EPRI | ELECTRIC POWER RESEARCH INSTITUTE

LCRI LOW-CARBON RESOURCES INITIATIVE

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REQUEST FOR INFORMATION: IDENTIFICATION OF TECHNOLOGY TOPICS

OBJECTIVE

The Low Carbon Resources Initiative (LCRI) is seeking information on ideas and technologies in need of further research related to the production, delivery, storage, and end-use of low-carbon, alternate energy carriers (e.g., hydrogen, ammonia, synthetic fuels, advanced biofuels; see Figure 1 below). Information provided will be considered in the development of the LCRI Scope Roadmap.

With this Request for Information (RFI), LCRI is specifically seeking information and input for three separate potential opportunities that span the technology development cycle:

1. **Early-Stage Technology**

Project ideas or topics for technologies or technoeconomic studies of technologies at Technology Readiness Level (TRL) 2 – 3 where research efforts of <$200k over a 3 - 6-month project period would demonstrate basic proof of concept. Topics or technologies identified must be able to make meaningful progress towards demonstration of key performance needs with this amount of funding and time.

2. Proof of Concept

Project ideas or topics for technologies at TRL 4 – 5 where research efforts of <$500k over a 6 – 12-month time period would demonstrate required performance characteristics. Ideas or topics proposed in this category should have basic proof of concept already validated and be ready for a lab-scale type demonstration effort. Topics or technologies identified must be able to demonstrate that the technology, if successful, would be ready advance to the next step in commercialization with a project of this scale of resources and time.

3. Pilot and Demonstration

Project ideas or topics for technologies at TRL 6-7 suitable where research efforts of <$5M over a 12 – 36-month time period would demonstrate readiness for commercial deployment. Ideas or topics proposed should have already had successful lab scale demonstration. Topics or technologies identified must be able to show that the technology, if successful, would be ready for initial commercial deployment after the project is completed.

Input is solicited from academia, manufacturers, startups, national laboratories, consultants, independent inventors, and others. Responses from the international community and those unfamiliar with the power industry are also appreciated.

BACKGROUND

Three fundamental research questions remain in defining the path forward for deep, economy-wide decarbonization:

- How to decarbonize the difficult-to-decarbonize end uses that are projected to comprise as much as 40% of energy use after initial decarbonization efforts?
- How to provide the reliable, resilient, safe, affordable very-low or net-zero emission electricity that will power the low-carbon economy?
- How to create a portfolio of decarbonization solutions that increases the probability of success while also meeting a diverse set of energy customer needs across the economy?

To address these questions, the Electric Power Research Institute (EPRI) and the Gas Technology Institute (GTI) have created LCRI. This 5-year initiative provides a centralized, collaborative platform for the identification and acceleration of promising technologies, the assessment of performance and market opportunity of these technologies and processes, the identification of necessary improvements to maximize their application while minimizing environmental impact, and to inform key stakeholders and the public about technology pathways and options for deep decarbonization.

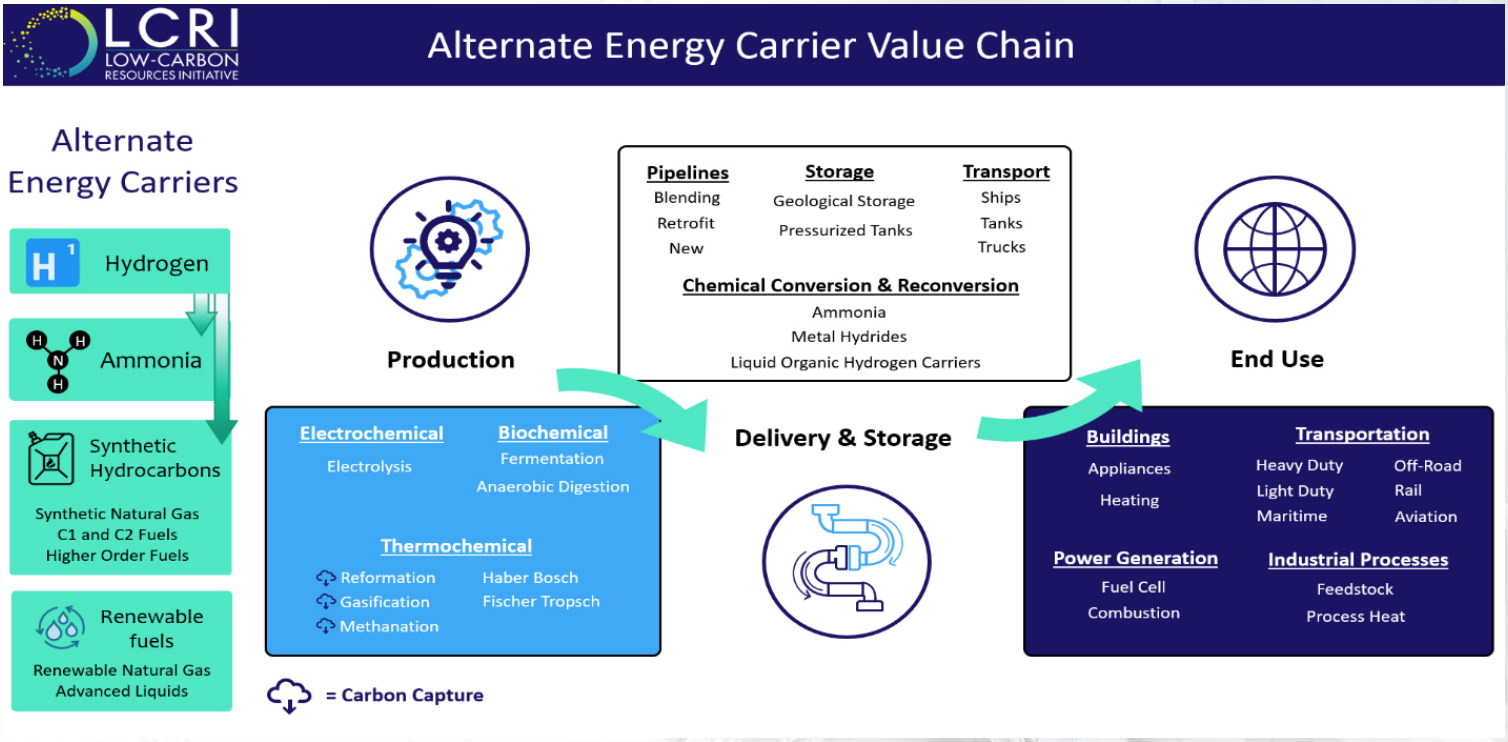

Figure 1: Alternate Energy Carrier Value Chain

INNOVATIVE TECHNOLOGIES OF INTEREST

LCRI is focused on the low-carbon, alternative energy carriers that will be necessary to achieve economy wide deep decarbonization, many of which are shown in Figure 1. Research interests span the entire value chain from production to transport and storage to end use applications. Potential topics or technologies sought under this RFI may be in any segment of the value chain but should be of the "no regrets" variety – meaning that they are nearly certain to be necessary for deep decarbonization of the economy or will provide greater insight into the best solution for an application, even if they may not ultimately be the best solution. Also of interest are carbon capture or sequestration technologies that would be allow for existing, fossil based production of these energy carriers to reduce or eliminate their carbon emissions. Responses to the RFI should include an explanation of why the topic or technology is "no regrets" in addition to technical details and economic potential.

Technologies and topics under consideration may also be a subsystem of a larger technology solution that, if improved, would make technology in which it would be integrated more likely to reach commercial adoption. Potential examples include, but are not limited to, improved membranes in electrolyzers, improved catalysts for ammonia production, or improved combustors within residential HVAC systems capable of handling hydrogen. Responses to the RFI should include why the particular component proposed is key to the ultimate successful commercialization of the larger technology it will be utilized in.

TIMETABLE

RFI posting: September 1st, 2020
RFI informational webcast: 11AM EST, September 15th, 2020
RFI response due: October 27th, 2020

RESPONSE GUIDELINES

Requested Information (if relevant to response)

Respondents are requested to provide the following information in their response:

- Company/institutional name
- Company/institutional technical and business contacts with email and phone contact information
- Company/institutional background and experience
- Brief description of the operations and mission of business or institution (several sentences will suffice)
- Bios or resumes of technical proposers (optional)
- Technology or topic description
  - Current state of the art
  - How the proposed technology works (if applicable)
  - Applications
  - Advantages
  - Disadvantages
  - Technology readiness level (now and at the end of research effort)
  - Number of years required for commercialization along with assumptions made to reach that estimate
  - Anticipated cost of the commercialized technology or project economics
  - Efficiency and other performance metrics (for example, flow rate, capacity, pressure, and temperature)
- Justification for "no regrets" classification
- Justification, including assumptions, for why the technology component or topic is key to successful commercialization of the technology (if applicable)
- Risks, potential for success, and possible impediments
- Expected research funding needs to take the technology to the next step in the commercialization process (e.g., early stage concept to proof of concept, proof of concept to demonstration, etc.)
- Proposed deliverables to demonstrate success at end of research project

ADDITIONAL INFORMATION

Responses should not exceed 5 pages, including drawings, tables, pictures, and references (excluding bios and resumes, if included). Minimum 12-point font, single spacing, and standard margins should be used.

More than one response is allowed per respondent. Any information obtained as a result of this RFI is intended to be used by LCRI on a non-attribution basis for program planning and possible future funding.

LCRI plans to distribute the submittals to technical experts within the LCRI advisory committees, which consists of members from LCRI sponsor institutions, for consideration. All submittals will be considered non-confidential and non-proprietary. LCRI will not provide confidential treatment to any information provided by respondents, even if it is marked as "Confidential," "Proprietary" or other similar marking. Exceptions would require the execution of a written non-disclosure agreement with respondent, which EPRI, GTI, the LCRI review committee and other funding organizations may enter in their sole discretion.

LCRI reserves the right to accept or reject any information submitted, has no obligation to respondents from receipt of respondent's information, and will not be required to provide feedback on any decision based on the responses received. A response to this RFI is not and will not be viewed as a binding commitment between LCRI and respondent to develop or pursue the project or ideas proposed. LCRI reserves the right to amend or cancel this RFI at any point prior to execution of an appropriate contract.

LCRI will not pay for information provided under this RFI and there is no guarantee that any submittal will be supported as a result of this RFI. This RFI is not accepting applications for financial assistance or financial incentives.

SUBMISSION AND DEADLINE

All responses to this RFI must be delivered electronically to the LCRI RFI website:
https://cvent.me/NVO9Rn

Responses to this RFI must be submitted by 11:59 p.m. Pacific Standard Time on October 27th, 2020.

LCRI thanks you for your consideration and response in addressing this very important societal issue.

FREQUENTLY ASKED QUESTIONS

General Questions regarding this RFI should be mailed to LCRI-RFI@epri.com. Responses to questions will be posted at https://cvent.me/NVO9Rn.

TECHNICAL CONTACT

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More information will soon be available at www.lowcarbonlcri.com

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