

March 21, 2022

**Re: DE-FOA-0002664: Bipartisan Infrastructure Law, 2022 Regional Clean Hydrogen Hubs Implementation Strategy Request for Information**

Submitted via email: [H2Hubs@hq.doe.gov](mailto:H2Hubs@hq.doe.gov)

The Business Council for Sustainable Energy (BCSE) appreciates the opportunity to respond to the Request for Information (RFI) from the U.S. Department of Energy's (DOE) Hydrogen Program, on behalf of the Energy Efficiency and Renewable Energy (EERE) Hydrogen and Fuel Cell Technologies Office (HFTO), the Office of Fossil Energy and Carbon Management (FECM), the Office of Nuclear Energy (NE), and in collaboration with DOE's newly formed Office of Clean Energy Demonstrations (OCED). Through these comments, BCSE will share the perspectives of its members related to the solicitation process and structure of a DOE Funding Opportunity Announcement (FOA) to fund regional hydrogen hubs, as required by the Infrastructure Investment and Jobs Act (IIJA).

The Council, founded in 1992, is a broad-based clean energy trade association. Its members span many industry sectors, including energy efficiency, energy storage, natural gas, renewable energy, sustainable transportation and emerging decarbonization technologies. BCSE also has an independent small- and medium-size businesses initiative under its banner, the Clean Energy Business Network (CEBN). Together, the BCSE and CEBN represent a broad range of the clean energy economy, from Fortune 100 companies to small businesses working in all 50 states supporting over 3 million U.S. jobs.

BCSE commends Congress and the Biden Administration for enactment of the IIJA and seeks to serve as a resource to federal agencies implementing the IIJA programs. IIJA authorizes appropriations of \$8 billion for the five year period encompassing fiscal years 2022 through 2026 for the development of regional clean hydrogen hubs that demonstrate the production, processing, delivery, storage, and end-use of clean hydrogen.

Hydrogen and related technologies, such as electrolyzers, fuel cells, and turbines, can play a key role in decarbonizing many sectors, including medium- and heavy-duty transportation, residential and commercial heating, power generation, and hard-to-decarbonize industries such as ammonia and steel.

According to the [2022 Sustainable Energy in America Factbook](#), published by BloombergNEF in partnership with the BCSE, the U.S. is a global leader with over 8GW of announced hydrogen-compatible power turbines, mostly at brownfield sites. State-level clean energy targets are clear drivers with nine of 10 planned projects due to provide electricity in states with clean energy mandates. Two-thirds of these projects have hydrogen-natural gas blend targets. Half expect to run on 100% H2 by 2045.

The U.S. currently produces 15-16 million metric tons of hydrogen, of which 65% is through dedicated plants. The vast majority of this is from unabated natural gas. However, the U.S. is seeing activity to develop cleaner hydrogen sources.

Further, U.S. investment in the hydrogen sector doubled between 2020 and 2021, with \$100 million invested in 2020 to \$200 million invested in 2022.<sup>1</sup>

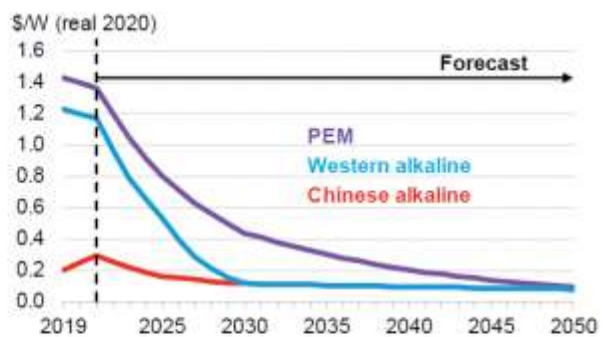
Figure 1: From the 2022 Sustainable Energy in America Factbook, published March 3, 2022

## Deployment: Hydrogen-fired power plants and electrolyzer costs

### Planned and projected cumulative capacity of H2-ready power projects



### Projected electrolyzer system costs



Source: BloombergNEF. Note: Left chart reflects announced and financed commercial projects. Bars begin at expected commercial operation date. 30-year asset lifetime assumed. "N/A" indicates projects that are planned but have not announced target dates. State mandate means there is a state-level clean energy target. Right chart: PEM means Polymer electrolyte membrane electrolysis system. Western-made represents alkaline systems made by a manufacturer outside of China. Chinese-made represents alkaline systems made by a manufacturer made of China.

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BloombergNEF

The Council offers the following comments in response to the RFI. Of note, as a diverse coalition, not all members take a position or endorse the recommendations included in this submission. Further, BCSE wishes to thank the Fuel Cell and Hydrogen Energy Association for their contributions to the BCSE submission.

### General Principles to Shape Guidance as the DOE Develops its Regional Hydrogen Hub Strategy

1. **Developing More Hubs** – BCSE members support the proposed development of the between six and 10 Hubs being awarded, which would allow full development of a national network. This would still achieve GW scale hubs at this more distributed capacity and would be more likely to address regional clean hydrogen demands and supply options, minimize transportation losses and costs, and create jobs in more regions. In addition, a staggered two-tranche launch could be beneficial, though we would encourage DOE to put the first projects in the ground as quickly as possible. Further, DOE should consider development of small-distributed projects which will improve grid diversity and resilience, allow for greater geographical distribution and remove barriers to entry for smaller players.

<sup>1</sup> 2022 Sustainable Energy in America Factbook, produced by the Business Council for Sustainable Energy and BloombergNEF, March 3, 2022, [www.bcse.org/factbook](http://www.bcse.org/factbook)

- **Project Criteria** - We would suggest some guiding principles and criteria to determining project selection, including: supporting projects that are shovel ready (mainly to build early success in the first tranche of hubs); hubs with technical merit; partnerships developed with an economy wide vision and will integrate multiple customers, OEMs, and end-users; projects with prior experience siting equipment at scale; projects with higher decarbonization within a fully installed hub; and long-term job creation. This should also include consideration of distributed projects with direct-connect to end-users. DOE should prioritize hub proposals from organizations and companies that have a track record of hydrogen excellence and project execution.
- **Definition of Regions** - Applicants should be given leeway to define the region and the FOA should maintain a definition that accounts for hubs of varying sizes up, including distributed projects, to multi-state regional developments. Hubs should also be given leeway to be expandable and connect to other hubs in agreement with our priority of a larger hydrogen ecosystem.
- **Building Domestic Supply Chain Manufacturing** – The Clean Hydrogen Programs enacted by IIJA provide a critical opportunity for the U.S. to invest in domestic supply chain manufacturing to ensure that there is sufficient supply of components and equipment to implement these hubs fully. Selecting Hubs that have strong hydrogen technology supply chains and partnerships as well as established component manufacturing processes will de-risk the investments by DOE and ensure a sustainable hydrogen economy.
- **Measuring CO2 emissions** – In order to both accurately reflect greenhouse gas (GHG) emissions intensity of hydrogen as well as to incentivize the reduction of GHG emissions not only at the point of production but also upstream, the DOE should calculate carbon intensity on a lifecycle basis, inclusive of upstream emissions. In developing an approach for lifecycle analysis, DOE should consider incorporating the definition of lifecycle GHG emissions in Section 211(o) of the Clean Air Act. Consistent with Section 822(a) of the IIJA, lifecycle GHG emissions should reflect those emissions that occur only up to the “point of production.” Further, we encourage DOE to explicitly recognize the environmental and greenhouse gas benefits of co-products and co-services both within, and external to, the Hub.
- **Promoting Workforce Development** – Programs for hydrogen workforce development will be an important area to enable broader investment, installation, and manufacturing for this industry. Training will be needed for the handling and delivery of compressed hydrogen and low-pressure oxygen systems. There is also a significant opportunity for retraining or shifting employment for the workforce from traditional fossil industries.
- **Importance of Disadvantaged Communities** – Hubs should demonstrate a nuanced approach to address specific criteria affecting individual disadvantaged communities within a region. Conversely, all disadvantaged communities have historically low income and higher education enrollment. As a result, Hubs should universally emphasize the importance of a just workforce transition, workforce training, and other opportunities affording advancement opportunities within these communities. These efforts can be demonstrated through community partnerships, educational institution partnerships, and other apprenticeship/workforce training opportunities. Strategies around public disclosure, community outreach, partnership formation, and fund allocation targets are all appropriate to consider in

supporting EEEJ goals. Hubs should seek to leverage existing programs and state agencies that prioritize EEEJ and disadvantaged communities to ensure program cost-effectiveness and best achievable results.

- **Updating the H2MatchMaker Tool** – We support the development and implementation of the DOE H2MatchMaker tool. However, the H2MatchMaker tool goal of connecting hydrogen and fuel cell regional project developers with technology product/service suppliers is only half realized by the current design of the online form. As currently designed, technology developers and suppliers are able to locate hydrogen producers, infrastructure developers, consumers, and other stakeholders of current and planned projects by location. But, as currently implemented, those same project stakeholders do not have the ability to efficiently identify key technology product/service providers along the full hydrogen value chain necessary for successful project development. Currently, hydrogen technology product/service providers must enter their information as a Hydrogen (or CO<sub>2</sub>) Infrastructure Provider/Operator tied to a specific location regardless of whether those products and services have applicability across multiple geographies. In addition to difficulty to match projects with suppliers, this practice reduces the utility of the mapping tool. To address this issue, we recommend DOE expand the functionality of the H2MatchMaker tool by adding a self-populating, searchable database of major equipment and service providers capable of meeting the needs of the hydrogen hub project development community.

#### **Additional Policies and Incentives Needed**

- *Tax Credits*: While the Regional Clean Hydrogen Hubs Program will drive significant development in this space, further policy support will be needed to build on this momentum to develop a national hydrogen network. In particular, the Clean Hydrogen Production Tax Credit proposed in the Build Back Better Act will be a critical enabler for investments into clean hydrogen. In addition, the long-term extensions of the energy credit which is inclusive of fuel cell technologies and energy storage, the light-duty qualified fuel cell motor vehicle credit, the commercial electric vehicle credit, alternative fuel refueling property credit, and the advanced energy project credit will also be vital for this industry to expand domestic deployment and manufacturing.
- *Enabling regulations*: Timely construction of hydrogen hubs will require the revision of existing regulations and promulgation of new rules. The Occupational Safety and Health Administration, Environmental Protection Agency, Pipeline and Hazardous Materials Safety Administration, and Federal Energy Regulatory Commission all have relevant regulatory authority for the production, transport, and use of hydrogen. It is critical that agencies commence the review and revision of their regulations so that outdated and insufficient regulations do not become an impediment during the environmental review of funded projects.
- *Permitting efficiency*: It takes on average 4.5 years to complete an environmental impact statement, with some projects taking significantly longer. To maintain the ambitious timeline proposed in the RFI (e.g., phase 1 completed in 18 months), DOE must actively manage the environmental review process and resolve impediments in a timely manner.

- *Research, Development, Demonstration and Deployment (RDD&D)*: The Hubs offer a historic opportunity for RDD&D, with an emphasis on demonstration and deployment. BCSE also supports continued RDD&D through various DOE offices, including the Hydrogen and Fuel Cell Technologies Office. Research areas of interest include pilot uses for the waste oxygen from electrolysis, among other topic areas.

Should you wish to discuss these comments further, I can be reached at any time by email at [ljacobson@bcse.org](mailto:ljacobson@bcse.org).

Sincerely,

A handwritten signature in black ink that reads "Lisa Jacobson". The signature is fluid and cursive, with a long horizontal stroke at the end.

Lisa Jacobson  
President  
Business Council for Sustainable Energy