UCONN
FACILITIES OPERATIONS

University of Connecticut

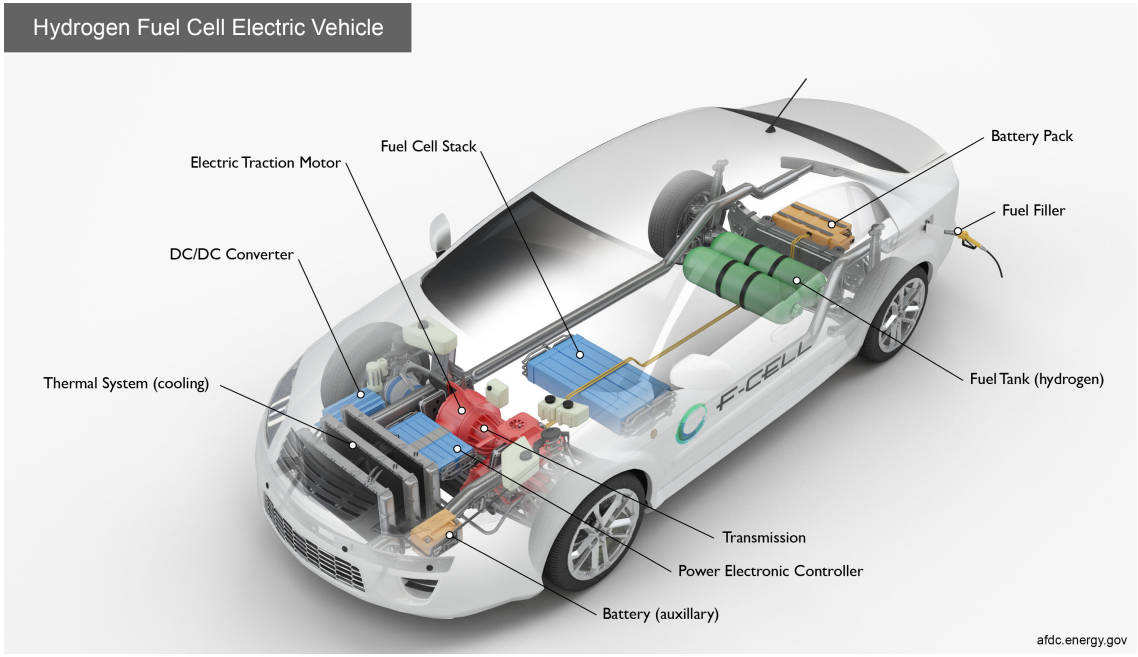
Carbon Neutral Task Force
Meeting #4

February 2023

Agenda

- Overview of Topics To Date
- Hydrogen Vehicles & Fueling
- H2 Trailer
- Hydrogen Task Force Summary
- Updates/Open Discussion

Hydrogen Vehicles & Fueling



- Hydrogen gas is compressed for fueling
  - 5,000 pounds per sq. inch (H35 – 350 bar)
  - 10,000 pounds per sq. inch (H70 - 700 bar)
- Hydrogen may be pre-cooled to speed fueling
- Pre-chilled (-40 C) vs ambient temperature fueling
- Appliance typically communicates with vehicle
- SAE J2601 (3 – 5-minute target)
- Hydrogen Prices
- U.S. Department of Energy (DOE) – Hydrogen Shot (June 7, 2021)
- Reduce the cost of clean H2 by 80% by 2031 to $1 per kilogram (1-1-1)
- California – February 1st – prices is $26 per kilogram ($108 for fill-up)

Hydrogen Vehicles & Fueling

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Hyundai Nexo

380-mile driving range

MPGe 65 City/54 Hwy/ 61 Combined

System Power 135 KW

95 kW stack & 1.56 kWh Battery

H2 Tank Capacity 6.33 kg

Hydrogen Vehicles & Fueling

H2 Fueling Locations

- IPB Fueling Station

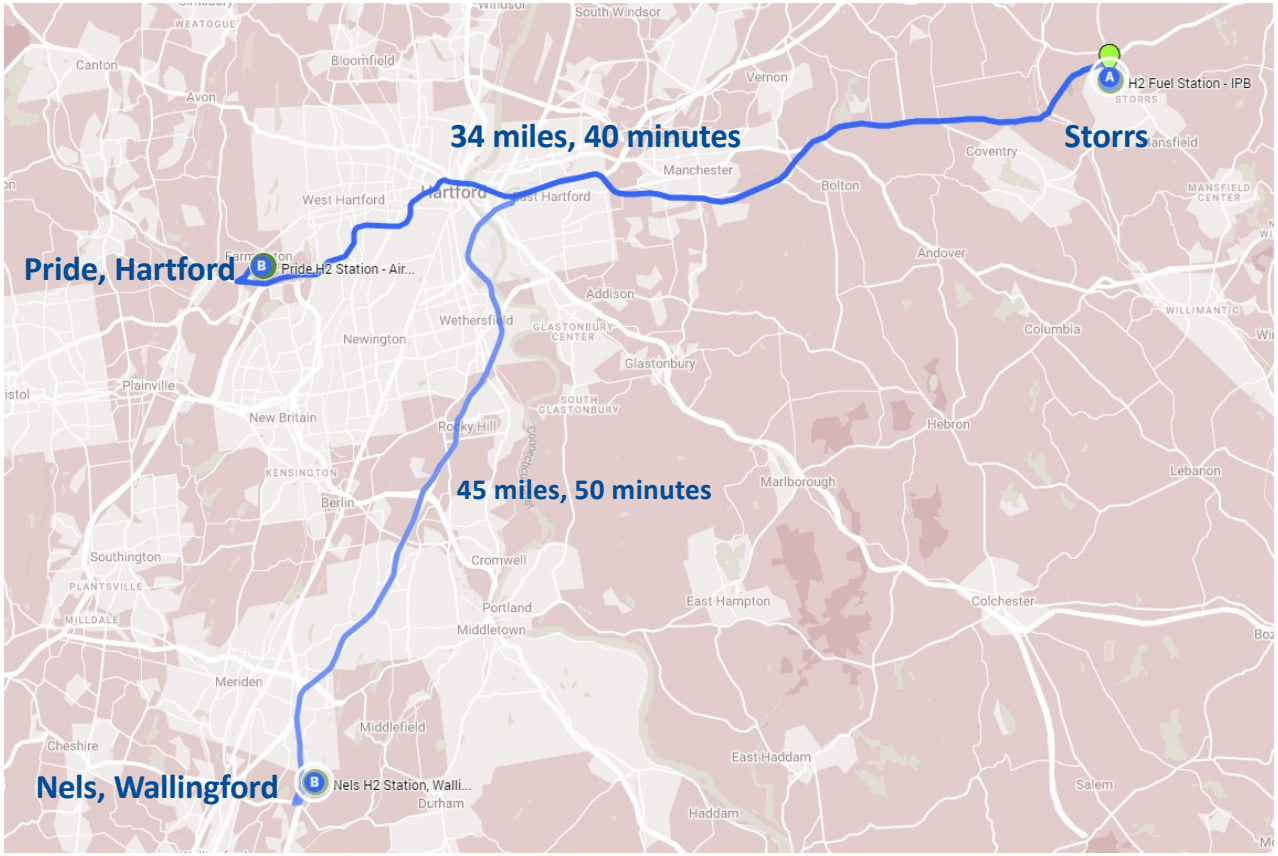
  159 Discovery Drive, Storrs, CT 06269

- Pride H2 Station

  10 Jennings Road, Hartford, CT 06120

- Nels H2 Station

  10 Technology Drive, Wallingford, CT 06492



H2 Trailer Concept

H2Genset - Mobile Hydrogen Power Generator (20Kw – 21hrs)

- A mobile hydrogen generator with integrated pressure tanks and a peak power of up to 20kW
- At continuous nominal power, the H2Genset can run for up to 21 hours without refueling.
- Refueling is possible at any hydrogen filling station as well as with a bundle of cylinders.
- Can be operated in any weather and environmental conditions without special safety precautions.
- Thanks to its modular design, the power spectrum can be tailored precisely to the customer's requirements
- By TEST-FUCHS GmbH

Generator Costs

100 KW Hdyrogen Power Generator $ 257,000.00

- 125 KVA / 100KW Maximum Output
- Optional 120/208Y VAC Or 277/480Y VAC Input/Output
- 8 Hour Built In Hydrogen Tank
- 10' Container
- Optional 6 Day External Hydrogen Tank (20' Container), Unlimited Expansion With Additional External Hydrogen Tanks
- Generates Power At ~$0.33 Per KWH Based On Current Hydrogen Prices
- Projected To Generate Power At ~$0.07 Per KWH Based On Government 1-1-1 Hydrogen Plan Within The Next 5 Years

Generator Costs

100 KW Natural Gas Generator $32,000

Generac 100kW Propane Generator Protector Series 120/240 Volts 3 Phase

Utility-Grade Power—Less than 5% THD for Electronics and Appliances

- Generac 1800 RPM Propane 9 Liter V-8 Engine
- Liquid-Cooled Engine with Water Pump, Cooling Fan, Radiator
- Low-Speed Quiet Self-Test runs weekly, bi-weekly, or monthly
- WiFi Connectivity Included. Generator Monitoring with Mobile Link
- RhinoCoat aluminum enclosure corrosion protection for any climate
- EPA and California Emissions: For Sale in all 50 States
- Standard 5-Year Limited Warranty Includes—Extended Warranty Options Available

Hydrogen Task Force – State

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University of Connecticut

Radenka Maric
President

Task Force Recommendations Highlights:

- Connecticut Clean Hydrogen Innovation Center
- Strategic Innovation Fund
- Workforce Development and Research

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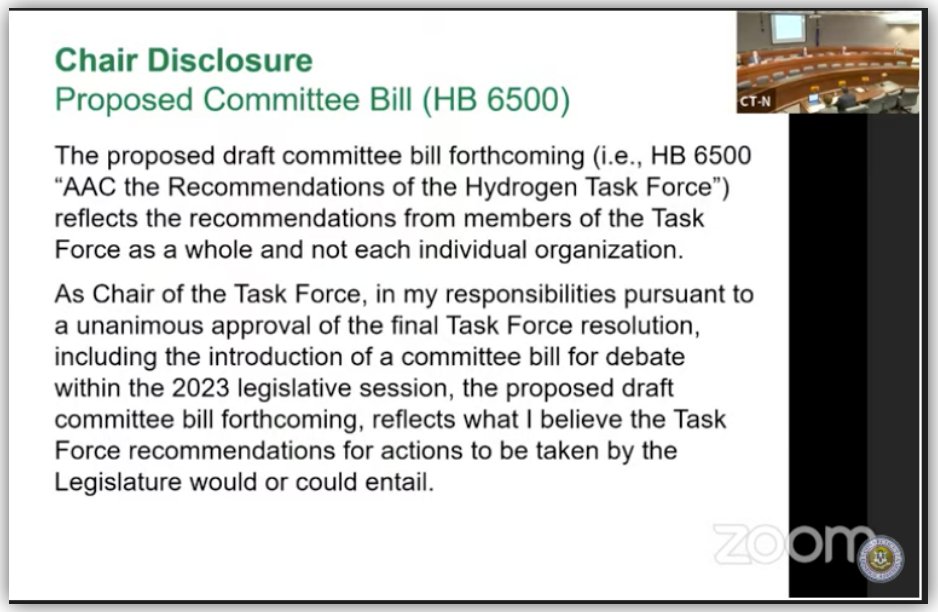

Questions for Panelists

Relevant Task Force Recommendations

- UCONN should host a **learning laboratory** funded by the state, with the primary objective of addressing technical barriers to the deployment of fuel cells, hydrogen, and other clean energy technologies.
- UCONN along with other education programs, should identify opportunities to support development of the **hydrogen workforce** and **advance research and development** in hydrogen electrolyzers and hydrogen fuel cells.
- Consider appropriating grant funding to **support federal match requirements**.
- Consider **tax exemptions** for hydrogen vehicles and critical facilities that produce or use clean hydrogen.
- Evaluate broader policies that would **facilitate the decarbonization of hard-to-electrify sectors**.
- DECD should establish a **Strategic Innovation Fund** with bond funds to encourage research, development, and deployment that will accelerate **technology transfer and commercialization of innovative products**, processes, and services related to hydrogen with guidance from an Industry Advisory Board.

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Task Force Charge

UCONN

"The Carbon Reduction Working Group will continue to support ongoing energy conservation efforts but will also identify, evaluate and recommend specific cost-effective initiatives and actions within the larger context of the university's available resources. This includes academic research and other programs, that will increase the use of clean and sustainable energy on UConn's campuses and reduce environmentally harmful emissions. The goals of this group include UConn achieving carbon neutrality on its campuses by 2030, with the ultimate goal of zero carbon by 2040. "

Open Discussion