U.S. Department of Energy
Advanced Research Projects Agency – Energy

Announcement of Teaming Partner List for Upcoming Exploratory Topic:

Advanced Modeling of the Intermodal Freight Transportation System

The Advanced Research Projects Agency – Energy (ARPA–E) is considering issuing a new Exploratory Topic under Funding Opportunity Announcements (FOAs) DE- FOA-0002784 and DE-FOA-0002785 to develop modeling tools to assist in the optimization of the national intermodal freight transportation system. These tools will provide guidance in both deployment of future low-carbon infrastructure and assets, as well as operational logistics improvements to minimize transportation-related energy and emissions while maximizing resiliency.

The intermodal freight industry has a good sense for what technology options will be available (e.g., battery energy storage, hydrogen fuel cells, zero carbon fuels), and approximate costs – but the execution and rollout strategy, on both spatial and temporal dimensions, is still unclear. These are significant financial decisions, and upcoming choices, such as on which fuel to commit a fleet to, could accelerate or delay national decarbonization timelines by years. It is vital that the industry work together and coordinate to maximize efficiency and effectiveness of this deployment. There are currently no comprehensive models of the intermodal system's energy demands and supplies, especially including overlap and shared infrastructure between modes. This will require synthesis and coordination of many different information streams.

Previous ARPA-E programs such as LOCOMOTIVES and TRANSNET have addressed route optimization for single modes (rail freight and light duty passenger vehicles, respectively). Other government, academic, and private modeling efforts have targeted portions of the freight system and specific modes, but none so far have addressed its deeply interconnected nature, including the challenges and opportunities the intermodal system presents. An ideal model should provide the optimum route for moving goods across maritime, rail and road transportation systems with the lowest CO2 emissions. Considering the interwoven yet fragmented nature of logistics and freight transportation, with limited data sharing, misaligned incentives, and many different stakeholders, there is a need for top-down modeling efforts that cross intermodal boundaries. More information on the ongoing ARPA-E LOCOMOTIVES program may be found here.

Given the many challenges associated with modeling the extreme complexity of the freight system, there exists no comprehensive plan to direct how freight decarbonization should be achieved. Innovation within and across sectors will be required to identify new optimal strategies. If issued, this Exploratory Topic will likely consist of two complementary tasks.

(1) Intermodal Infrastructure Model: Develop models of the national intermodal freight transportation network (i.e., moving freight by two or more modes of transportation -- e.g., trucks, trains, and cargo ships) that enable prioritization for energy infrastructure deployment, along with data required for the effective deployment of this optimized distribution system

(2) Intermodal Logistics Model: Develop models of the national intermodal freight transportation system that enable predictive and responsive optimization of modal choice, inter- or intra- modal transfer, or routing.

As a general matter, ARPA–E strongly encourages outstanding scientists and engineers from different organizations, scientific disciplines, and technology sectors to form new project teams. Multidisciplinary and cross-sector collaboration spanning organizational boundaries enables and accelerates the achievement of scientific and technological outcomes that were previously viewed as extremely difficult, if not impossible. Furthermore, ARPA-E strongly encourages involving industry partners to advise and collaborate with these project teams, with the goal of achieving successful industry adoption and integration of the innovative technologies these projects teams develop.

A Teaming Partner List is being compiled to facilitate the formation of new project teams. ARPA-E intends to make the Teaming Partner List available on ARPA–E Exchange (https://ARPA–E-foa.energy.gov), ARPA–E's online application portal, in January 2023. Once posted, the Teaming Partner List will be updated periodically, 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 the Teaming Partner List should complete all required fields in the following link: https://arpa-e-foa.energy.gov/ApplicantProfile.aspx. Required information includes: Organization Name, Contact Name, Contact Address, Contact Email, Contact Phone, Organization Type, Area of Technical Expertise, and Brief Description of Capabilities.

By submitting a response to this Announcement, respondents consent to the publication of the above-referenced information**. By facilitating and publishing this Teaming Partner List, ARPA-E is not endorsing, sponsoring, or otherwise evaluating the qualifications of the individuals and organizations that are self-identifying themselves for placement on this Teaming Partner List. ARPA-E reserves the right to remove any inappropriate responses to this Announcement (including lack of sufficient relevance to, or experience with, the technical topic of the Announcement).** ARPA–E will not pay for the provision of any information, nor will it compensate any respondents for the development of such information. Responses submitted by any means other than via the link provided above will not be considered.

This Announcement does not constitute a Funding Opportunity Announcement (FOA). No FOA exists at this time. Applicants must refer to the final Exploratory Topic, expected to be issued in January 2023 under the FOAs noted at the beginning of this Teaming Partner List, for instructions on submitting an application, the desired technical metrics, and for the terms and conditions of funding.