



Making Sustainable Alternative Fuels Viable in Brazil

June 19th, 2018

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Company Profile

Corporate Headquarters and R&D in Chicago, USA

- Founded in New Zealand
- Operations and Business offices in China and India
- Freedom Pines Biorefinery in Georgia, USA
- CEO: Dr. Jennifer Holmgren
- CSO, Founder: Dr. Sean Simpson

Over 130 staff

- Synthetic Biology, Fermentation
- Analytical, Process Validation
- Engineering

IP Portfolio

>400 Patents pending; >350 granted

Funding

4 rounds: \$250 M

khosla ventures



WTI

MLS
Capital



MITSUI & CO.

PETRONAS



SIEMENS





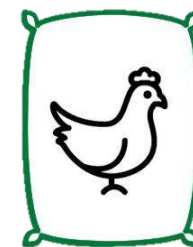
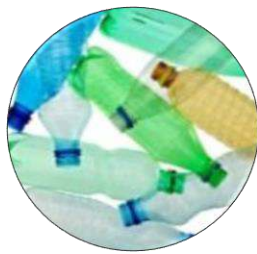
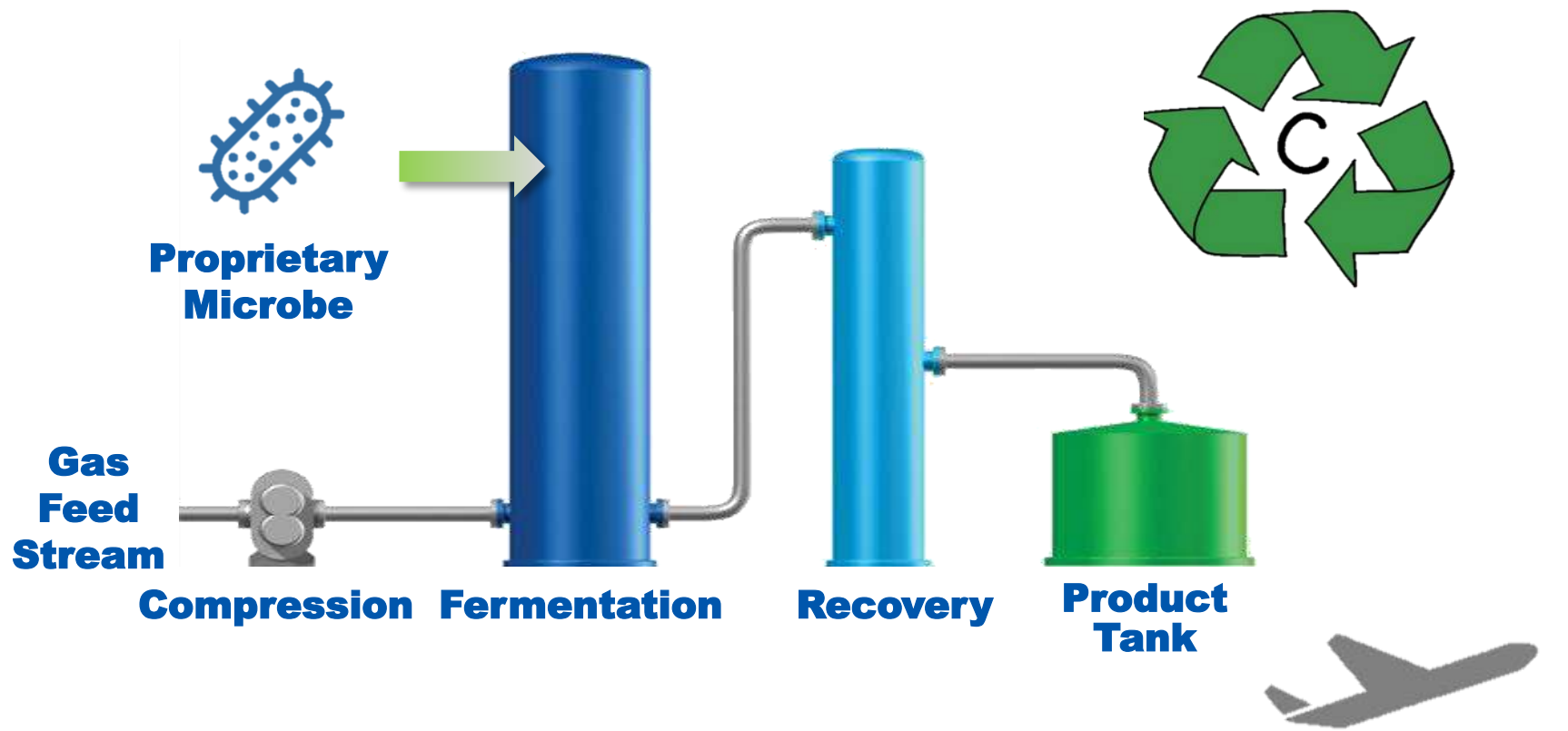
Chemicals for Everyday Products **need** Carbon



Recycling Carbon



**Industrial Off Gas
Biomass, MSW Syngas**





Started Up May 3rd 2018!





首钢朗泽
Shougang LanzaTech

China
48k MTA
2018



ArcelorMittal



Belgium
62k MTA
2019



South Africa
52k MTA
2019



India
34k MTA
2019



Industrial Off Gases



35k MTA
Dedicated MSW Syngas
Demonstration Scale
Biomass Syngas
2018-2017



It takes Time....It takes Data



*Multiple Demo plants
at various scales;
70,000 operating hours*

LanzaTech

CELEBRATING
13 YEARS

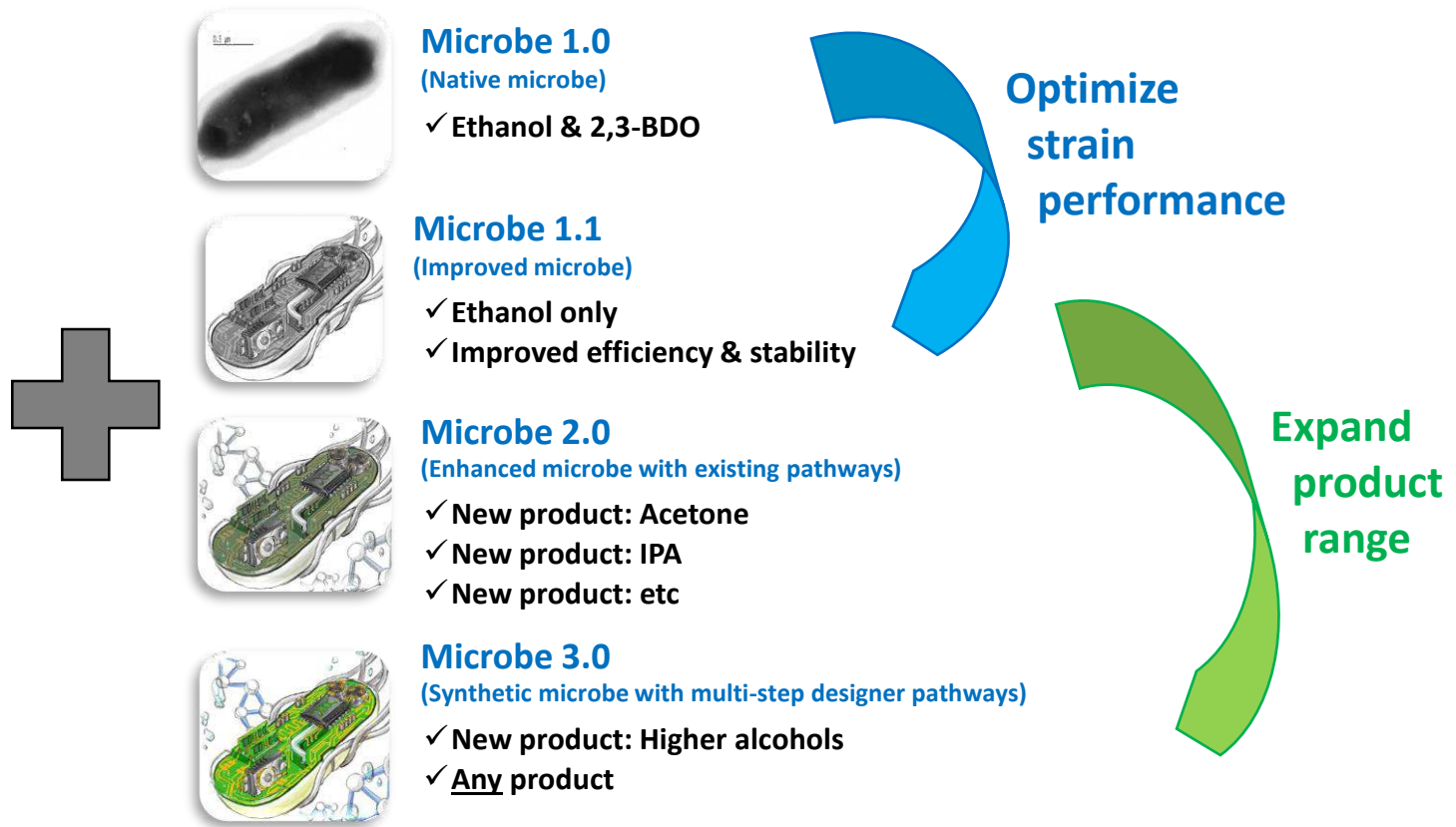


Overview Strain/Product Development Pipeline and Deployment Strategy

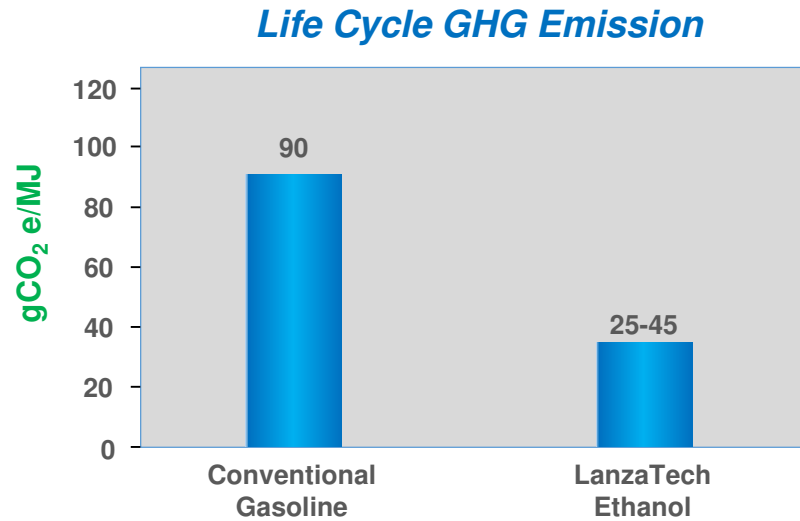
“hardware”



“software”



Recycling Gases: Environmental, Economic, Social Benefit



Life Cycle Analyses (LCA) for ethanol performed in cooperation with: Michigan Tech University, Roundtable on Sustainable Biomaterials (RSB), E4Tech, Ecofys and Tsinghua University

50-70% GHG Reduction over Conventional Gasoline



Energy security from sustainable, regional resources



No Land Biodiversity



Water Recycle



New revenue from waste



“Green jobs”

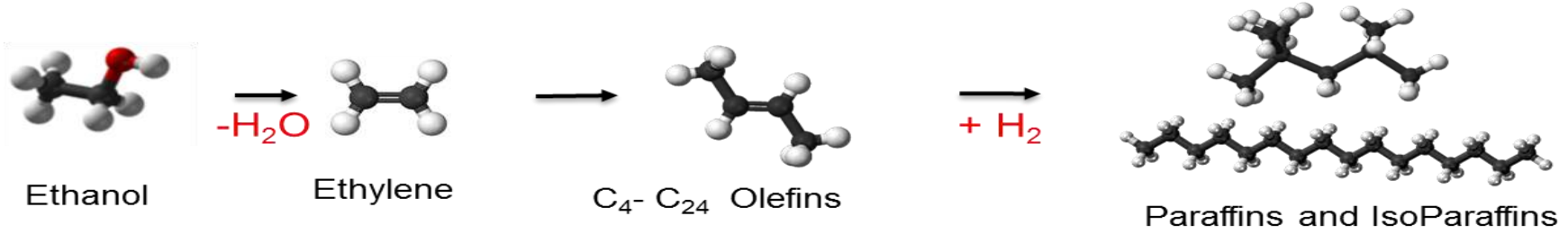
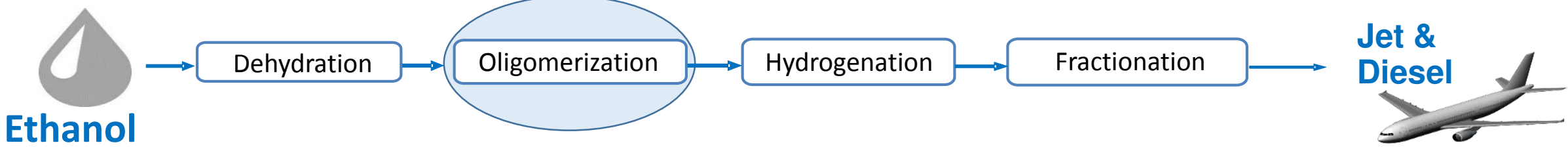


Carbon sequestered into new products



1st RSB Certified Facility in China

From Waste to Wing



Jet range hydrocarbons (C8-C16) selectively built from smaller molecules

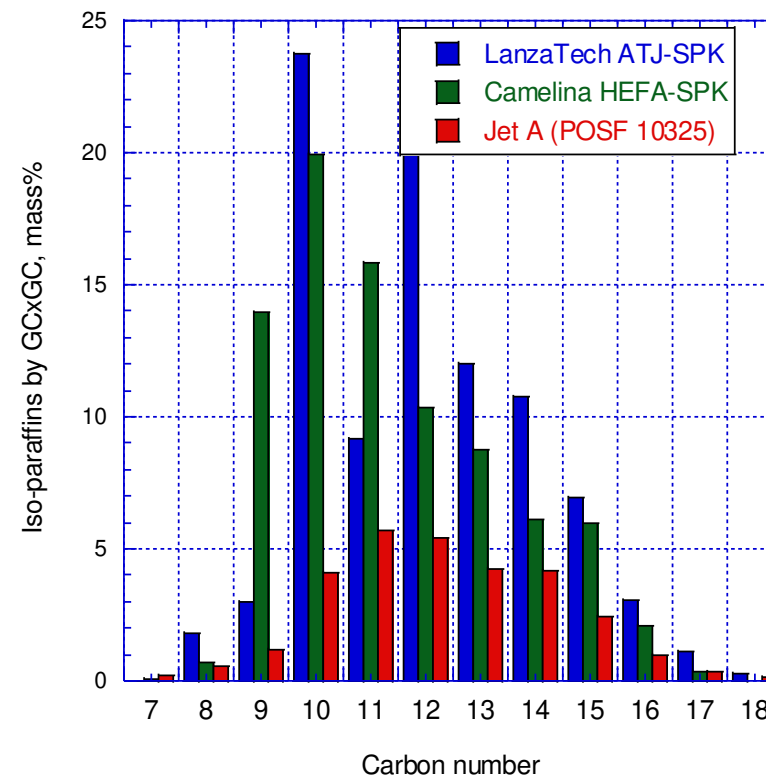
LanzaTech Jet Property Highlights

Fuel Property	Jet A Spec	LanzaTech ATJ-SPK	50/50% v with Jet A
Freeze Point, °C	-40 max	-61	-54
Energy Density, MJ/kg	42.8 min	44.4	43.8
Thermal Stability	Baseline	Excellent	Excellent
Viscosity @ -40 °C mm ² /sec	12 max	7.0	9.3
Hydrogen %	13.4 min	15.1	14.5
Aromatics %	8 min, 25 max	Nil	8.8
Sulfur, total mass %	0.30 max	<0.001	0.02

Meets or Exceeds Critical Jet Fuel Specifications
Neat fuel primarily isoparaffins with <0.2% aromatics

On April 1, 2018 ASTM Intl. Revised D7566 ATJ SPK Annex A5

- Added Ethanol as a feedstock
- Increased final blend ratio to max 50 %



Carbon number range similar to conventional jet fuel and other SPK's

The ASTM Ballot to add Ethanol was based on LanzaTech's Fit for Purpose Data and Research Report

LanzaTech Jet Production at its Freedom Pines Biorefinery



LanzaTech Produced...

✓ 4000 gallons Jet

✓ 600 gallons Diesel

- Demonstrated feedstock flexibility
 - 1,500 gal from waste gas ethanol (Lanzanol)
 - 2,500 gal from Grain Ethanol
- Waste gas ethanol (Lanzanol) produced in an RSB-certified demonstration facility
 - Shougang-LanzaTech 100,000 gal/yr China demonstration plant



Lower Cost Commercial Product



Ready NOW