

Hydrogen in Port Operations

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Plug Power is the Leader in Hydrogen and Fuel Cell Technology



- **1st** to create a market for HFC technology
- **80%** Blue Chip Customer Base
- **21,000+** GenDrive units deployed
- **14.6M** H2 fills from **70+** GenFuel stations
- **150+** patents
- **Headquarters:** Latham, NY
- **National** Service Hubs

Holds **90%+** of the **Hydrogen Fuel Cell Market** in the Material Handling industry



Why EVs

1. Design Simplicity
2. Lower Total Cost of Ownership
3. Higher Reliability
4. Self-Driven Vehicles / Autonomy
5. Climate Change

Why FCEVs

1. Power Density is 10x BEVs
2. Asset Utilization
3. Fueling Infrastructure
4. Fast Fueling
5. Range

FCEVs are ideal for asset-intense logistics applications.

Drayage and Yard Tractor Vehicles

- **Hydrogen** is the ideal solution for heavy duty hauling
- **Over 10x** energy density of batteries
- **Refill times and range** similar to diesel
- Avoid expensive **grid** charging **infrastructure**
- **Full** payload capability
- **More** reliable and **less** maintenance
- **Lower** operating and ownership costs

**Lower Total Cost of Ownership than
Batteries with Better Performance**



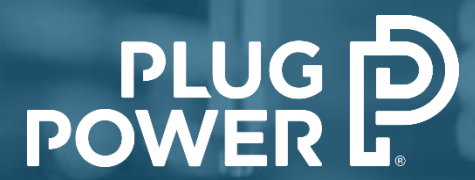
Pick Up and Delivery Vehicles

- **8,500+** miles traveled on-road, 400+ fuel cell hrs.
- Proven **166%** greater range than standard EV van
- **50%** more efficient to operate (wells-to-wheels)
- **Full** payload capability
- **Improved** driver experience
- **Reliable performance** despite upstate-NY weather conditions
- Quiet operation for **24/7** deliveries

With hydrogen fuel cells,
**EVs can be used on
all commercial routes.**



Commercially Viable Forklift Truck Solutions



- **21,000+** GenDrive fuel cells deployed
- **180M+** GenDrive operating hours
- **14.6 million+** GenFuel hydrogen fills into forklift fuel cells **9 million kg+** of hydrogen dispensed
- **70+** GenFuel hydrogen stations built at customer facilities

Over 50 Combined Walmart and Amazon Distribution Centers



Port Forklift Trucks Can be Replaced Now

- **746** ICE fork trucks in use at Ports of LA and Long Beach
- **620+** of those can be replaced with a **Hydrogen Electric** version
- **Hydrogen Electric** fork trucks are available now
- **Fueling** infrastructure barrier is coming down
- **Instant** air quality improvement
 - 5,800 tons CO₂e
 - 40 tons NO_x

“Port Air Emission Inventory Reports 2015-2016”, Starcrest Consulting

“California Transportation Electrification Assessment” CPUC 2016

- **Ideal** for asset-intense logistics applications
 - **Longer** run times
 - **Fast** fueling
- Up to **ten times** the power density of batteries
- **Efficient & sustainable** solutions being used commercial today
- With hydrogen fuel cells, EVs can be used on **all commercial goods movement** applications

**The world is going electric;
Just use fuel cells!**

