Notice of Intent (NOI) No. DE-FOA-0002021
Modification 0001

Modifications

All modifications to the NOI are [HIGHLIGHTED] in the body of the NOI.

Mod. No.	Date	Description of Modification
0001	2/13/2019	EERE is compiling a Teaming Partner List to facilitate the widest possible national participation in the formation of applicant teams for Topic 3. Information about the Teaming Partner List for Topic 3 is included below.

Notice of Intent to Issue
Funding Opportunity Announcement No. DE-FOA-0002022

The Office of Energy Efficiency and Renewable Energy (EERE) intends to issue, on behalf of the Fuel Cell Technologies Office (FCTO), Funding Opportunity Announcement (FOA) DE-FOA-0002022 entitled "Fiscal Year 2019 H2@Scale Funding Opportunity Announcement."

Hydrogen is one part of DOE's all-of-the-above energy portfolio, and can offer options for affordable and secure energy for transportation, as well as for stationary and industrial applications. The United States produces over 10 million metric tons of hydrogen per year[1], used primarily for petroleum refining and fertilizer production, but there are a number of opportunities to increase hydrogen generation and utilization across the country.

"H2@Scale"[2] is an initiative to enable affordable and reliable largescale hydrogen generation, transport, storage, and utilization in the United States across sectors. For example, electrolyzers can produce hydrogen by splitting water when power generation exceeds demand. This can reduce or prevent curtailment of renewables, optimize baseload (e.g., nuclear power) assets, and enable grid stability and resiliency, while also producing hydrogen as a fuel or feedstock for end users. In addition, hydrogen produced from existing baseload assets can be stored,

[1] https://www.hydrogen.energy.gov/pdfs/16015_current_us_h2_production.pdf
[2] https://www.energy.gov/eere/fuelcells/h2-scale

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distributed, and used as a fuel for transportation, stationary power, process or building heat, and industrial sectors (e.g. steel manufacturing), creating an additional revenue stream for those assets.

FCTO focuses on research, development, and innovation to advance hydrogen and fuel cells for transportation and diverse applications enabling energy security, resiliency, and a strong domestic economy in emerging technologies. This FOA supports the FCTO's goals, the President's fiscal year (FY) 2019 Budget Request, and FY 2019 congressional appropriations direction.

FCTO anticipates that the FOA may include the following Areas of Interest:

Area of Interest 1 - Early Stage H2@Scale-Enabling R&D

- **Topic 1: Advanced Hydrogen Storage and Infrastructure R&D**

  Reducing the cost of hydrogen storage and infrastructure technologies would allow hydrogen and fuel cells to be more accessible to every day consumers, whether through vehicles, stationary power, or portable power applications. This topic seeks early stage concepts with the potential to reduce the cost of the storage, use, and transportation of hydrogen. The two focus areas are: 1A) Hydrogen carrier materials R&D, with a focus on bulk storage and transport of hydrogen (selected projects will be integrated into the Hydrogen Materials—Advanced Research Consortium (HyMARC)[3]); and 1B) Hydrogen materials compatibility R&D, with a focus on metallic and non-metallic materials required across the infrastructure value chain (selected projects will be integrated into the Hydrogen Materials (H-Mat) consortium[4]).

- **Topic 2: Innovative Concepts for Hydrogen Production and Utilization**

  Hydrogen production and utilization technologies need to be more affordable for hydrogen and fuel cells to become more mainstream. This topic seeks applications for early stage foundational research in technologies for widespread hydrogen production and fuel cell concepts to hit $4 per gasoline gallon equivalent and $40/kW cost goals. Focus areas include: 2A) Advanced water splitting materials research (selected projects

[3] https://www.energy.gov/eere/fuelcells/hymarc-hydrogen-materials-advanced-research-consortium

[4] The U.S. Department of Energy's H-Mat consortium enables early-stage R&D on hydrogen materials compatibility through collaborations between industry, academia and the national laboratories. H-Mat is led by Sandia National Laboratories and Pacific Northwest National Laboratory, with participation from Oak Ridge, Savannah River, and Argonne National Laboratories. R&D thrusts include the effects of material properties (at various pressures, temperatures, and loading conditions) on the performance of both polymers and metals used in hydrogen infrastructure and storage. For more information, please see https://www.hydrogen.energy.gov/pdfs/review18/h2f02_rustagi_2018_p.pdf

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will be integrated into the HydroGEN[5] Advanced Water Splitting Materials consortium); 2B) Affordable biological hydrogen production from biomass resources; 2C) Co-production of hydrogen and value-add byproducts from diverse resources; and 2D) Reversible fuel cell development where hydrogen can be produced and utilized in a single system.[6]

Area of Interest 2 - H2@Scale Integrated System R&D

- **Topic 3: Integrated Production, Storage and Fueling System[7]**

There is little existing information available on the integration and optimization of advanced technologies for hydrogen production, storage, distribution, and utilization into a complete system and then evaluating its performance to meet consumer needs. FCTO intends to seek applications for industry-led efforts to demonstrate a hydrogen-focused integrated energy production, storage, and transportation fuel distribution/retailing system and to enable integrated energy systems using high or low temperature electrolyzers with the intent of advancing the H2@Scale concept. In addition to the use of renewables, this topic seeks to encourage the use of nuclear baseload operation and systems optimization R&D for a viable value proposition.

This first of-its-kind R&D demonstration of an H2@Scale integrated approach can enable viable business cases for increasing asset utilization across the entire energy production to end-use value chain. The effort would serve as a real world demonstration with multi-sector industry-led validation of innovative technologies that will help guide future R&D needs. FCTO encourages regional clusters that enable economies of scale, rather than disparate, geographically unconnected demonstrations. Multiple regional end users in one demonstration can generate larger volumes (e.g. several hundred kilograms of hydrogen per day) that can reduce overall hydrogen cost.

Topic 3 Teaming Arrangements

An effective application will include multi-disciplinary teams across the entire energy production to end-use value chain.

EERE is compiling a Teaming Partner List to facilitate the widest possible national participation in the formation of applicant teams for Topic 3. The list allows

[5] https://www.energy.gov/eere/fuelcells/hydrogen-advanced-water-splitting-materials-consortium
[6] https://www.energy.gov/sites/prod/files/2018/07/f54/steab-beyond-batteries-7-13-18.pdf

[7] Additional federal funding may be available from other DOE EERE Offices (e.g. Solar, Wind, etc.), subject to applications that use relevant technologies (e.g. solar, wind, etc.). Federal funding may also be available from the Office of Nuclear Energy if applicants/team member(s) propose the use of technologies relevant to that office (e.g. nuclear power generation for hydrogen production). Other DOE offices may also fund national lab efforts directly to support the industry-led project, separate from the FOA.
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organizations who may wish to participate in an application, but do not wish to apply as the Prime applicant, to express their interest to potential applicants and to explore potential partners.

The Teaming Partner List will be available on EERE Exchange at https://eere-Exchange.energy.gov under NOI DE-FOA-0002021 until the FOA is released, after which time the Teaming Partner List will be available on EERE Exchange under FOA DE-FOA-0002022 from its release through its closing. The Teaming Partner List will be updated at least weekly until the close of the Full Application period, to reflect new Teaming Partners who have provided their information. Any organization that would like to be included on this list should submit the following information to **FCTOFOA@ee.doe.gov**, with the subject line "Teaming Partner Information":

Organization Name, Contact Name, Contact Address, Contact Email, Contact Phone, Organization Type, Area of Technical Expertise, and Brief Description of Capabilities.

By submitting a request to be included on the Teaming Partner List, the requesting organization consents to the publication of the above-referenced information. By facilitating this Teaming Partner List, EERE does not endorse or otherwise evaluate the qualifications of the entities that self-identify themselves for placement on the Teaming Partner List. EERE will not pay for the provision of any information, nor will it compensate any applicants or requesting organizations for the development of such information. EERE will not respond to questions concerning this Notice of Intent.

EERE envisions awarding multiple financial assistance awards in the form of Cooperative Agreements and Annual Operating Plans (if national laboratories are sub-recipients).

The estimated period of performance for each award will be approximately 1-3 Years. Topic 3 may be more than 3 years if warranted. Note: DOE/NNSA Federally Funded Research Development Centers/National Laboratories are prohibited from applying as Prime Applicants. National Laboratories may participate as a Subrecipient to the Prime Applicant, except where they are a core lab in a lab-led consortia (e.g. HydroGEN, HyMARC, H-Mat). However, the primary intent of this FOA is to encourage participation by companies, universities and other private sector entities, particularly new stakeholders from diverse geographical regions across the country.

This Notice is issued so that interested parties are aware of EERE's intention to issue this FOA in the near term. All of the information contained in this Notice is subject to change. It should be noted that the NOI (DE-FOA-0002021) number and FOA number (DE-FOA-0002022) are different, as outlined in the heading on the cover page of this notice. EERE will not respond to

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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 in **February 2019** 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 register for any open EERE FOAs that are currently in EERE 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
- Obtain a Dun and Bradstreet Data Universal Numbering System (DUNS) number (including the plus 4 extension, if applicable) at http://fedgov.dnb.com/webform
- 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.
- 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.

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