Biotechnology Innovation Organization

Climate Policy Innovation Series: Fueling the Energy Transition

November 2, 2023, 1:00 PM (ET)

Moderator:

- John Torres, CAE, Director, Federal Government Relations, Agriculture & Environment, BIO

Speakers:

- Tom Dower, Vice President, Public Policy, LanzaTech
- Dave Kettner, President & General Counsel, Virent, Inc.

CARBON RECYCLING FOR A CIRCULAR ECONOMY

November 2, 2023

LanzaTech

Nasdaq: LNZA

DISCLAIMER

Forward Looking Statements

These slides and any accompanying oral presentation contain forward-looking statements. All statements, other than statements of historical fact, included in these slides and any accompanying oral presentation are forward-looking statements reflecting management's current beliefs and expectations. In some cases, you can identify forward-looking statements by terminology such as "will," "anticipate," "expect," "believe," "intend" and "should" or the negative of these terms or other comparable terminology. Forward-looking statements in these slides and any accompanying oral presentation include, but are not limited to, statements about estimates and forecasts of other financial and performance metrics and projections of market opportunity, expectations and timing related to the rollout of our business and timing of deployments, customer growth and other business milestones. These statements are based on various assumptions, whether or not identified in this presentation, and on the current expectations of our management and are not predictions of actual performance. These statements relate to future events or to our future financial performance and involve known and unknown risks, uncertainties and other factors that may cause our actual results, performance or achievements to be materially different from any future results, performance or achievements expressed or implied by these forward-looking statements. The potential risks and uncertainties that could cause actual results to differ from the results predicted include, among others, those risks and uncertainties included under the captions "Risk Factors" and "Management's Discussion and Analysis of Financial Condition and Results of Operations" in our Form 10-K filed with the Securities and Exchange Commission and subsequent annual reports, quarterly reports and other filings made with the Securities and Exchange Commission from time to time. Any forward-looking statements contained herein are based on assumptions that we believe to be reasonable as of the date hereof. Except as required by law, we assume no obligation to update these forward-looking statements, even if new information becomes available in the future.

This presentation includes data obtained from third-party studies and internal company surveys prepared for other purposes. We have not independently verified the data obtained from these sources. Forward-looking information obtained from these sources is subject to the same qualification and the additional uncertainties regarding the other forward-looking statements in this presentation.

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DISCLAIMER

Financial Information; Non-GAAP Financial Measures

To supplement our financial results presented in accordance with US GAAP and to provide investors with additional information regarding our financial results, we have presented in this presentation adjusted EBITDA, a non-GAAP financial measure. Adjusted EBITDA is not based on any standardized methodology prescribed by US GAAP and is not necessarily comparable to similarly titled measures presented by other companies.

We define adjusted EBITDA as as net loss, excluding the impact of depreciation, interest income (expense), net, gain on extinguishment of debt, stock-based compensation and change in fair value of warrant liability, and loss/(gain) from equity method investees, net. We monitor and have presented in this presentation adjusted EBITDA because it is a key measure used by our management and the board of directors to understand and evaluate our operating performance, to establish budgets, and to develop operational goals for managing our business. We believe adjusted EBITDA helps identify underlying trends in our business that could otherwise be masked by the effect of certain expenses that we include in net loss. Accordingly, we believe adjusted EBITDA provides useful information to investors, analysts, and others in understanding and evaluating our operating results and enhancing the overall understanding of our past performance and future prospects.

Adjusted EBITDA is not prepared in accordance with US GAAP and should not be considered in isolation of, or as an alternative to, measures prepared in accordance with US GAAP. There are a number of limitations related to the use of adjusted EBITDA rather than net loss, which is the most directly comparable financial measure calculated and presented in accordance with US GAAP. For example, adjusted EBITDA: (i) excludes stock-based compensation expense because it is a significant non-cash expense that is not directly related to our operating performance; (ii) excludes depreciation expense and, although this is a non-cash expense, the assets being depreciated and amortized may have to be replaced in the future; and (iii) does not reflect the cash requirements necessary to service interest on our debt, which affects the cash available to us; (iv) gain or losses on equity method investee; and (v) excludes certain income or expense items that do not provide a comparable measure of our business performance. In addition, the expenses and other items that we exclude in our calculations of adjusted EBITDA may differ from the expenses and other items, if any, that other companies may exclude from adjusted EBITDA when they report their operating results. In addition, other companies may use other measures to evaluate their performance, all of which could reduce the usefulness of our non-GAAP financial measures as tools for comparison.


LANZATECH CAPTURES &
TRANSFORMS CARBON

WHERE OUR CARBON COMES FROM WILL DEFINE OUR CLIMATE FUTURE

OUR PROCESS RECYCLES CARBON WASTE INTO CHEMICAL BUILDING BLOCKS TO CREATE A WIDE VARIETY OF PRODUCTS

VOGUE BUSINESS

BEAUTY

Why Gucci's latest fragrance is made from recycled carbon

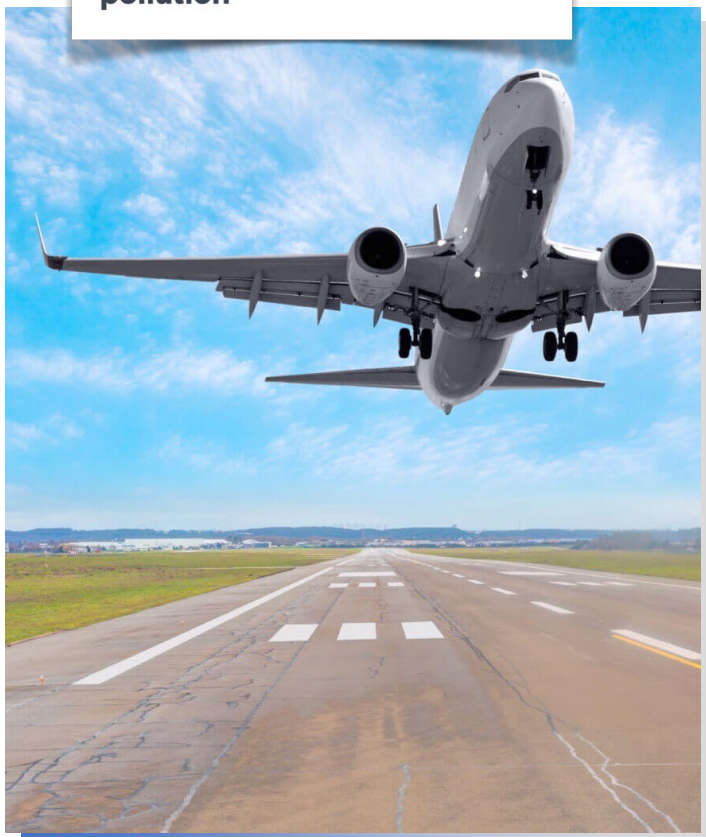
FAST COMPANY

These gorgeous Zara party dresses are made from carbon emissions

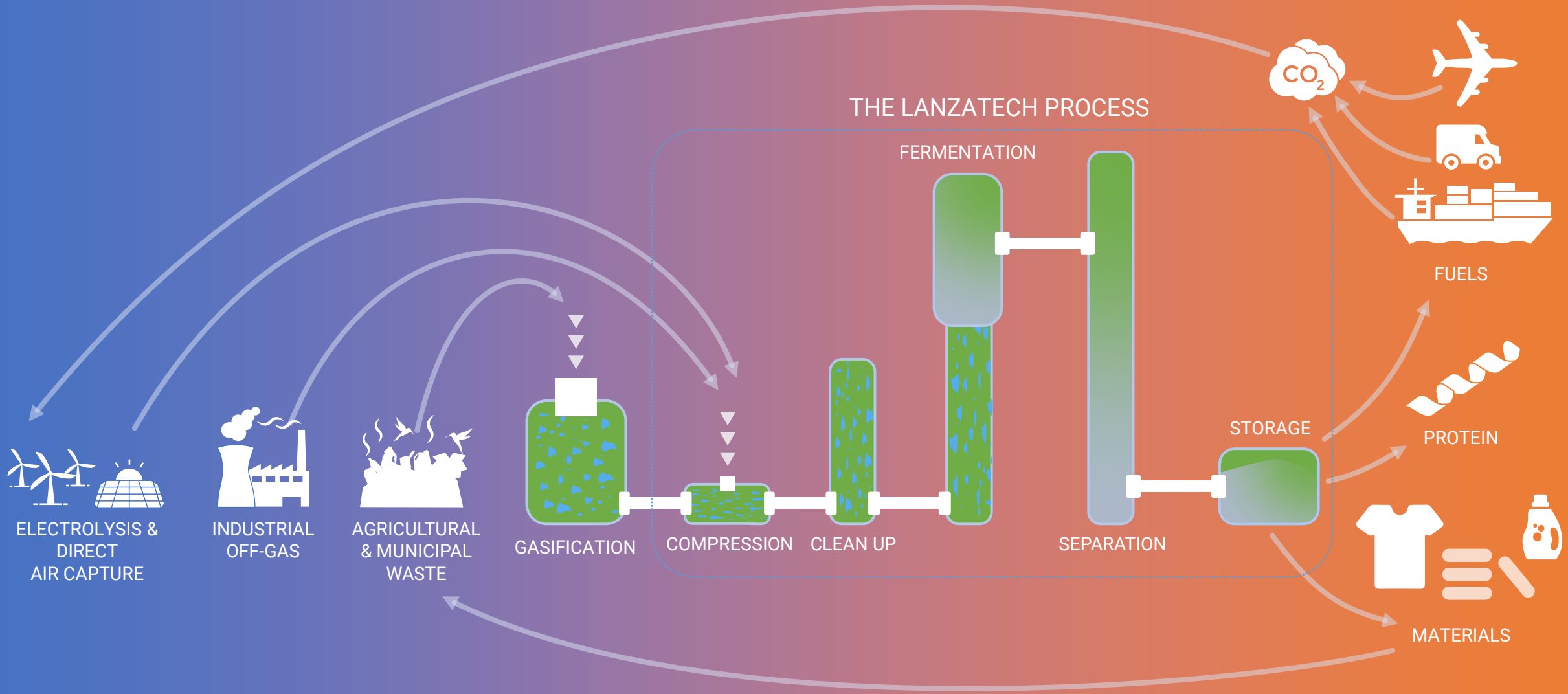
Carbon created by a Chinese steel factory is fermented with bacteria and then ends up in this capsule collection.

CNBC

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



LanzaTech's Transformation Process



GLOBALLY LICENSED & COMMERCIALLY OPERATIONAL TODAY

LanzaTech

2023 EXPECTED GAS FERMENTATION PLANT START UPS

Project/Partner	Carbon Source	Actual or Anticipated Start Date	Ethanol Production Volume (tons/year)	CO_2 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***

LanzaTech

WORLD CLASS PARTNERS CURRENTLY DEPLOYING AND COMMITTED TO ROLLING OUT BIOREFINING CCT PLANTS

Partnership with Industrial Leaders Deploying LanzaTech Solutions

- ✓ De-risked technology at commercial-scale
- ✓ Multiple feedstocks deployed globally
- ✓ Licensing model where partners fund capital required for projects

ArcelorMittal · SEKISUI · SUNCOR ENERGY · NextChem Maire Tecnimont for Energy Transition · MITSUI&CO. · Brookfield · IndianOil · Woodside Energy · Shougang

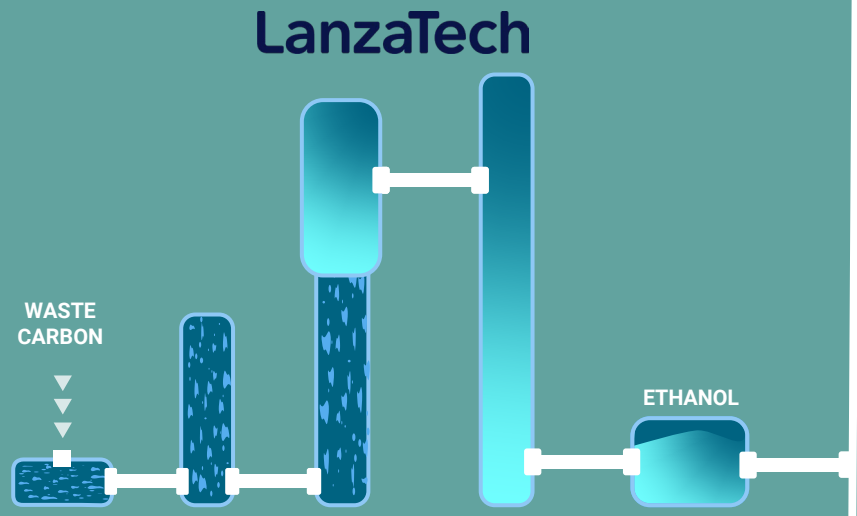
Projects In Operation, Construction And Advanced Engineering Across The Globe

- Operating Commercial Scale Facility
- Operating Demonstration Scale Facility
- Late-Stage Construction or Commissioning[1]
- Engineering[2]

Steel and Ferroalloy Gas · MSW · Refinery Gas · Biomass · Biogas · CO_2 +H_2 · SAF Facility

[1]Project commissioning and/or start-up expected in 2023;[2]Partners not yet publicly announced for all opportunities

DEMAND FOR SUSTAINABLE PRODUCTS CREATES DEMAND PULL FOR ADDITIONAL LICENSED BIOREFINING CCT PLANTS



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

PRODUCTS MADE FROM CARBON EMISSIONS

TEXTILES

SHOE SOLES

PACKAGING

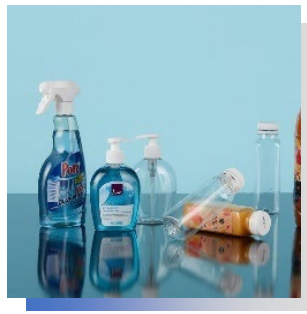
CLEANING PRODUCTS

FRAGRANCES

SAF

DETERGENTS

CONTAINERS



SURFACTANTS

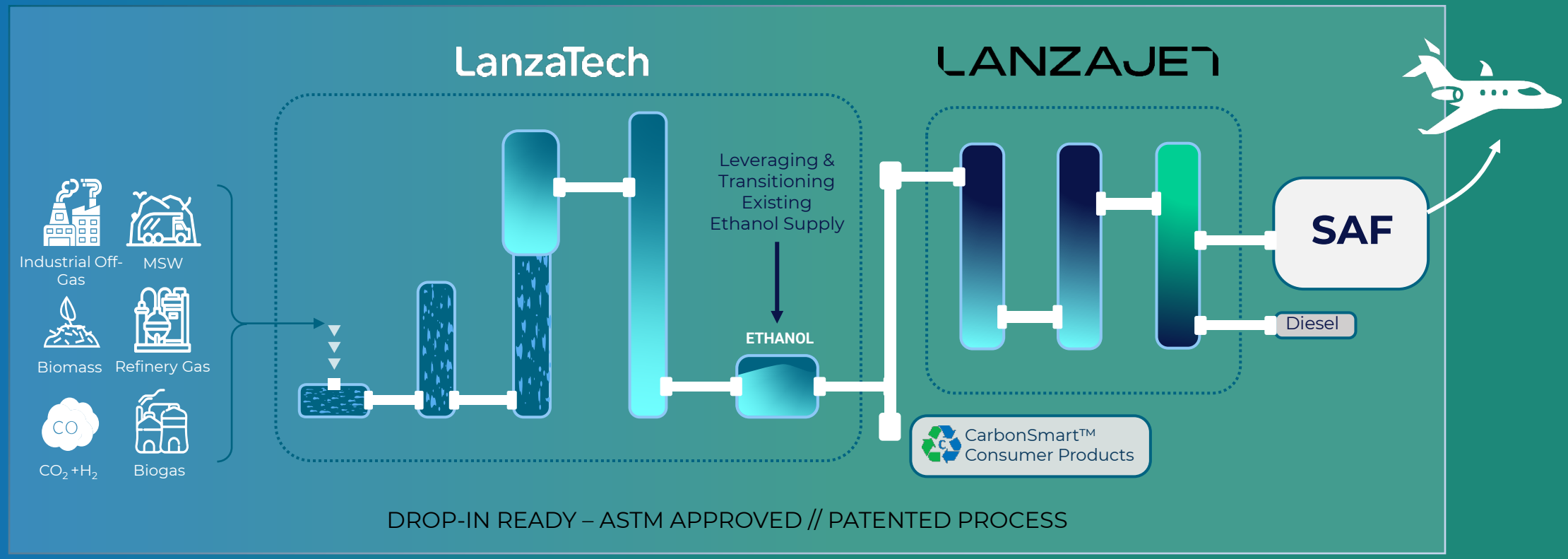
COTY SINCE 1904 ZARA MIGROS mibelle GROUP CRAGHOPPERS Unilever virgin atlantic H&M MOVE

DOWNSTREAM FLEXIBILITY TO INTEGRATE WITH LANZAJET'S SAF PLATFORM

Alcohol-to-Jet Technology Developed within LanzaTech

LanzaTech Ownership at ~25%, Path to Majority through Additional License Contributions

SAF from LanzaJet Platform Creates Demand Pull for Waste-Based Ethanol



LanzaTech

LanzaJet Formed in 2020

BRITISH AIRWAYS ANA Microsoft U.S. DEPARTMENT OF ENERGY LanzaTech MITSUI&CO. SUNCOR ENERGY Breakthrough Energy

LANZATECH IS AT THE CUTTING EDGE ACROSS MULTIPLE TECHNOLOGICAL CAPABILITIES & PROCESSES

A Global Leader in Gas Fermentation

Fermentation

Benchtop & Pilot Scale Gas-Fed Reactors with Integrated Analytics & Data Collection

World's First Anaerobic Biofoundry

Fully Automated Engineering & Screening of Thousands of Anaerobic Gas Fermentation Strains

Advanced AI & Modeling

Fully-Integrated Predictive Metabolic & Process Models

Rapid *In Vitro* Prototyping Platform

Predictive & Low-Cost, Cell-Free Prototyping of Enzymes & Pathway Designs

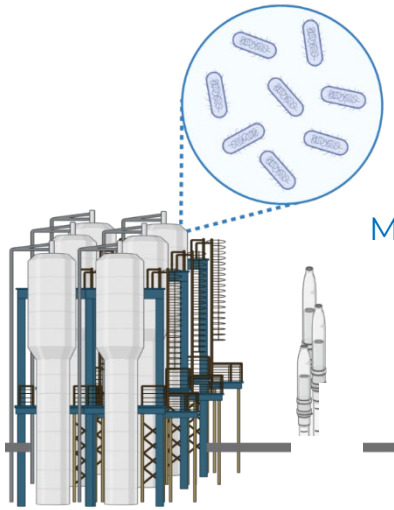
World-Class Synthetic Biology Platform

Cell image credit: Justin Muir.

WHERE WE'RE HEADED: DIRECT PRODUCTION OF BULK COMMODITY CHEMICALS ON A DISTRIBUTED SCALE

"Hardware"

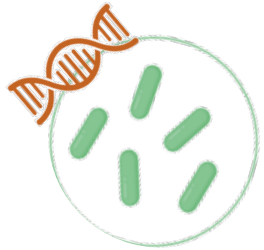
Existing Commercial Plants



Microbe 1.0
Ethanol

"Software"

New Strains To Expand Product Portfolio & Efficiency



Microbe 2.0
Isopropanol

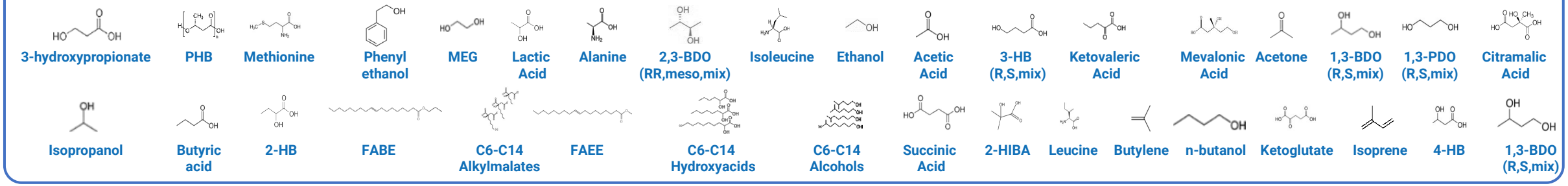
Microbe 3.0
Acetone

Microbe 4.0
MEG

Microbe …

✓ **Same reactor** ✓ **Same feedstock** ✓ **Same process**

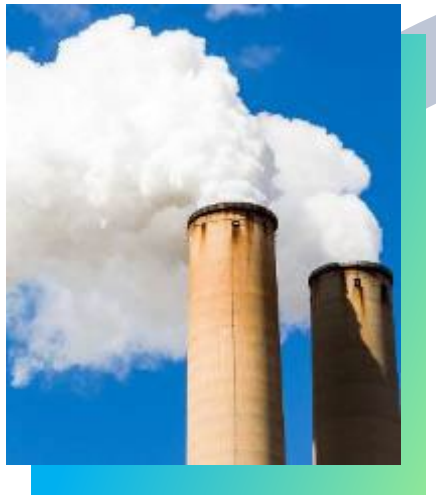
100+ Potential Chemicals Identified

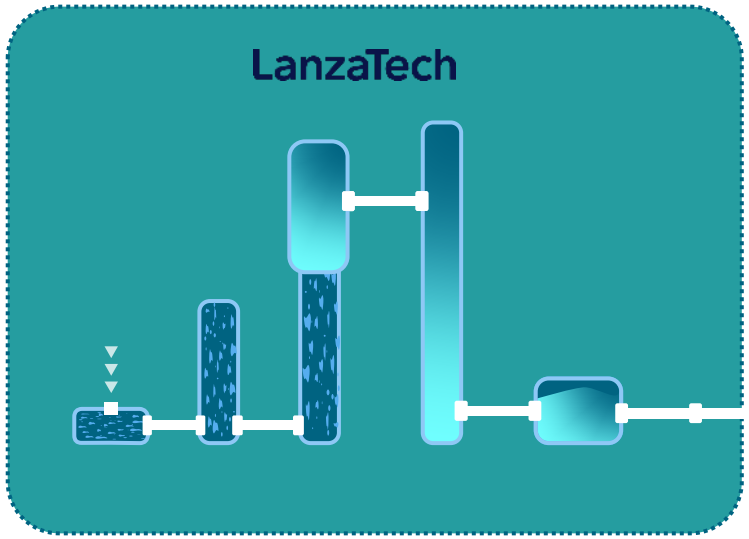


New product development and direct production of high value chemicals if achieved, can expand TAM and increases demand for Biorefining CCT licensing

Images generated with Biorender.com.

THE NEW CARBON ECONOMY IS DISTRIBUTED AND CIRCULAR



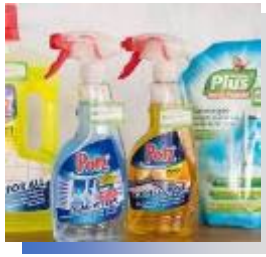


TEXTILES

SHOE SOLES

PACKAGING

CLEANING



FRAGRANCES

AVIATION FUEL

DETERGENTS

CONTAINERS

SURFACTANTS

LanzaTech

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

WE CREATE VALUE
WHERE OTHERS
SEE WASTE

JOIN US ON THIS JOURNEY

LanzaTech

Nasdaq: LNZA

WELCOME TO THE POST POLLUTION FUTURE


VIRENT
BioForming®
Innovating for a Low Carbon Future

Virent Forward Looking Statements

This Presentation includes forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995. Such statements may relate to, among other things: our leadership in catalytic conversion; the future of compliance obligations in fuels; consumer preferences and demand in chemicals and fuels; our ability to implement our operational plans; branding effects, including “halo” effects; our ability to manage risks related to new technology, scale-up and regulatory incentives; feedstock prices and supply chain efficiencies; compliance costs and competition; our access to capital; and the contributions from and benefits to members of the Consortium, among others.

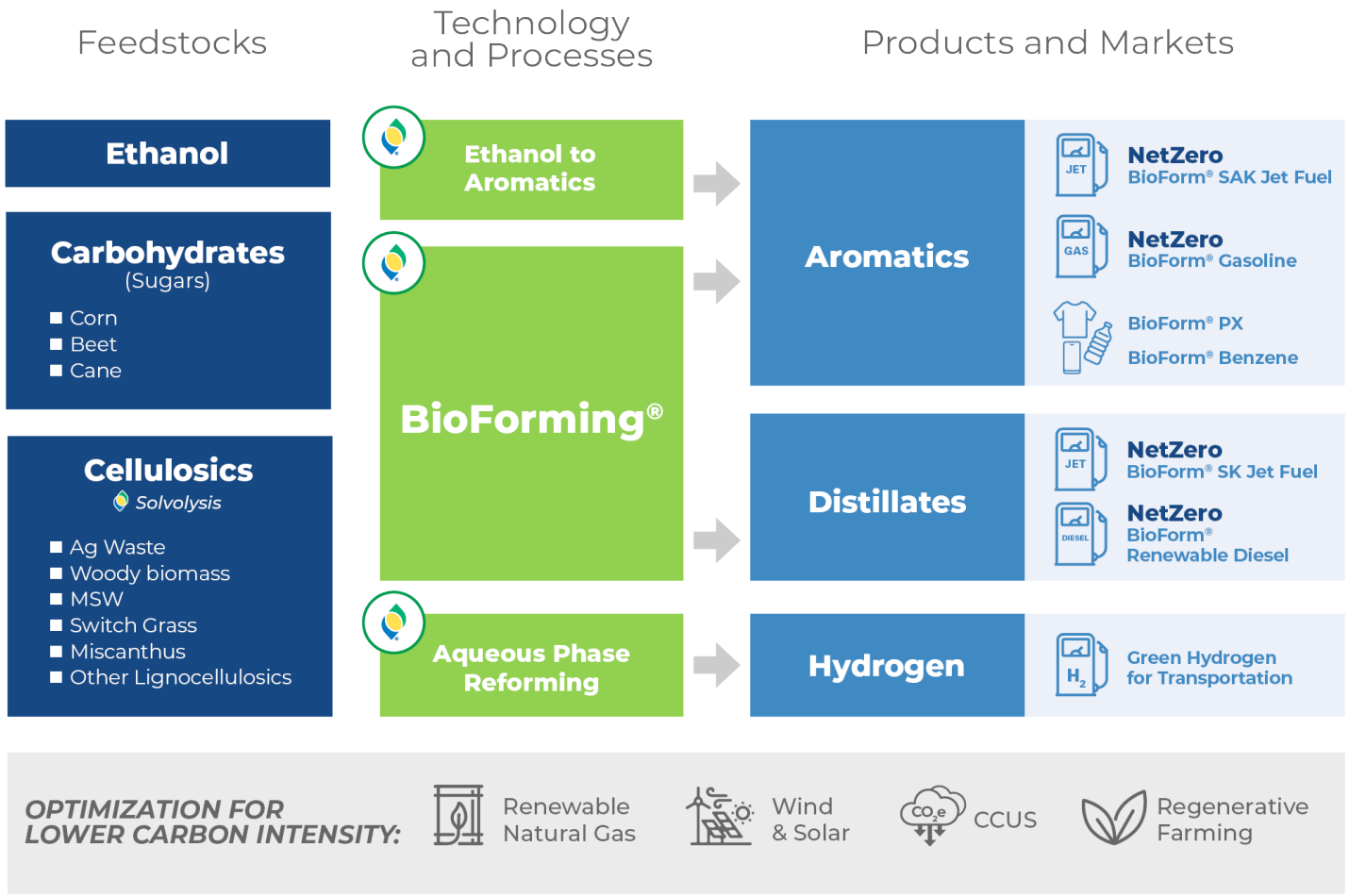
We have used words like “anticipate”, “believe”, “could”, “estimate”, “expect”, “intend”, “may”, “plan”, “predict”, “project”, “should”, “will” to identify forward-looking statements in this presentation. Although we believe the assumptions upon which these forward-looking statements are based are reasonable, any of these assumptions could prove to be inaccurate and the forward-looking statements based on these assumptions could be incorrect. Our operations and anticipated transactions involve risks and uncertainties, many of which are outside our control, and any one of which, or a combination of which, could materially affect our results of operations and whether the forward-looking statements ultimately prove to be correct. Actual results and trends in the future may differ materially from those suggested or implied by the forward-looking statements depending on a variety of factors which are described in greater detail in filings with the SEC by Marathon Petroleum Corp., of which Virent is a wholly-owned subsidiary. All future written and oral forward-looking statements attributable to us or persons acting on our behalf are expressly qualified in their entirety by the previous statements. We undertake no obligation to update any information contained herein or to publicly release the results of any revisions to any forward-looking statements that may be made to reflect events or circumstances that occur, or that we become aware of, after the date of this presentation.

Our Journey

Since 2016, we have been working with our key strategic partners to ready our first technology for commercialization and demonstrate its products and the vision for the future.

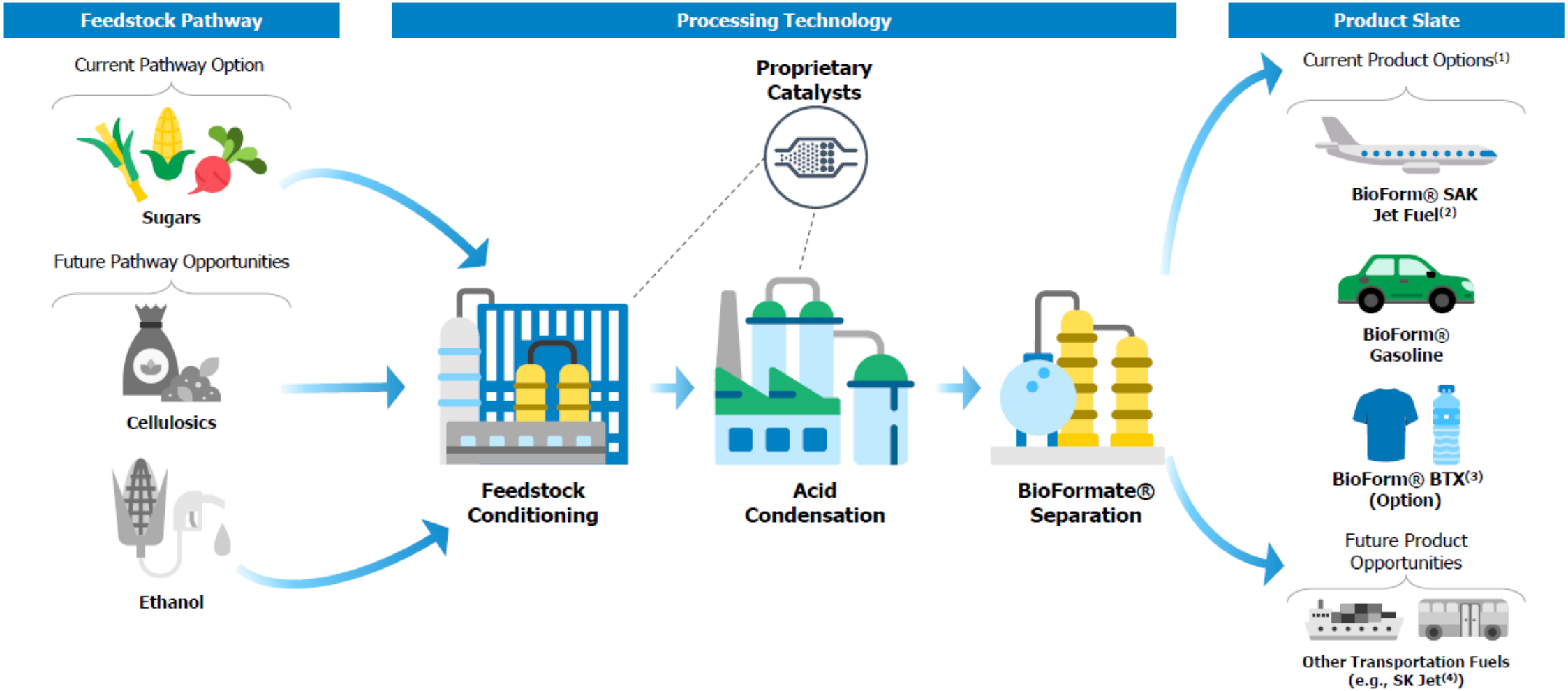
Virent is creating opportunities for renewable markets

- Headquartered in Madison, WI
- Founded in 2002 on renewable hydrogen technology discovered at the University of Wisconsin
- A wholly-owned subsidiary of Marathon Petroleum Corporation
- Commercial focus is on scale-up and first plant deployment of Virent's S2A Technology

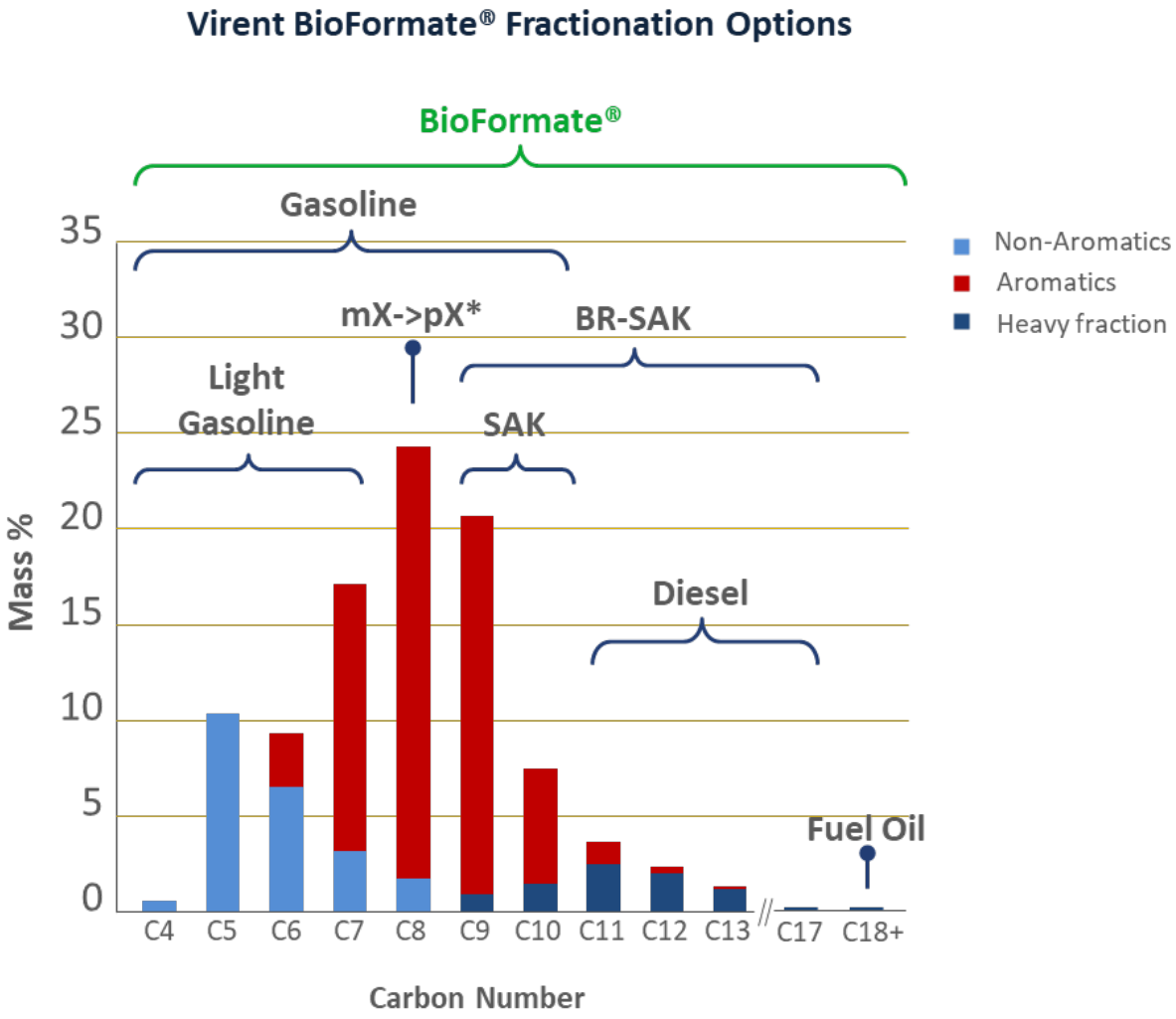


BioForming® Process – Sugars to Aromatics

The S2A platform can work with corn and a range of other sugar feedstocks to produce products which can be blended with existing fuel product or refinery streams



Virent's unique product offering: BioFormate®



Virent's BioForming® technology's process output is a highly aromatic product stream

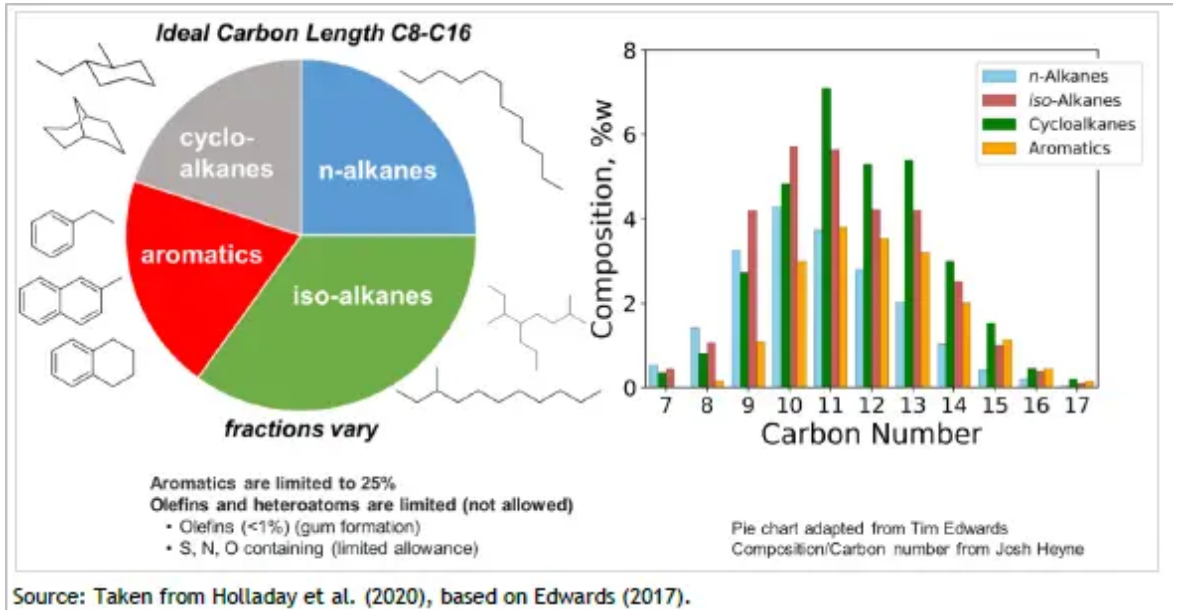
- Similar to the stream from a petroleum reformer unit
- The subsequent separations and fractionation steps dictate the final products – much like a traditional refinery
- Allows for multiple destination markets:
  - **C4-C10:** **Gasoline** – Premium (high octane) blending component
  - **C4-C7/C8:** **Light Gasoline** – Targeted for gasoline blending
  - **C8 (only):** **Mixed Xylenes** – Feedstock for paraxylene, benzene, etc.
  - **C9-C10:** **SAK –** Narrow Range Synthesized Aromatic Kerosine (SAK)
  - **C9-C17:** **Broad Range SAK** – Contains SAK and paraffins (BR-SAK)
  - **C11-C17:** **Diesel** – Diesel blending component
  - **C18+:** **Fuel oil** – Small volumes for use as fuel oil

** Note that pX will require further separation and processing equipment.*

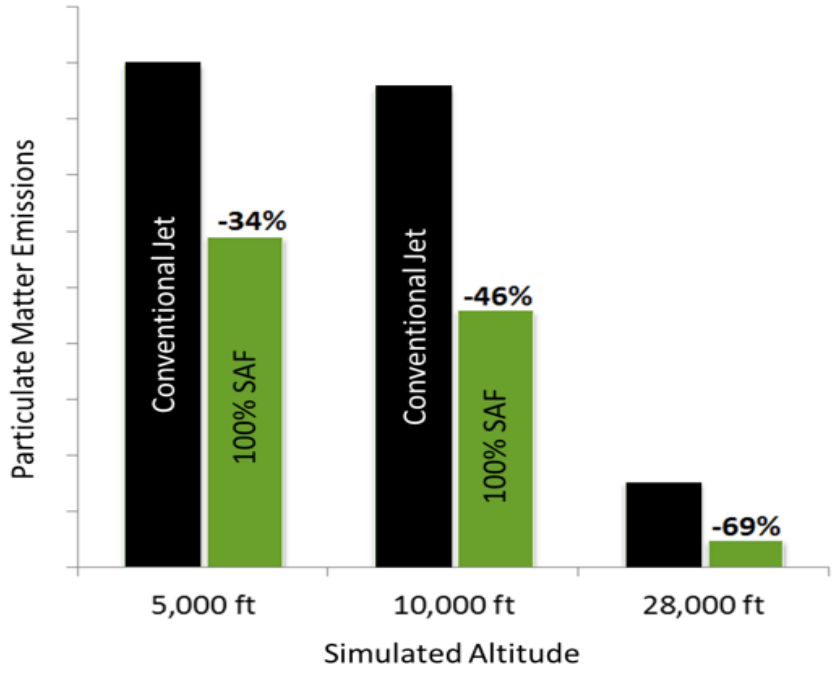

VIRENT
BioForming® S2A
The products we produce can also be utilized as sustainable aviation fuel to lower the overall impact of our travels.

BioForm® SAK improves fuel properties and enables 100% Drop-In SAF

*While also providing **lower particulate matter emissions** than conventional jet fuel*



Source: Taken from Holladay et al. (2020), based on Edwards (2017).



SAK is a cleaner burning fuel and an ideal blending component for Synthesized Paraffinic Kerosenes (SPK) such as HEFA, ATJ and FT Jet Fuels

Test	Units	D1655 Limit	HEFA	SAK	20% SAK + HEFA
Aromatics	Vol %	8 – 25	0	98.0	19.6
Naphthalenes	Vol %	< 3	0	0.1	0.02
Density	kg/m3	775 – 840	750	875	775
Freeze Point	°C	< -40	< -40	< -77	<< -40
Viscosity (-20°C)	mm^2/sec	Max 8	~10	3.2	5.5

Ref: Production of Hydroprocessed Esters and Fatty Acids (HEFA)—Optimisation of Process Yield / Oil & Gas Science and Technology · January 2014

December 2021

January 2023

February 2023

December 2022

100% Drop-in SAF Demonstrations with Partners. Virent SAK/HEFA SAF Blends


VIRENT
BioForming® S2A
Low Carbon Gasoline is another option

There is a big push today for battery electric vehicles

The New York Times

California to Ban the Sale of New Gasoline Cars

The decision, to take effect by 2035, will very likely speed a wider transition to electric vehicles because many other states follow California's standards.

CNBC

CLIMATE POLICY

New York law phases out most gas-powered vehicles by 2035

PUBLISHED THU, SEP 9 2021·7:07 PM EDT

MOTORTREND

No Dice, ICE: European Union Upholds 2035 Internal Combustion Engine Ban

How will the EU decision impact European automakers' U.S.-market plans, if at all?

The New York Times

G.M. Will Sell Only Zero-Emission Vehicles by 2035

The move, one of the most ambitious in the auto industry, is a piece of a broader plan by the company to become carbon neutral by 2040.

CBS NEWS

MONEYWATCH ›

Volvo plans to phase out gas engines in all its cars by 2030

AP

U.S. Department of Energy awards $2.8 billion to boost EV and grid battery production

The White House announced the passing of a Bipartisan Infrastructure law that will provide $2.8 Billion in funding for 20 companies across 12 states in the US

… but much needs to be done to recognize the benefits

Requires investments in new infrastructure, access to foreign resources and time

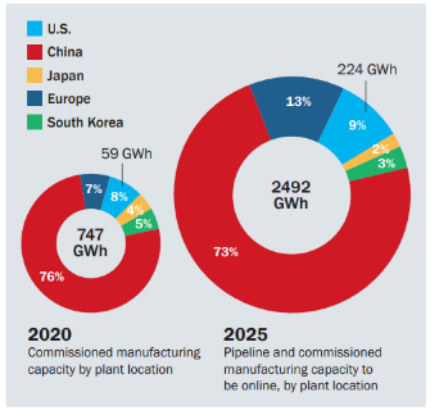


FIGURE 3. Cell manufacturing capacities.
Source: "Lithium-Ion Battery Megafactory Assessment", Benchmark Mineral Intelligence, March 2021.

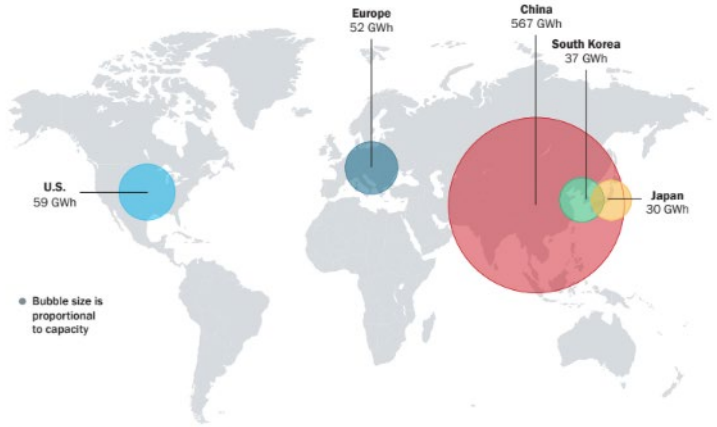
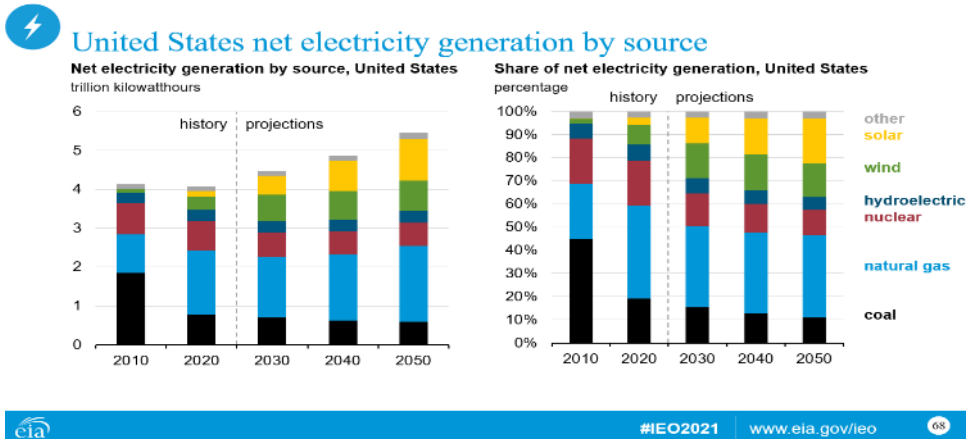


FIGURE 6. Cell manufacturing capacity by country or region.
Source: "Lithium-Ion Battery Megafactory Assessment", Benchmark Mineral Intelligence, March 2021.[32]



Executive Summary: National Blueprint for Lithium Batteries 2021-2030 DOE
https://www.energy.gov/sites/default/files/2021-06/FCAB%20National%20Blueprint%20Lithium%20Batteries%200621_0.pdf

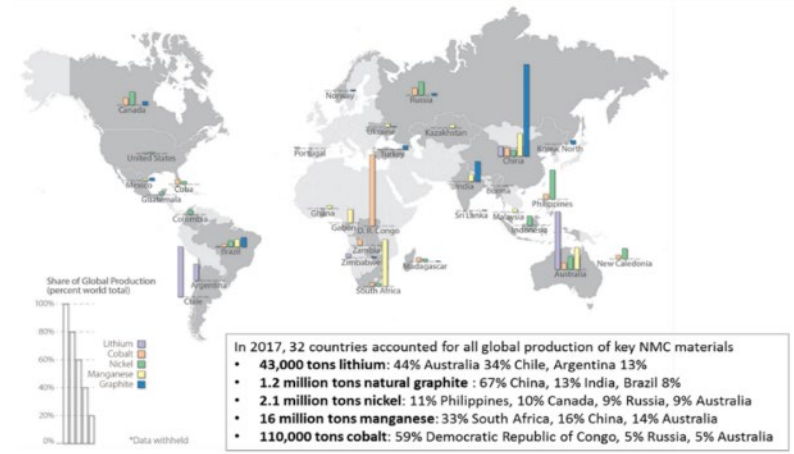
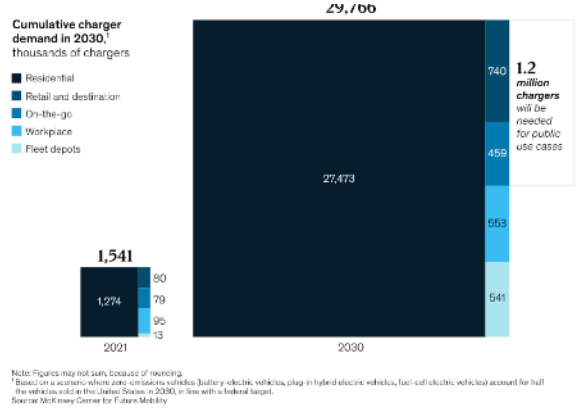


Figure 1. Key nickel, manganese, cobalt materials locations

Source: Mayyas et al. 2019

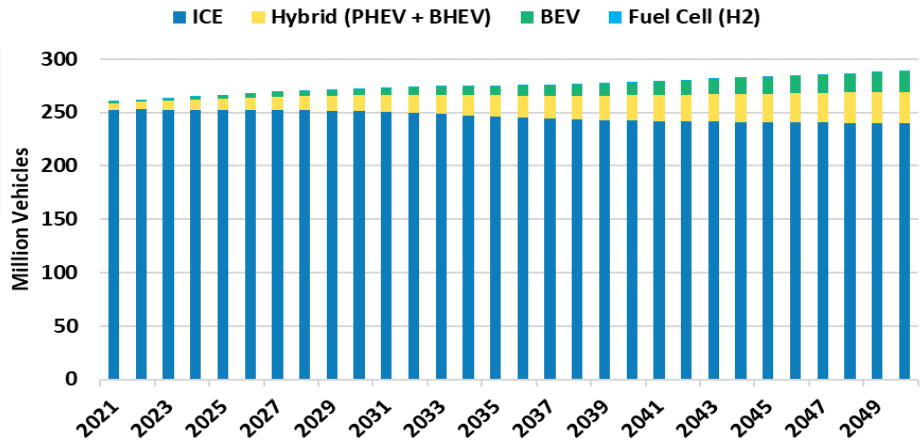
Supply Chain of Raw Materials Used in the Manufacturing of Light-Duty Vehicle Lithium-Ion Batteries https://www.nrel.gov/docs/fy19osti/73374.pdf



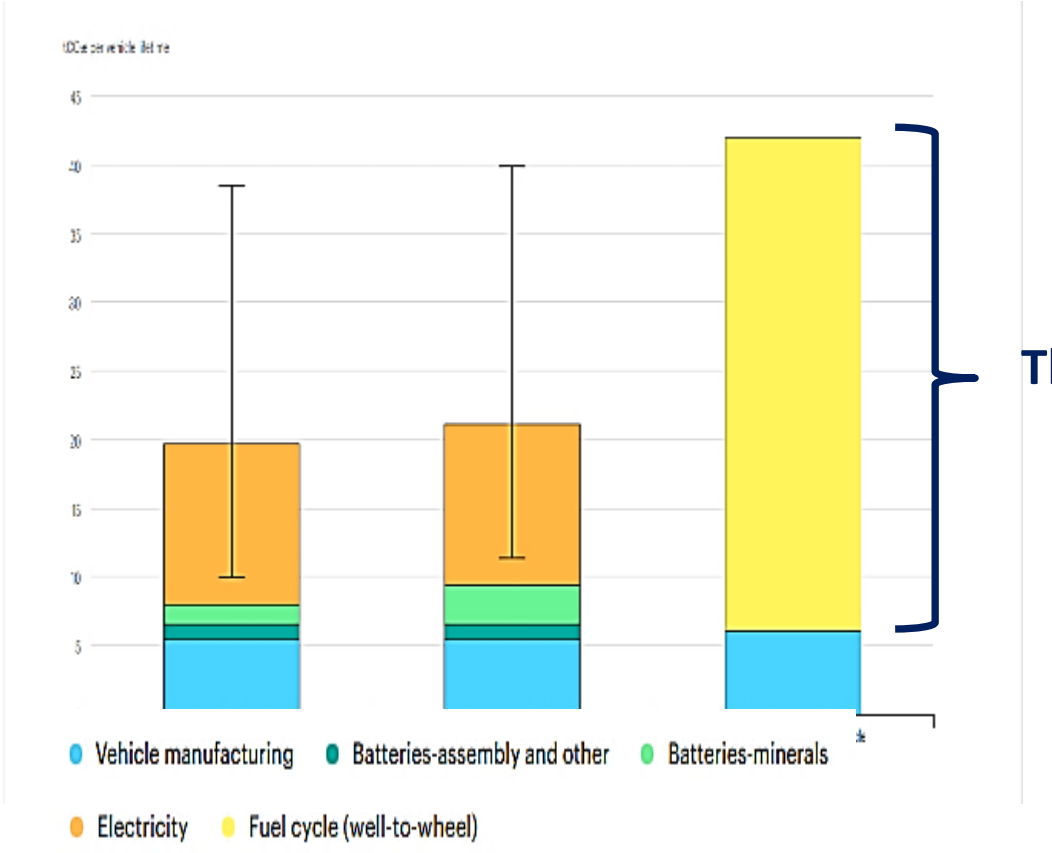
https://www.mckinsey.com/industries/public-and-social-sector/our-insights/building-the-electric-vehicle-charging-infrastructure-america-needs

U.S. Light Duty Vehicle Stock

Source: EIA AEO 2022



Low-carbon gasoline is a viable option too



IEA, Comparative life-cycle greenhouse gas emissions of a mid-size BEV and ICE vehicle, IEA, Paris https://www.iea.org/data-and-statistics/charts/comparative-life-cycle-greenhouse-gas-emissions-of-a-mid-size-bev-and-ice-vehicle, IEA. License: CC BY 4.0 Last Updated 10-26-2022

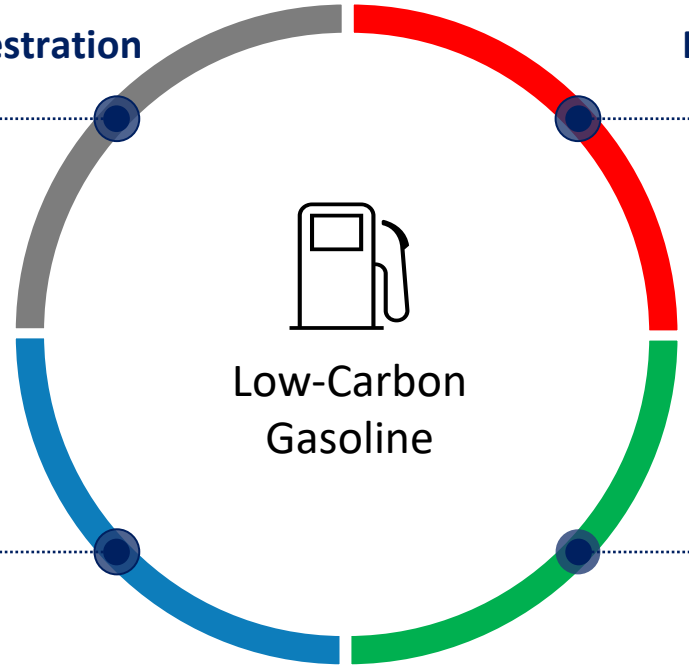
The Opportunity

- **Fuel cycle is the biggest CI driver for the internal combustion engine (ICE)**
- **Electricity and battery materials/assembly are the biggest CI drivers for battery electric vehicles (BEV)**
- **Recall that gasoline is also required for hybrid electric vehicles and plug-in hybrid vehicles**

… and it is within reach using today's infrastructure

Carbon Capture and Sequestration

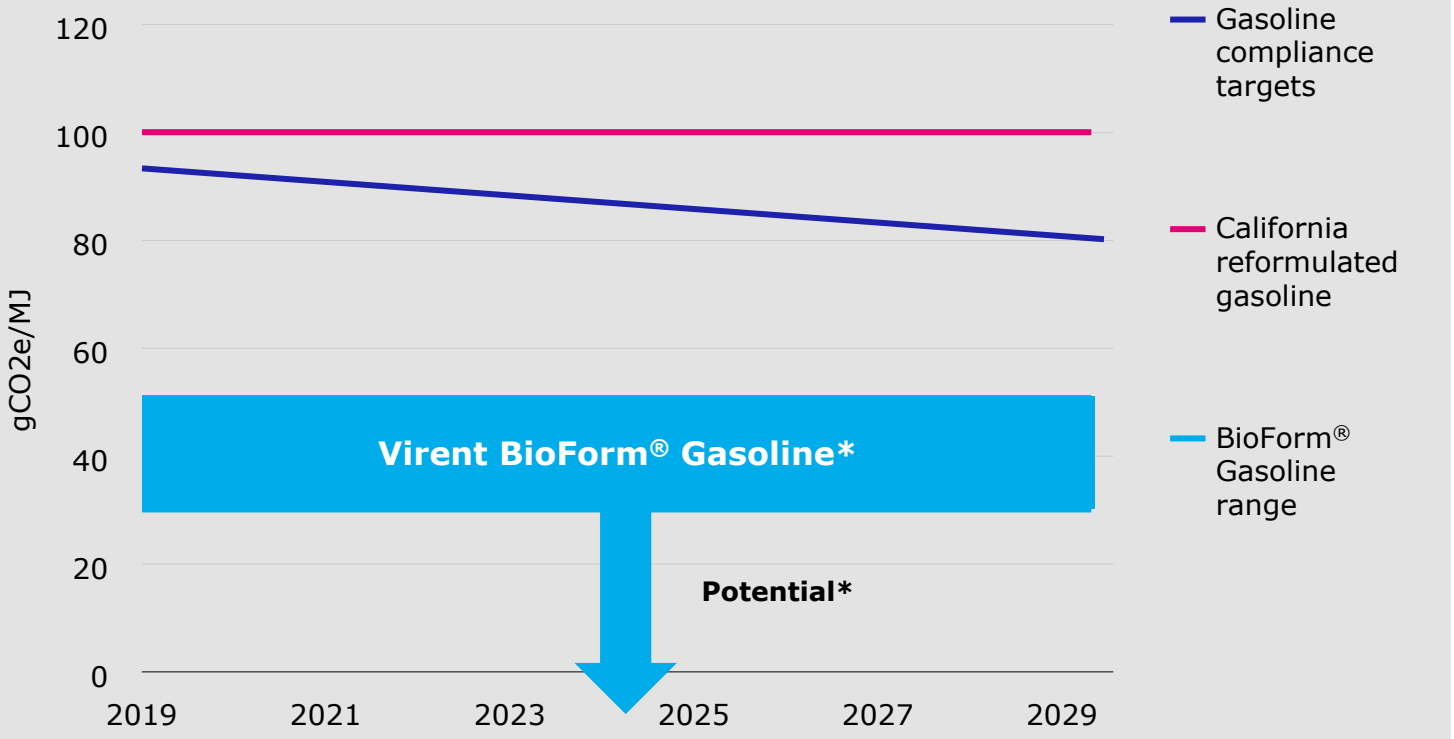
Low-Carbon Hydrogen



Refinery Improvements

Biobased Feedstocks

A pathway to renewable, low carbon gasoline



*Virent BioForm® Gasoline CI will be determined by choice of utilities and deployment strategy
Examples: Grid electricity vs renewable electricity, renewable natural gas (RNG) use, etc.

Successful 12-vehicle no-harms testing

EPA part 79 registration up to 45% BioForm gasoline

BioForming® S2A

Innovating for the future of biosynthetic clothing and packaging

“Keep warm naturally with the SugarDown Hoody, our first fully biobased insulation piece. With a shell made entirely from sugarcane…”

Patagonia SugarDown Hoody

https://www.patagonia.com/product/mens-sugardown-hoody/85530.html?dwvar_85530_color=CTRB

“The fabric in this series is made of a polyester fiber developed by and in association with Toray Industries Inc. made from a 100% plant-based source.”

Issey Miyake RESONANT SUIT PB

Presented at Paris Fashion Week

(2022, October 1) ***Issey Miyake Spring Summer Collection 2023*** https://www.isseymiyake.com/en/news/9861

“The Coca-Cola Company’s sustainable packaging journey crosses a major milestone this week with the unveiling of its first-ever beverage bottle made from 100% plant-based plastic…”

Coca-Cola Plant-Based Bottle

https://www.coca-colacompany.com/news/100-percent-plant-based-plastic-bottle

“Toray Develops ”Ultrasuede™ nu” using 100% Plant-based polyester for Headrest Covers of ANA Green Jet”

ANA Future Promise Program

(2022, October 3) ***Toray Develops ”Ultrasuede™ nu” using 100% Plant-based polyester for Headrest Covers of ANA Green Jet***
[Press Release] https://www.toray.com/global/news/details/20220930170124.html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