

# Chart Industries, Inc. Hydrogen Equipment and Solutions

OCTOBER 1, 2020



# Our Business

## Heat Transfer Systems



- Air Cooled Heat Exchangers
- Brazed Aluminum Heat Exchangers (BAHX)
- Cold Boxes
- Nitrogen Rejection Units (NRU)
- Integrated systems
- High Efficiency Flow Fans

## Cryo Tank Solutions



- Bulk and Micro Bulk Storage Tanks
- ISO Containers
- Packaged Gas Systems
- Fueling Stations
- Non-specialty mobile equipment
- Vaporizers

## Repair, Service & Leasing



- Repair and service
- Aftermarket parts and maintenance
- Global Leasing
- Installations
- Full lifecycle

## Specialty Products

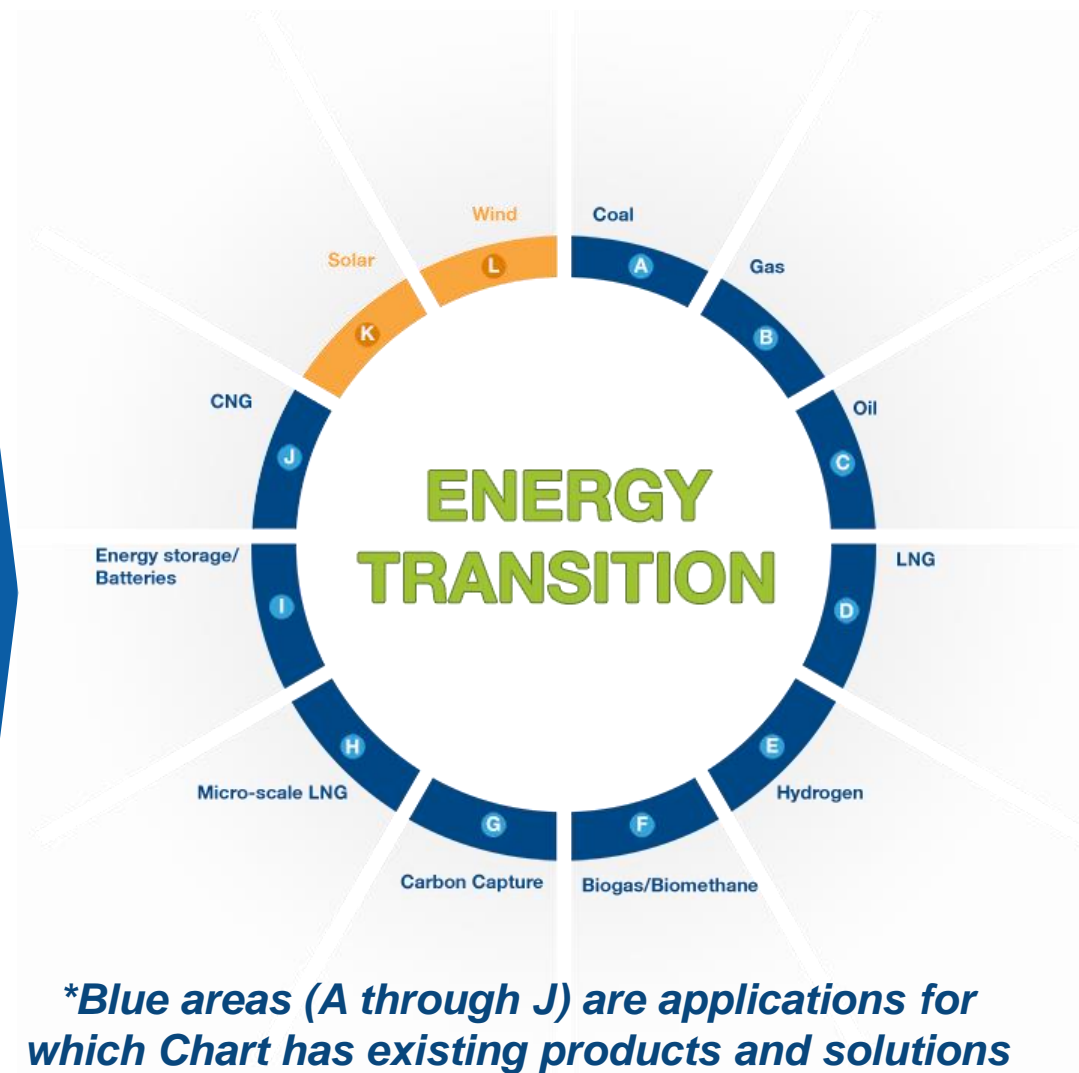


- Dosing equipment
- HLNG vehicle tanks
- LNG by Rail (Gas By Rail Offering)
- Hydrogen equipment
- Cannabis products
- FEMA Valves / FLOW Meters

**Global Commercial Team**

**Global Engineering Team**

# Focused Strategy Supports Clean Energy Targets

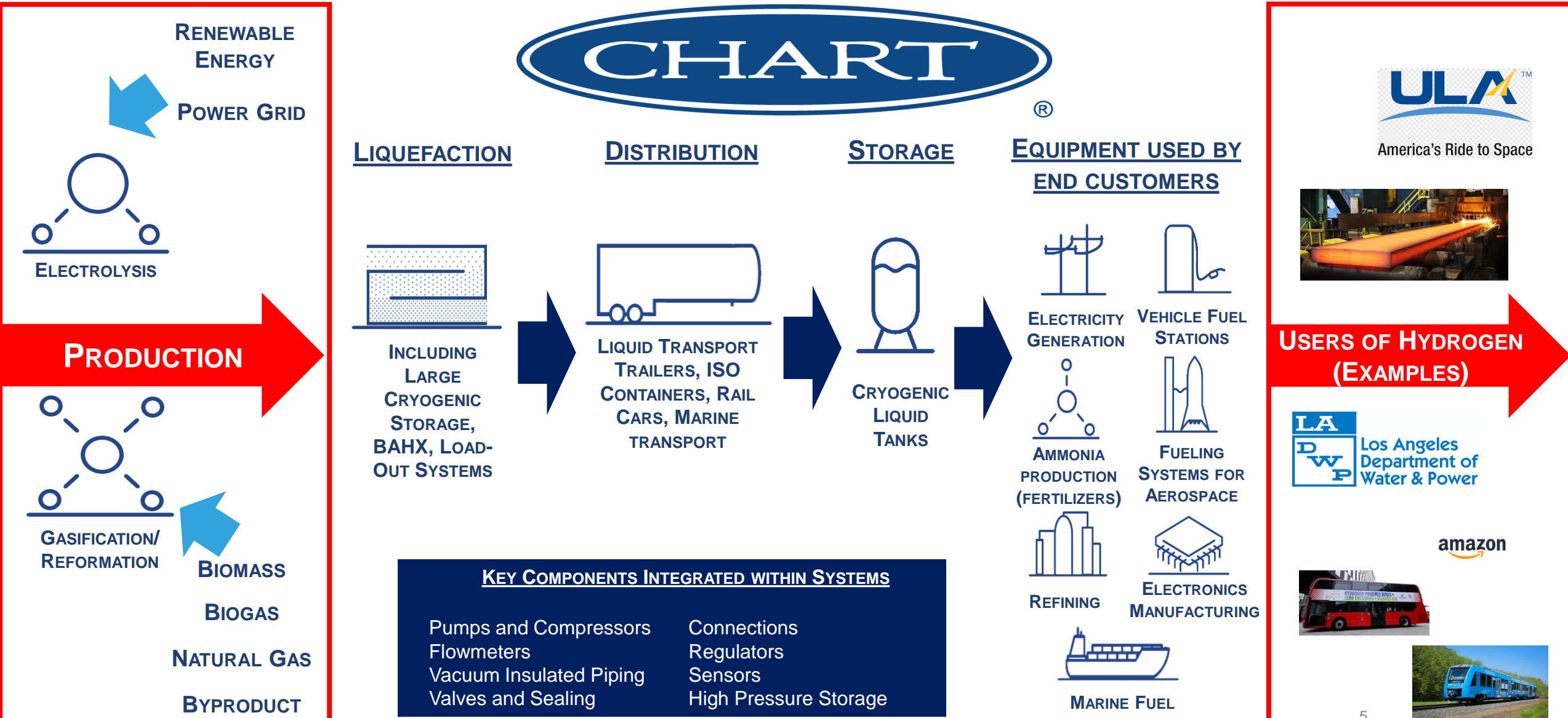


# LNG, Hydrogen: We Play in Both With Similar Strategy

|                        | Gas and LNG   | Hydrogen   |
|------------------------|---|--|
| Value Chain            | Gas infrastructure and LNG developers looking to extend the life of their assets; future potential to leverage LNG equipment / infrastructure for Hydrogen          |  |
| Relationships          | Existing relationships across the Hydrogen and LNG Value Chain; many of the same LNG customers are also in Hydrogen   |  |
| Role                   | <i>“Equipment Arms Dealer”</i><br>Chart role in LNG as aggregator / connector of supply and demand; similar in H2 as equipment provider to production and end users |  |
| Customer View of Chart | High quality, safety and over 50 years of building this equipment   |  |
| Scale / Liquidity      | 2020 Natural Gas Market ~3000 MTPA<br>LNG is ~400 MTPA (13% of Global Gas)  | 2020 Hydrogen Market is ~100 MTPA<br>Demand in 2050 expected to be 575 MTPA  |
| Participants           | LNG Developers, Importers, Distributers, Utilities  | Industrials, Chemicals, Ammonia, Steel Aerospace, Energy Companies, Transport Companies, Utilities, Infrastructure Operators |
| Commerciality          | Cost and scalability are mature   | Cost and scalability are embryonic; many projects are still pilots   |

Source: Wood Mackenzie, Chart Industries

# Discipline: Where We Play In the Hydrogen Supply Chain



## LIQUEFACTION



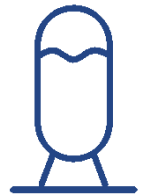
INCLUDING  
LARGE  
CRYOGENIC  
STORAGE,  
BAHX, LOAD-  
OUT SYSTEMS

## DISTRIBUTION



LIQUID TRANSPORT  
TRAILERS, ISO  
CONTAINERS, RAIL  
CARS, MARINE  
TRANSPORT

## STORAGE

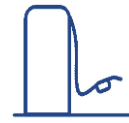


CRYOGENIC  
LIQUID  
TANKS

## EQUIPMENT USED BY END CUSTOMERS



ELECTRICITY  
GENERATION



VEHICLE FUEL  
STATIONS



AMMONIA  
PRODUCTION  
(FERTILIZERS)



FUELING  
SYSTEMS FOR  
AEROSPACE



REFINING



ELECTRONICS  
MANUFACTURING



MARINE FUEL

**KEY COMPONENTS INTEGRATED WITHIN SYSTEMS**

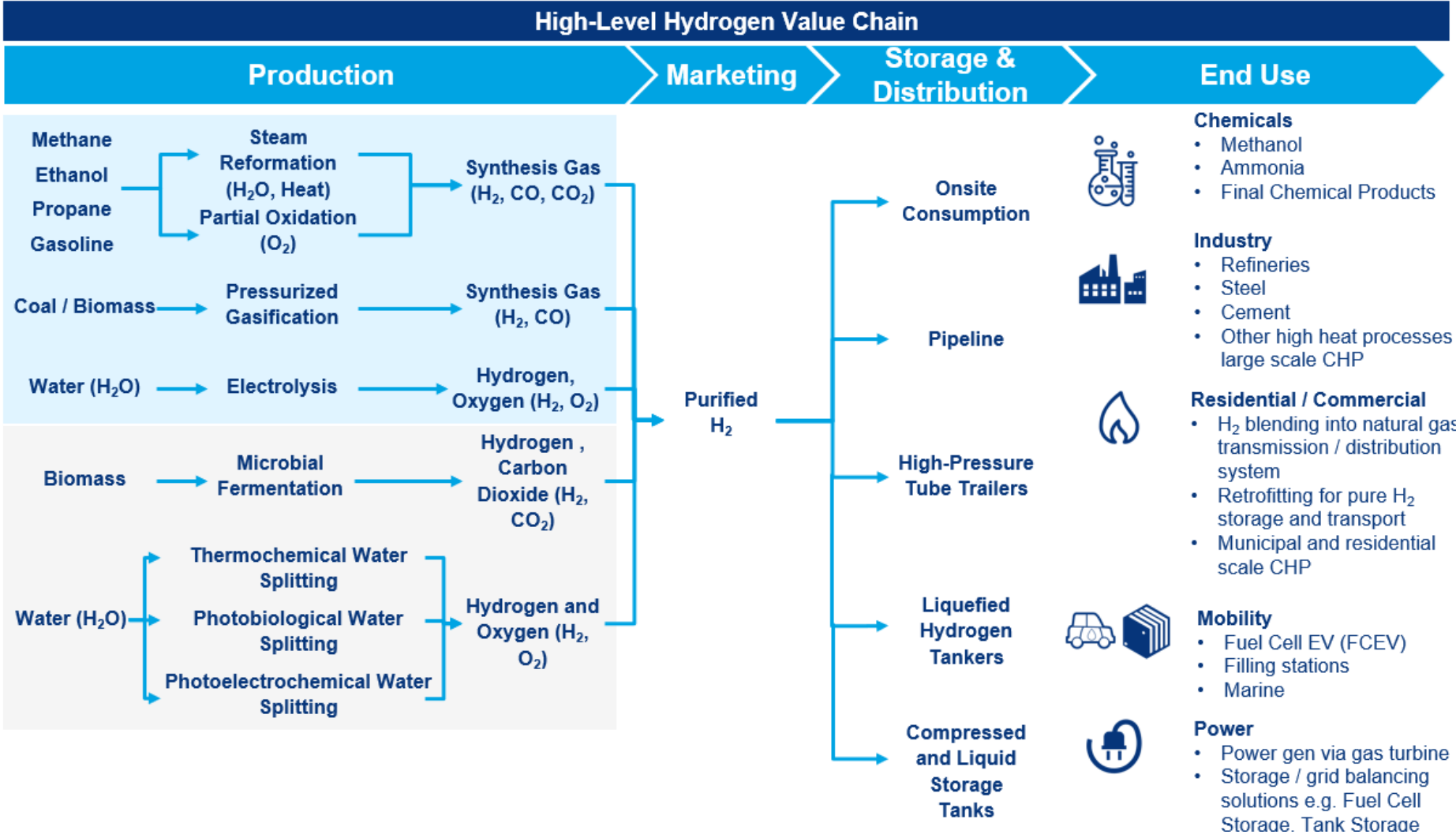
|                         |                       |
|-------------------------|-----------------------|
| Pumps and Compressors   | Connections           |
| Flowmeters              | Regulators            |
| Vacuum Insulated Piping | Sensors               |
| Valves and Sealing      | High Pressure Storage |



## USERS OF HYDROGEN (EXAMPLES)



# The Hydrogen Value Chain, A Different Look



Source: Wood Mackenzie

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# Companies Collaborate to Solve Cost & Scale Challenges



Hydrogen Means Business in California!

The advocate for hydrogen and fuel cells in California



A global initiative of leading energy, transport and industry companies with a united vision and long-term ambition for hydrogen to foster the energy transition.



USISPF is committed to creating the most powerful strategic partnership between the U.S. and India, with a new Hydrogen Task Force



Represents the European industry, national associations and research centers active in the hydrogen and fuel cell sector.



*Cooler By Design.*<sup>TM</sup>



An industry/government collaboration aimed at expanding the market for fuel cell electric vehicles.



Aims at an ambitious deployment of hydrogen technologies by 2030



The leading organizations that are advancing innovative, clean, safe, and reliable energy technologies.



The DNV GL led Maritime Hydrogen Safety Joint Development Project which focuses on maritime hydrogen safety.



The Society for Gas as a Marine Fuel

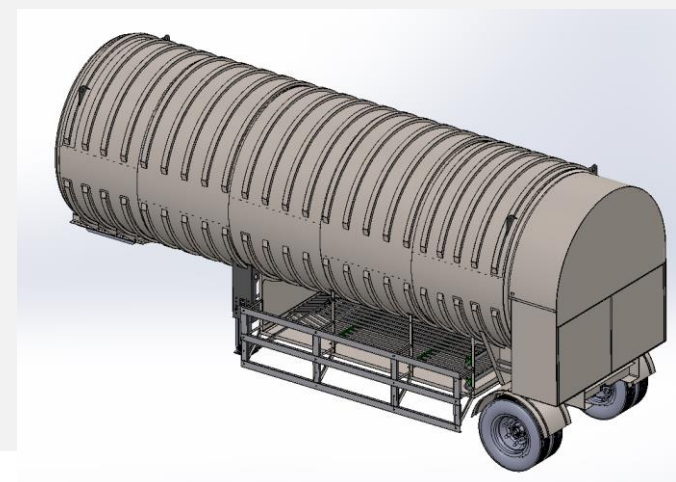
# Expanding Our Hydrogen Offering

|                              | Application/Technology                                | Chart |
|------------------------------|---|-------|
| <b>Production</b>            | Liquefaction  | ✓     |
| <b>Transport</b>             | Cryo Liquid Container                                 | ✓     |
|                              | Flowmeters  | ✓     |
| <b>Storage</b>               | Cryo Tank   | ✓     |
| <b>Refining</b>              | Cryo Storage & Regasification                         | ✓     |
| <b>Ammonia/<br/>Methanol</b> | Cryo Storage & Regasification                         | ✓     |
| <b>Industrial</b>            | Cryo Storage & Regasification                         | ✓     |
| <b>Fueling</b>               | Liquid Storage FCEV Fuel Station                      | ✓     |
|                              | Fork Truck Fuel Station                               | ✓     |
|                              | FCEB Fuel Station                                     | ✓     |
|                              | Aerospace   | ✓     |
|                              | Station Monitoring and Support (EU)                   | ✓     |
|                              | Station Monitoring and Support (Other)                | ✓     |
| <b>Power Gen</b>             | Cryo Storage & Regasification                         | ✓     |
| <b>Energy Storage</b>        | Cryo Storage & Regasification                         | ✓     |
| <b>Mobility</b>              | Vehicle Fuel Tanks (Liquid)                           | ✓     |
| <b>Organic Dev</b>           | LH2 pump  | NPD*  |
| <b>Organic Dev</b>           | LH2 vehicle tanks                                     | NPD   |
| <b>Organic Dev</b>           | LH2 transport   | NPD   |
| <b>Organic Dev</b>           | Hydrogen liquefaction                                 | NPD   |
| <b>Organic Dev</b>           | Hydrogen filling station for class 8 trucks in Europe | NPD   |
| <b>Organic Dev</b>           | Hydrogen insulation improvement                       | NPD   |

## Liquid Hydrogen Vehicle Tanks HLH2



## Hydrogen Transports



\*NPD = New Product Development (Organic)



# Chart's Hydrogen Three-Year Addressable Market

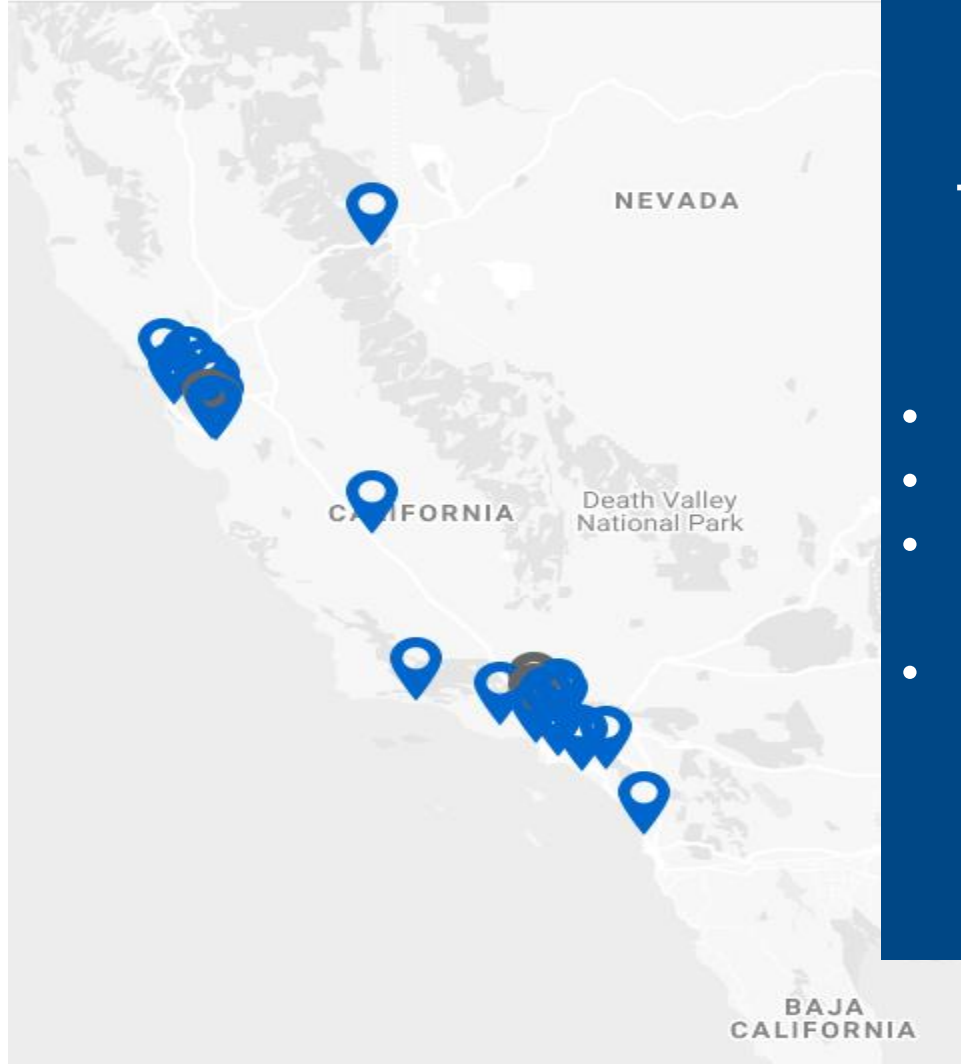
## \$600 Million addressable market

*(all numbers are annual estimates)*

- 100 Fueling stations
- 25 hydrogen transports
- 4 hydrogen liquefiers
- Space launch tanks

## Not included in TAM

- Marine opportunities
- HLH2 onboard tanks



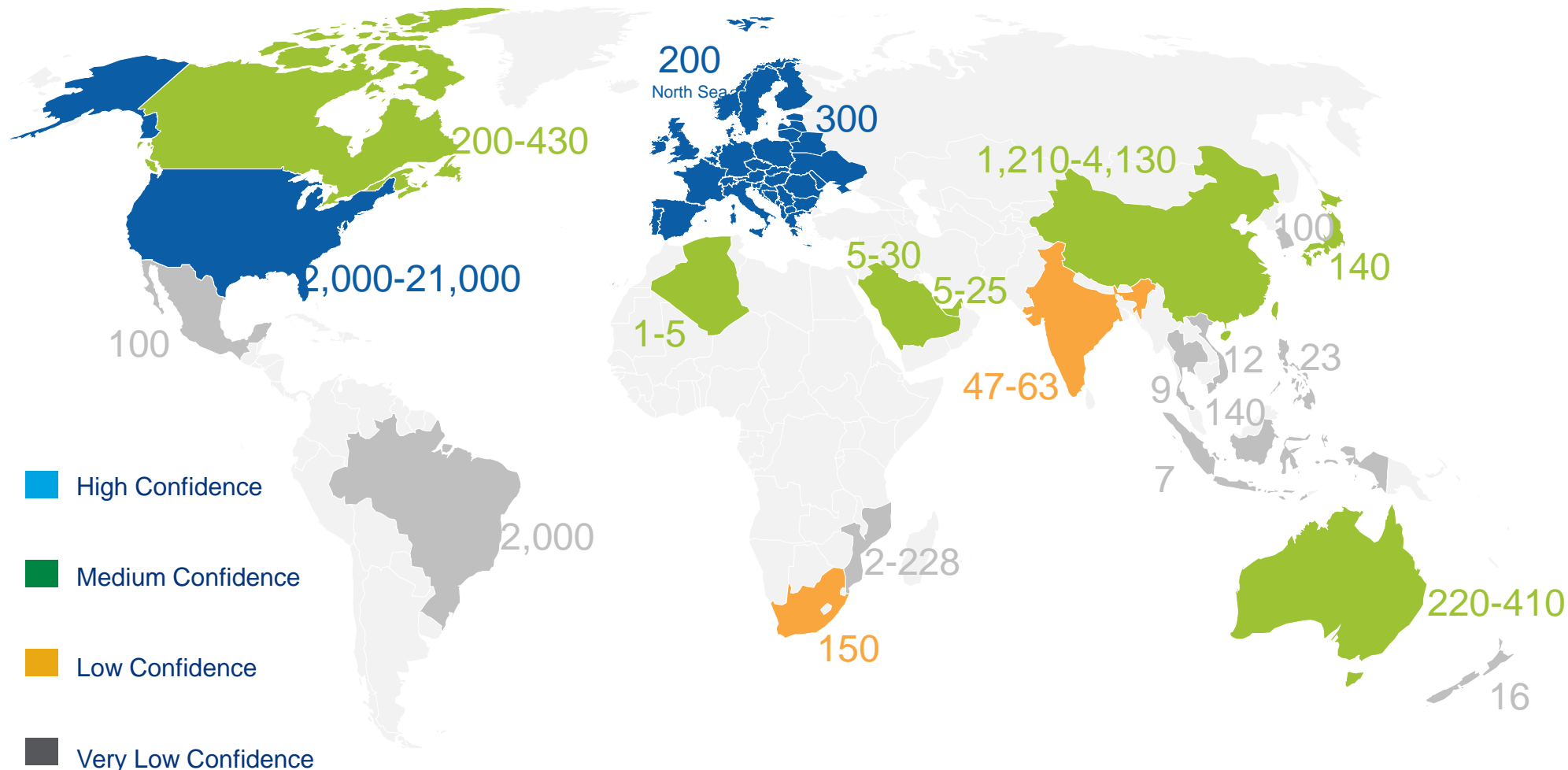
## An Example: FirstElement Fuel's TrueZero Station Network

- State of California
- 25 stations currently
- Funded for 49 stations in latest CEC grant
- Chart content on a station is \$1 to \$2 million per station



# CCUS storage potential overlaps with H2 producing regions

## GLOBAL CCUS STORAGE POTENTIAL (GIGATONNES CO<sub>2</sub> STORAGE)



Source: Global CCS Institute, Global Status Report 2019

# Focused Strategy Supports Clean Energy Targets

