

NASEO Comments on
DE-FOA-0002687: Request for Information on Industrial Decarbonization Priorities

**National Association of State Energy Officials Comments on
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National Association of State Energy Officials (NASEO)

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Submitted via Industrial-Decarb-RFI@ee.doe.gov

The National Association of State Energy Officials (NASEO) represents the 56 governor-designated state and territory energy directors and their offices across the nation. We appreciate the opportunity to provide input on the U.S. Department of Energy's (DOE) RFI on Industrial Decarbonization Priorities.

NASEO's mission is to support the states' efforts to promote energy efficiency, deliver affordable energy, support energy-related economic development, meet state environmental objectives, and ensure energy system security, reliability, and resilience.

Advancing manufacturing and, more broadly, industrial productivity and competitiveness while simultaneously achieving environmental benefits, including decarbonization, is central to State Energy Office missions. The State Energy Offices and partner agencies in their states operate and support many initiatives to this end, from developing supportive policies to providing technical assistance to funding to helping develop large projects. Just a few examples include the New York State Energy Research and Development Authority (NYSERDA) FlexTech technical assistance program, Pennsylvania and Minnesota Technical Assistance Programs (PennTAP, MnTAP), Michigan's Small Manufacturer Energy Waste Reduction Incentive Program, California's Realizing Accelerated Manufacturing and Production (RAMP), and the Texas State Energy Conservation Office's Industrial Energy Efficiency Program.

One prominent industrial decarbonization initiative is Louisiana's newly announced \$4.5 billion clean energy complex that plans to produce more than 750 million standard cubic feet per day of hydrogen while becoming the world's largest sequesterer of carbon dioxide. The project is estimated to create 170 direct jobs with an average salary of \$93,000 plus benefits, 413 new indirect jobs, entail construction labor, and help retain existing employment. Many states are looking to reposition their heretofore fossil fuel-based industries, workforces, and expertise to become decarbonized engines of economic development.

Our comments address crosscutting issues rather than focusing on particular technologies, processes, and industry sectors. We comment on the following matters:

- Support for a balanced portfolio approach that addresses multiple decarbonization pathways across the continuum of RD&D through deployment.
- Attention to electric grid impacts of industrial electrification and decarbonization.
- Importance of technology demonstration and validation, factors affecting technical assistance efficacy, and diffusion of innovation.
- Coordination and collaboration across DOE offices, federal agencies, NASEO, and various state, local, utility, and non-governmental organizations and institutions.

- Attention to workforce and equity.

Support for a balanced portfolio approach that addresses multiple decarbonization pathways across the continuum of RD&D through deployment.

NASEO supports a balanced approach to decarbonization across multiple pathways as well as across the continuum of research, development and demonstration (RD&D), commercialization, and deployment. This should encompass both advancement of new, emerging technologies and technical assistance to disseminate existing best practices.

The multiple pathways or approaches identified in the RFI are energy efficiency (EE); electrification and low-carbon fuels, feedstocks and energy sources (LCFFES); and carbon capture, utilization and storage (CCUS). To this we urge inclusion of material efficiency that incorporates pollution prevention and waste minimization, recycling and “downcycling,” and beneficial use of by-products and residuals.¹ All materials, including water, are embodied energy and entail “embodied carbon” and wider environmental footprints. Material efficiency is as integral to decarbonizing industry as decarbonizing sources of electricity and thermal energy. Material efficiency should encompass designing products for reuse, recycling, and safe disposition as well as efficiency of processing and assembly during manufacture.

Attention to electric grid impacts of industrial electrification and decarbonization.

A major path for decarbonizing industry is to electrify processes that currently rely on fuel combustion. Also, electrolytic hydrogen utilizing zero-carbon generation, as an alternative to steam methane reformation or partial oxidation of methane, is a major path for production of hydrogen as feedstock for existing industrial processes as well as for emerging processes, such as for direct reduction ironmaking. In addition, carbon capture and sequestration (CCS) is dependent on electricity at sites of capture and for compression, transport, and sequestration.

In short, decarbonizing industry (along with electrifying buildings and transportation) will greatly increase demand for zero-carbon electric power generation, leading to potential grid stresses—although electrolytic hydrogen may also provide a means to reduce variable renewable generation “curtailment” while allowing long-term storage to mitigate electric system stresses too.² A robust, reliable, and clean electricity grid will be critical to decarbonizing industry.

DOE should integrate electric grid considerations in its industrial and manufacturing programs, including R&D, demonstration and validation, technical assistance, and deployment (including financial support). Distributed energy resources (DERs), encompassing onsite generation, electrical and thermal energy storage, and demand flexibility (shifting and modulating demand and, at times, feeding power back to the grid), and attention to electricity distribution systems

¹ This hierarchy comports with Congress’ findings and statement of national policy in the Pollution Prevention Act of 1990 (§ 13101) <https://www.epa.gov/p2/pollution-prevention-act-1990> .

² The Western Green Hydrogen Initiative, co-founded by NASEO, the Green Hydrogen Coalition, and Western Interstate Energy Board, includes 14 states, two Canadian provinces, and other partners to advance green hydrogen infrastructure and deployment. <https://www.ghcoalition.org/wghi>

should be considered in projects and programs. If well-designed and well-managed, industrial facility DERs and demand flexibility can reduce grid costs and stresses and even provide services back to the grid to enhance reliability and resilience not only of the industrial facility but also of the electricity system.

We note NASEO's partnership with the National Association of Regulatory Utility Commissioners (NARUC) in operating the [NASEO-NARUC Grid-interactive Efficient Buildings Working Group](#). Although initially focused on buildings, the Working Group, with State Energy Office and Public Utility Commission representative from 25 states, is exploring ways to enhance demand flexibility and load management that can apply to industrial operations as well.

Importance of technology demonstration and validation, factors affecting technical assistance efficacy, and diffusion of innovation.

Everett Rogers, in his classic work *Diffusion of Innovations*, identified various factors that greatly influence the diffusion and widespread adoption of technologies, techniques, and practices.^{3,4} These factors are critical if American industry is to be rapidly decarbonized and are, thus, vital to the success of DOE's intent.

Among factors identified by Rogers are *perceived advantage, compatibility, complexity, trialability, and observability*. Potential adopters of new technologies are often skeptical of performance claims made by vendors and technical assistance providers, and they are also concerned about compatibility with existing processes, products, skill sets, and business relationships and practices.

Trialability and observability are important for resolving questions of relative advantage and compatibility of a proposed technology or practice with existing systems. Being able to try a new approach or technology on a portion of a facility allows the potential user to mitigate risks of disrupting large parts of its operations for something that may not deliver the expected benefits. Observability, meaning the ability for others to discern the results, is also important for diffusing techniques. Seeing a technology or practice work at one facility can give confidence that it will work at the observer's own facility.

These factors point to the importance of technology demonstrations and their validation through objective analysis of performance data. This principle applies to new, emerging technologies seeking to bridge the "valley of death" in the commercialization process as well as to diffusion of existing technologies and practices to unfamiliar markets by technical assistance agents.

³ Rogers, Everett M., *Diffusion of Innovations*. 4th ed. New York: The Free Press, 1995.

⁴ This and the next paragraph draw from Alliance Commission on National Energy Efficiency Policy, "Advancing Energy Productivity in American Manufacturing," Alliance to Save Energy, Washington, DC, January 2013. http://www.ase.org/sites/ase.org/files/resources/Media%20browser/commission_manufacturing_2-7-13.pdf

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These diffusion of technology factors, corroborated by studies in the energy and environmental technical assistance field, should guide DOE in developing its R&D, demonstration and validation, and technical assistance activities.

Coordination and collaboration across DOE offices, federal agencies, NASEO, and various state, local, utility, and non-governmental organizations and institutions

NASEO is pleased that RFI responses will be shared beyond the Advanced Manufacturing Office (AMO) with the new Office of Clean Energy Demonstrations and other offices in DOE. We urge strong communication and coordination across DOE as well as with other federal agencies pertinent to manufacturing and industry (such as the U.S. Environmental Protection Agency, U.S. Department of Interior, and National Institute of Standards and Technology [NIST], among others).

We also strongly urge robust coordination and collaboration with NASEO and the State Energy Offices. As noted, the confluence of industrial energy, environmental, and economic development opportunities and impacts is a central matter for the nation's State Energy Offices. NASEO, indeed, is developing a State Working Group focused on advancing energy efficiency, clean energy, and decarbonization in the industrial/manufacturing sector.

We seek to work with DOE to enhance the efficacy of federal industrial decarbonization programs in the states and to support cooperation, collaboration, and coordination across business and technical assistance programs and agencies. We note that various manufacturing provisions within the Infrastructure, Investment, and Jobs Act are directly oriented toward the states (e.g., §40534 State Manufacturing Leadership), have states among eligible funding recipients, or involve states in planning, policy, and implementation.

Beyond the DOE-supported technical assistance and related programs (such as the Industrial Assessment Centers, Combined Heat and Power Technical Assistance Partnerships, and Better Plants program), there are State Energy Office programs, the NIST-State Manufacturing Extension Partnerships, state pollution prevention programs, Small Business Development Centers, state green banks, and utility programs. These and other business and technical assistance programs and resources may not always be well coordinated, yet all can have substantial roles in advancing industrial decarbonization. We hope that DOE can work with NASEO and others in this regard.

Attention to Workforce and Equity

NASEO supports provisions in the Bipartisan Infrastructure Law, including in manufacturing-focused provisions, that attend to matters of workforce development, employment opportunity, and equity for historically disadvantaged communities and those that may be adversely affected in the transition to a decarbonized energy economy.

The expansion of the Industrial Assessment Centers' activities to include community colleges, trade schools, and union training programs as well as support for apprenticeships and

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internships is welcome. Also welcome is the “covered census tract” provision in Advanced Energy Manufacturing and Recycling Grant Program and language concerning economically distressed communities under the Carbon Removal (direct air capture hubs) program.

We note NASEO Equity Committee⁵ and our exchanges with DOE and the Administration in support of Justice 40 objectives.

People and communities must be at the forefront of our industrial decarbonization efforts and the success of such efforts must be measured in human terms of economic development and human dignity as much as by technical criteria in units of energy and emissions.

Conclusion

NASEO, on behalf of the Nation’s State and Territory Energy Offices, appreciates this opportunity to respond to this important RFI. We hope this is useful to the U.S. DOE and we are grateful for our partnership with the Department to support state energy priorities.

⁵ <https://www.naseo.org/issues/equity>