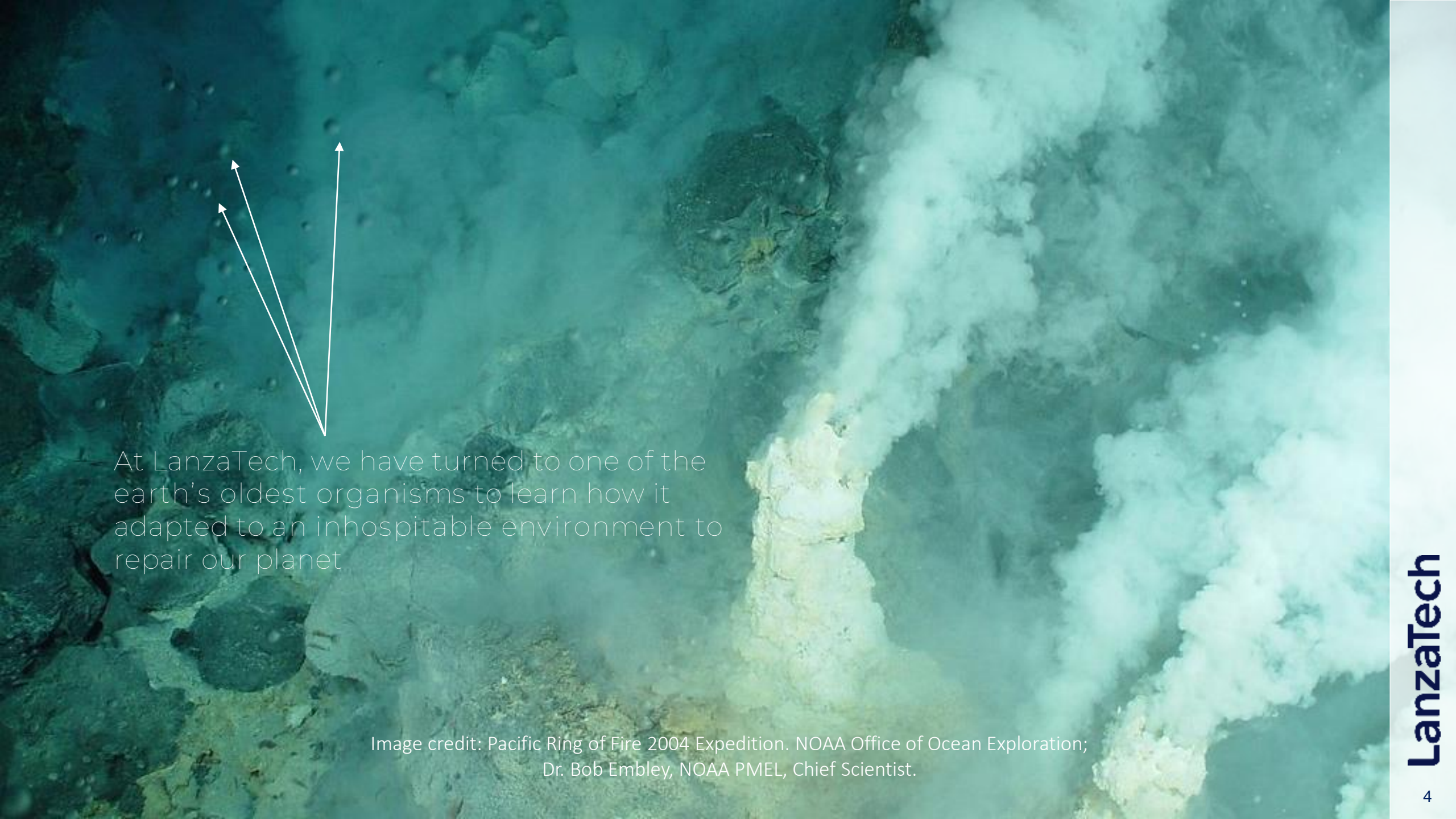
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# OUR “CLIMATE TIME BOMB IS TICKING”

– Antonio Guterres, U.N. Secretary-General

The fact that we are making our planet inhospitable is not new



At LanzaTech, we have turned to one of the earth's oldest organisms to learn how it adapted to an inhospitable environment to repair our planet.

Image credit: Pacific Ring of Fire 2004 Expedition. NOAA Office of Ocean Exploration; Dr. Bob Embley, NOAA PMEL, Chief Scientist.

A nighttime photograph of an industrial facility. On the left, a tall, cylindrical metal structure is illuminated from within. In the center, a modern, dark-colored building with a grid of rectangular windows is brightly lit from the interior, creating a strong contrast with the dark exterior. To the right, a complex network of pipes, walkways, and structural steel is visible, also illuminated by various lights. The overall scene is dark, with the primary light sources being the internal lights of the building and the industrial structures.

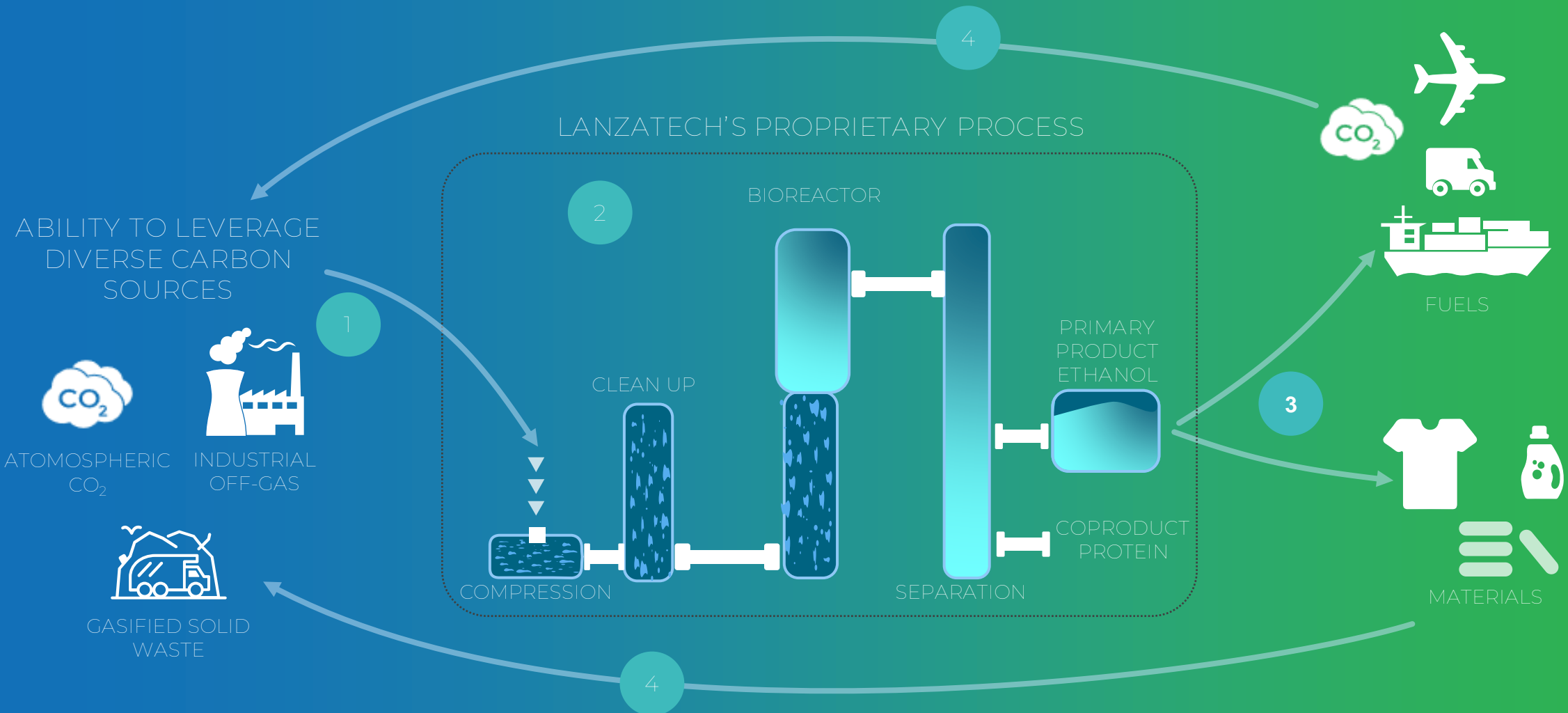
# LANZATECH CAPTURES & TRANSFORMS CARBON



THE WORLD HAS  
ENOUGH CARBON ABOVE  
GROUND TO MAKE  
EVERYTHING WE NEED

WE CREATE VALUE  
WHERE OTHERS  
SEE WASTE

# A NOVEL CIRCULAR SOLUTION, RECYCLING WASTE CARBON INTO VALUABLE PRODUCTS



ABILITY TO LEVERAGE DIVERSE CARBON SOURCES

LANZATECH'S PROPRIETARY PROCESS

ATMOSPHERIC CO<sub>2</sub> INDUSTRIAL OFF-GAS

GASIFIED SOLID WASTE

BIOREACTOR

CLEAN UP

COMPRESSION

SEPARATION

PRIMARY PRODUCT ETHANOL

COPRODUCT PROTEIN

FUELS

MATERIALS

- 1 Carbon rich waste gases enter compressor. Solids must first be gasified.
- 2 LanzaTech Process occurs within proprietary bioreactor; microbe consumes carbon in gas and produces ethanol and protein coproduct.

- 3 Ethanol is an intermediate product that can be further upgraded and converted into high value sustainable materials and fuels.
- 4 Circularity-enabled with solid waste carbon gasified and emitted carbon captured and returned to the process.

# GLOBALLY LICENSED & COMMERCIALY OPERATIONAL TODAY



2018

Production Volume:  
46,000 Tons per Year Ethanol

Carbon Source:  
Steel Mill Emissions



2021

Production Volume:  
46,000 Tons per Year Ethanol

Carbon Source:  
Ferroalloy Emissions



2022

Production Volume:  
60,000 Tons per Year Ethanol

Carbon Source:  
Ferroalloy Emissions



2023

Production Volume:  
60,000 Tons per Year Ethanol

Carbon Source:  
Ferroalloy Emissions





# 2023 EXPECTED GAS FERMENTATION PLANT START UPS



Project/Partner	Carbon Source	Actual or Anticipated Start Date	Ethanol Production Volume (tons/year)	CO <sub>2</sub> Abated (tons/year)	Location
IndianOil	Refinery Off Gas	3Q 2023	33,500	~60,000	India
ArcelorMittal	Steel Off Gas	4Q 2023	64,000	~125,000	Belgium

*Total of 6 commercial-scale gas fermentation facilities expected to be online by end of 2023 with cumulative nameplate capacity of +300,000 tons per year*

# PROJECTS IN OPERATION, CONSTRUCTION & ENGINEERING



- Operating Commercial Scale Facility
- Operating Demonstration Scale Facility
- Late-Stage Construction or Commissioning
- Engineering<sup>1</sup>

Steel and Ferroalloy Gas MSW Refinery Gas Biomass Biogas CO<sub>2</sub>+H<sub>2</sub> SAF Facility

<sup>1</sup>Partners not yet publicly announced for all opportunities

ON THE ROAD TO GIGATONS OF CARBON

500,000 tons CO<sub>2</sub>

ANTICIPATED ANNUAL ABATEMENT ONCE THREE ADDITIONAL FACILITIES ARE OPERATIONAL

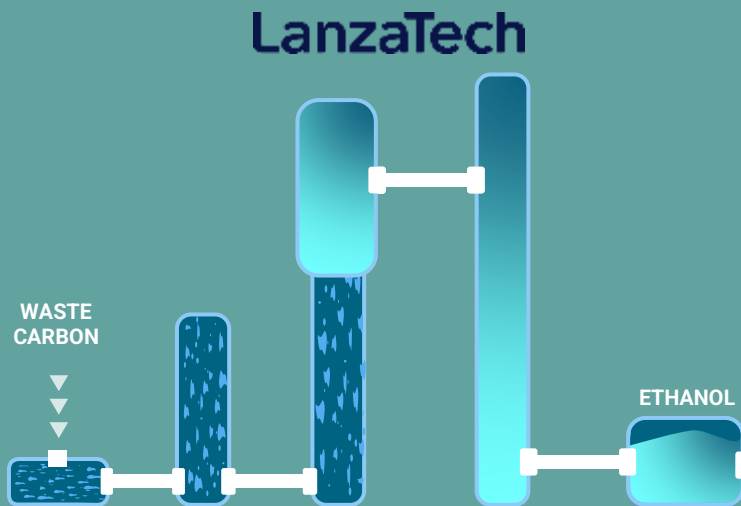


300,000 tons EtOH

ANTICIPATED ANNUAL PRODUCTION ONCE THREE ADDITIONAL FACILITIES ARE OPERATIONAL

DEMAND FOR SUSTAINABLE PRODUCTS CREATES DEMAND PULL FOR ADDITIONAL LICENSED PLANTS

PRODUCTS MADE FROM CARBON EMISSIONS



TEXTILES



SHOE SOLES



PACKAGING



CLEANING PRODUCTS



FRAGRANCES



SAF



DETERGENTS



CONTAINERS



SURFACTANTS



LanzaTech's commercial technology created the chemical building block (ethanol) for this CarbonSmart™ product portfolio

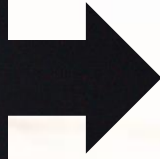


LanzaTech

**FASTCOMPANY**

## **These gorgeous Zara party dresses are made from carbon emissions**

Carbon created by a Chinese steel factory is fermented with bacteria and then ends up in this capsule collection.



**ZARA**

# MADE USING POLLUTION



**CO2RENU BY CRAGHOPPERS**  
GROUNDBREAKING TECHNOLOGY THAT  
TURNS CO2 EMISSIONS INTO FABRIC



**ISPO  
Award**  
2022



Winner

 **CRAGHOPPERS**



## VOGUE BUSINESS

BEAUTY

### Why Gucci's latest fragrance is made from recycled carbon

The Italian luxury house's new perfume, *Where My Heart Beats*, is Coty's first globally distributed fragrance manufactured using 100 per cent carbon-captured alcohol. *Vogue Business* has the exclusive.

BY KATI CHITRAKORN

April 3, 2023

“

As carbon recycling becomes a bigger focus in beauty, LanzaTech has emerged as the partner of choice.

”

# Migros launches recycled carbon derived consumer cleaning products





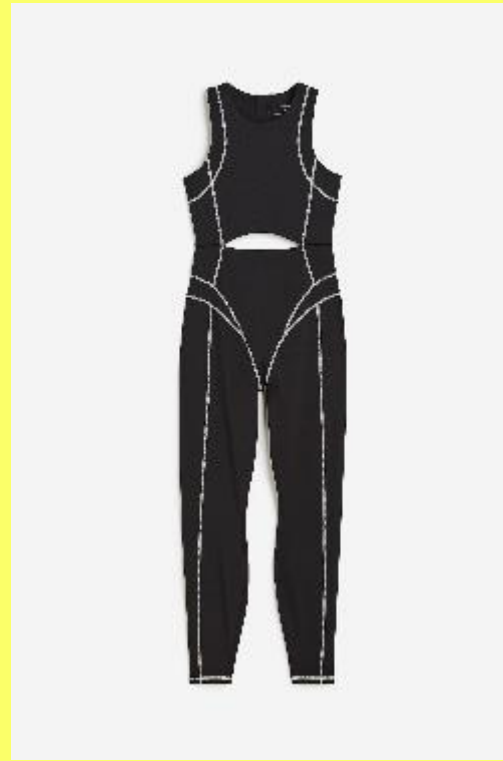
**Forbes**

**Swiss Footwear Brand  
Develops A Running Shoe  
Made From Carbon Emissions**



Run on clouds.

H&M MOVE  
×  
LanzaTech



6277763

We use captured  
carbon emissions as a  
new material feedstock.  
Selected building blocks  
of one of the yarns used in  
this product are based on  
this new technology.

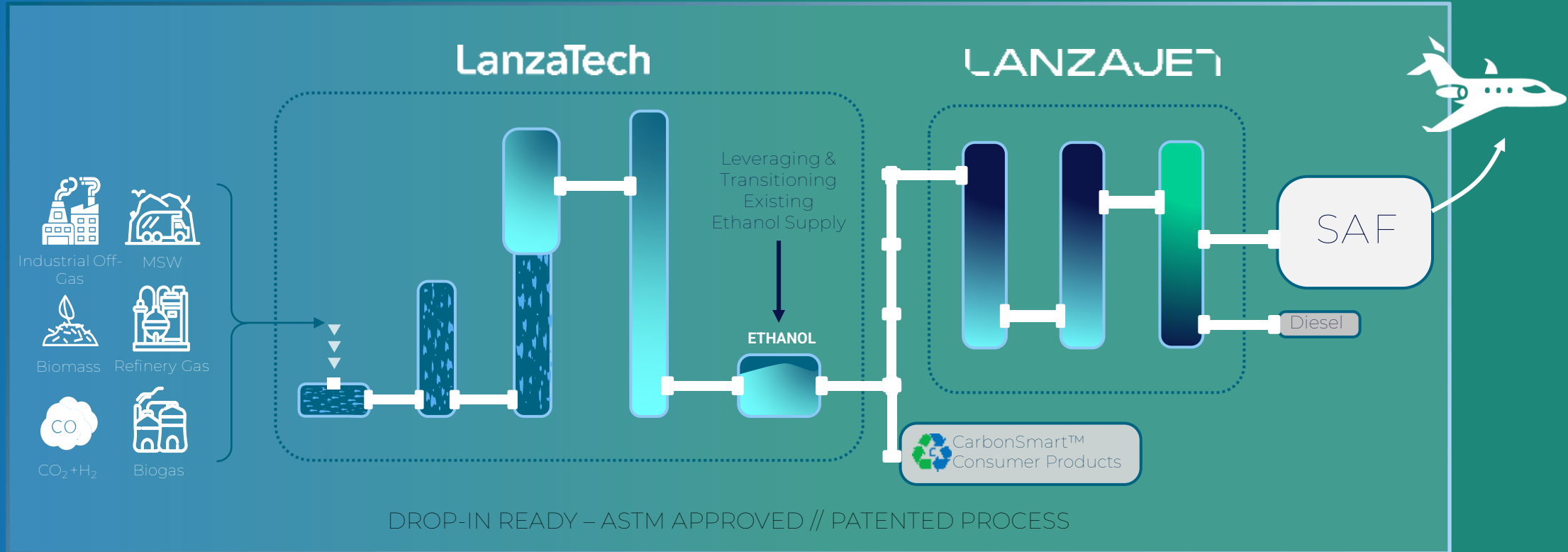
[ADIDAS.COM/SUSTAINABILITY](https://adidas.com/sustainability)

**F** Nous utilisons les émissions de  
carbone captées comme nouvelles  
matières premières. Cert  
posante



2% GLOBAL EMISSIONS

# DOWNSTREAM FLEXIBILITY TO INTEGRATE WITH LANZAJET'S SAF PLATFORM



 **make it**

**Richard Branson's Virgin Atlantic set  
to fly a 747 jet with fuel made from  
factory pollution**



**LANZAJET**

**Lanzatech**

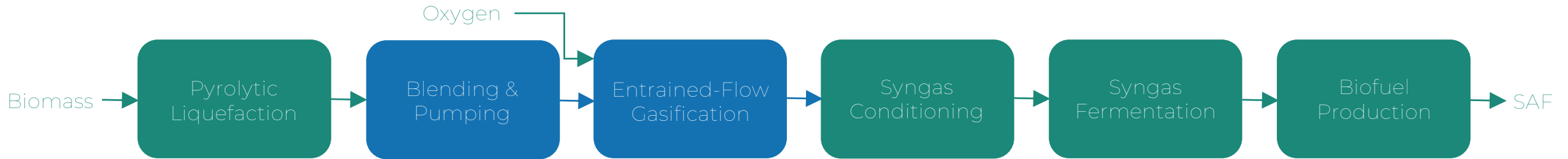


2023 EXPECTED LANZAJET FREEDOM PINES  
FUELS PLANT COMPLETION

# LANZAJET

The 10MGPY Sustainable Aviation Fuel project – the LanzaJet Freedom Pines Fuels Project – remains on schedule to reach mechanical completion by end of 2023 and commence operations in early 2024

# DOE PROJECT: ENTRAINED-FLOW BIOMASS GASIFICATION WITH SYNGAS FERMENTATION FOR PRODUCTION OF SAF



R&D/pilot scale gasification  
Fuel analysis

1 tpd pressurized O<sub>2</sub>-blown  
EFG system



Biomass liquefaction  
(RTP)

Py oil production



Instrument development  
ATJ process development  
Techno-Economic Analysis  
Life cycle analysis

SAF production  
Modeling



Gas fermentation  
(GTL)

Ethanol and SAF  
production using  
LanzaJet™ ATJ  
Process



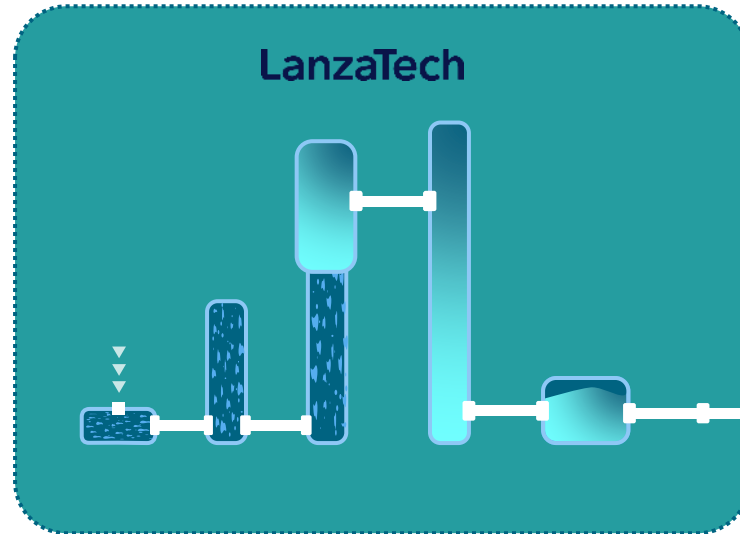
Gasification  
development  
Hot Oxygen Burner  
(HOB)

Modeling  
Equipment  
fabrication





# THE NEW CARBON ECONOMY IS DISTRIBUTED AND CIRCULAR



TEXTILES



SHOE SOLES



PACKAGING



CLEANING



FRAGRANCES



AVIATION FUEL



DETERGENTS



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RECYCLE CARBON WITH BIOLOGY