March 11, 2022

This information is provided in response to the Request for Information from the U.S. Department of Energy’s (DOE) Hydrogen Program on the regional clean hydrogen hubs implementation strategy (DE-FOA-0002664.0001).

**About the Renewable Thermal Collaborative (RTC)**

The Renewable Thermal Collaborative (RTC) serves as the leading coalition for organizations that are committed to scaling up renewable heating and cooling at their facilities and dramatically cutting carbon emissions.[[1]](#footnote-1) RTC members are industrial and commercial thermal energy buyers with ambitious emissions reductions targets who recognize the urgent need to meet the growing demand for renewable heating and cooling in a manner that delivers sustainable, cost-competitive options at scale.

We agree that the Infrastructure Investment and Jobs Act (Public Law 117-58) provides a once-in-a-generation opportunity to grow a sustainable, resilient, and equitable economy and that investing in the development of green hydrogen can help to further that effort. A wide range of renewable technologies, including green hydrogen, will be needed to address the various thermal needs of industrial energy users. Developing green hydrogen economically and reducing deployment costs will be critical to addressing climate change, while ensuring that the U.S. is a global leader in developing renewable thermal technologies and that U.S. companies secure any competitive advantages from being early adopters of renewable thermal technologies. A focused effort on green hydrogen development can help to overcome technical barriers, reduce costs for deployment, and achieve significant emissions reductions from the industrial and buildings sectors and economywide.

**3.e. How might hydrogen production be constrained by the availability of clean electricity or natural gas supply and distribution?**

Green hydrogen is created by chemically separating water through electrolysis powered by renewable electricity resources such as wind and solar. While green hydrogen has the potential to reduce thermal emissions, including industrial emissions, there are barriers to large-scale green hydrogen production. Producing significant quantities of green hydrogen will require a massive deployment of renewable electricity generation as well as the corresponding transmission.

Not having access to 100 percent renewable electricity for electrolysis should not hold us back. The carbon intensity of the United States electricity grid continues to decrease, and it is possible to achieve emission reductions with hydrogen substitution for fossil fuels. In 2020, the carbon intensity of the U.S. grid fell to 818 lb CO2/MWh, though there is wide regional variation.[[2]](#footnote-2) Since 2005, U.S. power sector emissions have declined by 35 percent. As we accelerate the effort to deploy greater quantities of zero-emission generation technologies and further decarbonize the grid, we can simultaneously focus on bringing down the cost of equipment (e.g., electrolyzers), developing and deploying the ecosystem (i.e., infrastructure), and building the market for green hydrogen.

Green hydrogen and its associated infrastructure must be developed following sustainability principles that reduce negative environmental and social externalities and maximize biodiversity and social co-benefits.

In addition, the existing gas pipeline system may provide a cost-effective way to transport hydrogen, but additional research is required to determine what quantities of hydrogen can be safely transported or what retrofits may be required. Measures must be instituted throughout the supply chain to ensure the safety of end users, the general public, energy workers, and the environment (e.g., minimizing leakage).

**33. What role/actions can DOE take to support reliable supply and demand for potential hydrogen producers and customers?**

Using green hydrogen blended with or instead of natural gas for thermal energy provides an opportunity for the industrial and buildings sectors to reduce their emissions, but facilities will need support evaluating what amount of hydrogen their current equipment can use or what retrofits or upgrades may be required. Traceable certificates can allow end users to ensure that they are using green hydrogen.

Engaging potential industrial and commercial customers early on can help DOE to better understand hurdles to green hydrogen adoption and create plans to lower these hurdles. Ensuring that the hydrogen hubs’ work considers industrial and commercial customers’ needs, including the range of green hydrogen applications in industrial process heating, can help to support potential customers.

**40. Please provide any additional information or input not specifically requested in the questions above that you believe would be valuable to help DOE develop a Regional Clean Hydrogen Hub FOA, including any specific criteria that DOE may take into consideration in implementing the Hub program.**

Green hydrogen is a promising industrial decarbonization solution but faces numerous barriers that need to be resolved as quickly as possible. Cost and complex technological issues such as how much hydrogen existing systems can use or what replacement equipment may be needed are top barriers. RTC members are also greatly interested in how hydrogen will be delivered. DOE’s support of green hydrogen research and development through the hydrogen hubs can help to solve these and other challenges thermal energy buyers currently face.

A focused effort on green hydrogen development can help to overcome technical barriers, reduce costs for deployment, and achieve significant emissions reductions from the industrial sector. The RTC is in the process of developing a green hydrogen technology assessment that will analyze the potential of green hydrogen in the short-term (by 2030) and the long-term (2050), identify major technical, market, and policy barriers, risks and unintended consequences on climate, sustainable forest and land management, freshwater, and biodiversity, as well as implications for local communities, related workforce, and people with disabilities, and provide recommendations for large corporate and institutional buyers.

The RTC welcomes the opportunity to provide additional insights to DOE regarding industrial and commercial use of green hydrogen through working groups, discussions, or other forums. Please do not hesitate to reach out to us for further information.

1. The Renewable Thermal Collaborative was founded in 2017 and is facilitated by the Center for Climate and Energy Solutions, David Gardiner and Associates, and World Wildlife Fund. [↑](#footnote-ref-1)
2. U.S. Environmental Protection Agency, eGrid Download Data, January 27, 2022, https://www.epa.gov/egrid/download-data. [↑](#footnote-ref-2)