

H₂ Infrastructure for the Transportation Sector

Scale-up Scenario Development

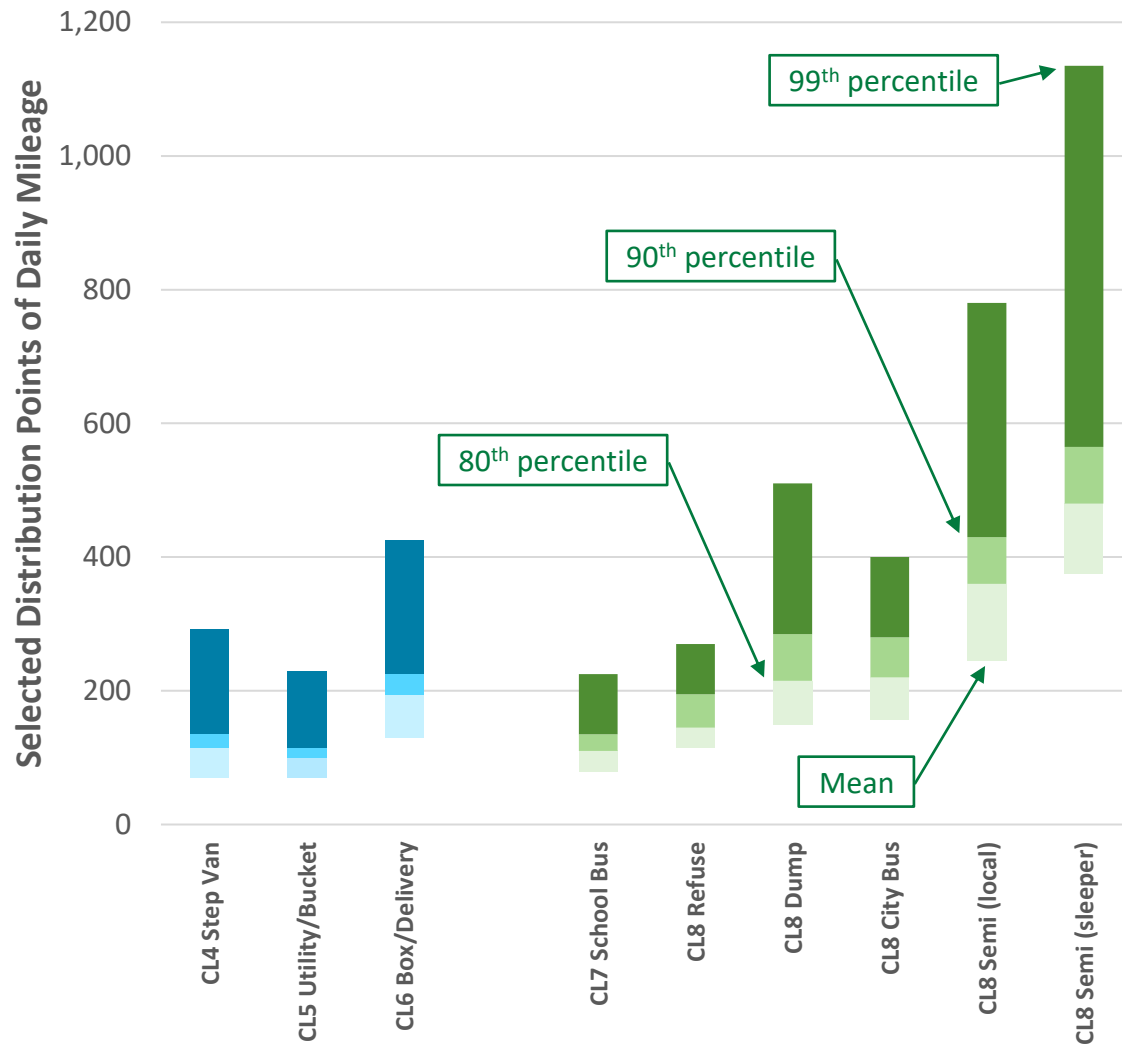
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Old Town Alexandria Westin Hotel
Alexandria, VA

February 27, 2024



Medium- and Heavy-Duty Vehicle Variety



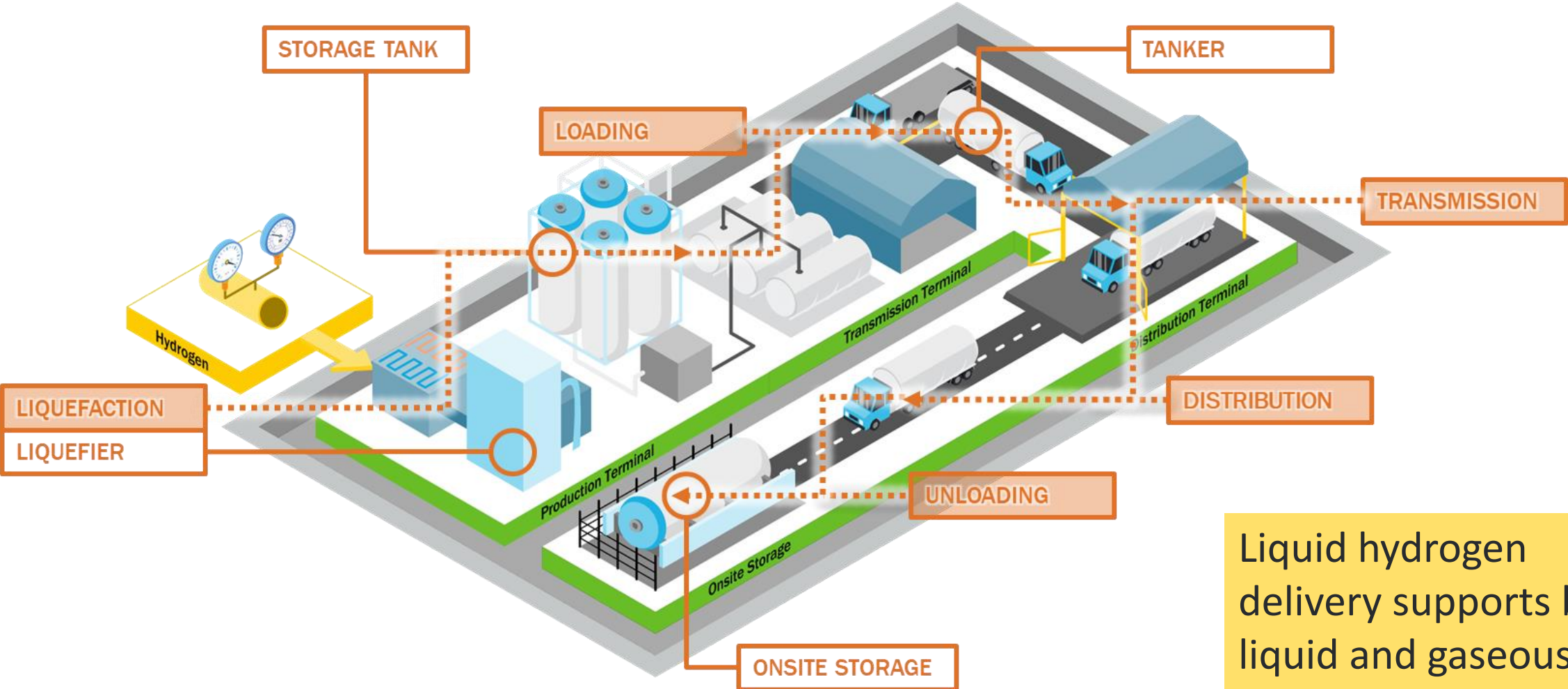
- Fueling pathway selection drivers:
 - Vehicle duty cycles
 - Other vehicle constraints (e.g., weight or space limited)
 - Fueling locations needed, from central depot to dispersed retail
 - Availability and cost effectiveness of fueling pathway technologies
- Anticipate that a range of fueling configurations will be needed both for early market development and deployment at scale

• This workshop is about DOE learning from stakeholders to understand development needs

MD/HD Transportation Scale-up Scenario

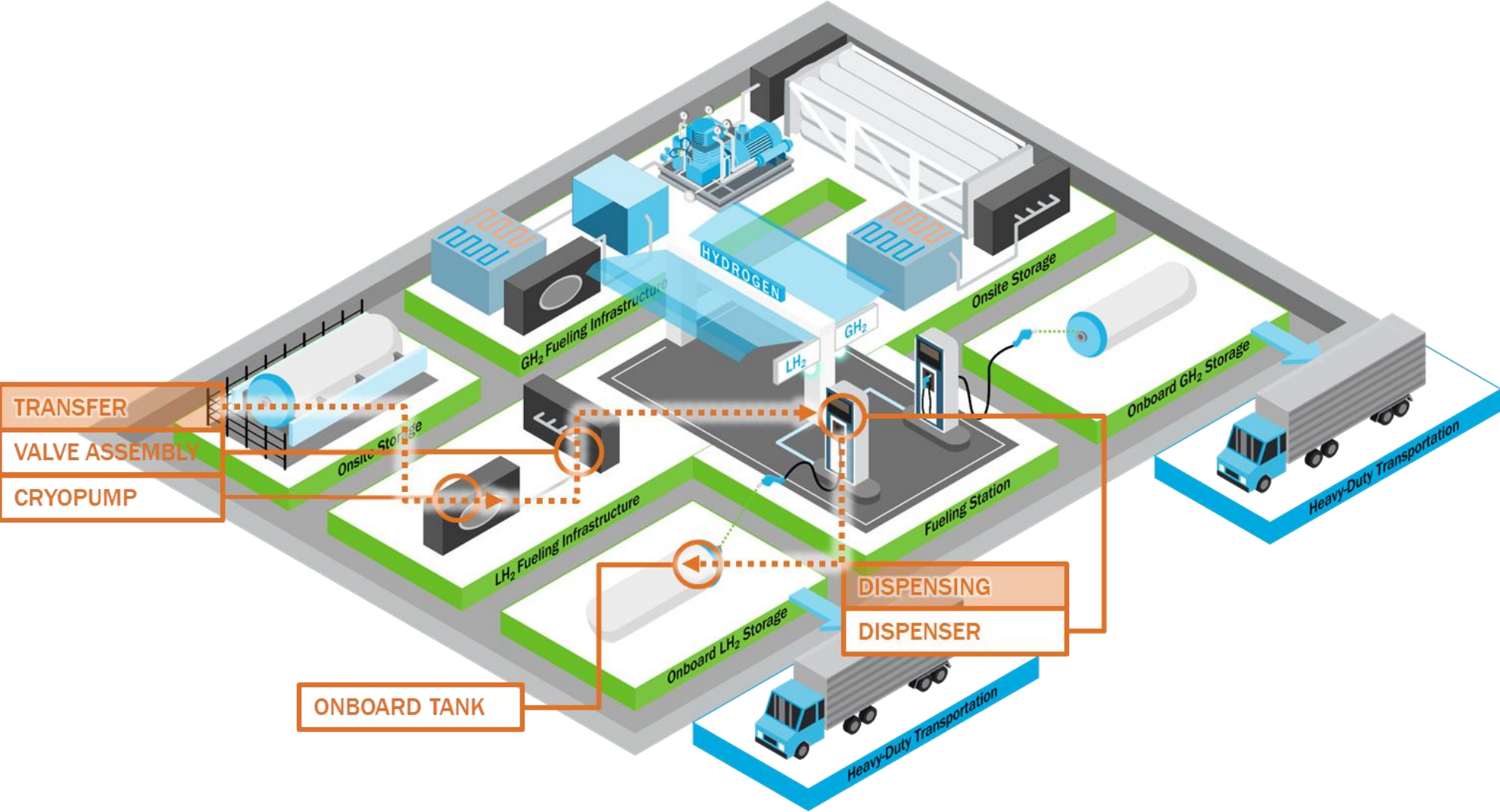
- Medium- and heavy-duty transportation is one of three priority areas, which include industrial processes and energy storage
- Objective: Develop a guiding document that details relevant infrastructure pathways for the highest impact hydrogen end uses
- Draft document is under development
 - This workshop will contribute to the MD/HD transportation document

MD/HD Transportation: Liquid Hydrogen Delivery

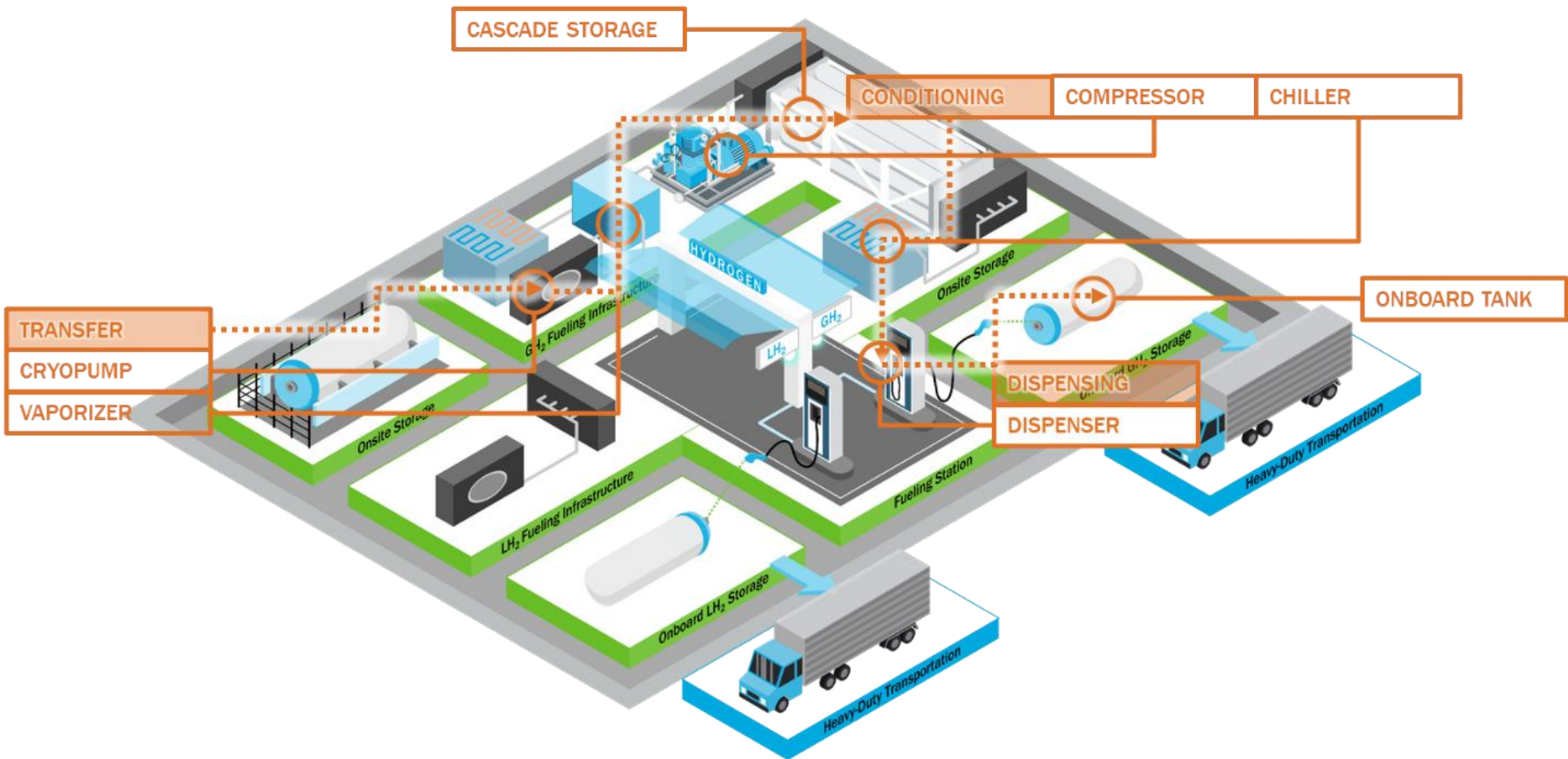


Liquid hydrogen delivery supports both liquid and gaseous hydrogen dispensing

MD/HD Transportation: Liquid Hydrogen Dispensing



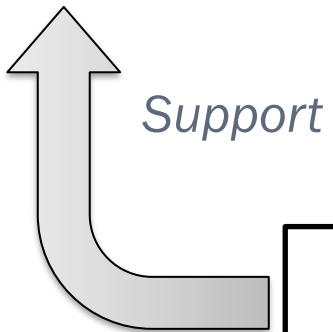
MD/HD Transportation: Gaseous Hydrogen Dispensing



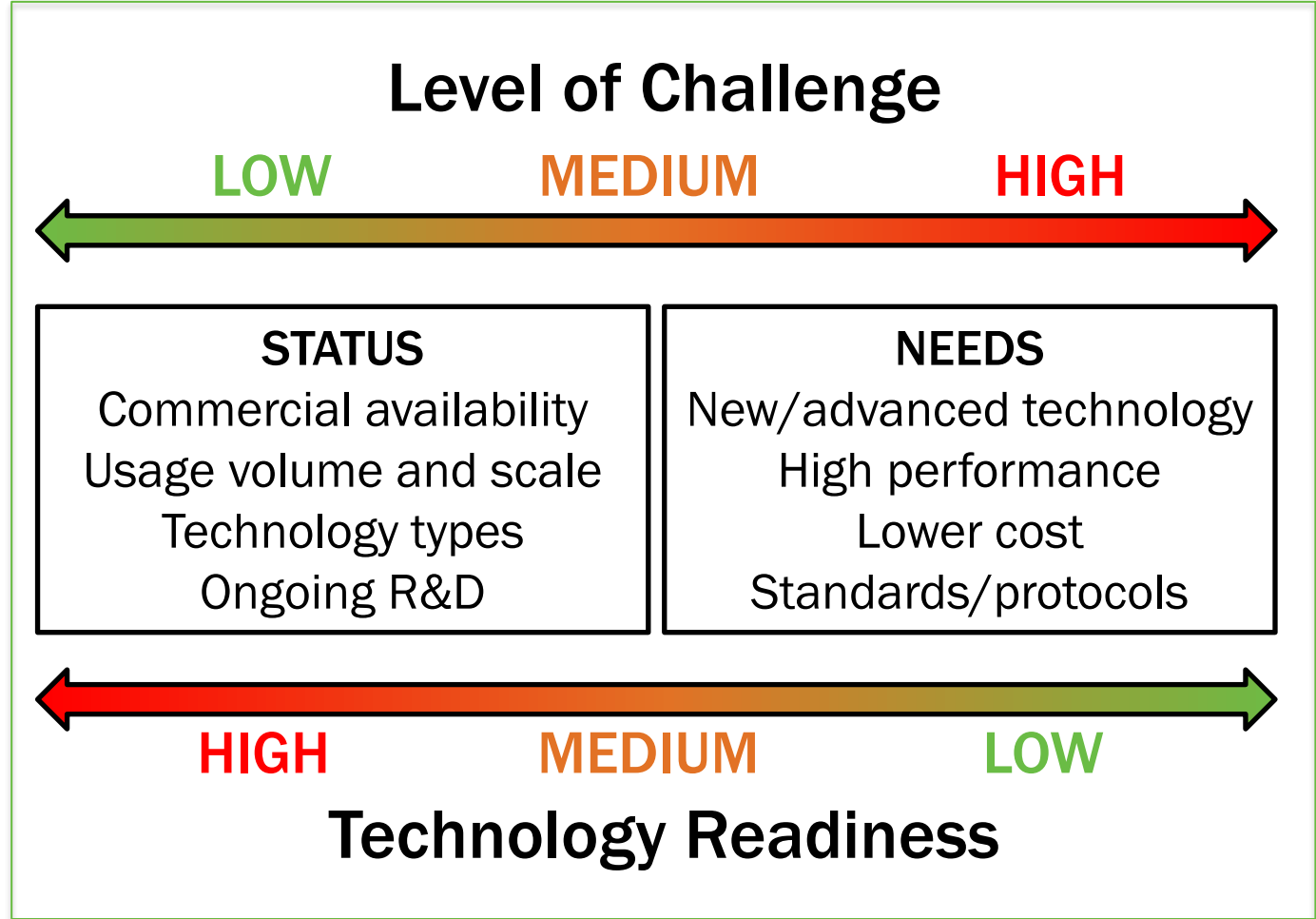
Level of Challenge, Technology Readiness, and DOE Impact

Non-DOE Opportunities, Investments, and Influence

- Industry investment
- Economies of scale
- Market growth
- Public perception
- Market competition
- Regulations



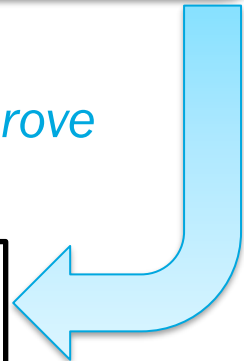
Support



DOE Opportunities, Investments, and Influence

- Research & development
- Demonstration and validation
- National Lab capabilities
- Industry partnerships mitigate industry risk









Improve



Backup

FHWA, U.S. Census, and EPA Vehicle Classifications

Left: <https://afdc.energy.gov/data/10381>
 Right: <https://afdc.energy.gov/data/10380>

Class One: 6,000 lbs. or less
 <p>Full Size Pickup Mini Pickup Minivan SUV Utility Van</p>
Class Two: 6,001 to 10,000 lbs.
 <p>Crew Size Pickup Full Size Pickup Mini Bus Minivan Step Van Utility Van</p>
Class Three: 10,001 to 14,000 lbs.
 <p>City Delivery Mini Bus Walk In</p>
Class Four: 14,001 to 16,000 lbs.
 <p>City Delivery Conventional Van Landscape Utility Large Walk In</p>
Class Five: 16,001 to 19,500 lbs.
 <p>Bucket City Delivery Large Walk In</p>
Class Six: 19,501 to 26,000 lbs.
 <p>Beverage Rack School Bus Single Axle Van Stake Body</p>
Class Seven: 26,001 to 33,000 lbs.
 <p>City Transit Bus Furniture High Profile Semi Home Fuel Medium Semi Tractor Refuse Tow</p>
Class Eight: 33,001 lbs. & over
 <p>Cement Mixer Dump Fire Truck Fuel Heavy Semi Tractor Refrigerated Van Semi Sleeper Tour Bus</p>

Gross Vehicle Weight Rating (lbs)	Federal Highway Administration		US Census Bureau
	Vehicle Class	GVWR Category	VIUS Classes
<6,000	Class 1: <6,000 lbs	Light Duty <10,000 lbs	Light Duty <10,000 lbs
10,000	Class 2: 6,001 – 10,000lbs		
14,000	Class 3: 10,001 – 14,000 lbs	Medium Duty 10,001 – 26,000 lbs	Medium Duty 10,001 – 19,500 lbs
16,000	Class 4: 14,001 – 16,000 lbs		
19,500	Class 5: 16,001 – 19,500 lbs		
26,000	Class 6: 19,501 – 26,000 lbs	Heavy Duty >26,001 lbs	Light Heavy Duty: 19,001 – 26,000 lbs
33,000	Class 7: 26,001 – 33,000 lbs		
>33,000	Class 8: >33,001 lbs		Heavy Duty >26,001 lbs

Gross Vehicle Weight Rating (lbs)	EPA Emissions Classification			
	Heavy Duty Vehicle and Engines			Light Duty Vehicles
	H.D. Trucks	H.D. Engines	General Trucks	Passenger Vehicles
<6,000 6,000	Light Duty Truck 1 & 2 <6,000 lbs	Light Light Duty Trucks <6,000 lbs	Light Duty Trucks < 8500 lbs	Light Duty Vehicle < 8500 lbs
8,500	Light Duty Truck 3 & 4 6,001 – 8,500 lbs	Heavy Light Duty Trucks 6,001-8,500 lbs		
10,000	Heavy Duty Vehicle 2b 8,501 – 10,000 lbs	Light Heavy Duty Engines 8,501 lbs – 19,500 lbs	Heavy Duty Vehicle Heavy Duty Engine >8,500 lbs	Medium Duty Passenger Vehicle 8,501 – 10,000 lbs
14,000	Heavy Duty Vehicle 3 10,001 – 14,000 lbs			
16,000	Heavy Duty Vehicle 4 14,001 – 16,000 lbs			
19,500	Heavy Duty Vehicle 5 16,001 – 19,500 lbs	Medium Heavy Duty Engines 19,501 – 33,000 lbs		
26,000	Heavy Duty Vehicle 6 19,501 – 26,000 lbs			
33,000	Heavy Duty Vehicle 7 26,001 – 33,000 lbs			
60,000	Heavy Duty Vehicle 8a 33,001 – 60,000 lbs	Heavy Heavy Duty Engines Urban Bus >33,001		
>60,000	Heavy Duty Vehicle 8b >60,001			