



Plug Overview

Name, Title

November X, 2022

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An aerial photograph of a dense forest of evergreen trees, likely spruce or fir, showing a repeating pattern of conical tree tops. The lighting is bright, creating a high-contrast scene with deep shadows and bright highlights on the foliage.

**Green Hydrogen is critical to the
green energy revolution.**



Who is Plug?



Plug: the green hydrogen ecosystem

25 years
of innovation

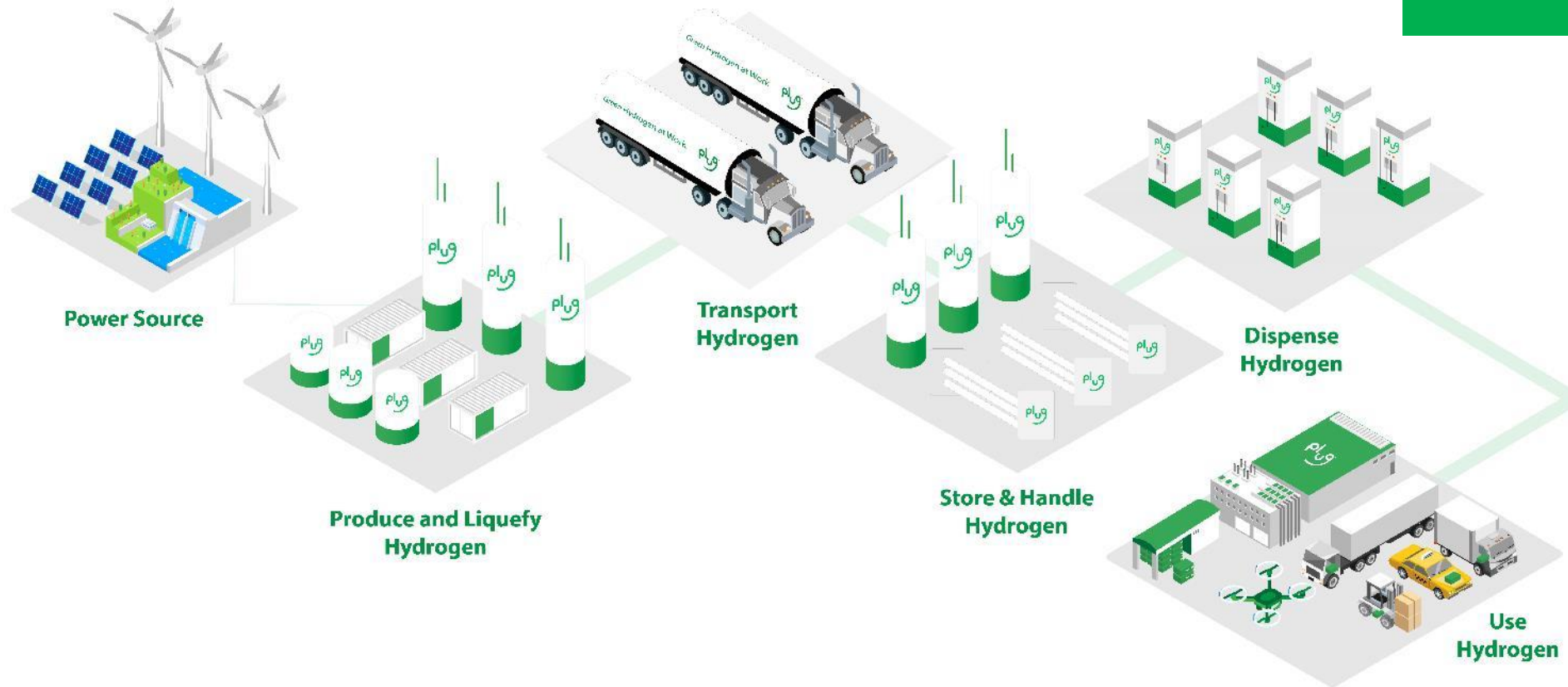
258
granted patents

40+ tons
of hydrogen
consumed daily

60,000+
systems in service

981+ million
hours of operation

3,000+
employees



We work with innovators across industries on energy and decarbonization roadmaps every day



Mercedes-Benz



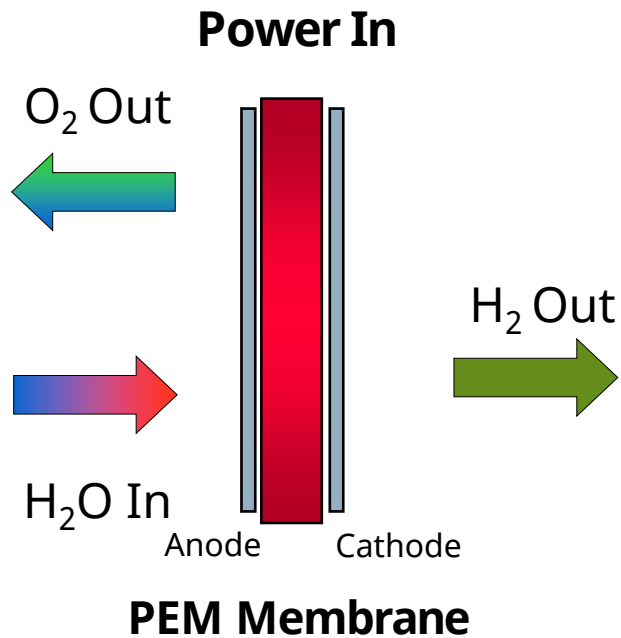
HONDA



Green Hydrogen

Zero Emissions Power: Electrolyzers

Hydrogen is generated via an electrochemical process using electricity to capture hydrogen from water.



ROBUST & DEPENDABLE

Based on more than 47 years of experience in design, production and sales of electrolyzer stacks and integrated products. Providing industry-leading performance for a variety of diverse applications including heavy industry, e-mobility, renewable energy and energy storage needs.

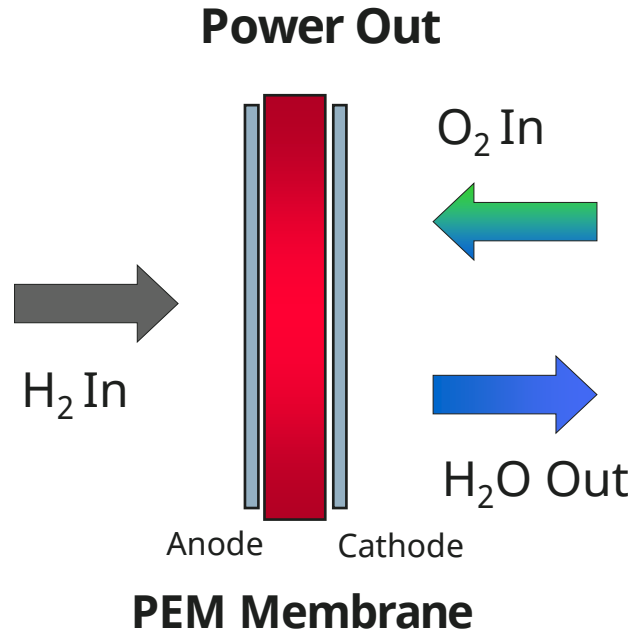


ADAPTABLE & MODULAR

GenFuel electrolyzer solutions support industry expansion – flexible and scalable to meet a wide array of performance requirements. Simplified BOP and reduced stack and system cost make these products cutting edge. PEM technology allows us to have immediate response time the moment that renewable electricity is available to turn it into hydrogen.

Zero Emissions Power: Fuel Cells

Power is generated via an electrochemical process using hydrogen and oxygen with water as the byproduct.



ZERO-EMISSION POWER

Hydrogen fuel cells (HFCs) produce no harmful emissions, the only by-products are heat and water, making our products a zero-emission, sustainable power source.



ROBUST RELIABILITY

Proven technology in tough conditions, including cold environments as low as -40 degrees F/C, weather environments like hurricanes, deserts, and winter storms, and even the hard-working business environments of material handling warehouses



IMPROVED EFFICIENCY

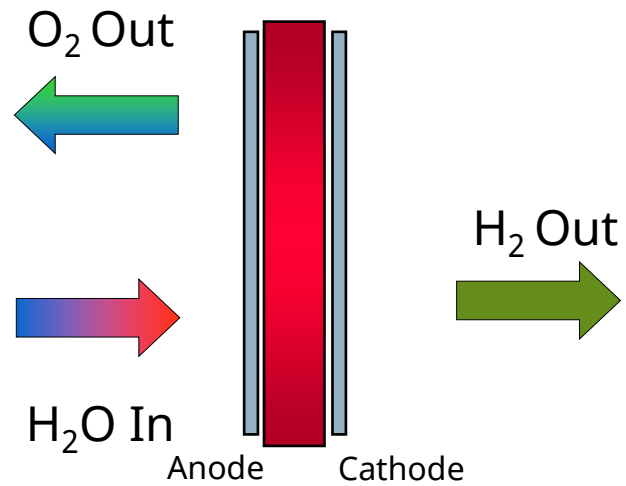
Hydrogen fuel cells are generally between 40-60% energy efficient. This range compares to the typical internal combustion engine of a car which is about 25% energy efficient



Zero Emissions Power

Electrolyzers: Green
Hydrogen

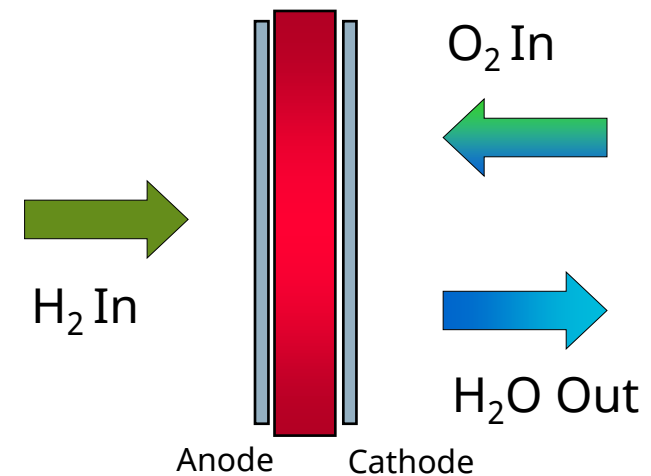
Renewable Power In



PEM Membrane





Fuel Cells: Zero Emission
Power


Power Out



PEM Membrane

What Makes Hydrogen Green?

	Transformed Molecule	Process	Emissions
	Coal	Gasification	NOx, SOx, Black Carbon or Particulate Matter
	Natural Gas (CH4)	Steam-Methane-Reforming	NOx, SOx, Black Carbon or Particulate Matter
	Natural Gas (CH4)	Steam-Methane-Reforming	CO2 that is captured
	Green H2O	Electrolysis through Renewables	Oxygen

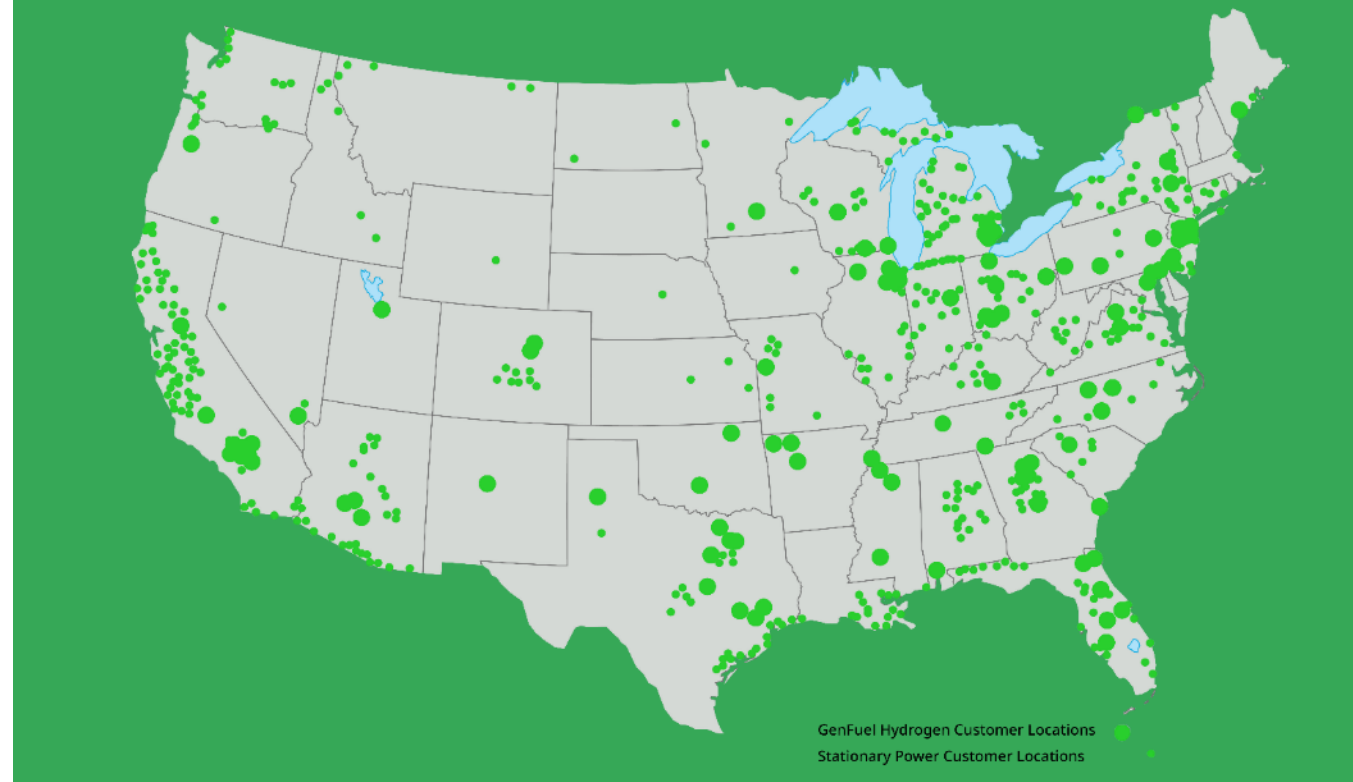


Plug Hydrogen Generation Network

We are making green hydrogen: easy, economical and available

YE2022 producing 50 TPD
YE2023 producing 200 TPD

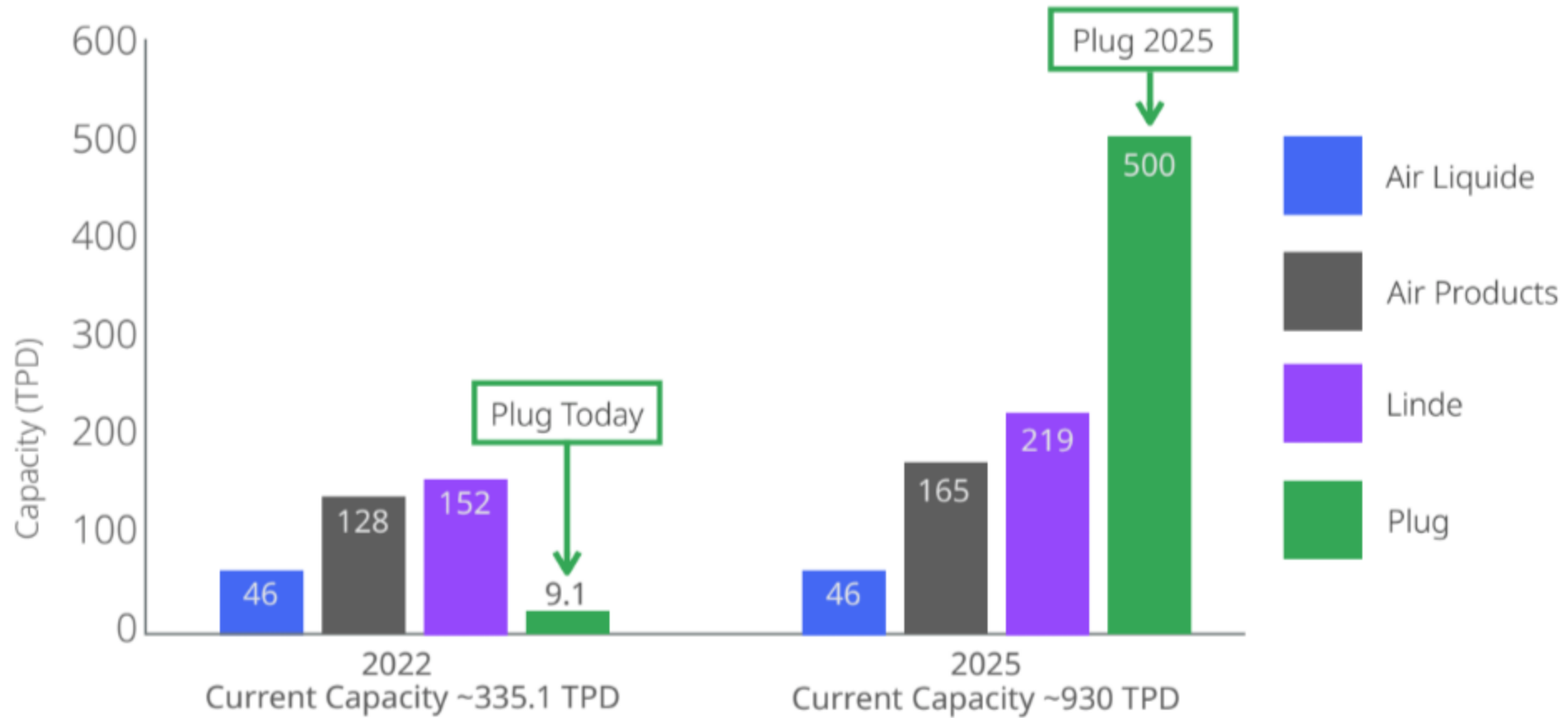
Announced 30TPD green hydrogen plant location at Port of Antwerp-Bruges



North American Network
500 TPD by 2025



Plug Leads in Green Hydrogen

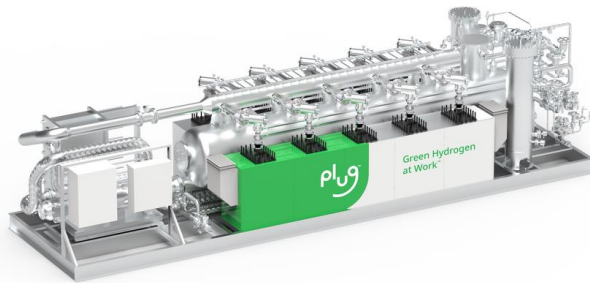


Our Products



Plug is integrated on the whole hydrogen value chain, from molecule generation to end-market solutions

Electrolyzers



Energy solutions



Fuel cell applications



✓ Electrolyzer

✓ H2 generation site

✓ Liquefaction technologies

✓ Gaseous and liquid storage

✓ Gaseous and liquid logistics

✓ Filling pumps

✓ Fuel cells



Market Opportunity

MATERIAL HANDLING

\$30Bn

- Target addressable market

ELECTRIC VEHICLES

\$300Bn

- Target addressable market

STATIONARY POWER

\$30Bn

- Target addressable market

HYDROGEN ECONOMY

\$10Tn

- Target addressable market

Plug Power Today

Long-Term Growth Trajectory

Forklifts

- More than 6MM forklifts deployed
- 1.5MM forklifts sold annually

On-Road Electric Vehicles

- Energy density is ~10x BEVs
- High asset utilization
- Enables sharing economy
- Faster fueling
- Longer range
- Infrastructure expertise
- Less challenging operating conditions than material handling applications
- Constant power

Data Centers & Wireless Infrastructure

- Small footprint, high power density
- Lower TCO vs. diesel generators

Hydrogen & Equipment



Industry Leaders Rely on Plug

Retail Distribution



Food Distribution



Logistics



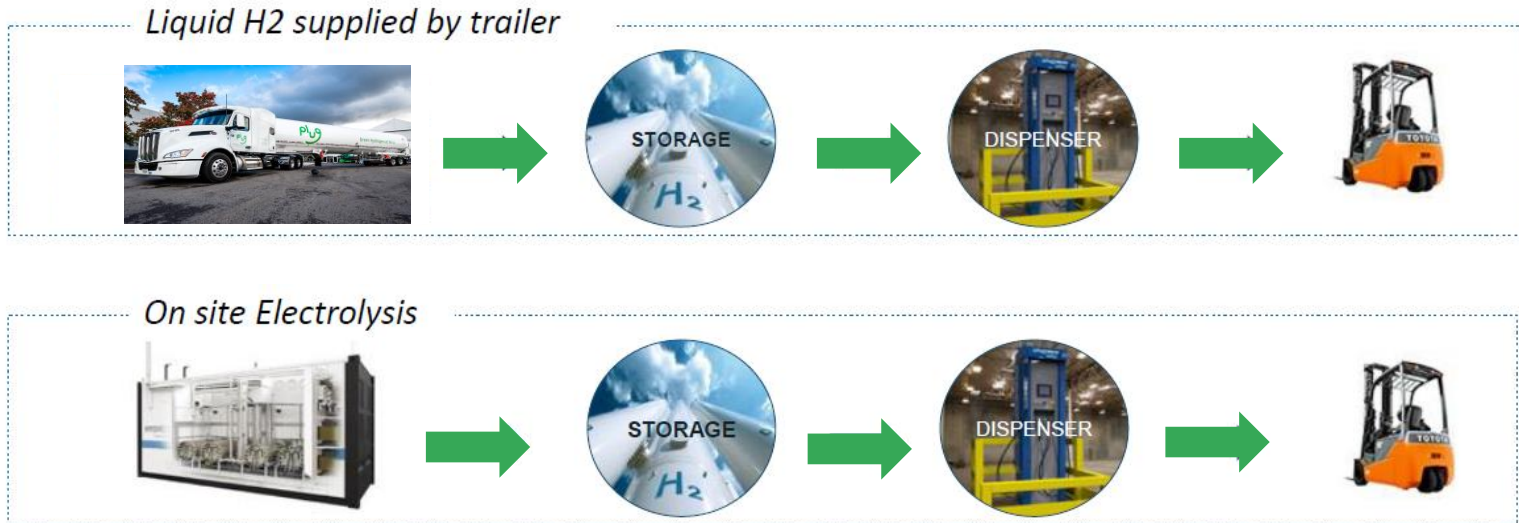
Automotive



Comms

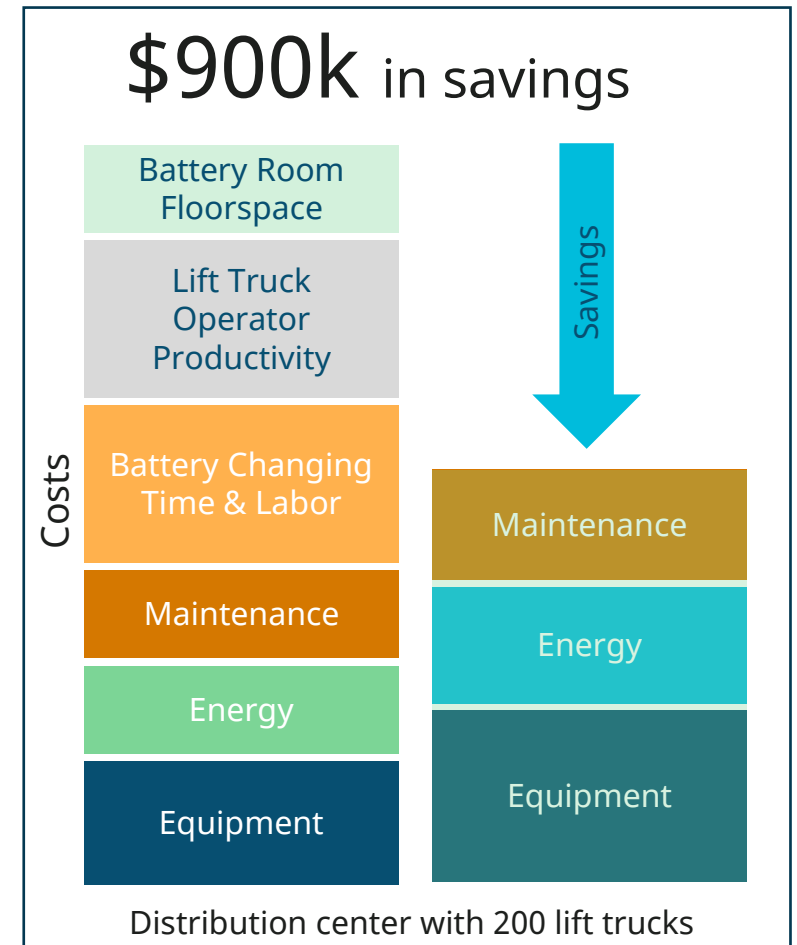


Material Handling: Mini Hydrogen Ecosystem



30%

of all food and groceries shipped in 2020 moved by Plug fuel cells during pandemic



Zero Emission Transportation and Stationary Power Solutions

Modular Design Enables Tailored Power Density
Pre-engineered OEM Platform
Easy to Integrate
Enable Multiple Applications



15kW



30kW



85kW



125kW



>1mW





Light Commercial Vehicles

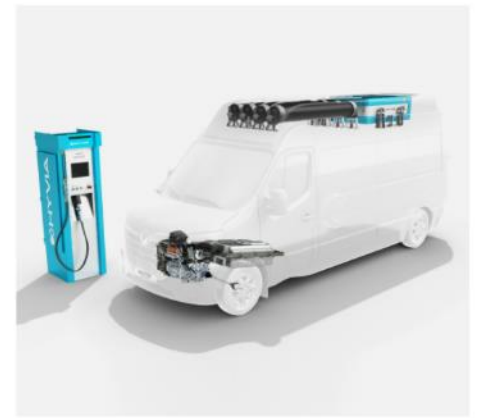
Specialized in FC Light Commercial Vehicle development and production

Targeting last mile delivery vehicle market

Integrating 30kW ProGen Engine + 5-10kg of H2 storage

Master Van

Professional goods transport vehicle with a range up to 500km



Master Chassis Cabine

Professional goods transport vehicle with a range up to 250km

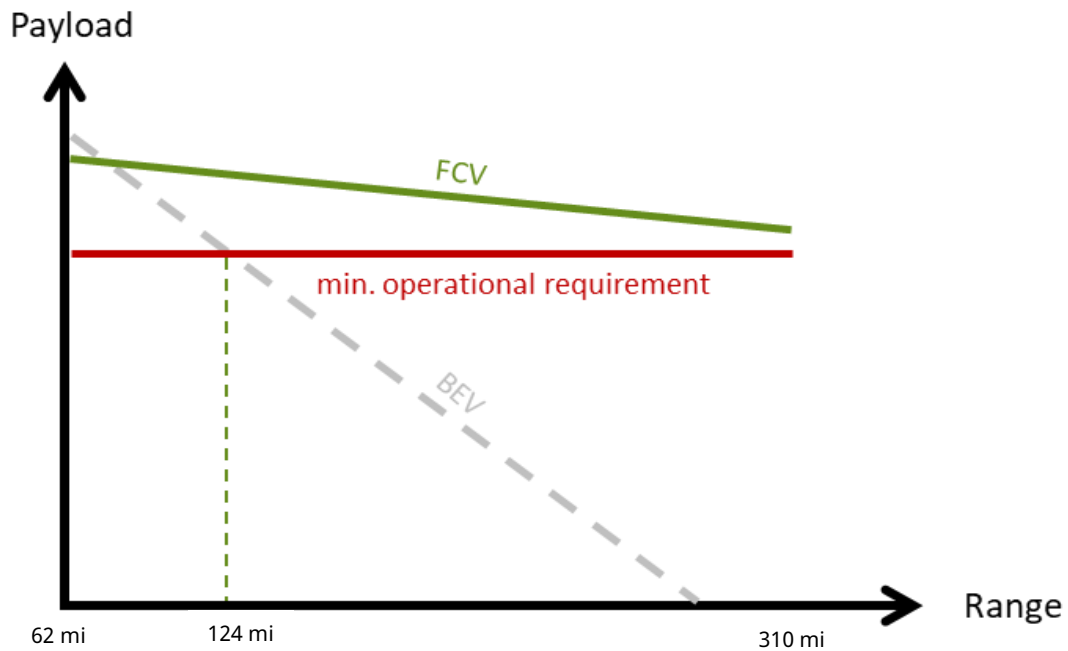


Master City Bus

Professional goods transport vehicle with a range up to 300km



Fuel Cell Trucks Increase Range and Payload



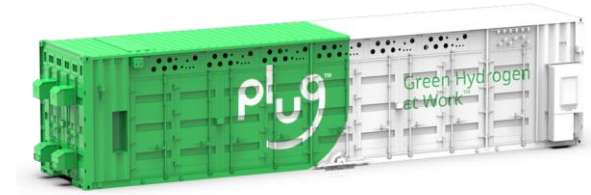
Operational Perspective

<u>Vehicle Type</u>	<u>Distance</u>	<u>Weight</u>	<u>Charge/Refuel Time</u>
Diesel	500 mile	45,000lb Payload 35,000lb Unloaded	5 Minutes
	125 mile	44,000lb Payload 36,000lb Unloaded	3 Hours
Battery	500 mile	34,600lb Payload 45,400lb Unloaded	11 Hours
	150 mile	45,000lb Payload 35,000lb Unloaded	5 Minutes
Fuel Cell	500 mile	42,600lb Payload 37,400lb Unloaded	15 Minutes



Source: Corporate Incubations, Deutsche Post DHL Group

Hydrogen: The New Diesel



“We’re announcing that we’re aiming to eliminate diesel fuel by 2030. While diesel fuel accounts for less than 1% of our emissions, we believe it’s important to help accelerate the global transition away from fossil fuels and we are charting a new course using low-carbon fuel sources including hydrogen.”

Lucas Joppa | Microsoft
Chief Environmental Officer

Microsoft builds 3MW hydrogen fuel cell backup power plant

Two shipping containers of fuel cells can match one diesel genset

2019 Generator Usage

CARB studied and quantified customer generator usage during PSPS events

- CARB estimated that customers used ~125,000 backup generators during October alone.
 - CARB estimates each generator ran an average of 50 hours.
 - They produced PM emissions roughly equivalent to 29,000 heavy duty diesel trucks running for one month.
- Every solution that can be deployed will decrease the need for customers to run these backup generators, preventing criteria pollutants that have no safe threshold.
- Incentivizing BTM preferred resources would further decrease the need for gas or diesel generators.

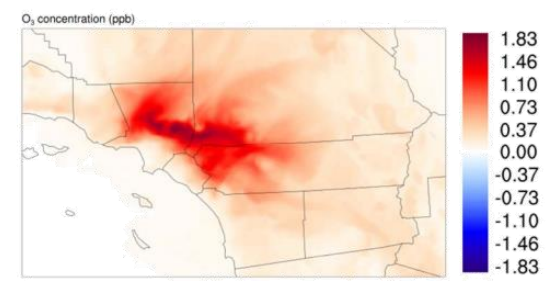
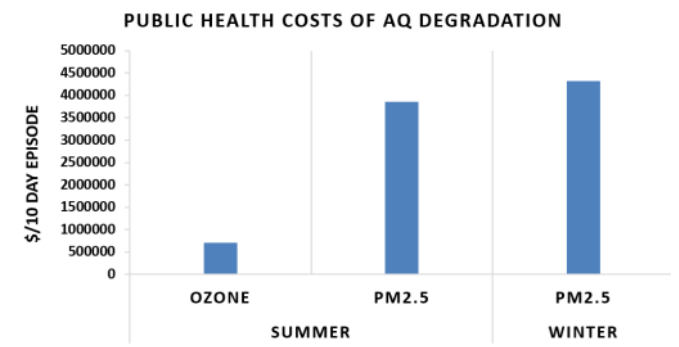


Figure 3. Increases in ground level MD8H summer ozone from the widespread use of fossil backup generators during a grid disruption



Plug Electrolyzer Building Blocks



425 kg per day Container	2 Ton per Day System	4 Ton per Day Array
Up to 1 MW input	Up to 5 MW input	Up to 10 MW input
Fully containerized solution (standard 40 ft. / 12.2 m ISO container)	Includes full BoP for turnkey simplicity	BoP custom-engineered to meet customer requirements
Scalable drop-and-play convenience	Containerized solution for high demand applications	Efficient, scalable solution for high volume H ₂ plants

Plug Energy Goals

50_{TPD}

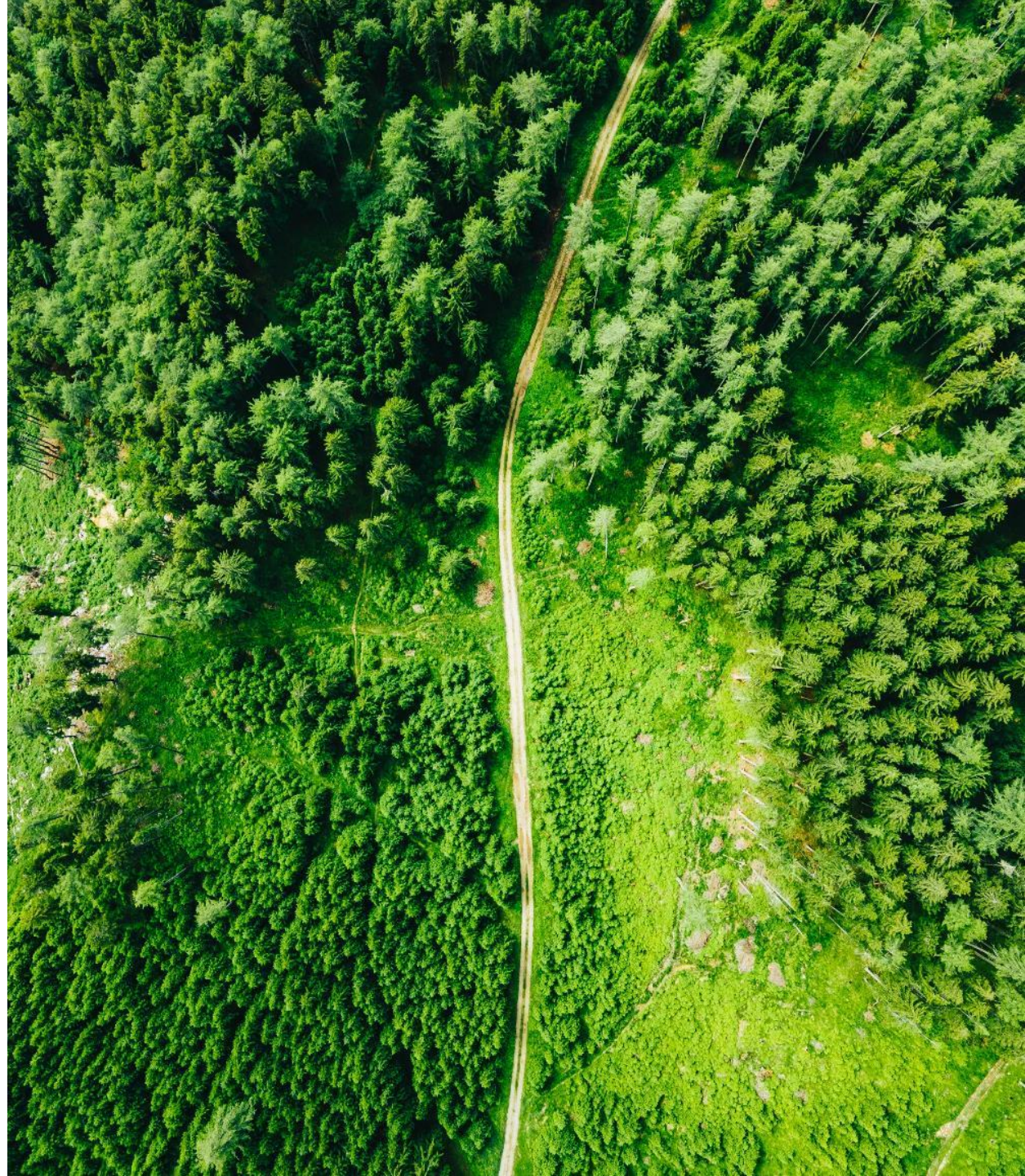
of green hydrogen production by end of 2022

Generation

Green Liquid Hydrogen: 500-tons per day by 2025 and 1000-tons per day by 2028

200+_{TPD}

2022 green hydrogen bookings



Hydrogen policy opportunities

Inflation Reduction Act (IRA) and Bipartisan Infrastructure Law

- Substantial incentive for green h₂
- Catalyst for development of green h₂ infrastructure in the US
- “Trifecta effect”: climate, jobs and national security
- PTC will further enhance Plug and North America’s leadership in green h₂ ecosystem
- Requires developing a National Hydrogen Strategy and Roadmap



Conclusion

Vertical Integration: Accelerate Green Hydrogen Strategy

Our comprehensive solutions enables us to successfully serve multiple industries with low-cost Green Hydrogen

- Our capabilities will generate long-term growth
- 40+ years of electrolyzer experience
- Only non-industrial gas company to bring a liquefier online
- Internal demand representing ~15% of liquid hydrogen market

Building Blocks to Plug Power's Green H2 Vertical Integration

H2 Generation

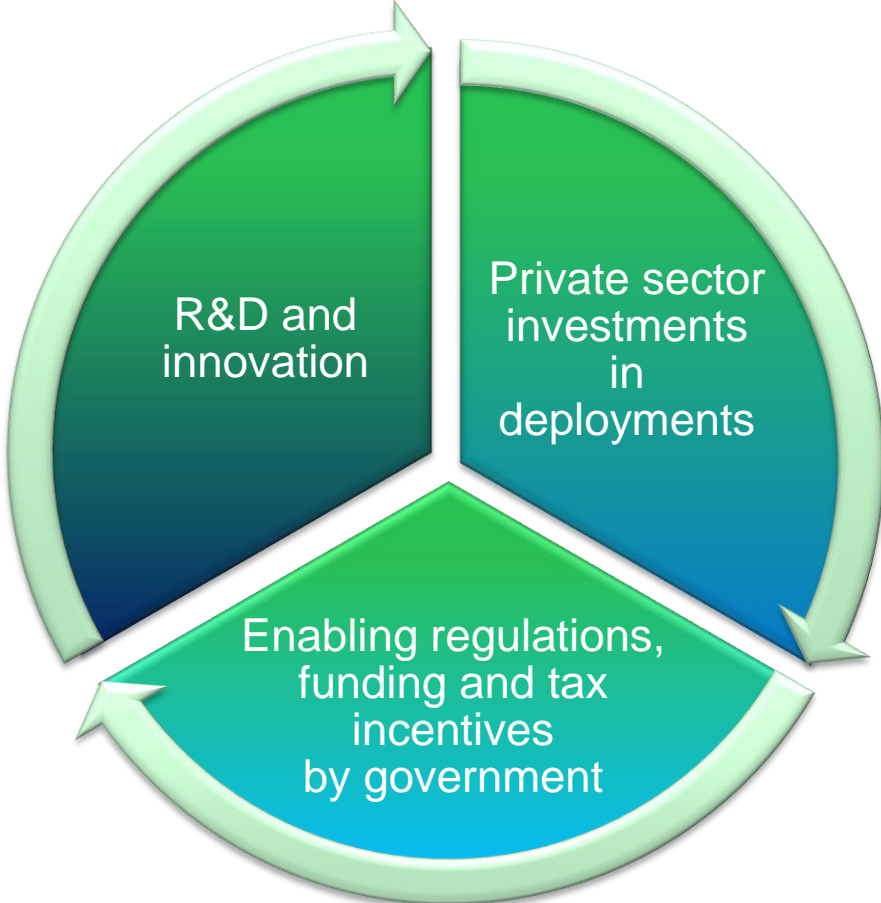
Liquefaction

Logistics



Concerted effort required to build on momentum and scale up

Scaling up of deployment





Green Hydrogen at Work™