



## Meeting Minutes<sup>1</sup>

Thursday, December 19, 2022  
3:00 p.m. – 4:00 p.m.

The fourth meeting of the Infrastructure Working Group was held on December 19, 2022.

All participants joined via the Teams conference call.

### **Task Force Members Present:**

Enrique Bosch (Avangrid), Nikki Bruno (Eversource), Samantha Dynowski (Sierra Club), Bryan Garcia (Connecticut Green Bank), Shannon Laun (Conservation Law Foundation), Adolfo Rivera (Avangrid), Lidia Ruppert (Designee – CT DEEP)

### **Others Present:**

Chris Capuano (Nel Hydrogen), Erin Childs (Strategen), Nina Hebel (Strategen), Collin Smith (Strategen)

### **1. Call to Order**

- Collin Smith, a Senior Consultant at Strategen providing technical support for the Infrastructure Working Group, called the meeting to order at 3:04 p.m.

### **2. Welcome and Introductions**

- Mr. Smith provided an overview of the meeting agenda which included attendee introductions and a review and discussion of the Infrastructure Working Group findings and recommendations.
- Each participant introduced their name and organization.
- Mr. Smith provided an overview of the final Working Group meeting schedule for December noting the upcoming Sources and Uses Joint Working Group on Wednesday, December 20, 2022.

### **3. Review of Working Group Deliverables**

- Mr. Smith noted that the Infrastructure Working Group deliverables as noted in the Working Group's charter include the following activities:
  - A geographic analysis detailing the locations of existing infrastructure and proximity to hydrogen production and offtake sites.
  - A high-level assessment of needed infrastructure and associated costs.
  - An assessment of priority areas for hydrogen infrastructure development, considering environmental justice and economic development objectives.

### **4. Review of Key Findings**

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<sup>1</sup> For access to the meeting recording – <https://www.ctgreenbank.com/hydrogentaskforce/>

- Mr. Smith identified that connecting infrastructure will likely be required to transport hydrogen to major offtakers at scale as Connecticut's areas of high renewable production potential are not directly by high potential demand sites.
- Mr. Smith noted that the location of major hydrogen offtakers creates opportunities for the growth of a hydrogen economy to support environmental justice and economic development activities.
- Ms. Laun noted potential tension regarding siting hydrogen infrastructure in environmental justice communities.
- Ms. Dynowski noted that the potential for increased NOx emissions from combusting hydrogen is an issue as it relates to asthma rates.
  - Ms. Childs clarified that the key recommendations posed by the Task Force discuss fuel cells, rather than hydrogen combustion.
  - Ms. Dynowski requested that the report and associated graphics emphasize this detail.
- Mr. Smith explained that transportation, storage, compression, and potentially liquefaction, are important components of the hydrogen supply chain. Mr. Smith explained that hydrogen is produced at low pressures of 20-30 bar and must be compressed between 200 to 500 bar to be economically transported. He noted that regarding transportation, under stable demand conditions, pipelines containing gaseous hydrogen are likely the most economic form of hydrogen delivery. Mr. Smith explained that liquid hydrogen is often desirable compared to gaseous hydrogen due to its higher energy density and lower cost at high volumes. Further, Mr. Smith noted that salt caverns are considered one of the best options for underground hydrogen storage as they have low permeability and can handle high pressures.
  - Ms. Bruno inquired whether transportation of hydrogen via rail or barge was considered.
    - Mr. Smith clarified that barge and rail are possible options for hydrogen transport and may be included as future areas of research, but this analysis primarily analyzed pipeline transportation.
  - Ms. inquired whether there were Connecticut specific cost estimates available for hydrogen storage, compression, liquefaction, and transportation.
    - Mr. Smith indicated that these estimates would be presented and shared.
- Mr. Smith noted that the costs of connecting infrastructure for hydrogen varies with the transportation volume and distance. He explained that as delivery distance increases, price increases and as volume increases, price decreases. He explained that delivery to concentrated end users such as ports or industrial facilities would cost \$0.06-\$1.82 per kg of hydrogen while delivery to distributed end users such as fueling stations or critical facilities would cost around \$0.65-\$3.87 per kg of hydrogen. Finally, connection to out of state storage would cost about \$0.10-\$0.58 per kg of hydrogen.
- Mr. Smith explained the cost of hydrogen infrastructure is likely to be the make or break economic factor for hydrogen in competition with transportation fuels.

## 5. Discussion of Draft Recommendations

- Mr. Smith presented an overview of draft recommendations related to the Infrastructure Working Group, as follows:
  - DEEP should lead interstate and interagency coordination to develop a hydrogen roadmap and strategy that identifies approaches to a clean hydrogen backbone to enable cost-effective scaled transport, as well as other

research and infrastructure investment opportunities to inform policy development, funding, and R&D strategy in consultation with ecosystem stakeholders.

- DEEP should investigate the need for hydrogen fueling stations to support multi-sectoral mobility applications, and as appropriate, coordinate with CT DOT to develop more specific strategies for optimizing siting and funding.
- DEEP should clarify and work with relevant agencies and stakeholders to explore the acceleration of permitting for hydrogen infrastructure.
- Ms. Laun recommended outlining guardrails as they pertain to accelerated permitting processes, in order to protect community stakeholders.

#### **6. Next Steps**

- Mr. Smith reviewed the upcoming Task Force milestones and schedule through January.

#### **7. Adjourn**

- Mr. Smith adjourned the meeting at 3:42 PM