Request for Information
U.S. Department of Energy
Office of Energy Efficiency and Renewable Energy

Home Hydrogen Refueler H-Prize Topic
DE-FOA-0000907

Date: 04/22/2013

Subject: Request for Information (RFI) for home hydrogen refueler system status and future needs

Description: The Department of Energy (DOE) seeks feedback from interested parties to understand the current status of home hydrogen refueler systems and future needs relevant to a possible H-Prize topic consistent with the Energy Independence Security Act of 2007 to incentivize innovative advances in the field of hydrogen energy technologies.

This RFI is not a competition announcement or a FOA; therefore, DOE is not accepting applications at this time. DOE may issue a competition or a FOA in the future. However, DOE may also elect not to issue a competition or a FOA. There is no guarantee that a FOA will be issued as a result of this RFI. Responding to this RFI does not provide any advantage or disadvantage to potential competitors or applicants if DOE chooses to issue a competition or FOA regarding the subject matter.

Parties interested in submitting a response to this RFI should review the RFI Guidelines below in their entirety before developing and submitting a response. DOE will review and consider all responses in its formulation of program strategies or in potential development of an H-Prize competition.

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Background: The Fuel Cell Technologies Office (FCT) is a key component of the DOE's Energy Efficiency and Renewable Energy (EERE) portfolio. EERE seeks to provide clean, safe, secure, affordable, and reliable energy from diverse domestic resources, along with the benefits of increased energy security and reduced criteria pollutants and greenhouse gas emissions. The H-Prize was established by the Energy Independence and Security Act of 2007[1], and authorized the Secretary of Energy to competitively award prizes for advances in hydrogen energy technologies.

[1] For the text of Section 654 of EISA, see http://www.gpo.gov/fdsys/pkg/BILLS-110hr6enr/pdf/BILLS-110hr6enr.pdf

The purpose of the H-Prize is to accelerate the research, development, demonstration, and commercial application of hydrogen and fuel cell technologies by offering prizes to motivate and reward outstanding scientific and engineering advancements. The H-Prize is currently administered by the Hydrogen Education Foundation (HEF) for the Department of Energy. More information can be found at http://www.hydrogenprize.org/.

The FCT Office is seeking information related to a potential H-Prize competition involving home hydrogen refueling systems, which would further the purpose of H-Prize in accelerating the development and commercial application of hydrogen energy technology. These systems would be designed to produce hydrogen applicable to residential settings for vehicle fueling, using feedstocks with an existing residential delivery infrastructure. The potential prize award would be $1 million.

Systems of interest would provide supplemental hydrogen for vehicle fueling at single- or multi-family dwellings. These systems would be installed in residential locations using feedstocks commonly delivered to most residences (e.g., electricity and natural gas). The system physical size and safety requirement must be appropriate for a residential setting. Information regarding individual components of the systems are of interest, but responses regarding complete systems (including the hydrogen generation technology and the components required for refueling, including compression and filling equipment) are of particular interest. Technologies in all stages of development are of interest.

Please identify your answers by responding to a specific question or topic if possible. Respondents may answer as many or as few questions as they wish. Any information obtained as a result of this RFI is intended to be used by the Government on a non-attribution basis for planning and strategy development. DOE will review and consider all responses in its formulation of program strategies for the identified materials of interest that are the subject of this request.

Area of Interest 1: Proposed Refueling System
The FCT Office seeks feedback on the following question:

- What type of system/components for home refueling can be developed and demonstrated that would be suitable for a $1 million prize?

Current technology status: The FCT Office would like information on the current status of systems designed to produce hydrogen applicable to residential settings for vehicle fueling. Please describe the current status of the system:

- What type of technology would be proposed? What is the feedstock?
- What is the system's hydrogen production characteristics, such as:
    - The demonstrated hydrogen production rate and/or vehicle fueling rate, and over what timeframe
    - The pressure and purity of the hydrogen, as produced
- What equipment is included in the system in addition to the hydrogen production technology, such as:
    - Hydrogen storage, and if so, what kind, and how much can be stored

    - Any equipment required for the hydrogen to meet fueling requirements (e.g., compressors to reach 350 bar, purification systems to meet vehicle requirements[2])
    - Refueling equipment (e.g., hoses, nozzles)
    - Other equipment that uses hydrogen that is or could be integrated (e.g., a stationary fuel cell)
- What are the system considerations for the end-user, such as:
    - the expected costs to the end-user (e.g., capital cost or lease price, operations and maintenance costs)
    - Expected maintenance requirements, equipment durability
    - Modifications required for installation in a residential location (e.g., to meet zoning requirements or special safety considerations)? Relevant safety, codes and standards regulations
- How does the technology compare to similar systems (e.g., natural gas refuelers)?
- What are the key barriers to adoption (e.g., cost, performance, durability, safety, codes, and standards)?

Expected near-term development of the proposed system: With the expected commercial roll-out of Fuel Cell Electric Vehicles (FCEVs) in 2015 and beyond, hydrogen infrastructure is increasingly being recognized as an urgent challenge. Home refueling systems may provide an early source of hydrogen fuel that does not require a large-scale hydrogen infrastructure and can offer drivers an option before hydrogen stations are widely available. Therefore, the DOE seeks feedback regarding the likely development of home refueling systems in the near-term (2-5 years), and the key research needs and barriers to commercial deployment of the systems in the mid-term (5-10 years).

As part of your response to this RFI, please provide comments and information on likely near-term development of the refueling system described above, such as:

- Given the current state of the technology and the expected research and development (R&D) efforts, what are the likely improvements in the next 2-5 years?
- Given current R&D, how long until systems reach commercial release?
- What are the key technical barriers to commercial deployment in the mid-term (5-10 years)?
- What are the barriers to consumer acceptance in the mid-term (5-10 years)?

Area of Interest 2: Potential Contest Criteria: This RFI seeks to gain input from interested parties on applicable criteria for a potential home refueler competition that can be meaningfully measured and represent advancement beyond the development expected to occur in the next 2-5 years in the absence of the added incentive of a prize. Criteria that involve technical challenges and key barriers to consumer acceptance are of interest. For example, criteria might include installation or fueling costs, hydrogen production and/or refueling rates, system lifetime, and maintenance requirements. If multiple criteria are suggested, please indicate what the relative weight of each would be. Also indicate if the criteria would be a minimum metric to meet (e.g.,

[2] http://www1.eere.energy.gov/hydrogenandfuelcells/mypp/pdfs/appendix_c.pdf

the system must be able to fit within a certain footprint), used to rank entries (e.g., system price), or both (e.g., system should produce a minimum amount of hydrogen, and be ranked on any amounts above that).

As part of your response to this RFI, please provide comments and information on the following questions:

- What are the suggested criteria?
- How would the criteria be measured?
- If known, what is the current status of the technology today with regards to the criteria (e.g., if hydrogen production is suggested for one of the criteria, the current hydrogen production rate for home refueled systems)?
- Should the criteria be a minimum metric to meet (e.g., the system must be able to fit within a certain footprint), or used to rank entries (e.g., system price)?
- If one of the suggested criteria is price, what is the most appropriate way to evaluate the price? For example, system capital cost to the end-user or price per kg hydrogen, or a combination of measurements with relative weights suggested?

RFI Guidelines: DOE will not reimburse costs associated with preparing any documents for this RFI. All responses to this RFI must be provided as an attachment (in Microsoft Word format) to an e-mail message addressed to HomeRefueler@go.doe.gov. Please identify your answers by responding to a specific question or topic if possible. Respondents may answer as many or as few questions as they wish. Specific Areas of Interest are identified earlier in this RFI. If you wish to provide input to more than one Area of Interest, you should submit a separate response for each Area of Interest. Each response should not exceed 8 pages (not including any figures or references, minimum 11 point font, 1 inch margins) in length. **Please do not provide any information which may be considered proprietary or confidential.**

Questions may be sent to HomeRefueler@go.doe.gov with the subject line "Question".

DOE may or may not publish a report or compendium of responses received from this RFI. The RFI is one of several routine processes used to solicit information from interested parties, and no individual feedback or responses are provided to those who submit comments.

The response should include the name of the organization responding and the number and name of the topic or subtopic addressed. **Responses must be received no later than 5:00 PM EDT on May 24, 2013.**

Thank you for your participation and efforts in providing information to help advance clean energy technologies for the nation.