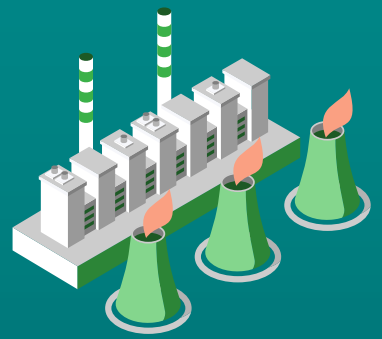
The Antelope Valley Circular Hydrogen Initiative: Transforming wastewater biogas into clean hydrogen.

Los Angeles County Solid Waste Integrated Waste Management Taskforce

June 20, 2024

RECARBON

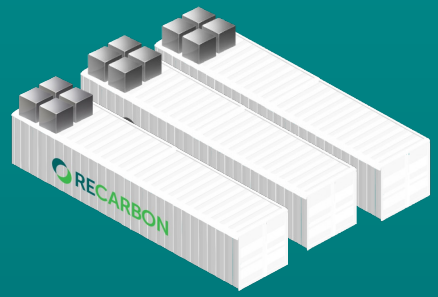
Transform carbon emissions into valuable clean fuels



Industrial Emissions and Biogenic Sources

CO_2 →

CH_4 →

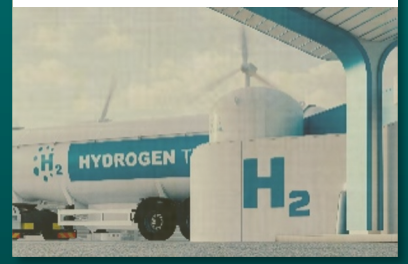


ReCarbon
Plasma Carbon Conversion Unit

Carbon-Negative Syngas (H_2 + CO) →

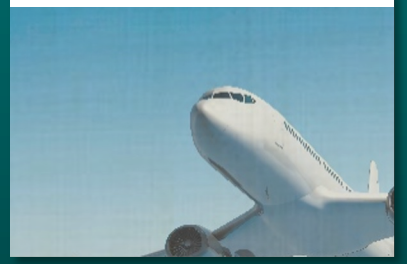
Downstream Technology

Hydrogen



Methanol

Aviation Fuel



Other Clean Fuels

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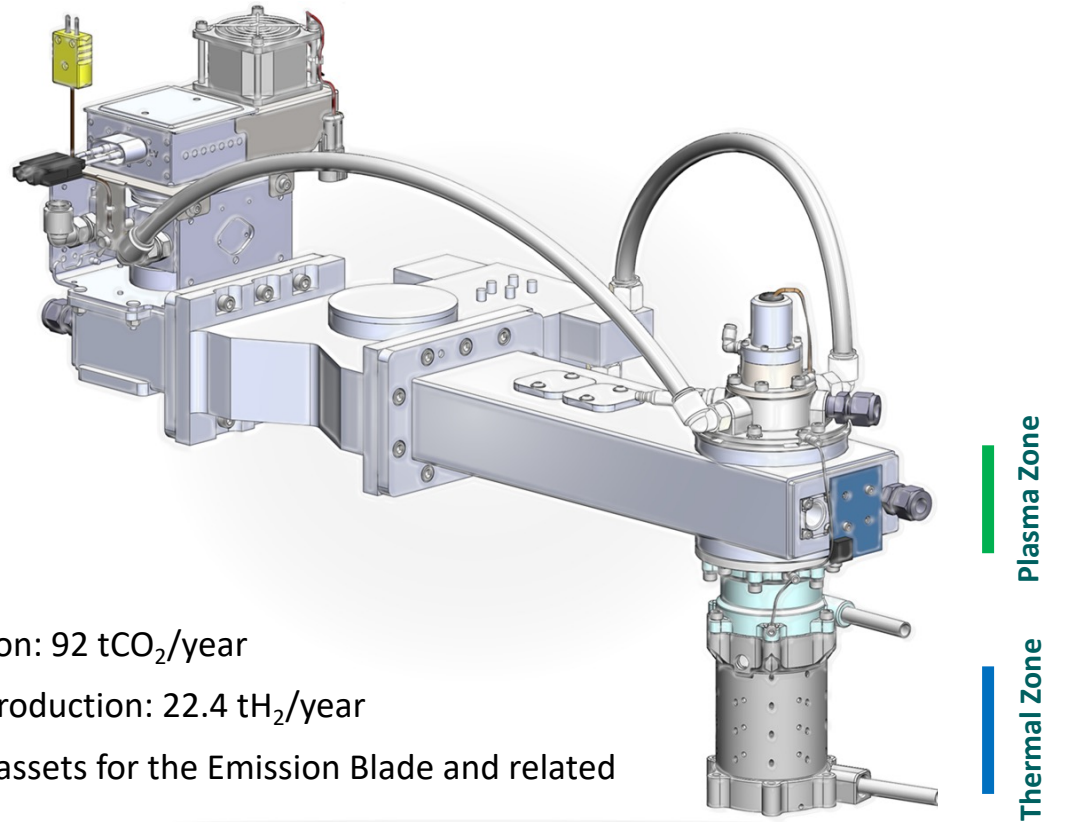
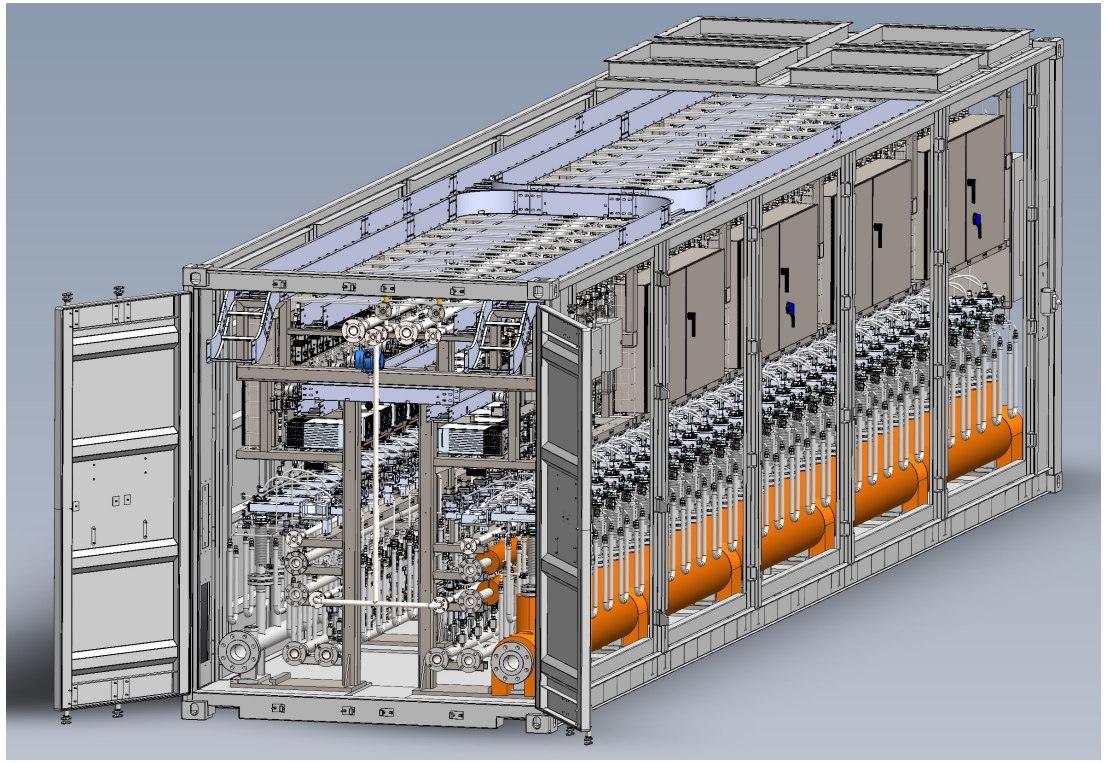
How it works: The Emission Blade

100% Electrified Reforming Technology



- CO_2 reduction: 92 tCO_2/year
- Hydrogen production: 22.4 tH_2/year
- 104 patent assets for the Emission Blade and related processes

The Plasma Carbon Conversion Unit (PCCU): Scalable, Configurable, and Modular



Standard Design

- Stackable 40 feet standard container-based module
  - ✓ Significantly reduces footprint
  - ✓ Easy to transport
- 60 Emission Blades
- CO_2 reduction: 5,500 tCO_2/year
- Hydrogen production: 1,335 tH_2/year (3.8 tH_2/day)

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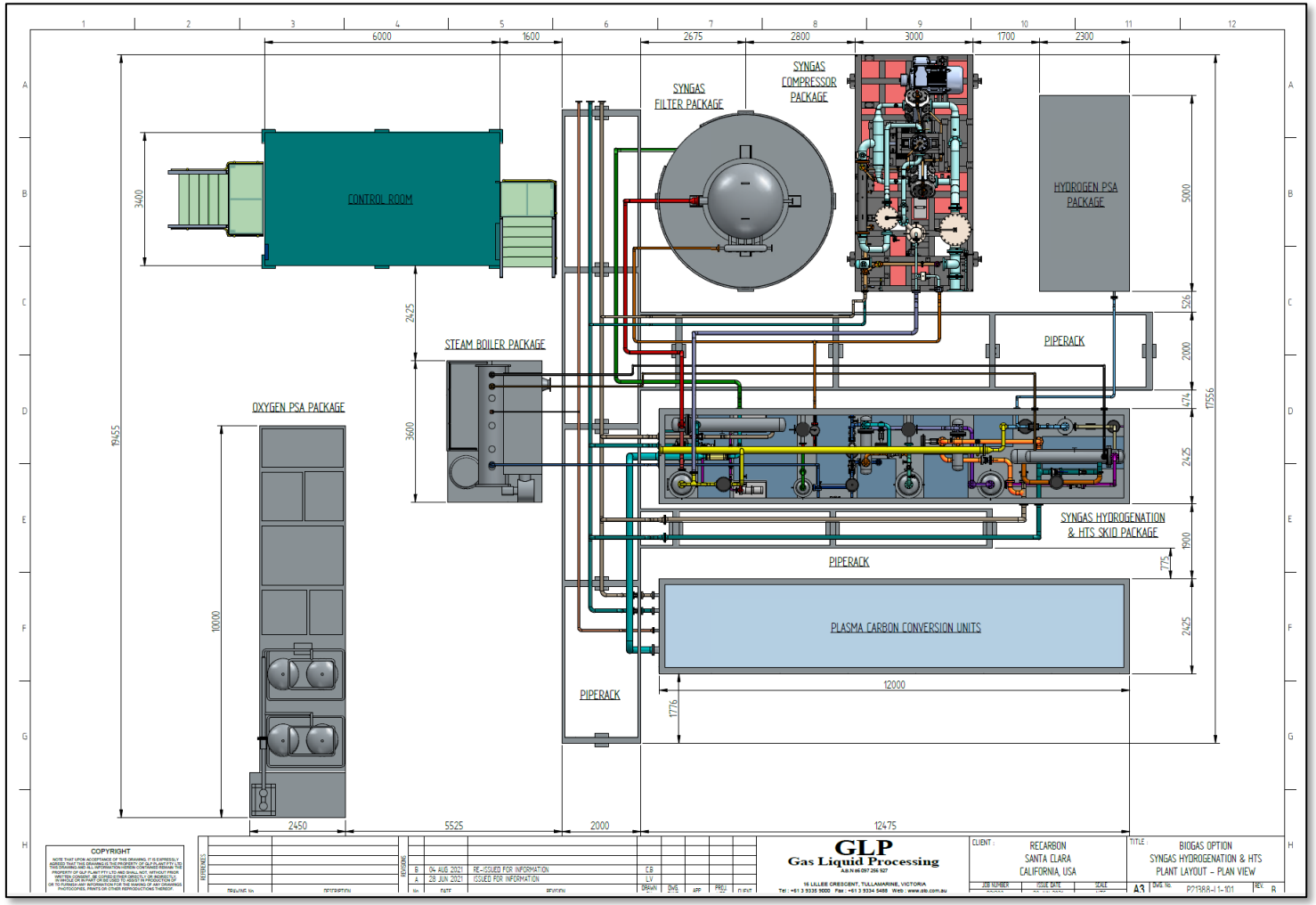
A PCCU-based hydrogen production plant



Key Equipment

- PCCU
- Syngas WGS Skid
- Hydrogen PSA
- Syngas Compressor
- Waste Heat Recovery: Steam Generator
- Oxygen Generator

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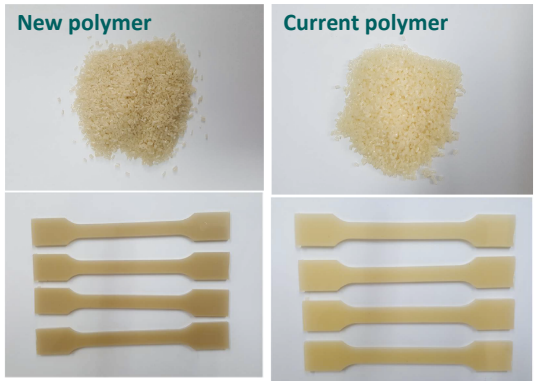
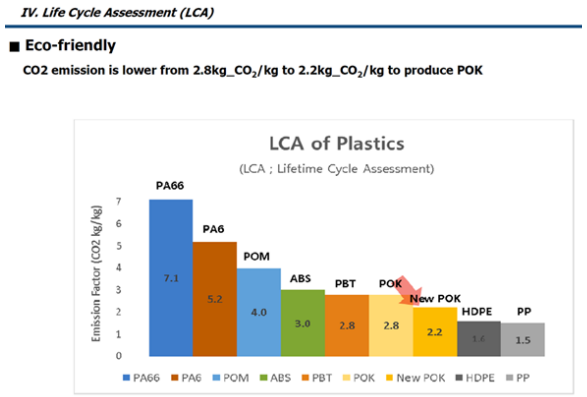
Pilot Plants: Landfills in Korea and the US

Korea Pilot: 2018 - 2019

US Pilot: 2020 - 2022





- 1kW technology: 72 Emission Blades
- EB technology and scale-up concept proven and demonstrated
- Polymers produced from ReCarbon product gas

- 3kW technology: 8 Emission Blades
- Extensive field tests including 90-day continuous run
- Executed a Supply Agreement to build hydrogen production plants

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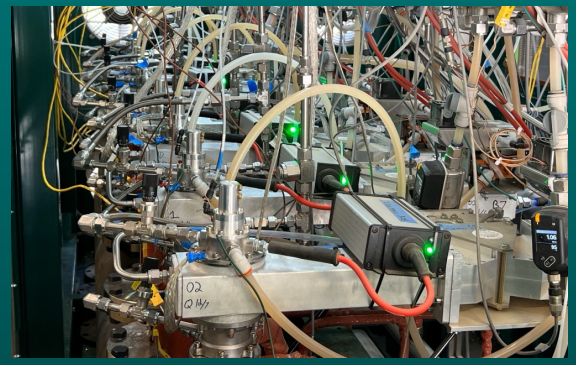
H2Renewables pilot plant–converting raw biogas into carbon-negative syngas

Plant Details

- H2Renewables & ReCarbon
- Bradley County, TN
- 7 Emission Blades
- Raw Biogas conversion to syngas

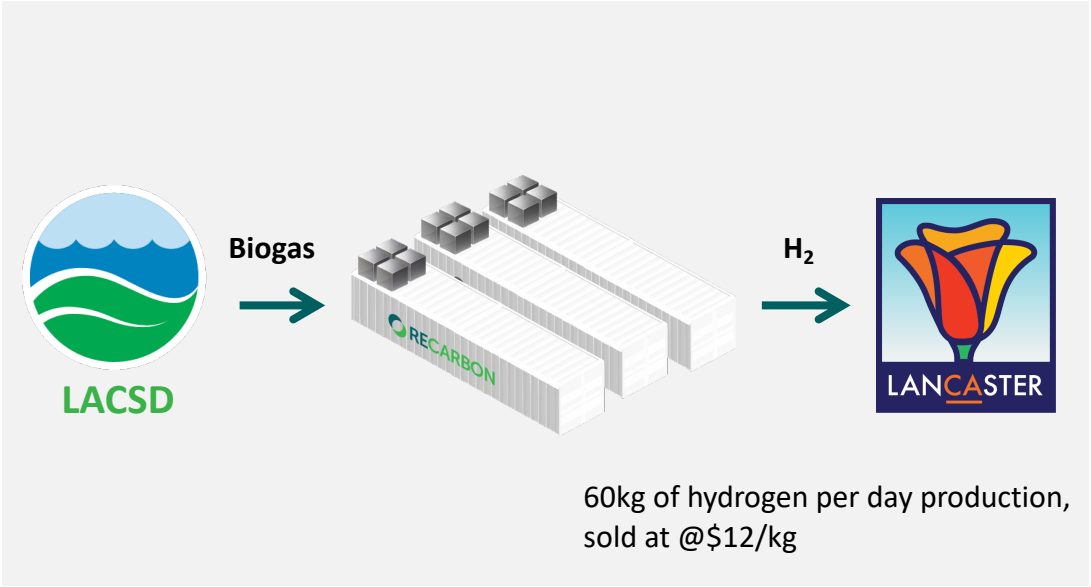
Plant

PCCU

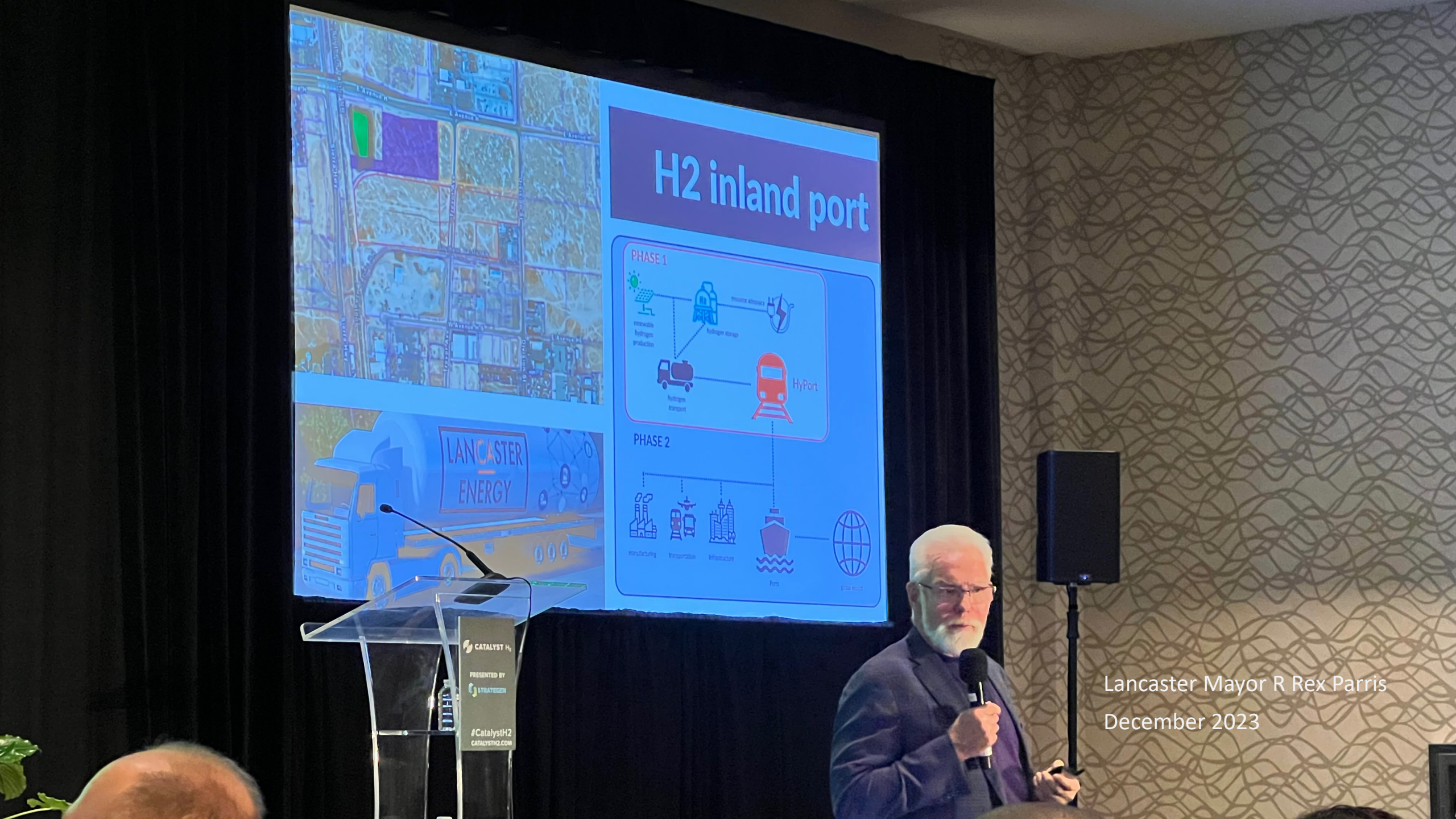


Emission Blades

Antelope Valley Circular Hydrogen Initiative:
Innovative public-private partnership to unlock potential of waste biogas



- **The Antelope Valley Circular Hydrogen Initiative (AVCHI)** is a multi-stakeholder, public-private partnership with the City of Lancaster California, hosted by the Los Angeles County Sanitation District (LACSD).
- First phase of the AVCHI will deploy a pilot clean hydrogen production facility utilizing biogas produced from a waste-water treatment facility.
- Lancaster has executed a non-binding clean hydrogen purchase agreement for the hydrogen at $12/kg.
- LACSD has executed a non-binding term sheet for the biogas supply and a land lease.
- After successful completion of field testing, the second phase would involve the design, build, and commissioning of a large-scale clean hydrogen plant at an agreed upon WWT site.



Lancaster Mayor R Rex Parris

December 2023

Lancaster Water Reclamation Plant (WRP)

LACSD Facility

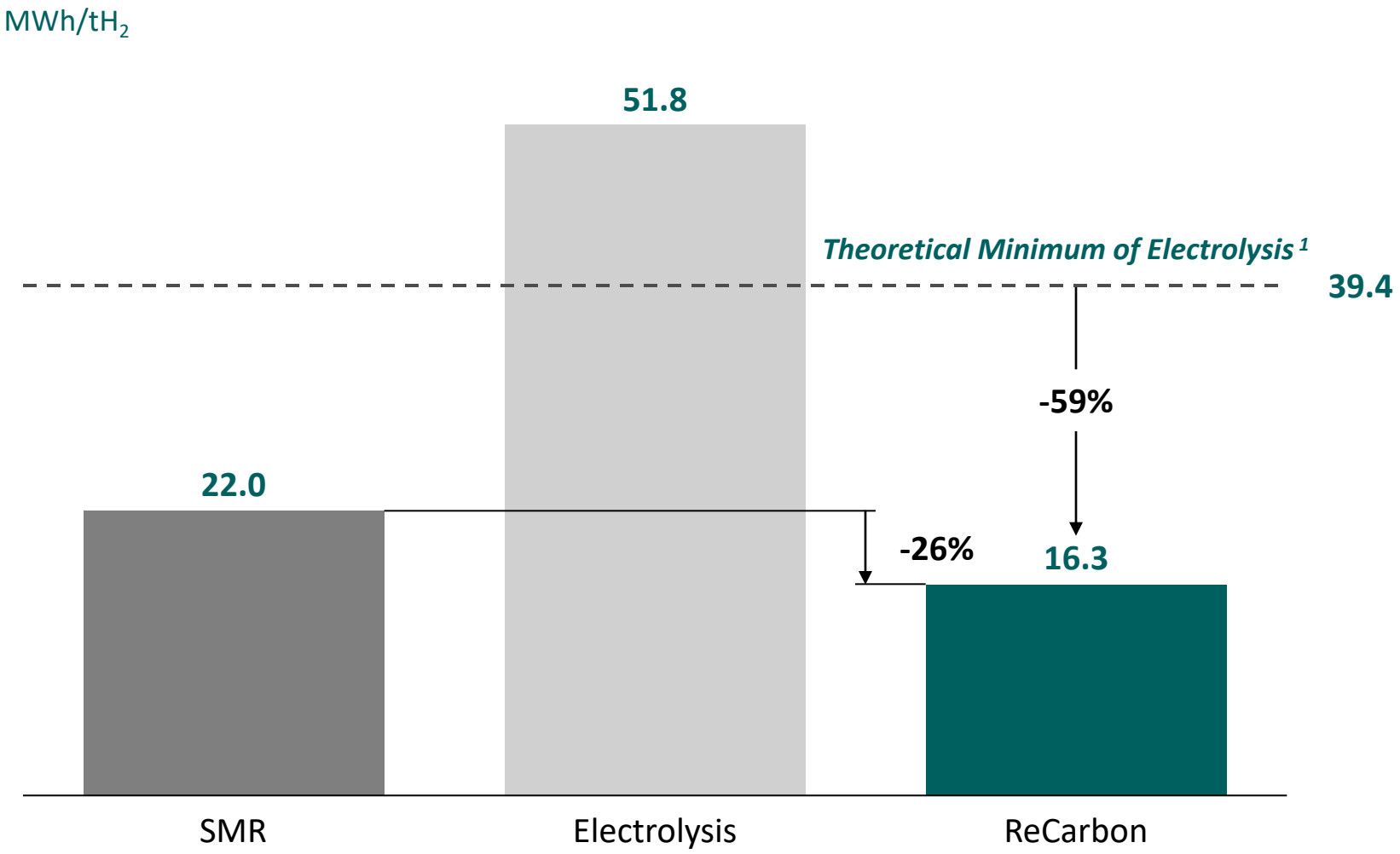
November 2023


Lancaster Water Reclamation Plant (WRP)
LACSD Facility
November 2023


Lancaster Water Reclamation Plant (WRP)
LACSD Facility
November 2023


Potential
Demonstration
Site

Our competitive advantage in H_2 production energy



[1]Calculated based on the enthalpy of reaction assuming 100% efficiency

ReCarbon's H_2 production energy is **more than 50% lower** than the *theoretical minimum* of electrolysis

ReCarbon's H_2 production energy is **decisively lower than the industry standard SMR** hydrogen production energy **(more than 25% lower)**

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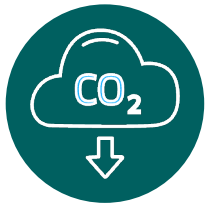
Market Focus



Clean Fuels

Target Markets:

- Americas, EU, and NE Asia
- Already large markets, growing fast

Target Customers:

- Biogas developers, hydrogen and methanol producers, shipping companies, ship builders

Our Value:

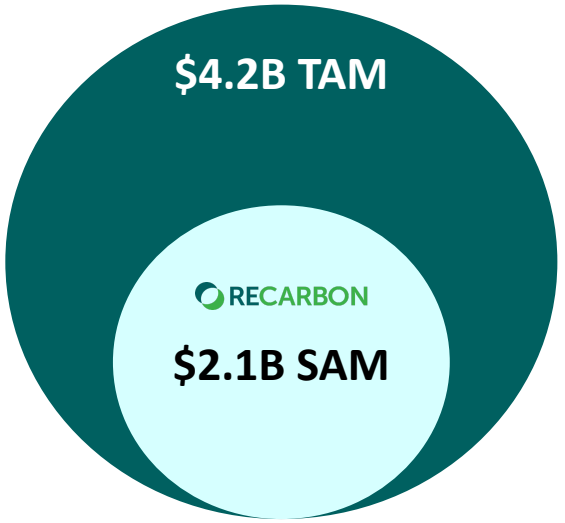
- Exceptionally low carbon intensity
- Cost competitive
- Significantly lower energy consumption

Sources: Global Hydrogen Report 2022, IAE; US DOE Hydrogen & Fuel Cells Technology Office; US DOE Alternatives Fuels Data Center; Bloomberg NEF Green Methanol Demand for Net Zero Shipping

TAM: Total Addressable Market
SAM: Serviceable Available Market

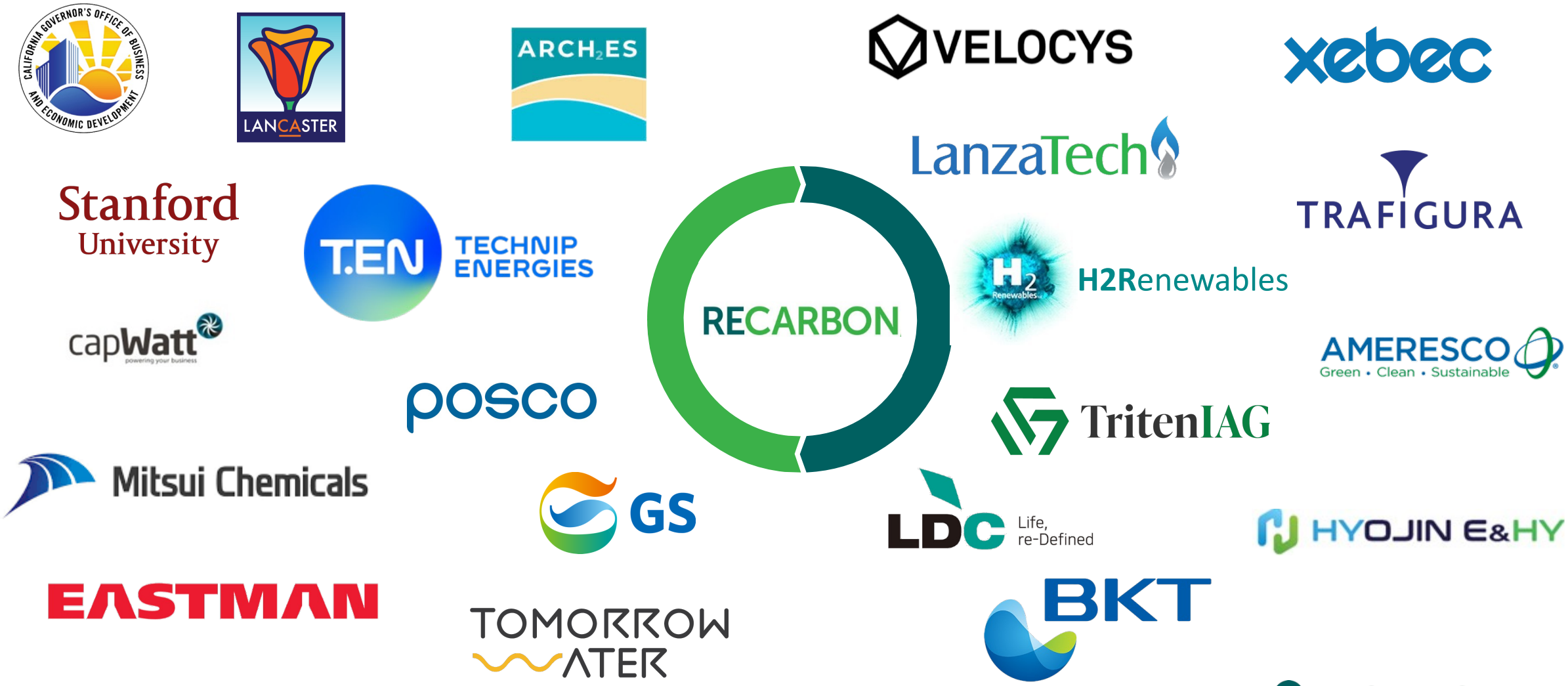
Clean Hydrogen (2030)

Green Methanol (2027)



RECARBON

ReCarbon's extensive network of partners help accelerate the adoption of solutions to transform biogas into clean hydrogen and fuels.



ReCarbon's proprietary technology enables a revolutionary solution.

On ReCarbon's Emission Blade:

"The plasma reforming technology developed by ReCarbon is a high throughput, electrified, dry oxy-methane reformer, producing syngas (hydrogen and carbon monoxide) with record low levels of energy.

A breakthrough by ReCarbon is the design and implementation of a 2nd stage reformer which utilizes the high internal energy carried by the 1st stage product gases. This technology greatly enhances the throughput of the system leveraging both the waste heat and the chemical potential energy of the feed gas mixture."

Mark Cappelli
Professor of Mechanical Engineering

Stanford University

RECARBON

Michael Schmitz
EVP Product & Partnerships
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