# Accelerating the Development of a Texas and Gulf Coast Clean Hydrogen Hub



May 2023

### Vision For Texas As A Hydrogen Hub – 2050 Snapshot

Houston as the epicenter of a global clean hydrogen hub **No.1** 

**21MT** 

**170k** 

Global leader in hydrogen production, use, innovation, and talent development

of clean hydrogen production in Texas, including 12MT local demand, 9MT export; 4% of global hydrogen production in 2050 (540MT)

potential direct, indirect, and induced jobs to be created in the hydrogen economy

\$100b

potential addition to Texas' GDP, i.e., 6% of Texas' 2019 GDP



**220MT** CO2 abatement potential from 21MT of hydrogen, i.e., 4x Houston's 2019 emissions



# Industry and export could drive most of the demand that come online by 2035, with mobility and industrial heating to follow



1. Sizing includes Gulf Coast (Texas and Louisiana); 2. Sizing includes Texas; marine only includes Port of Houston; 3. Includes refining, petrochemicals, ammonia, iron, steel, and cement; 4. Includes synthetic fuels and hydrogen propulsion for Texas; 5. Includes natural gas power generation and energy storage; 6. Represents hydrogen and hydrogen-based fuels (e.g., for aviation and marine) produced in Texas and consumed elsewhere

### Announced Clean Hydrogen Projects in Texas and Louisiana



### Federal Policy Support Clean Hydrogen Development

#### Infrastructure Investment and Jobs Act (IIJA)



#### Inflation Reduction Act (IRA)

CBO estimate for 2023-2031

### Hydrogen Hub Applications



### HyVelocity Hub: Creating the Texas and Gulf Coast Hydrogen Ecosystem

#### **Our Vision**

Create the nation's largest clean hydrogen hub stretching across Texas, Southwest Louisiana, and along the U.S. Gulf Coast to advance the clean hydrogen ecosystem and rapidly scale clean hydrogen supply and demand, leading to a market-based, end-toend innovation ecosystem.

#### **Participating Companies (Public Announcements)**

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"The name 'HyVelocity' conveys the idea that we have a tremendous opportunity to accelerate the creation of a clean hydrogen market at the pace needed to meet aggressive decarbonization goals for communities in our nation and around the globe."

Paula A. Gant, PhD,
President and CEO, GTI
Energy

### www.hyvelocityhub.us





### Hydrogen Transportation Infrastructure Opportunities

#### Texas truck traffic, 2018



\*\*Truck markets are focused on those involving the Houston area. Assessing viability of H2 trucks in other TX truck markets (e.g., I-35) is out of scope for this study.

#### Potential Hydrogen Transportation Infrastructure Opportunities:

- Texas Triangle: Major Truck Transit Corridors
  - **I45:** Container/bulk shipping between Dallas and Houston
  - **I35:** Dallas and San Antonio on I 35.
  - **I10:** Houston to San Antonio (may extend to El Paso) and some reverse flow.
- Port of Houston
  - **Chemicals Logistics:** Trucking in port area from refineries to container terminals
  - **Port Drayage:** Port of Houston and adjacent private terminal container/drayage shipping to regional distribution centers
  - **Port Logistics:** Port of Houston equipment in future
- Distribution centers: Sites anchored w forklifts for which refueling infrastructure would support lifts and distribution trucks
- Airports: On-site vehicles and loading equipment as well as refueling for cargo shipping (more likely at Bush). May tie into I 45 corridor concept



## Overcoming infrastructure cost is key to achieving Hydrogen – diesel competitiveness



Total Cost of Ownership, diesel and H2 HDVs on I-45, \$M/truck1,2

Source: Center for Houston's Future, 2019. Houston Region: Becoming a Global Hydrogen Hub



### **TxDOT Transportation Corridor Designations**





### NCTCOG STUDY ON 145 ZEV Corridor

Chapter 1 – Introduction

- Chapter 2 The Importance of ZEV Projects Along the IH 45 Corridor
- Chapter 3 Filling the Gaps: EV Charging for Light-Duty Passenger Vehicles
- Chapter 4 Building a Corridor for Medium- and Heavy-Duty Freight Vehicles
- Chapter 5 Implementation Resources
- Chapter 6 Policy and Regulator Landscape
- Chapter 7 Federal and State Incentives to Support Zero Emission Vehicle Deployments
- Chapter 8 Accomplishments and Recommended Next Steps

www.nctcog.org/IH45-ZEV

### **INTERSTATE HIGHWAY 45 CORRIDOR** Zero Emission Vehicle Plan

From Dallas to Houston on Zero Emissions



### Infrastructure for Heavy-Duty Vehicles

#### **Data-Driven Approach**

- 1. Intersects a Freight System Corridor
- 2. No Direct-Connect Ramps
- 3. Cross Street Accessible from Both NB and SB Directions of Travel
- 4. Turning Point Indicated by StreetLight Data
- 5. Access to at Least 2 Types of Amenities Truck Stops Key

#### **Recommendations:**

- 5 EV Charging Sites: Houston, Huntsville, Buffalo, Corsicana, near UP Intermodal Facility
- 3 Hydrogen Fueling Sites: Houston, Buffalo, near UP Intermodal Facility



### H2Houston Hub – Ideal Concentration for Hydrogen Trucks





### H2Houston Hub – Dense Concentration of Truck Traffic at Port Houston

