



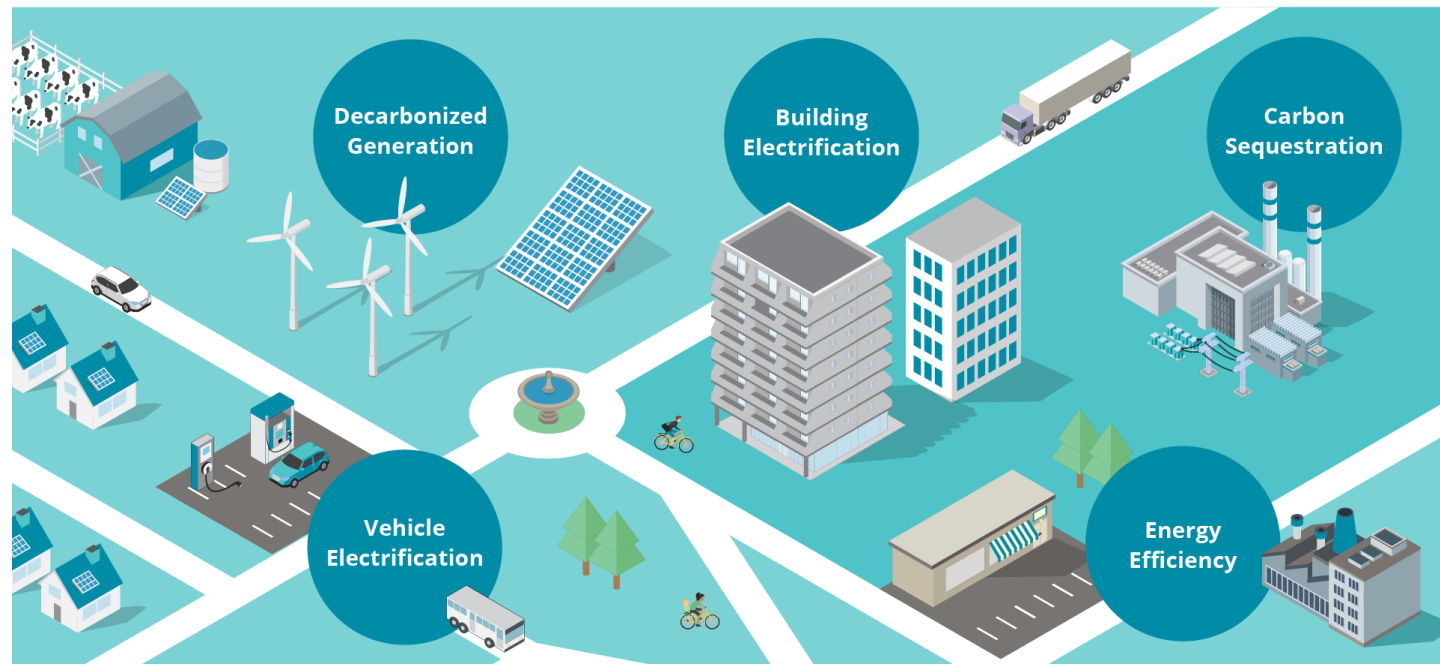
Sponsoring partner

- U.S. DOE EERE HFTO

Industry partners

- Air Liquide
- Chart Industries
- Frontier Energy*
- Gas Technology Institute*
- Mitsubishi Heavy Industries
- OneH2
- ONE Gas
- ONEOK
- Shell
- SoCalGas
- Toyota
- University of Texas at Austin*
- Waste Management

* Project team leads



Demonstration and Framework for H2@Scale in Texas and Beyond

UT Austin and Port of Houston region

Nico Bouwkamp

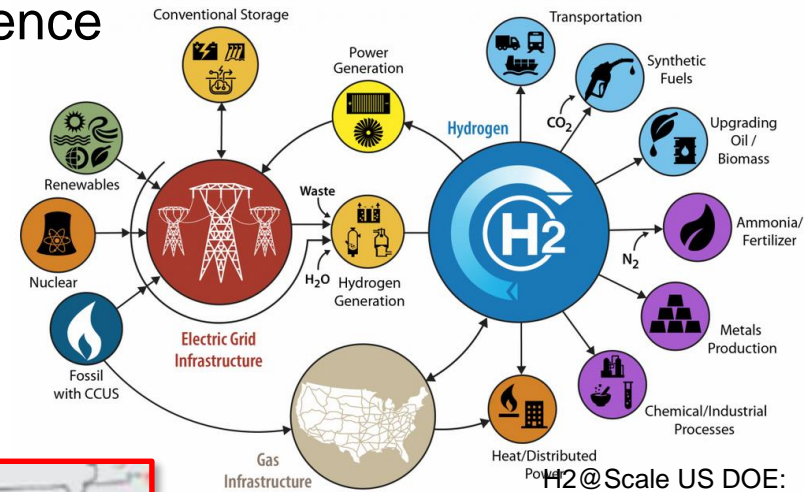
Texas Hydrogen Roundtable: Benefiting from an Emerging Technology

January 12, 2021

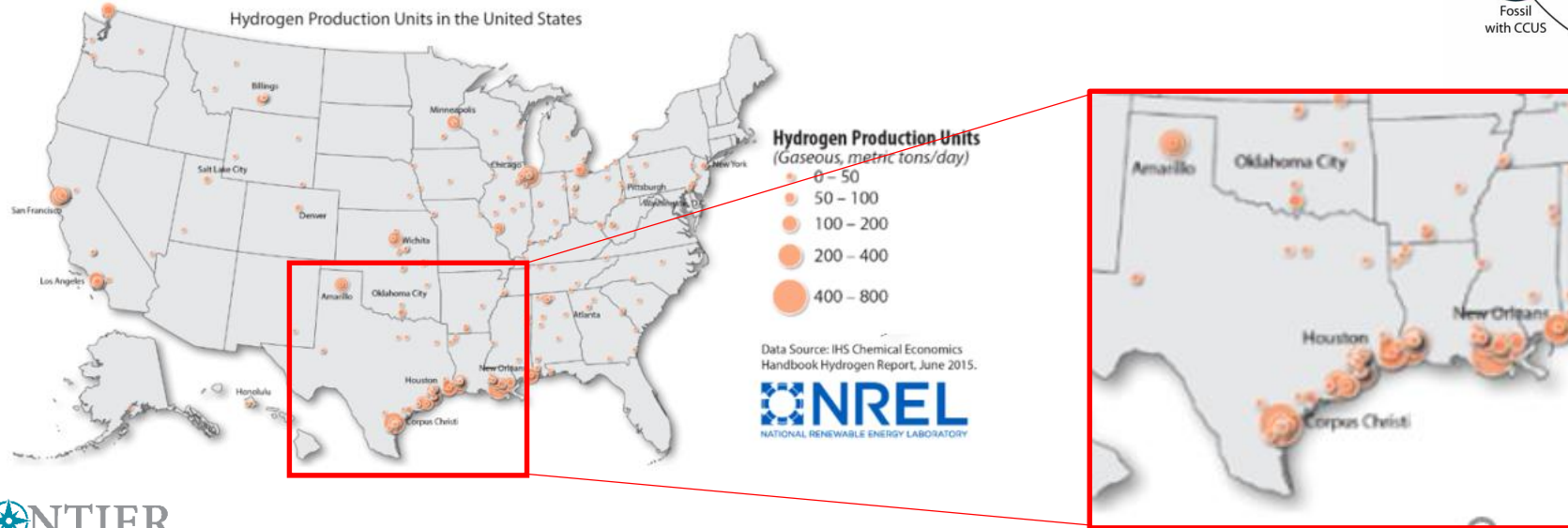
Growing H2@Scale in Texas

Texas ideal to lead H₂ production for a sustainable energy system

- Major industry leaders on Hydrogen Council have significant presence
- Excellent resources of NG, RNG, solar and wind for RH₂
- Largest established H₂ producer in the nation



H2@Scale US DOE:
<https://www.energy.gov/eere/fuelcells/h2scale>



H2@Scale TX Project

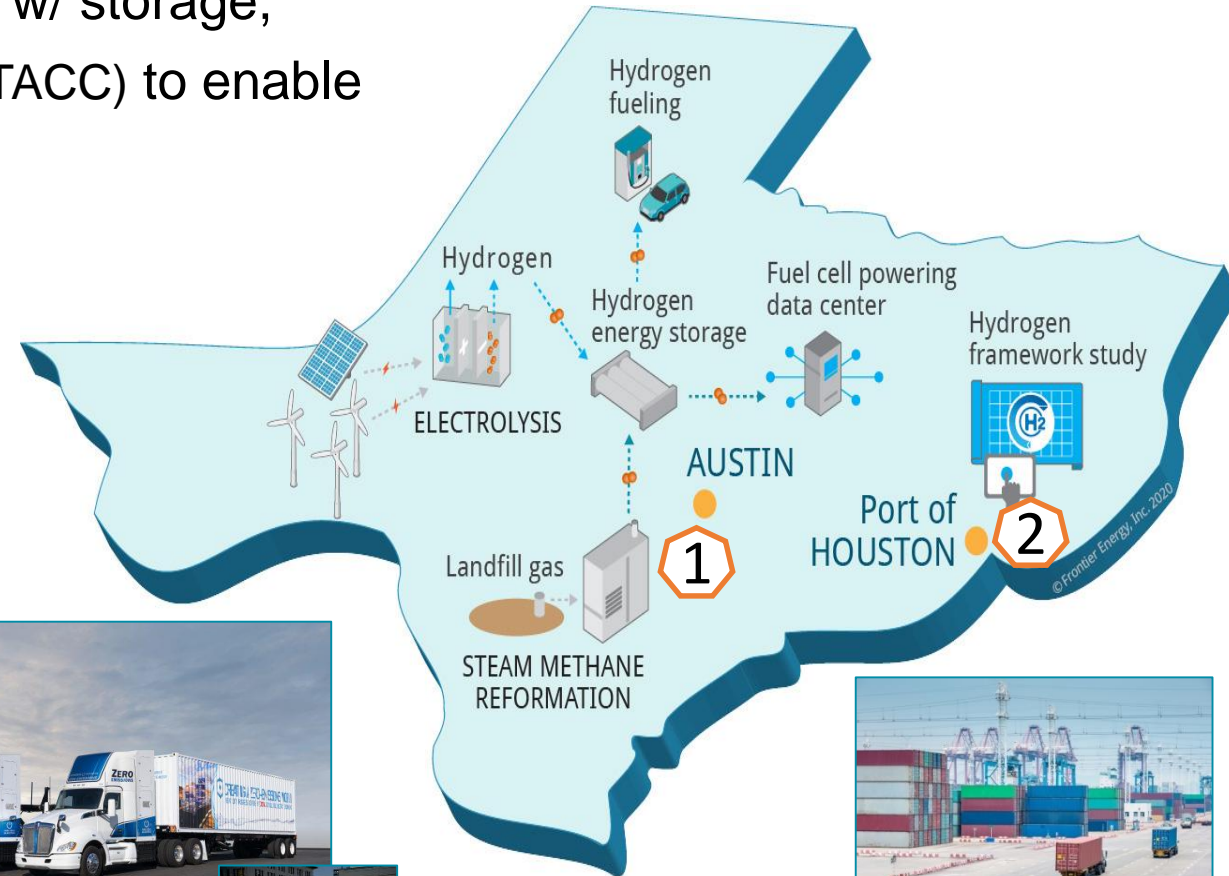
Two unique tracks to grow understanding of H₂ integration potential

① Demonstrate multiple RH₂ generation options w/ storage, vehicle fueling and base load user (UT Austin TACC) to enable cost-effective H₂ energy solutions



② Develop framework for actionable H2@Scale plans in Texas, incl. energy decarbonization, energy storage & FCEV rollout

- Identify policy and regulatory barriers
- Leverage existing industry resources



(Source: Toyota)



Progress to Date

Project management

- Press release 9/15/20 (shorturl.at/kmxyD)
 - Industry and media interest from Texas, US and globally
- Stakeholder engagement and planning

1 Demonstration activities

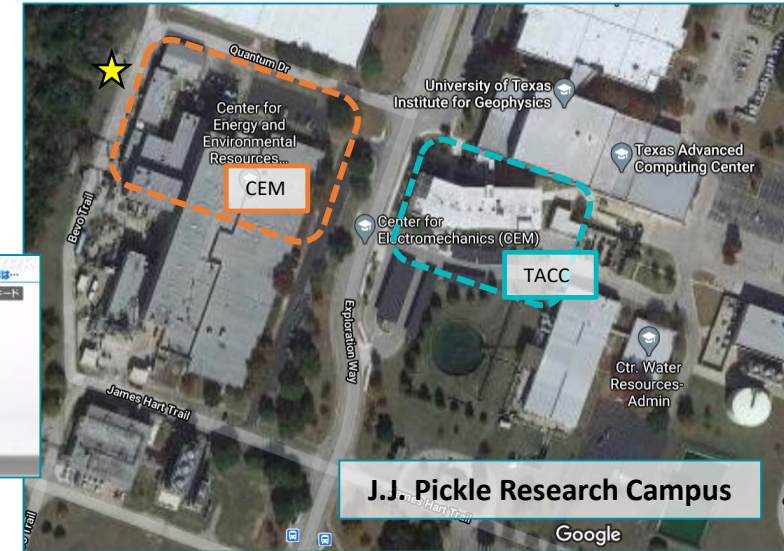
- Working with UT Facilities to cost and select equipment site
- Shipped existing H2 equipment to GTI for upgrades
- Initiated procurement of long-lead equipment
- Analysis of TACC & solar power data

2 Port of Houston Framework

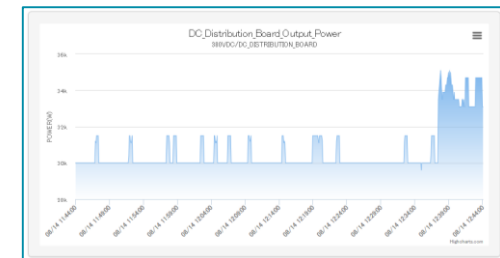
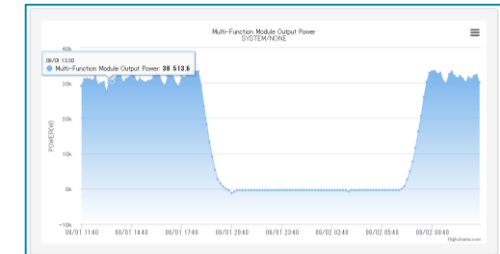
- Compiling data existing infrastructures and energy systems
- Developing list of stakeholders for workshops (50+ identified)
- Initial stakeholder engagements



(Credit: Ricky Sakai, MHI)



(Source: GTI)



Example power data from Texas Advanced Computing Center. Solar array power on top, DC distribution power on bottom.

Expansion and Integration Opportunities

- Domestically sourced decarbonized H₂ for multiple sectors and/or export
- H₂ enables zero emissions in all transportation modes, and for stationary, remote, and portable power
- H₂ used as a grid “responsive load” for grid stability and GWh scale energy storage, and to increase power generators utilization
- H₂ critical feedstock for process and chemicals industries
- Combinations of any of the above
 - Economic growth

Questions or follow up

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