

Hydrogen Infrastructure Today and Tomorrow

17 September 2013

Zero Emission Bus workshop
South Coast AQMD

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Who is Air Products?

- Global \$10B atmospheric, process and specialty gases, performance materials, equipment and services provider
- Serving industrial, energy, and technology markets worldwide
- Fortune 250 company
- Operations in over 40 countries
- 18,900 employees worldwide
- Known for our innovative and diverse culture , operational excellence and reliable supply
- Leader in sustainability
- Recognized industry leader in safety



FTSE4Good

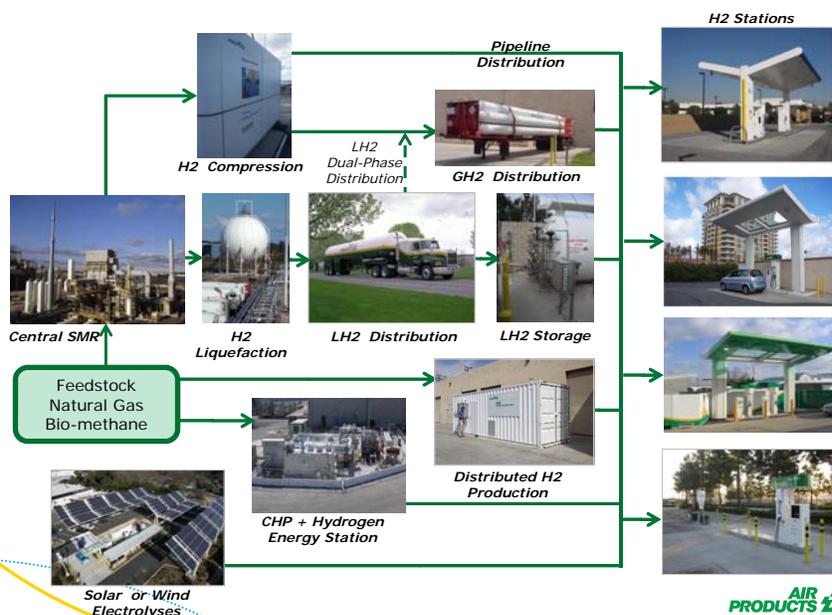


50+ Years of Hydrogen Experience

- World's largest producer of merchant hydrogen
- >5.0 million kg per day H₂ production
- Bulk, liquid, and pipeline distribution
- Onsite generation
 - SMR, POX, CPOX, ATR, EHTR, electrolysis
 - Waste gas clean-up technologies
- Extensive experience from 40 plus worldwide central plants, ~50 small onsite generators and 500 plus customers
- H₂ energy projects since 1993
 - > 150 hydrogen station projects
 - > 800,000 fuelings/year



Hydrogen Infrastructure Capability



Unique Supply Capability



Long History of Bus Fueling



Supplied a variety of transit and shuttle buses with various sources of hydrogen around the world



Key Environmental Technologies

- Municipal waste water converted to heat power and hydrogen via anaerobic digester facilities:
 - Operating in Orange County dispensing hydrogen
- Clean separable landfill waste via plasma gasification
 - \$400MM plant in construction
- Off-gas Stranded Waste streams
 - 10% of H₂ is derived from these streams today. 150 untapped facilities
- Steam Methane reforming with CO₂ Capture and Sequestration
 - \$400MM plant in operation

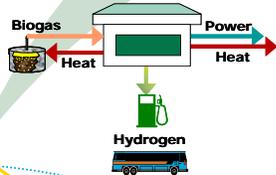


Proven Biogas can fuel ~ 210 Million cars



ZBUS Hydrogen Energy Station

H₂ Energy and Fueling Station Vision



3MW Energy Station

Heat, Power,
Plus enough Hydrogen
to fuel 50+ ZBUSes



Thank You!

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