LMOP Webinar

Innovative and Emerging LFG Energy Project Types

September 14, 2021

LANDFILL METHANE OUTREACH PROGRAM

Welcome and Agenda

Agenda
Fueling the Hydrogen Revolution with Renewable Natural Gas Stewart Stewart, Chief Commercial Officer, BayoTech
GasTechno Energy and Fuels, Renewable Fuels and Fleet 2021 John Baker, President, Alan Environmental, for GasTechno Energy & Fuels
Questions and Answers
Wrap Up

Mention of any company, association, or product in this presentation is for information purposes only and does not constitute a recommendation of any such company, association, or product, either express or implied, by the EPA.

LANDFILL METHANE OUTREACH PROGRAM

BayoTech

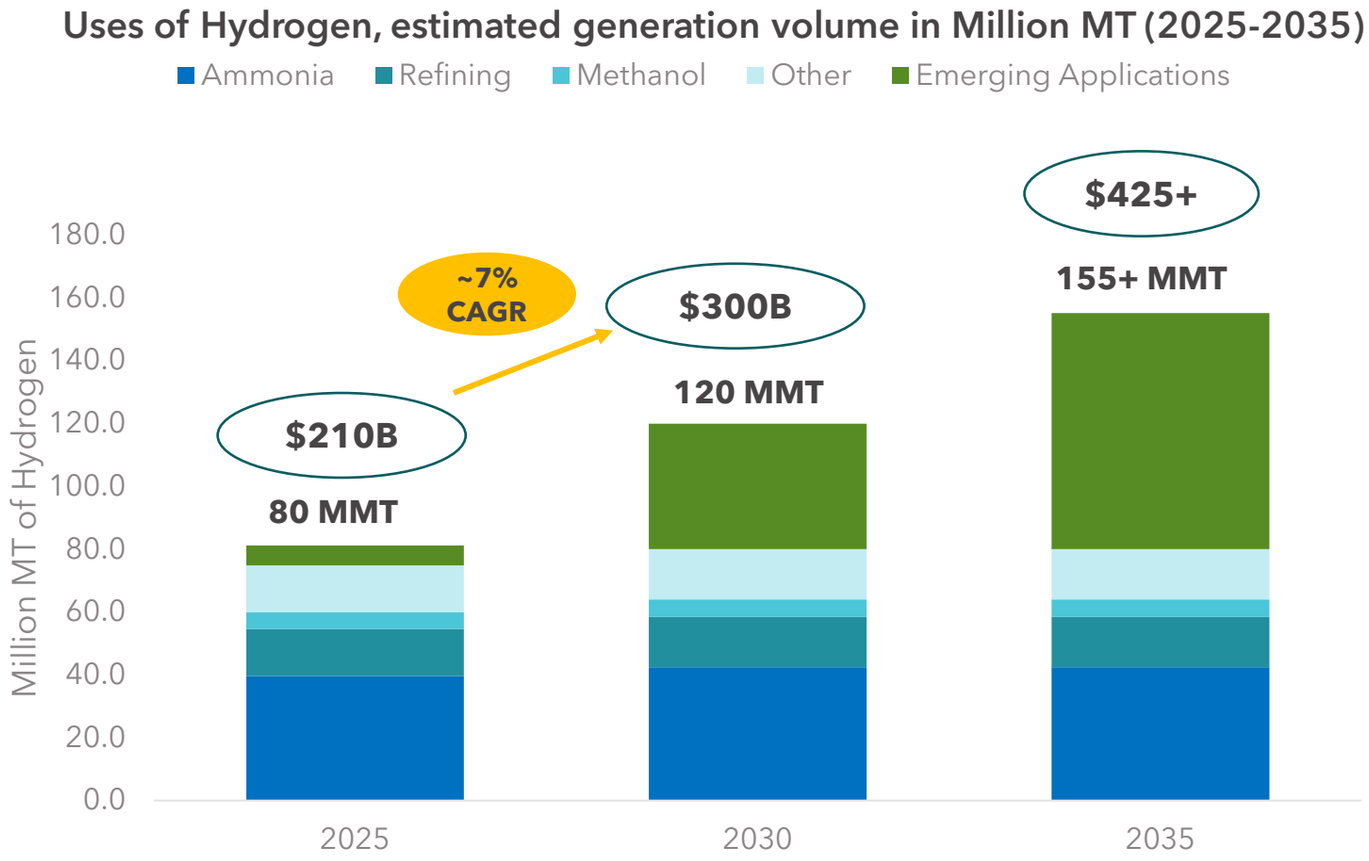
Fueling the Hydrogen Revolution with Renewable Natural Gas

bayotech.us

09.2021

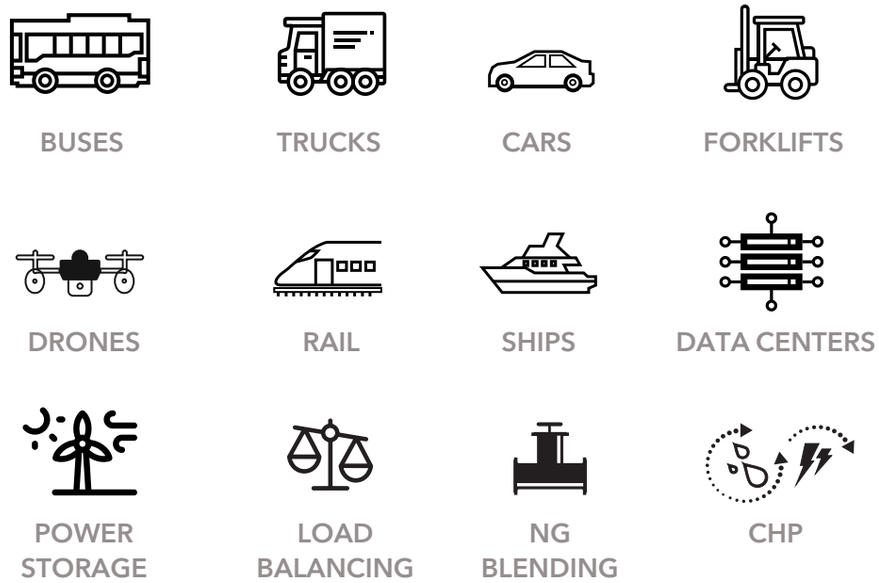
BayoTech

Hydrogen Market Momentum



Sources: The Essential Chemical Industry – online; Hydrogen Council volume forecast for 2030; iea.org Net Zero by 2050 report, Evercore PLUG analysis

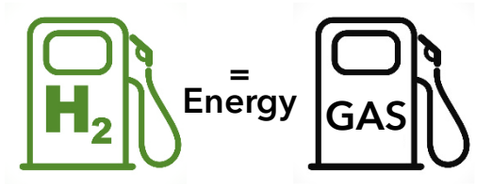
Emerging Applications



Emerging applications are distributed in nature

BayoTech

Why Hydrogen? Why Now?



1 kg 1 gallon

70 miles/kg vs 24 miles/gal

H2 Gas

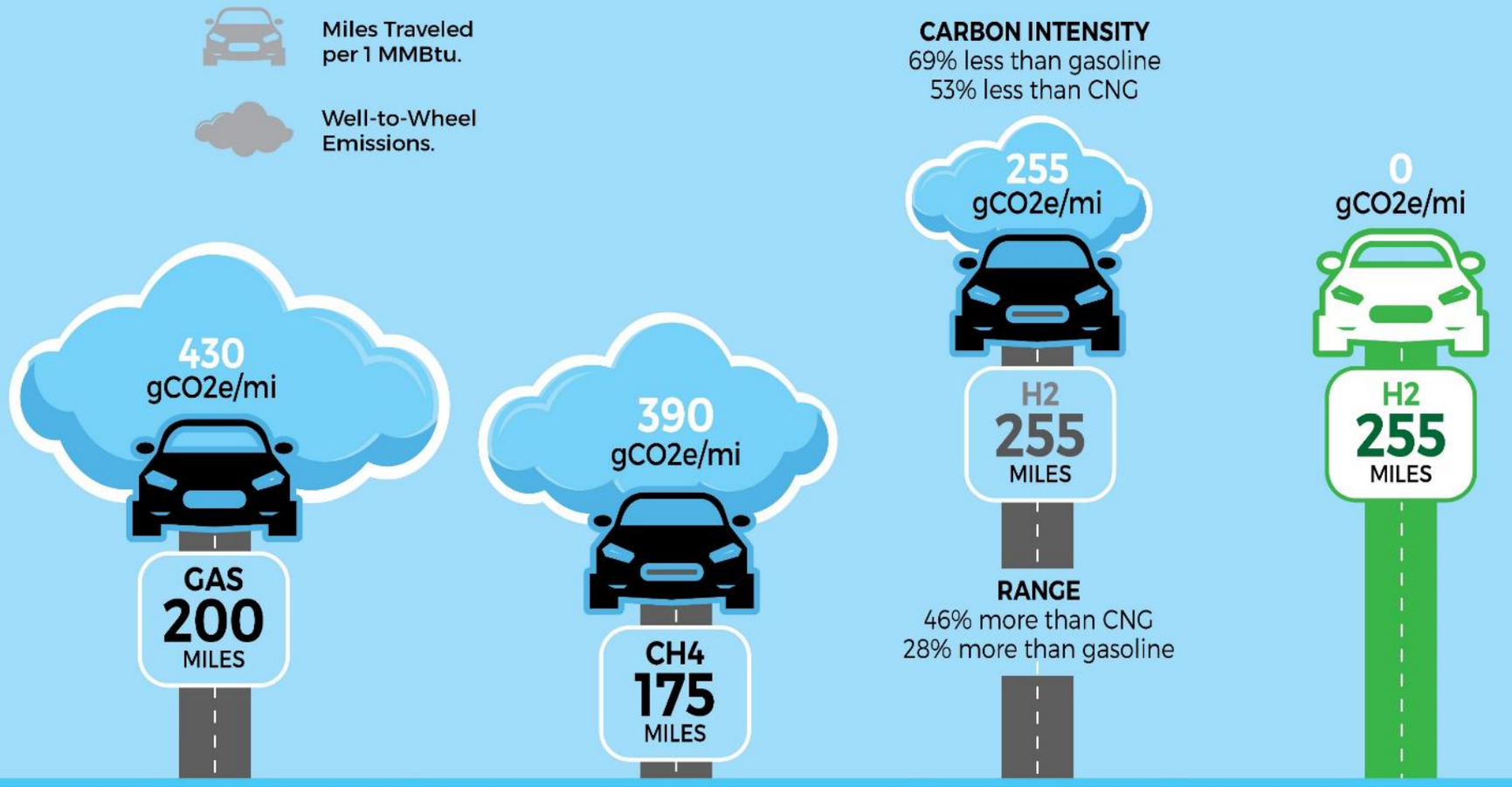
+

The only emissions when hydrogen is used in a fuel cell is water

> 2-3X

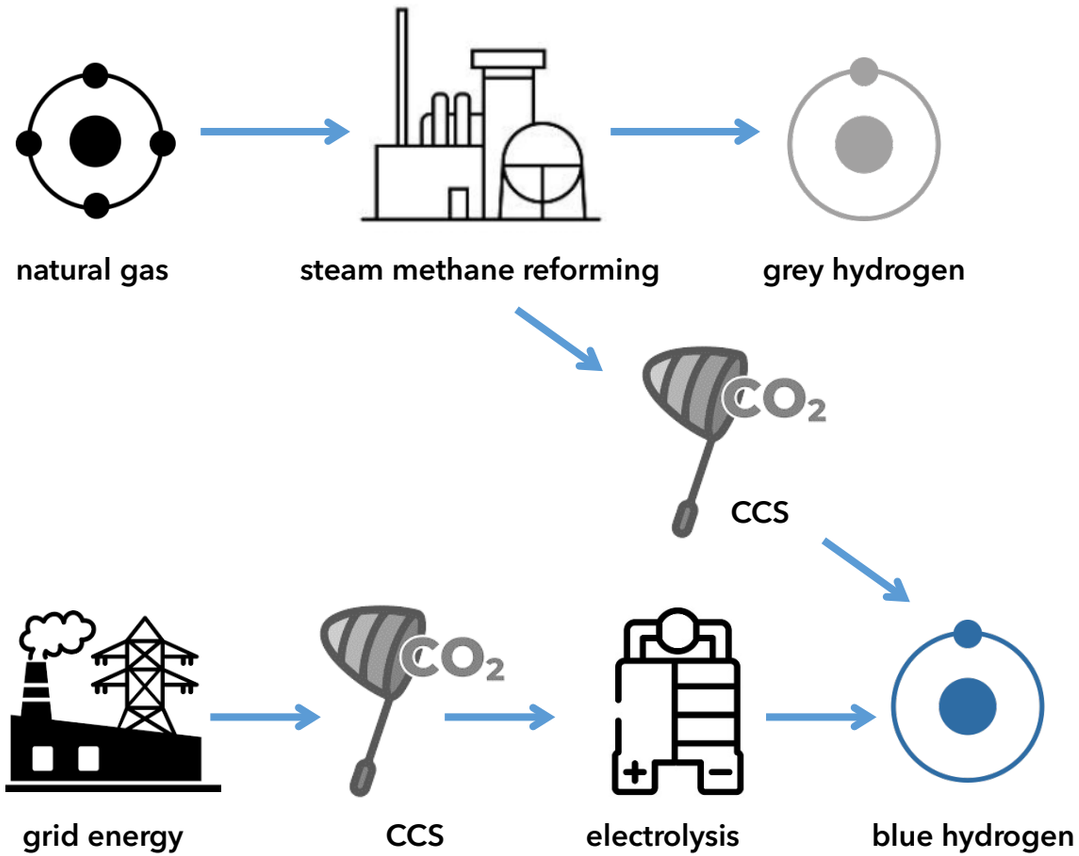
Fuel cells are 2 to 3 times more efficient than internal combustion engines

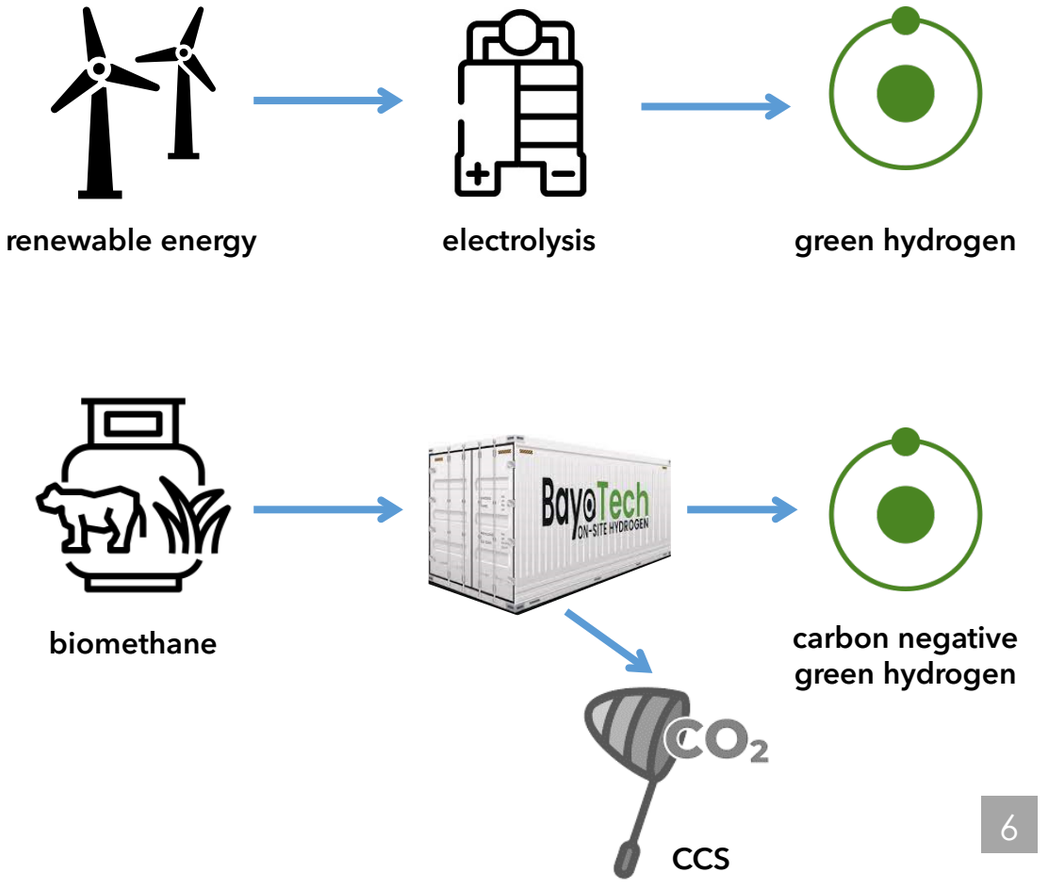
HOW FAR CAN A CAR GO ON
1MMBTU of CNG or Gasoline?



BayoTech

Hydrogen Technology Overview

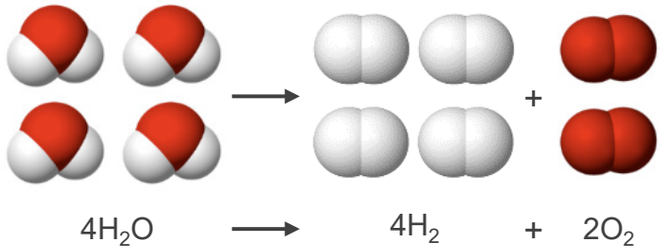




BayoTech

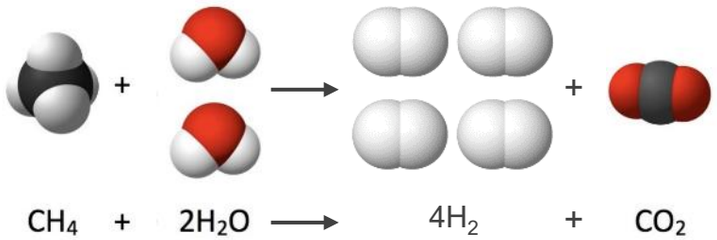
Technology, Energy & Water Requirements

Electrolysis



Power: 55 kWh/kg
Water: 6.8-8.0 gal/kg ~2x

Steam Methane Reforming



Gas: 0.2 MMBTU/kg
Power: 2 kWh/kg
Water: 3.1-5.8 gal/kg

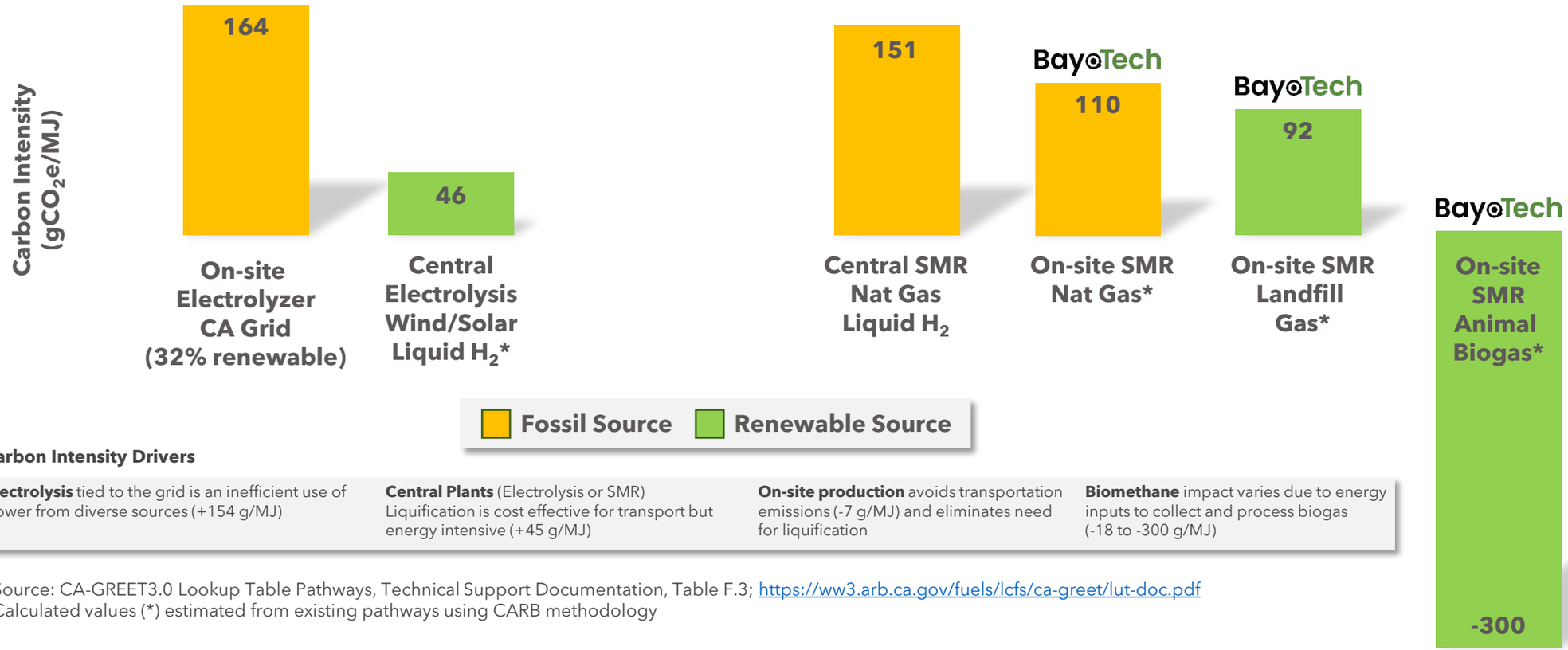
Carbon intensity of the resulting hydrogen driven by source of power and methane

Source: Water consumption from "Development of a Life Cycle Inventory of Water Consumption Associated with the Production of Transportation Fuels," Argonne National Laboratory (October 2015), p. 32.
Power & Gas demand from BayoTech estimates and industry interviews

BayoTech

Carbon Intensity of Hydrogen

BayoTech can achieve lower carbon intensity than electrolysis depending on feedstock



Carbon Intensity Drivers

Electrolysis tied to the grid is an inefficient use of power from diverse sources (+154 g/MJ)

Central Plants (Electrolysis or SMR) Liquification is cost effective for transport but energy intensive (+45 g/MJ)

On-site production avoids transportation emissions (-7 g/MJ) and eliminates need for liquification

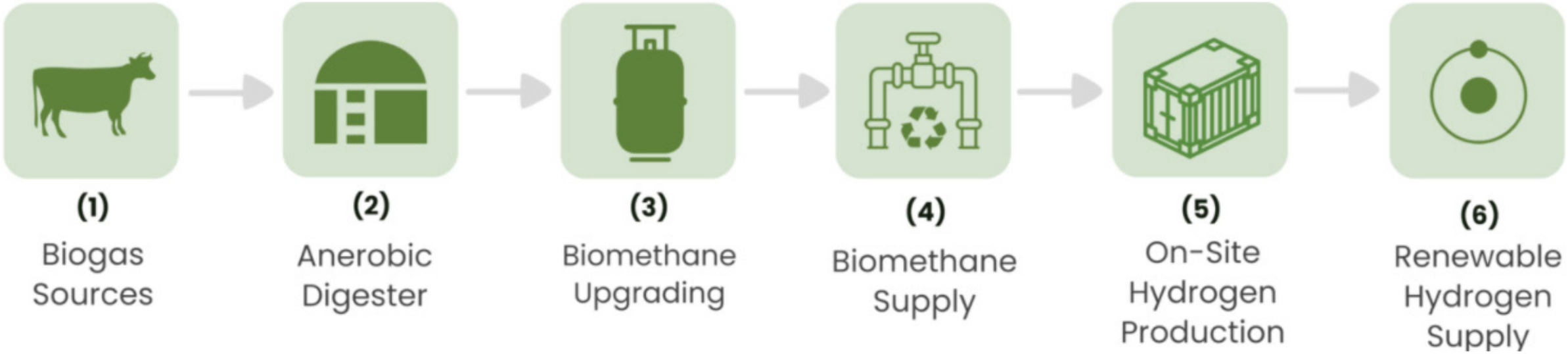
Biomethane impact varies due to energy inputs to collect and process biogas (-18 to -300 g/MJ)

Source: CA-GREET3.0 Lookup Table Pathways, Technical Support Documentation, Table F.3; https://ww3.arb.ca.gov/fuels/lcfs/ca-greet/lut-doc.pdf
Calculated values (*) estimated from existing pathways using CARB methodology

BayoTech

Generating Hydrogen from RNG

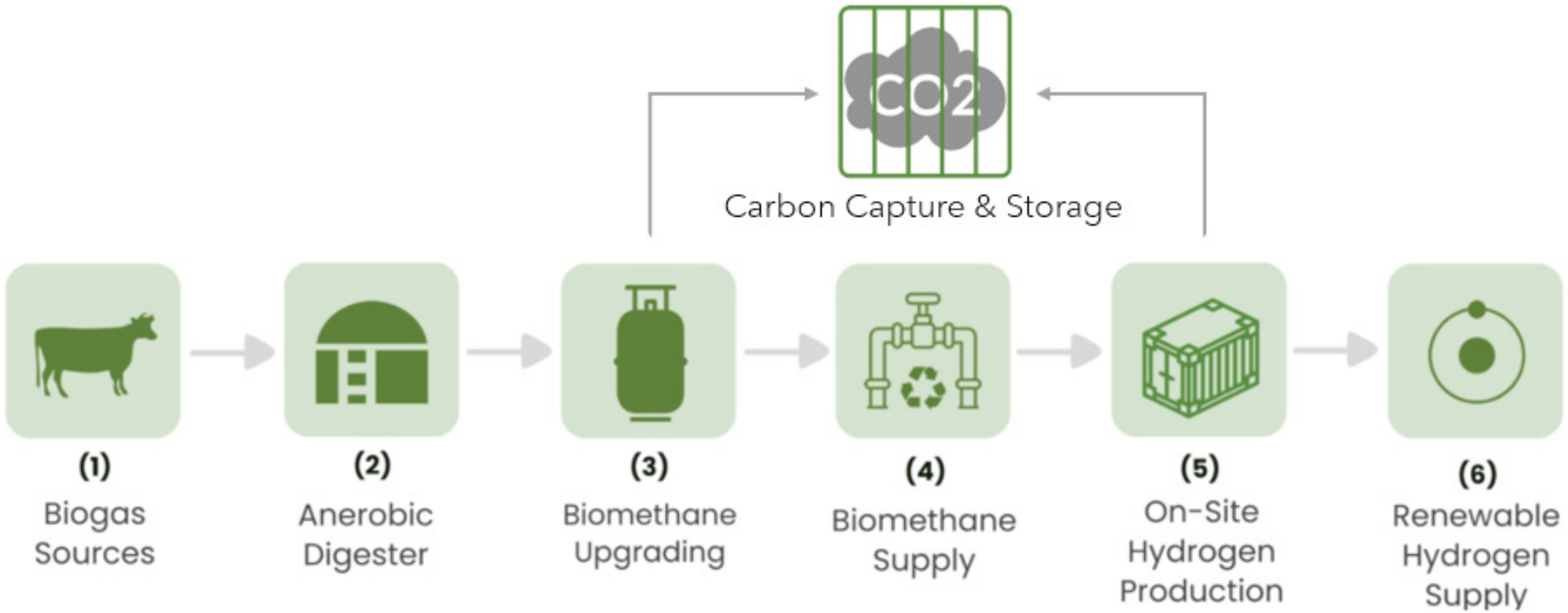
The waste industry providing feedstock to the hydrogen industry is a pathway to net-zero emissions.



BayoTech

Integrating Carbon Capture

Adding carbon capture to hydrogen production form RNG results in the lowest carbon intensity.



BayoTech

Realizing the Potential

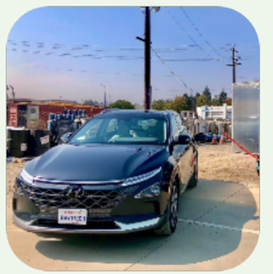
- U.S. total potential for hydrogen from biogas is over 4.2 million metric tons with a net availability of over 1.6 million metric tons
- That's enough renewable hydrogen to power over 11 million fuel cell vehicles a year

Landfill Gas
Hydrogen Potential
2.8 Million
(metric tons / year)

Wastewater
Hydrogen Potential
600,000
(metric tons / year)

Animal Waste
Hydrogen Potential
500,000
(metric tons / year)

IIC Waste
Hydrogen Potential
300,000
(metric tons / year)

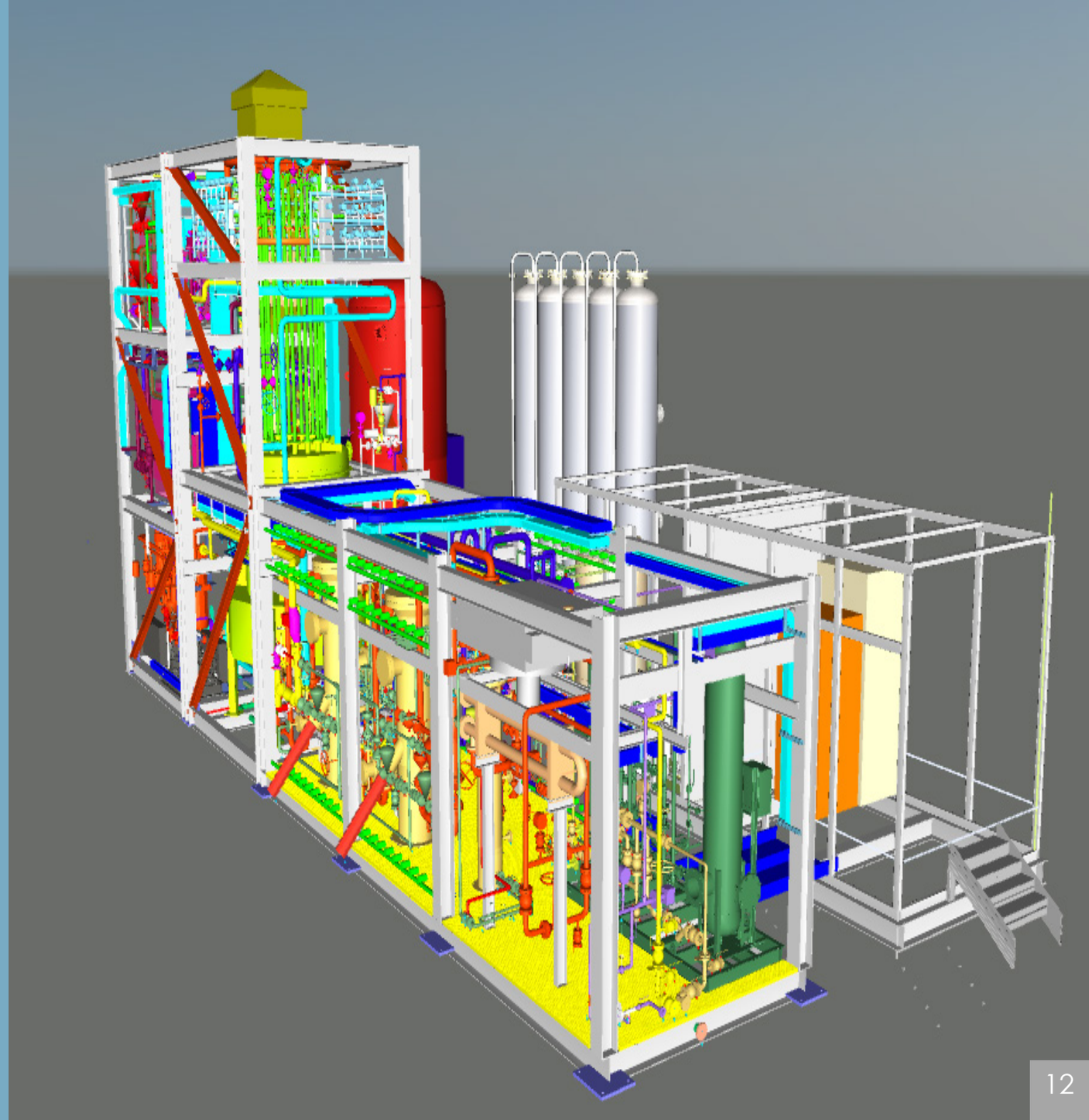


FCEVs
Hydrogen Use
11 million
(vehicles / year)

BayoTech

Distributed Hydrogen Generation

- Modular systems built for efficient scaling
- Small footprint
- Produces 1-5 tons of hydrogen per day, per location
- Autonomous operation
- Easy to maintain
- Performance guaranteed through BayoCare program
- Hydrogen is transported regionally to end users



BayoTech

Local Hydrogen Distribution

BayoTech can leverage its high-pressure hydrogen storage, transport & dispensing product lines to support local hydrogen distribution

High-Capacity Bulk Gas Transports



- Hydrogen delivery solution to replenish hydrogen vehicle fueling stations
- Scalable up to 800 kg of hydrogen at 517 bar
- Accepted & used by the major industrial gas companies

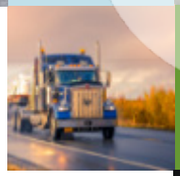
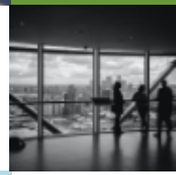
Fuel Storage Modules

- Scalable hydrogen storage for communication customers
- 3,000+ telecom BUP systems fueled by BayoTech
- 60 days of continuous operation

Compression & Dispensing

- Modular compression and dispensing skid for fast deployment of hydrogen vehicle fueling

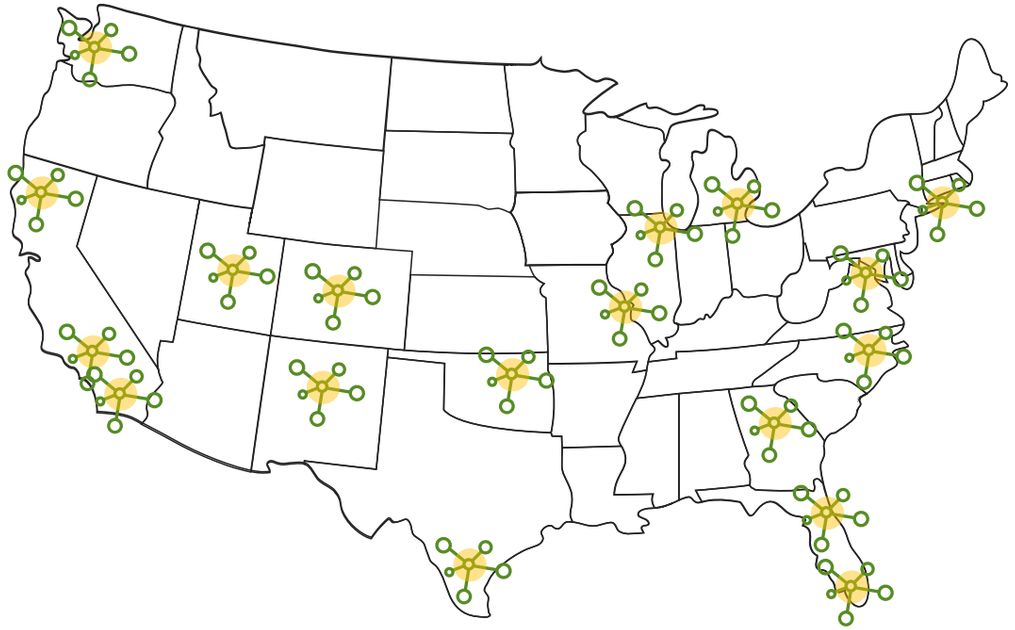
BayoTech

BayoGaaS Hydrogen Hub Network

BayoTech is developing hydrogen hubs nationwide today and looking for host sites and supply of RNG

- Provides security, resiliency and redundancy
- ~15 BayoGaaS hydrogen hubs to be deployed through 2023
- Initial deployments throughout United States and the United Kingdom
- Producing low-cost, low carbon, local hydrogen supply for end users within 200-mile radius
- Transported and stored via high-pressure, high-capacity, cylinder-based trailers



BayoTech

Key Takeaways

- The hydrogen economy is here now and the opportunity is significant
- Biomethane to hydrogen is viable and advantaged
  - It is the best link between biomethane and zero emission vehicles
  - Make distributed hydrogen for local use instead of piping RNG
  - RNG is the only way to create carbon negative hydrogen
- BayoTech can deploy these systems today for low cost, low carbon hydrogen

BayoTech

Questions?

For more information contact:

Stewart Stewart
Chief Commercial Officer
BayoTech
stewart.stewart@bayotech.us

GasTechno®
ENERGY AND FUELS

Renewable Fuels & Fleet 2021

Legal Notices

Confidentiality

This confidential document has been prepared for those wishing to establish a business relationship with GasTechno Energy & Fuels (USA) LLC. By accepting a copy of this document, the recipient agrees not to reproduce it, in whole or in part, not to use it for any other purpose for which the document was released, and not to disclose any of the contents of this document to third parties without written permission of GasTechno Energy & Fuels (USA) LLC. No representation or warranty is made by GasTechno Energy & Fuels (USA) LLC, its partners, or any other entity as to the accuracy or completeness of such information, and none of the information contained within this document shall be relied upon as an expressed promise or future representation.

Legal Notices & Terms of Use

Not an Offer of Securities

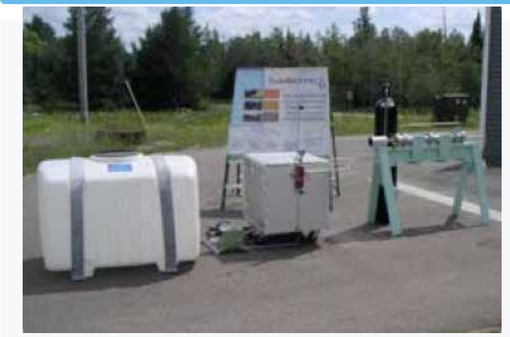
This document does not constitute an offer of, or an invitation to subscribe to or purchase any Common Stock or other securities of GasTechno Energy & Fuels (USA) LLC. Any decision to invest in GasTechno Energy & Fuels (USA) LLC at any time such investment is actually offered, must be based solely upon the information set forth in the Offering Documents and the due diligence of the prospective investor.

Forward Looking Statements

The company, from time to time, may discuss forward-looking information in this document. Forward-looking statements are based on many assumptions and facts, and are subject to many conditions, including the receipt or enforceability of contracts, the availability of products and services, the local political, economic and employment environment and the market for natural gas. Except for historical information contained in the document, all forward-looking information involves estimates by the company's management and is subject to various risks and uncertainties that may be beyond the company's control and may cause results to differ from management's current expectations. Actual results, performance or achievements of the company may materially differ from the forward-looking information and from future results, performance or achievements expressed or implied by such forward-looking statements.

The American Garage.

Where revolutionary companies are born!



2007 - Concept

2008 - Prototype

2010- Garage Pilot

2011- Field Pilot

2012- Garage Demo

The Vision

> “Success is making those who believed in you look brilliant.”
>
> Dharmesh Shah

2013 - Field Demo

2016 - Commercial Start

2017 - Tech Validation

2017 -2018 North Dakota

2018 - 2020 Confidential

GasTechno® Mini-GTL®

Leading the Gas-to-Liquids revolution
the market's lowest cost,
most scalable solution!

Patents ranked #1 in Michigan

June 2012

OCEAN TOMO®
INTELLECTUAL CAPITAL EQUITY®

Intellectual Property Ranking

#1. Gas Technologies LLC

#15. Michigan State University

#49. Dow Global Technologies LLC

#60. GE Aviation Systems LLC

#65. General Motors Corp

#76. Ford Motor Co.

#78. Union Carbide Chemicals

#79. ThyssenKrupp

#100. Delphi Technologies

Quality of Intellectual Property (QoIP) study

March 2021

Empower Results®

Indirect Conversion Results – Portfolio Statistics

Company	US Grants	US Apps	US Total	Int' Grants	Int'l Apps	Int't Total	WW Grants	WW Apps	WW Total
GasTechno	**14**	**0**	**14**	**14**	**5**	**19**	**28**	**5**	**33**
Linde	37	3	40	48	47	95	85	50	**135**
Haldor Topsoe	31	4	35	110	89	199	141	93	**237**
Shell	25	0	25	57	29	86	82	29	**111**
Air Liquide	19	2	21	35	21	56	54	23	**77**
EnBW	12	0	12	0	0	0	12	0	**12**
Exxon Mobil	11	0	11	12	6	18	23	6	**29**
Velocys	1	1	2	0	1	1	1	2	**3**

Direct Conversion Results – Portfolio Statistics

Company	US Grants	US Apps	US Total	Int' Grants	Int'l Apps	Int't Total	WW Grants	WW Apps	WW Total
GasTechno	**11**	**0**	**11**	**14**	**1**	**15**	**25**	**1**	**26**
Linde	0	0	0	0	0	0	0	0	**0**
Haldor Topsoe	0	1	1	0	4	4	0	5	**5**
Shell	0	0	0	0	0	0	0	0	**0**
Air Liquide	0	0	0	0	0	0	0	0	**0**
EnBW	0	0	0	0	0	0	0	0	**0**
Exxon Mobil	0	0	0	0	0	0	0	0	**0**
Velocys	0	0	0	0	0	0	0	0	**0**

Single-Step VS. **Multi-Step GTL Process**

70% lower CapEx, OpEx, and Scale

~~Natural Gas Preconditioning~~ → Methane Ethane Propane → ~~Syngas (CO + Hydrogen)~~ → Liquid Products

GasTechno® Single Step Conversion Process

Gas Source

VS.

Natural Gas Preconditioning → Methane Ethane Propane → Syngas (CO + Hydrogen) → Liquid Products

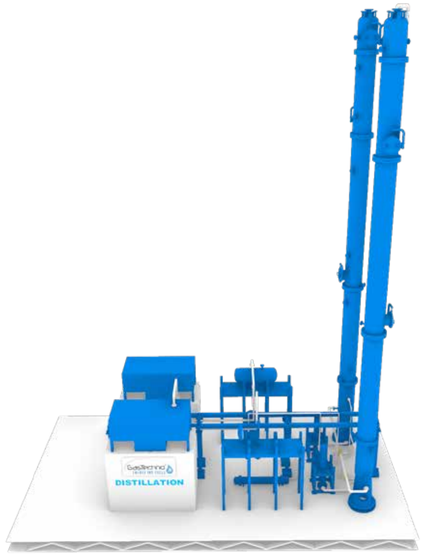
Traditional Multi Step Conversion Process

Product Offering

Mini-NGL-GTL®

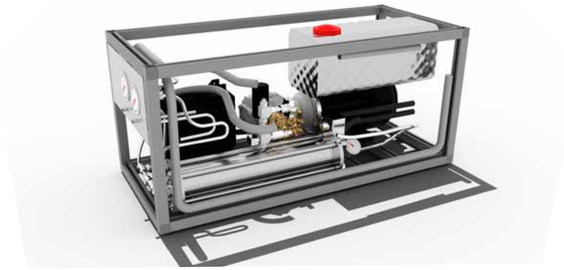
Fuel Storage / Pump Stations

Hydrogen Fueling Stations



Distillation

Residential Power / Storage



Oil Free Compressors

Class 2B -3 Vehicle Conversions

Class 3 / Fleet Conversions

Methanol Transport

The Problem

Pollution & a cost-effective pathway to renewable energy and fuels

Landfill Gas

Biogas

Wastewater

Revolutionary patented Gas-to-Liquids Technology

Renewable gas is converted directly into liquid Fuels using GasTechno® modular GTL plant

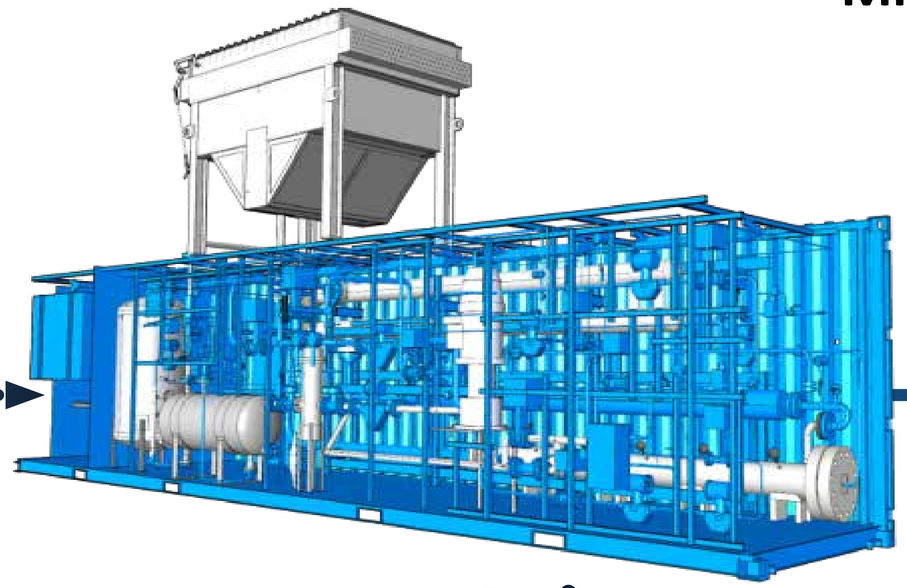
Landfill Gas

Biogas

Wastewater

Gas

Mini



Mini-GTL®

The Super Ultra Low (CI) Solution

Liquid

Renewable Fuels

- Methanol
- Hydrogen
- DME
- Biodiesel
- Electricity

LFG Capture Site

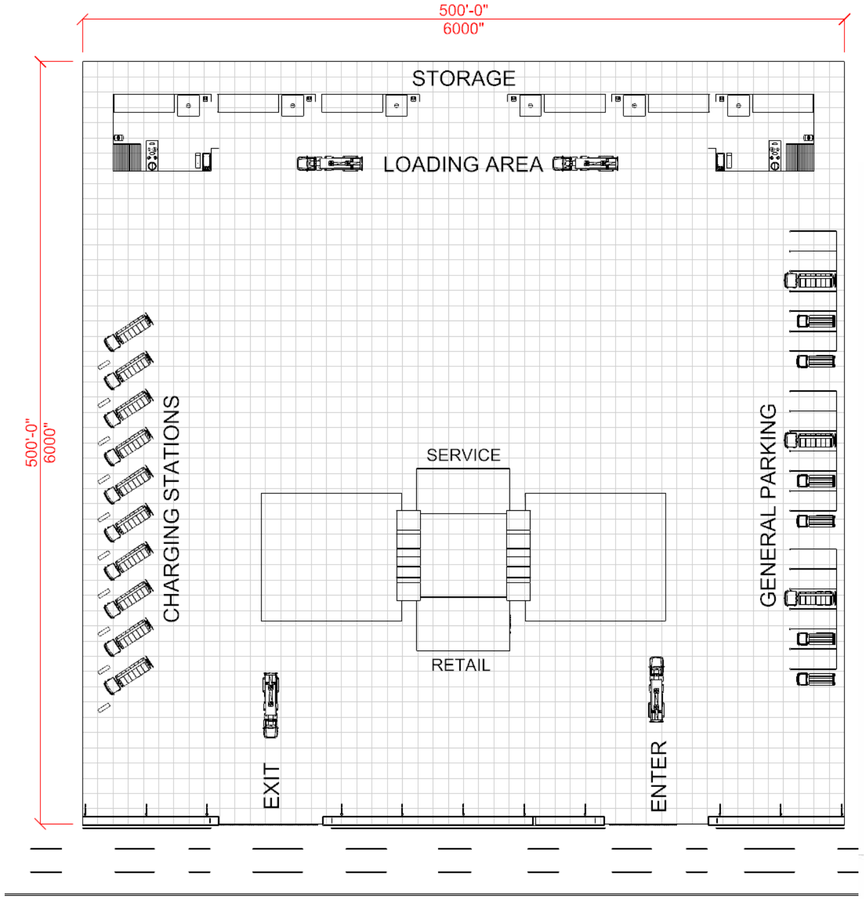
2021

Market demand for “green” hydrogen is outpacing the supply of cost-effective, flexible clean technology solutions to produce it.

GasTechno® Energy Centers

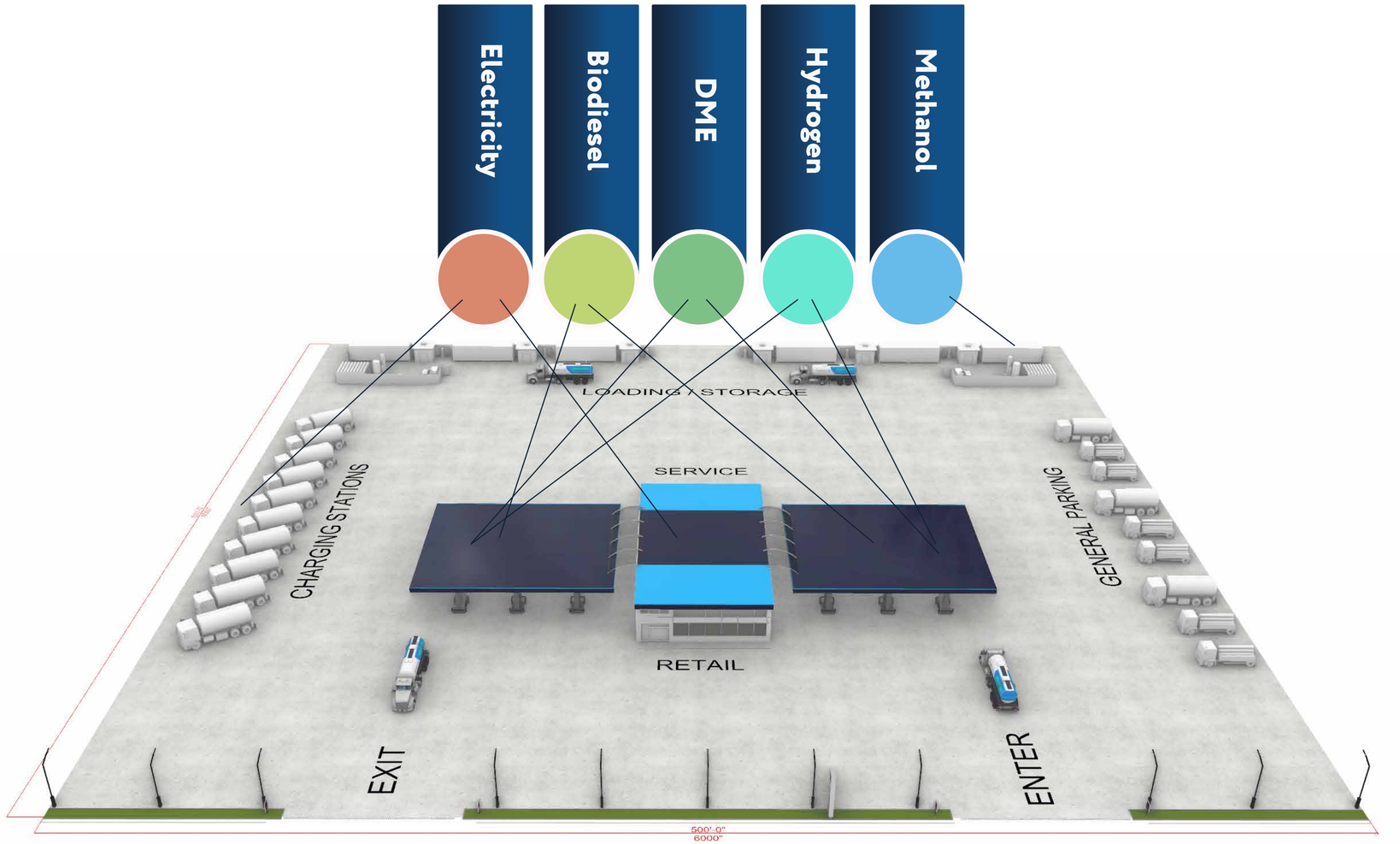
GasTechno® Energy Centers

Front Elevation



Road access

Renewable Fuels Storage



#1 Super Ultra Low Carbon Intensity Renewable Fuels Pathway


Landfill Gas


Biogas


Wastewater Treatment Gas

Gas IN

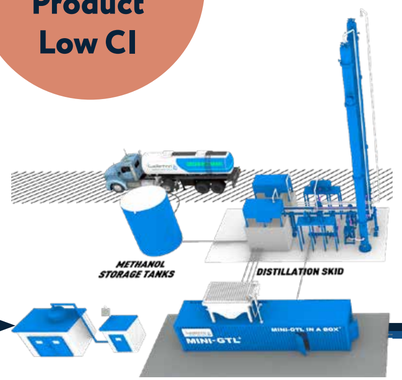
High BTU Plant

Emissions

Power Generation Product Low CI

Low CI Fuel IN

Gas IN



Mini-GTL® Plant

Liquid Fuels OUT

Natural Gas Can Cover Any Sales Short Falls

Natural Gas Pipeline

RNG LNG

RNG CNG

Low CI Ethanol Fuel

Blender

Low CI DME/ Propane Fuel

Blender

Distillation

Low CI DME/Diesel Fuel Alternative

Blender

Distillation

Low CI POM Diesel Aviation & Shipping Fuel

Low CI Bio-Diesel Fuel

Low CI Methanol Fuel

Hydrogen Generator

Low CI Hydrogen Fuel

Renewable Fuels Conversion Market

opportunity: to advance progress for cleaner air and lower greenhouse gas emissions right now.

Methanol	**Gasoline - Methanol / Hydrogen LEV**
DME	**Diesel -Methanol / Ethanol ULEV**
Hydrogen	**Methanol / Hydrogen SULEV**
Electricity	**Methanol / Hydrogen / Electric (fuel cell electric vehicle) ZEV**

Class 2B : 6,001 to 10,000 lbs.

Pickup Truck | Full Size Pickup | Mini Bus | Minivan | Step Van | Utility Van

Class 3 : 10,000 to 14,000 lbs.

Delivery | Small Bus | Walk in

Class 4 : 14,000 - 16,000 lbs.

Delivery Trucks, Box Trucks

Class 5 : 16,001 - 19,500 lbs.

Bucket Trucks,
Farming Equipment

Class 6 : 19,501 - 26,000 lbs.

School Buses, Beverage Haulers,
Rack Trucks

Class 7 : 26,001 - 33,000 lbs.

Garbage Trucks, Street Sweepers
Transit Buses

Class 8 : 33,001 + lbs.

Big Rigs, Cement Trucks, Dump Trucks

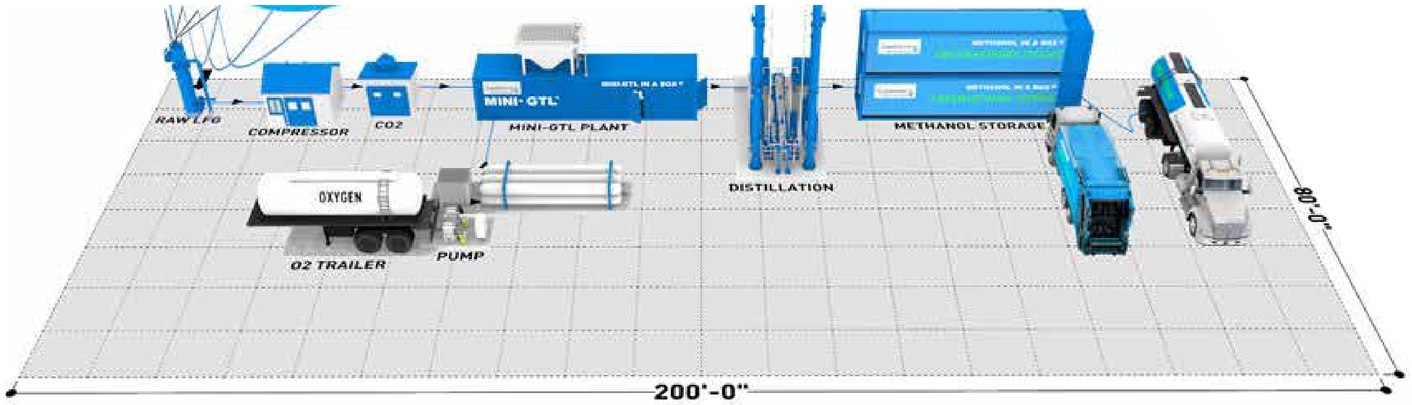
Class 9

Vehicles that
defy classification

Lowest Carbon Intensity (CI Score)

Lowest Cost - Well to Wheel (GTL) Technology

Safe Low Cost Liquid Fuel Storage



GasTechno® Renewable Fuels Production Site

Renewable Fuels Market

Public **Municipal**

Commercial **Industrial**

significant revenue from **LCFS credits and RINs**

FISKER · TESLA · HYLIION · LORDSTOWN · EVgo FAST CHARGING · NIKOLA MOTOR COMPANY · LUMINAR · chargepoint · PROTERRA · ROMEO POWER TECHNOLOGY · LUCID · VOLTA · THE LION ELECTRIC CO. · XOS · XLFleet · WHEELS UP · Faraday Future · ENOVIX

Future Projects

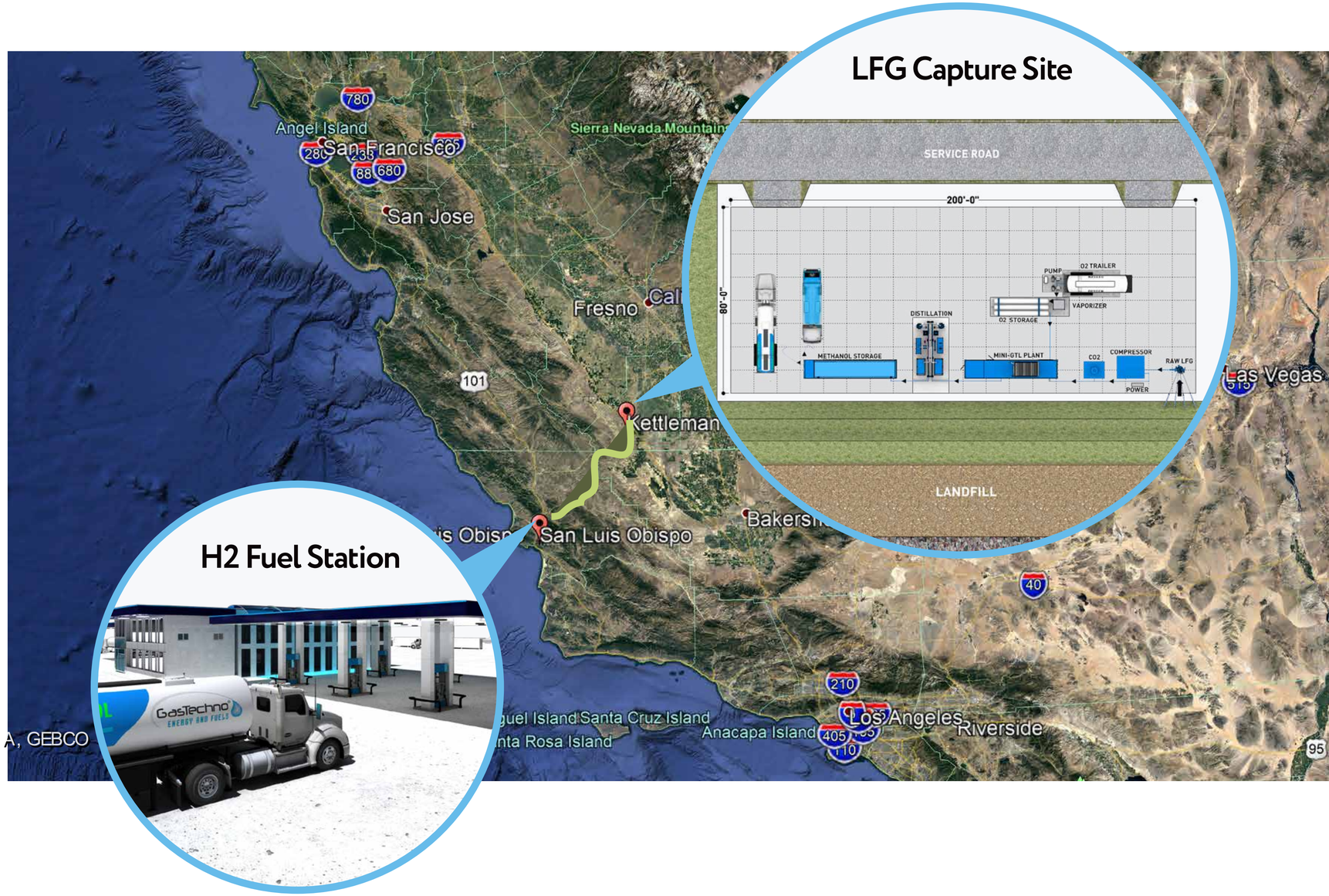
2022

Hydrogen Fueling Station

Green Methanol will be converted **“on demand”** to Green Hydrogen at its proprietary fueling stations beginning in California under the LCFS program.

LFG Capture Site

Market demand for “green” hydrogen is outpacing the supply of cost-effective, flexible clean technology solutions to produce it.



Mini-GTL Benefits vs. RNG

Superior Financial Returns -	Estimated 10-year IRR = 28 Unleveraged
Rapid Deployment -	6 month or less installation vs. 12-24 months for typical RNG project No costly, time consuming pipeline connection required
Diversified Products & Markets -	Methanol, Ethanol liquid fuels vs. gaseous fuel Methanol RINs Ethanol RINs Low Carbon Fuel Standard (LCFS) Credits Methanol-to-Electricity & Hydrogen Truck Fleet (rapidly growing market) Blend for Biodiesel (FAME).
Transportation & Storage -	Liquid fuels easier to transport and safely stored
Greater market access -	Evolving low carbon fuel regulations (e.g., American federal) focus on liquid (vs. CNG) fuels like methanol, ethanol, H2

Our Expertise

GasTechno® has been in business since 2004 and began developing and deploying their small scale, modular GTL systems at locations with under utilized gas streams in 2010 The initial focus was on associated flared gas from oil gas production but in 2020 the company shifted to producing renewable methanol from landfill gas, wastewater treatment gas bio digester gas and pipeline natural gas In 2021 the company began sourcing projects in Michigan and California for development using our low cost, energy efficient technology that converts renewable nature gas into methanol, ethanol, DME and hydrogen Further, the company has been developing conversion kits to allow class 2b to 8 trucks that operate on near zero emissions methanol.

The company has operated 3 separate plants since 2010 on six different locations between Michigan and North Dakota The 2010 pilot project was an 18 foot cargo trailer that validated the reactor system both with 100 pure methane, and at an oilfield site with high nitrogen associated flared gas The 2013 portable Mini GTL plant was a 25 foot car hauling trailer and operated over 7 months both on pipeline gas and associated flared gas exceeding 1,600 btu The 2016 2017 commercial Mini GTL 300 was first installed in Michigan on a gas storage field and operated over 900 hours for third party commercial scale validation. The company received a third party validation of operations. In 2017 the plant was moved to North Dakota for associated gas flaring proof of concept and utilized air rather than oxygen for testing

In 2021 the Mini-GTL 300 plant is returning to Michigan for demonstration at a landfill gas site.

Contact

Walter Breidenstein

CEO

GasTechno Energy & Fuels (USA) LLC
Tel: +1-231-535-2914
walterb@gastechno.com
www.gastechno.com

Financials

Available upon request

Questions

Q&A

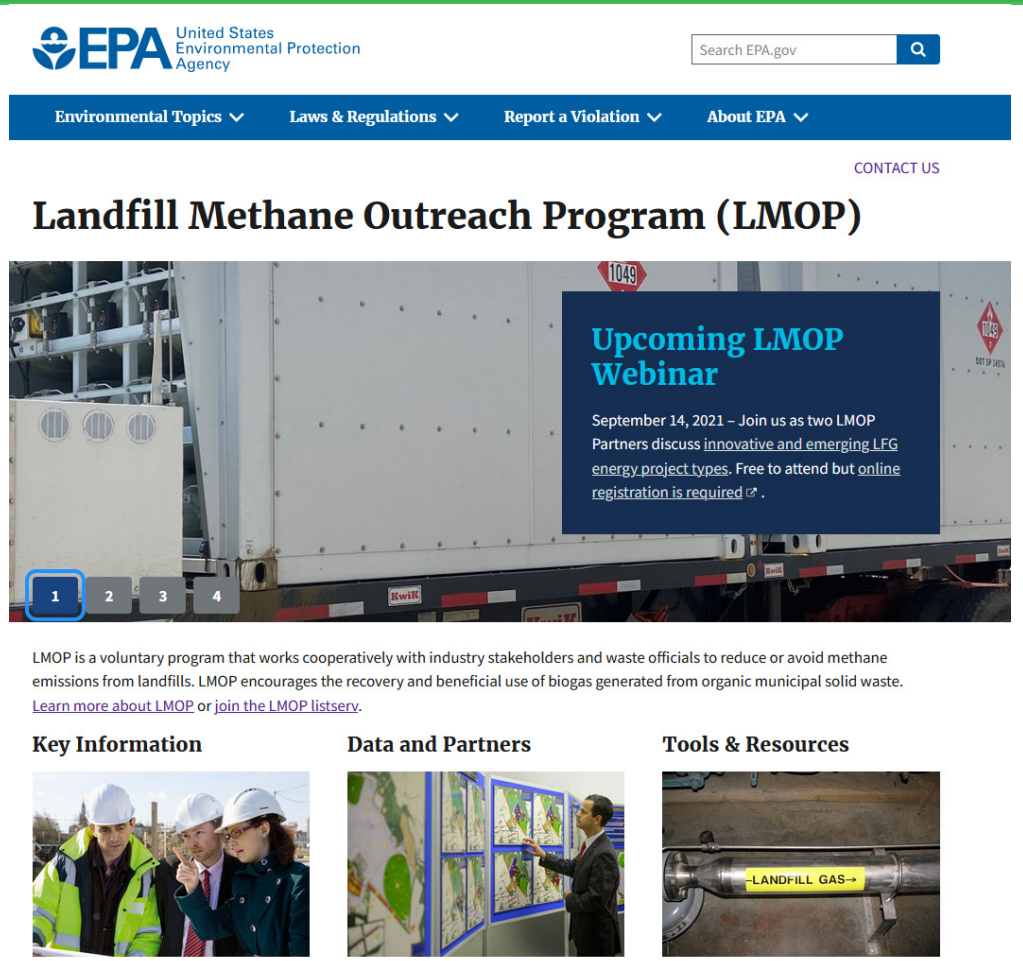
Wrap Up

Contact Information

LANDFILL METHANE OUTREACH PROGRAM

Wrap Up

- The slides and recording from today's webinar will be posted on the LMOP website
- To learn more about LMOP or LFG energy, visit our website at epa.gov/lmop
- Have a webinar idea? Drop us a note with your email in the Q&A box or email lmop@epa.gov



LANDFILL METHANE OUTREACH PROGRAM

Join us for our next LMOP webinar

Don't Waste the Heat!

Tuesday, September 28th from 4:00-5:00 pm ET

- Learn from three LMOP Partners about purposing waste heat from LFG energy projects
- Visit epa.gov/lmop for more information and to register

Thank You

Please reach out with any questions or comments

Ellen Meyer
meyer.ellen@epa.gov
(202) 748-7888

Lauren Aepli
aepli.lauren@epa.gov
(202) 343-9423

LANDFILL METHANE OUTREACH PROGRAM