

Notice of Intent No. DE-FOA-0003212

Notice of Intent to Issue Funding Opportunity Announcement No. DE-FOA-0003213

The Office of Energy Efficiency and Renewable Energy (EERE) intends to issue, on behalf of the Hydrogen and Fuel Cell Technologies Office, a funding opportunity announcement (FOA) entitled “Hydrogen and Fuel Cell Technologies Office FOA to Advance the National Clean Hydrogen Strategy.”

Clean hydrogen and fuel cell technologies are important elements of a comprehensive energy portfolio, particularly for use in hard-to-decarbonize sectors of the economy (such as heavy-duty transportation and industrial applications) and to enable long duration energy storage for a clean electric grid. These elements directly support the Administration’s goals of achieving carbon pollution-free electricity by 2035 and net-zero emissions economy-wide by no later than 2050, benefiting all Americans.¹

This FOA supports the vision outlined in the *U.S. National Clean Hydrogen Strategy and Roadmap*², affordable clean hydrogen for a net-zero carbon future and a sustainable, resilient, and equitable economy. The FOA will target Research, Development, Demonstration & Deployment (RDD&D) topics critical to enabling increased adoption of clean hydrogen across sectors, particularly in heavy-duty (HD) vehicles and other heavy-duty transportation applications, which supports the *U.S. National Blueprint for Transportation Decarbonization*, including the buildout of fueling corridors.³ Increased adoption of hydrogen technologies will help achieve economies of scale and drive down costs, directly supporting DOE’s Regional Clean Hydrogen Hubs (H2Hubs) Program,⁴ an \$8 billion federal investment to create networks of hydrogen producers, consumers, and local connective infrastructure to accelerate the use of hydrogen as a clean energy carrier. Improvements in clean hydrogen technologies will also contribute to the long-term viability of the H2Hubs and other commercial-scale deployments. Activities funded under this FOA will also align with the H2@Scale Initiative,⁵ which aims to advance affordable hydrogen production, transport, storage, and utilization to enable decarbonization and revenue opportunities across multiple sectors. The FOA’s objectives support DOE’s Hydrogen Shot goal,⁶ which targets affordable clean hydrogen production at \$1/kg within a decade. In addition to RD&D topics, this FOA will focus on enabling hydrogen

¹ Executive Order 14008, “Tackling the Climate Crisis at Home and Abroad,” January 27, 2021

² U.S. Department of Energy, “DOE National Clean Hydrogen Strategy and Roadmap”,
<https://www.hydrogen.energy.gov/library/roadmaps-vision/clean-hydrogen-strategy-roadmap>

³ “The U.S. National Blueprint for Transportation Decarbonization”
<https://www.energy.gov/eere/us-national-blueprint-transportation-decarbonization-joint-strategy-transform-transportation>

⁴ [Regional Clean Hydrogen Hubs | Department of Energy](#)

⁵ <https://www.energy.gov/eere/fuelcells/h2scale>

⁶ <https://www.energy.gov/eere/fuelcells/hydrogen-shot>

deployments through safety and permitting support, equitable community engagement, and developing strategies for effective community benefits.

Hydrogen and fuel cells can help create opportunities and benefits for communities that have been historically underserved, such as improving air quality, providing resiliency, and creating jobs, including good-paying union jobs. Consistent with DOE's commitment to benefit all Americans, this anticipated FOA will encourage the participation of underserved communities and underrepresented groups.

EERE anticipates the FOA may include the following Areas of Interest:

Topic 1: Components for Hydrogen Fueling of Medium- and Heavy-Duty Vehicles

This topic is expected to seek activities to develop advanced components to enable gaseous and/or liquid hydrogen fueling at refueling stations for medium- and heavy-duty (MD/HD) hydrogen-powered vehicles. The *U.S. National Clean Hydrogen Strategy and Roadmap* identifies MD/HD transportation as a key sector where clean hydrogen can help achieve decarbonization, and where limited alternatives exist. Today, the manufacturers of MD/HD hydrogen vehicles have not yet achieved consensus on whether compressed gas or liquid hydrogen will be the preferred mode for onboard storage. Without significant R&D advances, components currently employed at compressed gas stations for refueling light-duty vehicles cannot provide the high flowrates needed for fueling MD/HD trucks. Targeted flow rates for fueling HD trucks are an average of 10 kg H₂/minute with a peak capability of at least 18 kg H₂/minute over a 100 kg H₂ fill.

This topic may include RD&D of high-flow components such as cryopumps, cryocoolers, vaporizers, flow meters, transfer and dispensing components, cryogenic piping and hoses, and other components specifically for fueling MD/HD vehicles and for enabling low-loss, large-scale hydrogen delivery for MD/HD fueling facilities. Proposed projects may be expected to develop and demonstrate designs that provide high reliability at low cost and (where appropriate) have the potential for standardization to facilitate wide adoption. Designs proposed under this topic may be required to minimize or eliminate hydrogen losses in normal operation; and be required to address performance needs as well as commercial viability based on cost and manufacturability.

Topic 2: Standardized Hydrogen Refueling Station of the Future

This topic is expected to seek projects to develop and demonstrate a low-cost, standardized, and replicable hydrogen fueling station of the future. Outcomes from this topic will help support several of the recently announced H2Hubs, which include significant plans for rollout of MD/HD trucks and buses, including the necessary hydrogen infrastructure such as hydrogen fueling stations. Projects may be required to focus on station designs that not only reduce

operating and capital cost but also offer scalability, standardization, reliability, and hydrogen fuel flexibility. Proposed station designs may need to provide fast fueling for MD/HD trucks—up to 100 kg per fill using 700 bar hydrogen tanks, and DOE encourages designs that offer flexibility to accommodate other hydrogen applications such as light-duty vehicles, 350-bar fueling for applications such as buses, and the potential for build-out and retrofitting to accommodate onboard liquid hydrogen fueling.

It is envisioned that projects would balance the costs of construction and operation with a number of key station attributes and performance indicators, such as fill time, station reliability and up-time, and overall hydrogen capacity including per-hour throughput. Examples that may be considered include design for manufacturing and designs that are modularized, replicable, and can be built off-site in controlled factory environments then transported to fueling sites (to reduce construction times and streamline permitting and local approval). Proposed projects may be expected to both: (a) develop an optimal, standardized, low-cost, scalable station design and (b) demonstrate at least one station under real-world conditions. This topic is expected to encourage unique, forward-thinking operating designs, with focus placed on maximizing cost reductions and minimizing both the number of station components and the overall station footprint, while also ensuring reliability.

Additionally, this topic is expected to require: (a) proposed designs that meet applicable codes and standards, such as J2601, J2719, NFPA2 as well as future heavy-duty protocols that are currently under development; (b) proposed designs that emphasize reducing hydrogen releases, including leakage, venting, and purging; (c) detailed technoeconomic analysis comparing proposed designs with traditional approaches; and (d) processes to collect and share data. Applicants may also be encouraged to focus on disadvantaged communities, in order to enable good-paying jobs and to locate hydrogen fueling stations where they may enable reduced pollution from diesel-powered vehicles.

Topic 3: Enabling Permitting and Safety for Hydrogen Deployment

This topic is expected to seek proposals that will help determine the primary challenges to siting, permitting, and installation across the value chain from hydrogen production through end-use, and help identify opportunities to address them. A robust permitting process is essential for ensuring equitable deployment of energy infrastructure (e.g., by preventing disadvantaged communities from being overburdened with health concerns and safety risks), but the variation in permitting requirements throughout the United States can introduce significant obstacles to deployment. In addition, widespread availability and communication of safety-related information are crucial to enabling the safe use of hydrogen in all applications.

Applicants would identify key challenges to the siting, permitting, and installation of hydrogen technologies, with a focus on the state, community, or region represented by their project

team. Deliverables may include, but not be limited to: (a) specific actions applicants will take to address those challenges; (b) development and deployment of hydrogen safety, codes, standards, and emergency response training opportunities; (c) tools and resources on hydrogen safety, codes, and standards for local and regional officials or authorities having jurisdiction; and (c) guidance, lessons learned (e.g., specific gaps/barriers at local and federal levels that hinder efficient permitting), and best practice resources. These activities are anticipated to advance the permitting process for hydrogen technologies and empower communities to be at the forefront of hydrogen technology deployment, while addressing the unique need of stakeholders. It is anticipated that teams will be encouraged to include not only industry but also stakeholders such as environmental groups and parties representing environmental-justice communities and disadvantaged communities, to ensure engagement throughout the process of streamlining permitting.

Topic 4: Equitable Hydrogen Technology Community Engagement

This topic is expected to solicit proposals to design and implement community engagement activities focused on understanding the concerns of communities and educating them about hydrogen technologies. The topic will be coordinated by HFTO and EERE across relevant offices such as the Office of Energy Justice and Equity, the Office of Fossil Energy and Carbon Management, the Office of Nuclear Energy, and the Office of Clean Energy Demonstrations. Hydrogen technologies can enable significant benefits such as improved resiliency, reduced emissions reductions, improved air quality, and economic opportunities across multiple sectors. However, potential negative impacts can include increased water use, NO_x emissions, land-use impact from storage installations, and other factors, depending on how deployments are executed. The use of diverse resources (renewables, fossil with carbon capture and storage, nuclear) and across end uses (industrial, transportation, energy storage, and stationary power) will all be considered.

Ensuring that the impacts of clean-hydrogen installations are equitably shared across communities and that sustainability and environmental justice (EJ) are addressed are key priorities for DOE and other federal agencies, as laid out in the *U.S. National Clean Hydrogen Strategy and Roadmap*. The “guiding principles” of the *National Strategy* specifically state that a holistic approach, one that specifically addresses EJ concerns, must be employed as scale is ramped up and market liftoff is achieved for clean hydrogen. However, since the production, transport, and use of hydrogen can involve complex processes as well as new technologies that are not widely understood, most communities lack awareness and understanding of both the potential advantages and disadvantages of expanding hydrogen use. The key deliverable for projects selected under this topic will be a report thoroughly detailing the priorities for community benefits, as identified by each disadvantaged community. These reports are expected to include model community benefits plans (CBPs).

EERE envisions awarding multiple financial assistance awards in the form of cooperative agreements. The estimated period of performance for each award is anticipated to be approximately 24 to 36 months for Topics 1, 3, and 4 and up to 48 months for Topic 2.

This Notice is issued so that interested parties are aware of the EERE's intention to issue this FOA in the near term. All the information contained in this Notice is subject to change. EERE will not respond to questions concerning this Notice. Once the FOA has been released, EERE will provide an avenue for potential Applicants to submit questions.

EERE plans to issue the FOA on or about December 2023 or January 2024 via the EERE eXCHANGE website <https://eere-eXCHANGE.energy.gov/>. If Applicants wish to receive official notifications and information from EERE regarding this FOA, they should register in EERE eXCHANGE. When the FOA is released, applications will be accepted only through EERE eXCHANGE.

In anticipation of the FOA being released, Applicants are advised to complete the following steps, which are **required** for application submission:

- Register and create an account in EERE eXCHANGE at <https://eere-eXCHANGE.energy.gov/>. This account will allow the user to apply to any open EERE FOAs that are currently in EERE eXCHANGE.

To access EERE eXCHANGE, potential applicants will be required to have a [Login.gov](https://login.gov/) account. As part of the eXCHANGE registration process, new users are directed to create an account in [Login.gov](https://login.gov/). Please note that the email address associated with Login.gov must match the email address associated with the eXCHANGE account. For more information, refer to the Exchange Multi-Factor Authentication (MFA) Quick Guide in the [Manuals section](#) of eXCHANGE.

It is recommended that each organization or business unit, whether acting as a team or a single entity, use only one account as the contact point for each submission. Questions related to the registration process and use of the EERE Exchange website should be submitted to: EERE-eXCHANGESupport@hq.doe.gov

- Register with the System for Award Management (SAM) at <https://www.sam.gov>. Designating an Electronic Business Point of Contact (EBiz POC) and obtaining a special password called an MPIN are important steps in SAM registration. Please update your SAM registration annually. Upon registration, SAM will automatically assign a Unique Entity ID (UEI).

NOTE: Due to the high demand of UEI requests and SAM registrations, entity legal business name and address validations are taking longer than expected to

process. Entities should start the UEI and SAM registration process as soon as possible. If entities have technical difficulties with the UEI validation or SAM registration process they should utilize the HELP feature on SAM.gov. SAM.gov will work entity service tickets in the order in which they are received and asks that entities not create multiple service tickets for the same request or technical issue. Additional entity validation resources can be found here: [GSAFSD Tier 0 Knowledge Base - Validating your Entity](#).

- Register in FedConnect at <https://www.fedconnect.net/>. To create an organization account, your organization's SAM MPIN is required. For more information about the SAM MPIN or other registration requirements, review the FedConnect Ready, Set, Go! Guide at https://www.fedconnect.net/FedConnect/Marketing/Documents/FedConnect_Ready_Set_Go.pdf
- Register in Grants.gov to receive automatic updates when Amendments to a FOA are posted. However, please note that applications will not be accepted through Grants.gov. <http://www.grants.gov/>. All applications must be submitted through EERE eXCHANGE.