



Meeting Minutes<sup>1</sup>

Tuesday, September 27, 2022  
1:00 p.m. - 2:00 p.m.

The first Working Group meeting for Hydrogen Study Task Force Uses Working Group was held on September 27, 2022.

All participants joined via the Teams conference call.

**Task Force Members Present:** Enrique Bosch (Avangrid), Samantha Dynowski (Sierra Club), Sara Harari (Green Bank), Shannon Laun (Conservation Law Foundation), Lidia Rupert (Designee – DEEP)

**Others Present:** Jordan Ahern (Strategen), Eliasid Animas (Strategen), Ben Butterworth (Acadia Center), Erin Childs (Strategen), Evan Dantos (Robinson + Cole), Andrea Lubawy (Toyota), Collin Smith (Strategen)

**1. Call to Order**

- Collin Smith, a Senior Consultant at Strategen providing technical support for the Uses Working Group, called the meeting to order at 1:02 p.m.

**2. Welcome and Introductions**

- Mr. Smith provided an overview of the meeting agenda including attendee introductions, a review of the Working Group Charter, an overview of the work plan and upcoming milestones, and a discussion of the end use evaluation framework.
- Each participant introduced their name and organization and provided a brief overview regarding their involvement and interest in the Working Group.

**3. Review of Working Group Charter and Working Group Schedule**

- Mr. Smith introduced the Uses Working Group co-chairs - Joel Rinebold, Digaunto Chatterjee, and Frank Reynolds- the latter two of which were unable to join this meeting.
- Mr. Smith detailed the intention and purpose of the Uses Working Group charter and outlined the proposed deliverables to be presented to the state legislature at the completion of the Task Force efforts. Those deliverables are as follows: 1) a structured framework to prioritize hydrogen end use applications relevant for Connecticut; 2) a calculation of total demand size of priority hydrogen end uses identified through the framework, developed across at least three scenarios (High, Medium, Low); 3) development of scenario-based demand curves for each hydrogen end use, identifying price points at which hydrogen demand would be competitive and expected demand at those price points; and 4) as appropriate, coordination with DEEPs efforts to develop concepts for clean hydrogen use in a

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<sup>1</sup> For access to the meeting recording – <https://www.youtube.com/watch?v=ipjbeBWHOXo&feature=youtu.be>

regional clean hydrogen hub that would be accepted by stakeholders in a regional proposal.

#### 4. Review and Discussion of the End Use Evaluation Framework

- Mr. Smith provided an overview of potential hydrogen offtaker types and the locations of these offtakers. Mr. Smith noted that facilities commonly identified as ideal hydrogen offtakers, like steel and ammonia plants, do not operate in Connecticut. Mr. Smith illustrated the potential for several smaller offtakers, identified through a heat map.
- Mr. Smith presented the proposed evaluation criteria and end uses framework that will be applied to prioritize end-use applications. The criteria included in the end use framework included 1) cost effectiveness; 2) GHG reduction potential; 3) technology maturity; 4) infrastructure requirements; 5) environmental justice; 6) workforce development; and 7) resilience benefits. End uses that these evaluation criteria will be used to prioritize include power generation, industrial heat, and maritime applications, among others.
  - Ben Butterworth noted that safety was not included on the criteria list but should be considered.
- Mr. Smith detailed proposed methodology to evaluate each end use on a simple one (1) to three (3) rating scale. He explained how each criterion would be assessed.
  - Mr. Smith explained that cost effectiveness will be assessed via a literature review and ranked based on comparison to alternative decarbonization routes. The (1) to three (3) rating scale would be applied as follows: a score of one (1) indicates that the alternative is cheaper, a score of two (2) indicates ongoing uncertainty or close competition, and a score of three (3) indicates that hydrogen is the cost competitive option.
    - Shannon Laun raised a question regarding the cost competitiveness literature review. Specifically, she noted that a literature review may reveal wide-ranging preferences, but it must be noted that for varying lifestyles and environments, different options may have different levels of effectiveness.
      - Mr. Smith agreed that there is additional detail that needs to be added in the ranking system to cover situations where literature may suggest something that may not be practically feasible.
  - Mr. Smith explained that regarding greenhouse gas reduction potential, each sector would be evaluated as a function of its contribution to Connecticut's overall emissions.
    - Mr. Butterworth raised concern with the scope of emissions reduction analysis. He explained that the scope of emission reductions should expand beyond the State's lines. He noted that Connecticut may have certain competitive advantages nationally that may lead to different conclusions compared to a wider scope.
      - Mr. Smith acknowledged Mr. Butterworth's concerns.
  - Mr. Smith explained regarding technology readiness, faster deployment is preferred to accelerate market deployment. This analysis will include consideration of both technological maturity and commercial readiness of a particular technology, as well as the ability for a technology to be safely operated. This will be determined through a literature review.

- Mr. Smith, referring to Mr. Butterworth's previous comment regarding safety, noted technology readiness as a metric that could incorporate safety.
- Mr. Smith explained that infrastructure requirements represent the extent to which ancillary infrastructure is needed to enable hydrogen use. He explained that for hydrogen, cost of deploying a new technology is affected by both the cost of the technology and its supporting infrastructure
  - Ms. Laun inquired whether this analysis will take into account funding for a specific type of infrastructure, or if that will be considered separately.
    - Mr. Smith responded that in a situation where a particular type of infrastructure has dedicated funding that others do not, that can be factored in, but subsidies and other external opportunities would not be included.
- Mr. Smith explained that environmental justice and workforce development would be evaluated using a similar methodology based on a "do no harm principle" meaning that the median score would imply no change from the status quo.
- Mr. Smith explained that resilience is the ability for a system to respond to inclement events like extreme weather, supply chain disruptions, or fuel constraints. He noted that hydrogen can provide fuel diversity that improves resilience by reducing dependence on a single network, such as the electric grid. The resilience metric will be rated based on the value that is placed on resiliency benefits.
- Mr. Smith inquired whether attendees had feedback on the evaluation criteria henceforth presented.
  - Andrea Lubawy noted that the metric scores seemed specific to location, specifically noting alternative cost effectiveness and greenhouse gas reductions. Ms. Lubawy inquired how one score could be developed to represent the entire State.
    - Mr. Smith responded that this question is most relevant for environmental justice and workforce development, which may require location specific analysis. Mr. Smith added that there may be potential to create this level of granularity. For example, Mr. Smith noted that hydrogen used in power plants is an application that would have very specific local impacts, but we know the location of these plants and can approach the analysis based on this information.
- Mr. Smith inquired whether any criteria evaluation methodology should be adjusted.
  - Mr. Butterworth noted that regarding cost competitiveness, hydrogen should not be evaluated on a one-to-one comparison with electrification, considering blending limitations. He added that the cost effectiveness metric should also consider the cost of fuels needed in the blending process.
    - Mr. Smith noted that such a scenario may score poorly regarding greenhouse gas reductions, but very well in terms of infrastructure needs. He added that currently this analysis does not consider renewable natural gas, but it is possible to evaluate this and include factors like additional cost of ancillary fuels that are supplementing the hydrogen in the pipelines as a part of the infrastructure score, but noted that the most expedient methodology would be to give this scenario a median score to indicate increased complexity or

uncertainty regarding competition as it is challenging to capture these nuances in a concrete criteria.

- Erin Childs mentioned the importance of cross collaboration between Working Groups. She noted that the Uses Working Group should ensure that the key barriers and concerns with end-uses are addressed properly with other Working Groups, where appropriate.
- Mr. Butterworth raised a discussion about appropriate end uses and interactions with policy and supply. He noted that when considering the marginal benefits that are associated with emission reductions it is critical to align long term with net zero goals.
  - Mr. Smith indicated that the scoring principles are still being refined to incorporate stakeholder guidance.
  - Ms. Childs added that the discussion regarding state policy and alignment between Working Groups has been a key topic of discussion in the other Working Group meetings, and there will be opportunities for collaboration at the Task Force meetings.
- Ms. Laun inquired about process for assigning values for end uses.
  - Mr. Smith shared that stakeholder feedback is welcome on the criteria and valuation scheme. Mr. Smith noted his aim to solicit feedback from stakeholders in the near term and achieve a consensus on the approach.
- Mr. Smith inquired whether additional criteria should be considered.
  - Ms. Luan provided support for Mr. Butterworth's comments regarding safety, namely noting that it should be considered as a separate criterion, rather than embedded within commercial readiness, and provided support for Mr. Butterworth's concern regarding out of state emissions.
- Mr. Smith asked whether additional factors are important to consider in the environmental justice criteria.
  - Ms. Luan shared that consideration of whether a certain end use will increase local pollution is a good starting point and emphasized that this analysis should focus on disadvantaged communities.
    - Ms. Childs added that it will be important to identify local pollution impacts and hydrogen's role in displacing combustion. Ms. Childs inquired whether other components beyond local pollution should be considered.
      - Ms. Laun responded that displacing emissions due to fossil fuel combustion is important, but the burden of siting hydrogen infrastructure should also be considered.
      - Ms. Childs shared that the Infrastructure Working Group will develop maps including such indices regarding communities of concern, and Ms. Laun agreed that this will be a helpful approach.

## 5. Adjourn

- Mr. Smith adjourned the meeting at 2:00 p.m.