

Hydrogen Task Force:

Hydrogen Sources Working Group Charter

Co-Chairs

Ugur Pasaogullari, Professor and Director of the Center for Clean Energy Engineering, University of Connecticut

ugur.pasaogullari@uconn.edu

Katherine Ayers, Vice President of Research and Development, Nel

kayers@nelhydrogen.com

Strategen Lead

Collin Smith, Senior Consultant, Strategen Consulting

csmith@strategen.com

Objective

The objective of the Hydrogen Sources Working Group is to “[examine] the sources of potential clean hydrogen [in Connecticut] including, but not limited to, wind, solar, biogas and nuclear.” This will include an assessment of the maximum in-state clean hydrogen production that could be achieved using Connecticut’s share of carbon-neutral feedstocks, factoring in potential needs for these types of resources in other segments of a decarbonized economy. This analysis will also be coordinated with forecasts of clean hydrogen demand developed by the Hydrogen Uses Working Group to assess any gaps in the state’s clean hydrogen production capacity and its projected hydrogen use. This Working Group will also assess the equipment needed to produce hydrogen (e.g. electrolyzers, biogas reformers). However, it will not address infrastructure required to transport clean energy or hydrogen to/from production sites, which falls within the purvey of the Infrastructure Working Group

Statutory Responsibilities

Provide an “examination of the sources of potential clean hydrogen, including, but not limited to, wind, solar, biogas and nuclear” to the Connecticut Hydrogen Task Force. This Working Group interprets this

to refer to the production of hydrogen from water electrolysis using wind, solar, or nuclear energy sources, or through the reformation of biogas.

Guiding Research Questions

Hydrogen Production Potential

1. How is clean hydrogen defined in Connecticut? Should the state develop a definition distinct from that provided at the federal level?
2. What is the maximum production potential for clean energy within Connecticut?
3. How much clean energy will be available for hydrogen production after accounting for the energy needs of other components of Connecticut's decarbonization plan (e.g. transport electrification)?
4. Can clean energy that otherwise would have been curtailed be tapped to produce hydrogen? If so, how much hydrogen could this yield?
5. What feedstocks are best suited to meet clean hydrogen demand?

Equipment Manufacturing Potential

6. What hydrogen production equipment (e.g. electrolyzers, biogas reformers) would be required to produce the identified amount of clean hydrogen?
7. How much of the required production equipment could be met by CT-based manufacturers?
8. How much would local equipment manufacturing capacity need to increase to service the state's hydrogen production potential?
9. *(In coordination with the Policy and Workforce Development Working Group)* What workforce development opportunities exist in local manufacturing of hydrogen production equipment?
10. What are the key component costs of producing hydrogen (e.g. energy input, electrolyzer, balance-of systems)? How are these costs correlated to production scale?

Regional Integration

11. What level of hydrogen production is required to meet demand for clean hydrogen in Connecticut? What gaps (if any) exist between in-state hydrogen production and demand?
12. How much (if any) hydrogen could Connecticut export if its hydrogen production exceeds its expected demand?
13. What scale of hydrogen production capacity does Connecticut have relative to other states in the proposed Regional Clean Hydrogen Hub?

Siting and Other Concerns

14. Where would the major production sites for hydrogen in Connecticut be located?
15. How can environmental justice concerns be addressed as hydrogen production in Connecticut scales up?
16. Are there any steps that should be taken to ensure the safe production of hydrogen?
17. How might the hydrogen supply chain impact production timing or feasibility?
18. What near-term steps can be taken to leverage existing R&D to advance the development of clean hydrogen production in Connecticut?

Proposed Deliverables

1. Proposed definition of clean hydrogen (*in collaboration with the Policy and Workforce Development Working Group*).
2. Total production potential of clean hydrogen within Connecticut, developed across at least 3 scenarios (e.g. High, Medium, Low).
3. Impact on local manufacturing potential and industry in each of the hydrogen production scenarios identified above (*in collaboration with the Policy and Workforce Development Working Group*).
4. (*If not addressed by other state agencies*) Comparison of Connecticut's hydrogen production potential to other Northeast states in the Regional Clean Hydrogen Hub (e.g. NJ, NY, MA).
5. Scenario-based production curves for clean hydrogen, identifying the amount of hydrogen that could be produced at different price points based on cost of underlying energy feedstocks.

Preliminary Timeline

- September: Present a final Hydrogen Sources Working Group Charter to the Task Force for discussion.
- October: Present preliminary findings to the Task Force and provide a status update on the timing of subsequent analysis.
- November: Present draft final findings and recommendations to the Task Force for feedback.
- December: Present final findings and recommendations to the Task Force.
- January: Submit report to the legislature.

Logistics

- The Strategen team will handle meeting logistics, including scheduling and recording meeting minutes.
- The Strategen team will coordinate with Working Group Co-Chairs to develop meeting agendas which will be provided to participants a week before Working Group meetings.
- The Strategen team will provide technical assistance (including research), where appropriate, for the Working Group.
- It is expected that this working group will meet on a monthly cadence, with interim working sessions by the co-chairs. Meeting recordings and meeting minutes will be publicly available.