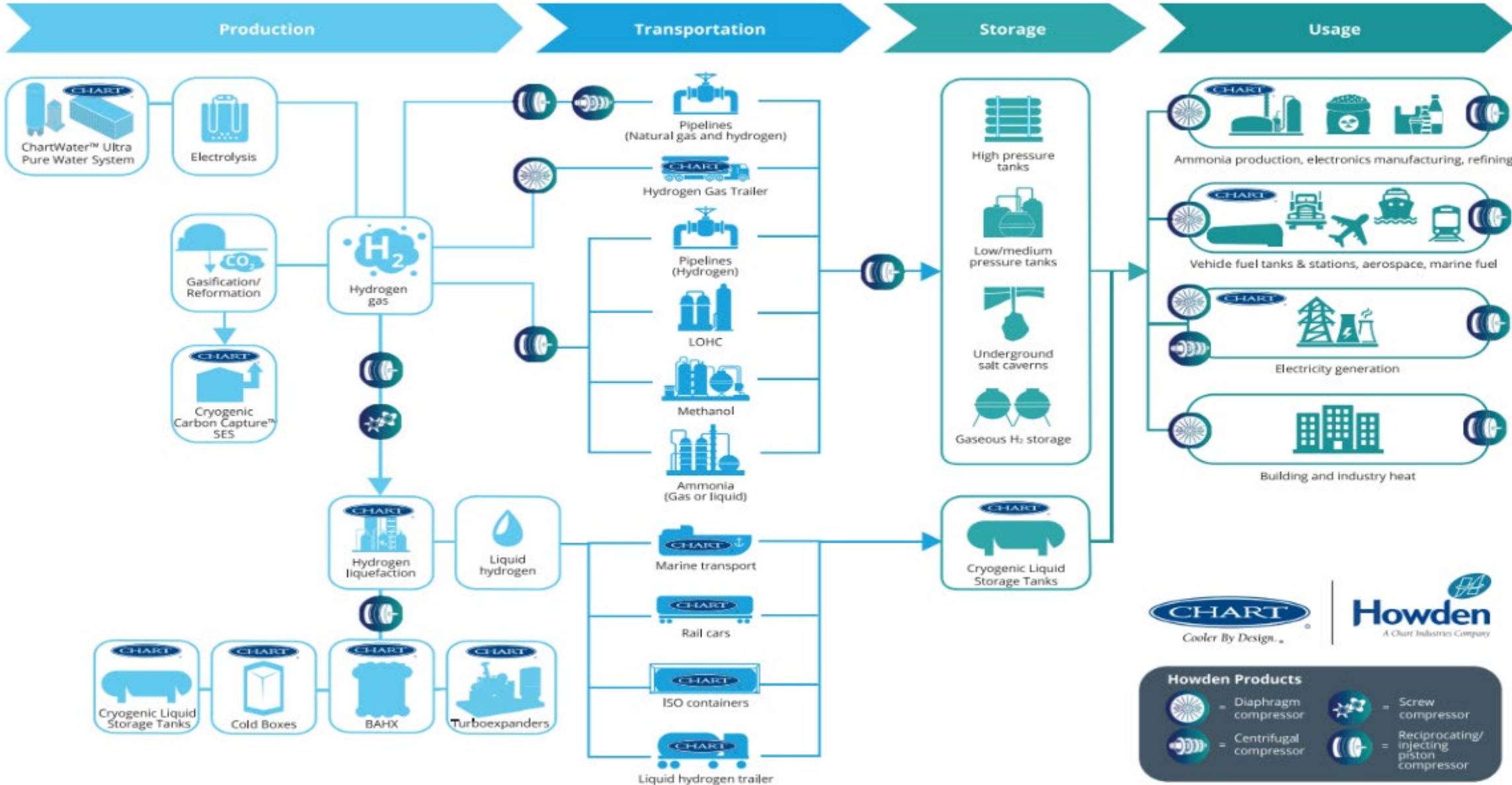


Hydrogen Supply Chain Infrastructure

Chart Industries



Why Liquid Hydrogen?

LIQUID HYDROGEN



- Density
- Transfer
- Safety
- Complexity
- Power
- Boil-Off

70+ GRAMS PER LITER
0.26 KG PER GALLON

GASEOUS HYDROGEN

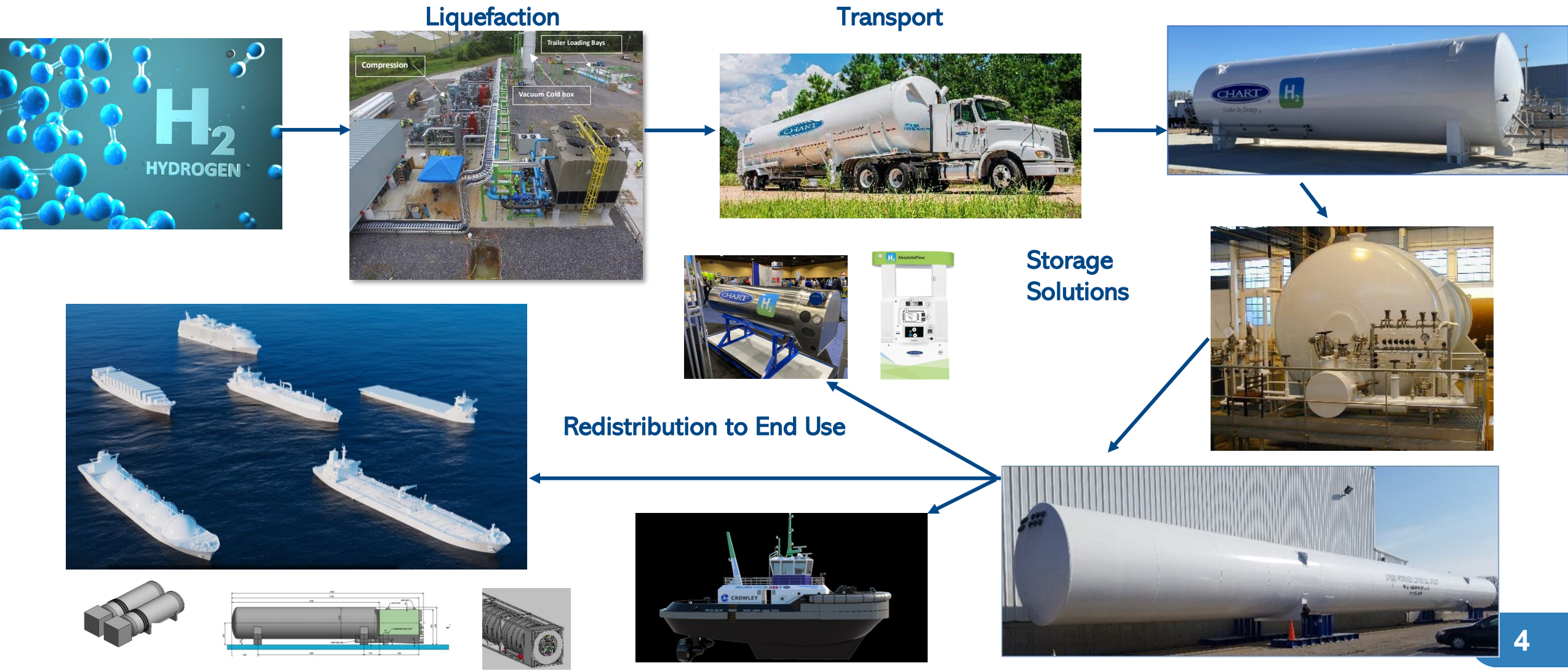


12-20 GRAMS PER LITER
~0.06 KG PER GALLON

LIQUID IS 4+ TIMES THE DENSITY!

IN CALIFORNIA AS HYDROGEN ADOPTION GROWS EVEN THE CH2 APPLICATIONS ARE MOVING TO LH2 SUPPLY CHAIN

Mid-Scale LH₂ Infrastructure



LH2 Infrastructure Technology is Mature

Liquefaction



Storage



Transportation



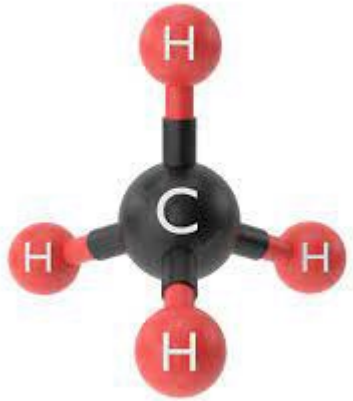
Compression



Large reciprocating piston compressors

Skid-mounted diaphragm compressors

Mid-Scale LNG – An example of how the buildout of projects and infrastructure may play out



Liquefaction



Transport



Storage Solutions



Redistribution to End Use



Image courtesy of Donsötank, with thanks to FKAB



Maritime Hydrogen Economics

IT DEPENDS...

COST BREAKDOWN

Production | Liquefaction | Transport and Fueling

55-60% | **10-15%** | **20-25%**

WITH EACH ROUND OF PROJECTS LH2 PRICING IS GETTING MORE COMPETITIVE WITH TRADITIONAL FUELS

2021
\$15/kg

2023
\$10/kg

2027
...

Maritime Hydrogen Testing & Training

- On-board liquid hydrogen fuel tanks : trucks and ships
- Test with Ballard Fuel Cell FCWave
- Fuel station design and integration
- Hub and spoke trans-fill systems



Thank You

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