Request for Information: Opportunities for operational validation of pilot-scale clean energy technology components and subsystems

Description

The Office of Clean Energy Demonstrations (OCED) was established in December 2021 as part of the Infrastructure Investment and Jobs Act, commonly known as the Bipartisan Infrastructure Law (BIL), to accelerate market adoption of clean energy technologies and fill a critical innovation gap on the path to achieving our nation's climate goals of net zero emissions by 2050.[1] OCED's mission is to deliver clean energy demonstration projects at scale in partnership with the private sector to accelerate deployment, market adoption, and the equitable transition to a decarbonized energy system.

Small and minority owned businesses have expressed challenges with testing the technologies they are developing at a component, subsystem, or integrated system at a relevant pilot scale. Performance data collection and validation can catalyze the additional financing or other partnerships needed to move to the next stage of commercial demonstration. With this Request for Information (RFI), OCED intends to gather feedback from the public on a potential new program designed to support rapid operational validation of pilot-scale components, subsystems, or systems for clean energy technologies. The entry level of this new program is expected to include technologies already validated in a laboratory environment. The program will support technology development needed to validate those components and/or subsystems in a commercially relevant environment or as part of an integrated system. OCED anticipates projects led by small businesses[2] and, possibly, mid-size businesses as technology and solution providers. OCED seeks input especially from small businesses, private investors (e.g., venture capitalists, corporate investors, impact funds), incubators and accelerators, and clean energy project developers (e.g., engineering, procurement, construction firms; facility owners and operators) interested in working with small businesses as technology or component suppliers for their projects.

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[1] Office of Clean Energy Demonstrations, Pub. L. 117–58, div. D, title XII, § 41201, Nov. 15, 2021, https://www.energy.gov/oced/
DOE Bipartisan Infrastructure Law Programs, https://www.energy.gov/clean-energy-infrastructure/bipartisan-infrastructure-law-programs.

[2] Review 13 CFR 121 for a complete definition of small business.

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Request for Information: Opportunities for pilot-scale demonstrations of clean energy technology components and subsystems

Background

OCED is a multi-technology office with funding for demonstrations that include advanced nuclear, clean hydrogen, carbon management, long-duration energy storage, industrial decarbonization, and more. With a clear role in commercializing critical clean energy technologies, OCED fills the gap between the research, development, and early-stage demonstration projects including those within DOE technology offices and initial deployments supported by the private sector and/or other DOE programs, such as the Loan Programs Office.[3]

To meet its mission and reach the national goals of 100% clean electricity by 2035 and net-zero emissions by 2050, OCED recognizes the importance of robust ecosystem to ensure sufficient, secure, and resilient supply chains, workforce, and technology innovation pipelines for the nascent clean energy industry. A specific focus is expected to be placed on both technical and adoption risks that may prevent the commercialization and deployment of new technologies. Such risks include, but are not limited to, delivered cost, functional performance, ease of use, market size and market openness, downstream value chain, ability to be integrated in a large infrastructure project, material sourcing, and environmental and safety elements.[4]

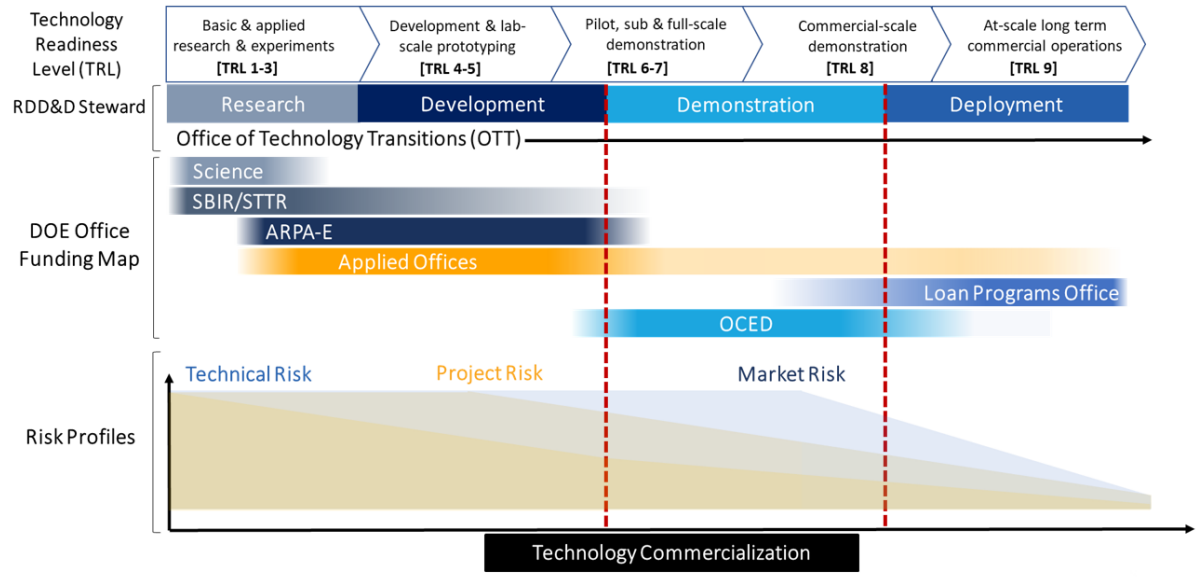

Figure 1 Roles of key DOE Offices in the continuum of technology development from basic research to at-scale commercial deployment of new technologies.

[3] https://www.energy.gov/lpo
[4] https://www.energy.gov/technologytransitions/adoption-readiness-levels-arl-complement-trl

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Figure 1 visualizes the roles of key DOE offices in the continuum of technology development. OCED's core mission is to support demonstration projects at scale that are typically first-of-a-kind operations of a fully functioning and integrated system. DOE recognizes there might be a gap between the two types of activities (left vertical red dotted line in Figure 1) and the need to support validation of integrated pilot projects in a commercial environment. In addition, DOE recognizes the importance of supporting the development of a pipeline of technology providers and solutions to address the immediate and future needs of the nascent clean energy industry.

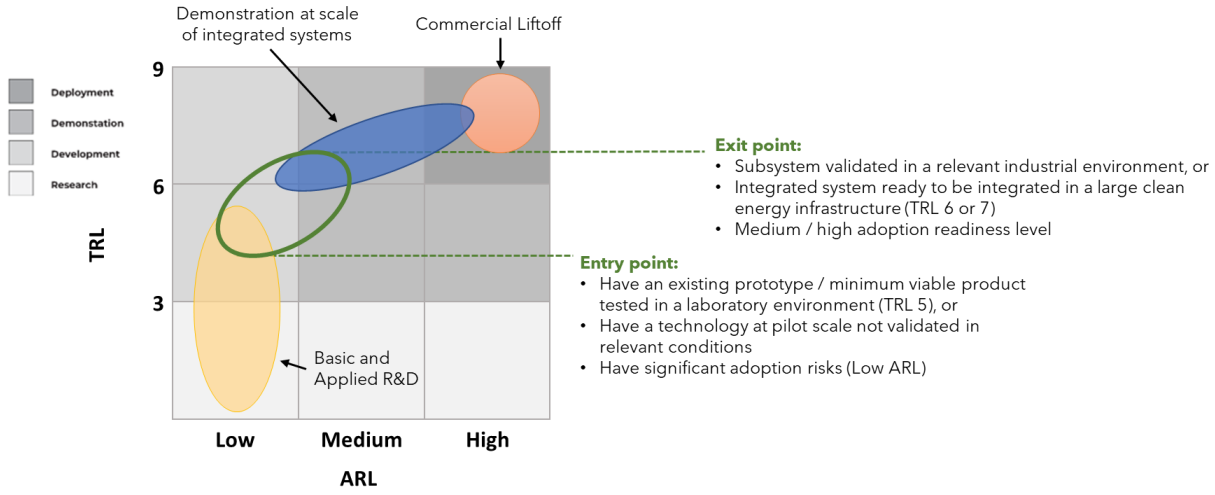

Figure 2 Expected entry and exit points for projects selected as part of the proposed program in a TRL / ARL map in relation to programs issued by other relevant DOE offices. This map is not meant to provide an exact description of the scope and objectives of different DOE programs and offices, but rather provide an easy visualization of the opportunities for a new program executed by OCED. For more information about the definitions of adoption readiness level, see https://www.energy.gov/technologytransitions/adoption-readiness-levels-arl-complement-trl

Figure 2 is a visual depiction of the expected entry and exit points for a project selected for this program. The main attributes of this program would be:

- Small and minority owned businesses are expected to apply with an existing prototype / minimum viable product tested in a laboratory environment (around TRL 5). DOE expects this technology component, subsystem, or system to have significant adoption risks at this stage (e.g., limited or no bankability, path to be integrated into a fully integrated system not fully developed yet, lack of proof of revenue viability, preliminary – but validated – cost model).
- Funding would be in the order of one to $15 million, including awardee cost share when required, for an 18–24-month long project.
- Awardees are expected to finish their project with OCED with a subsystem validated in a relevant industrial environment, or an integrated system ready to

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be integrated in a large clean energy infrastructure (TRL 6 or 7) and with medium/high adoption readiness level.[4]

This program would support the nascent clean energy and industrial decarbonization infrastructure by:

- Validating new technology solutions needed for the near- and long-term needs to achieve net zero carbon economy by 2050;
- Developing specialized and diverse workforce needs;
- Establishing a robust domestic supply chain ecosystem; and
- Addressing systemic technology gaps.

Through the appropriate design, funding, and support, this program would ensure rapid technology transfer and integration into clean energy and industrial sector infrastructure, thereby enabling commercialization and private sector led liftoff of clean energy and industrial decarbonization technologies.

Initially, this program will focus only on the technology spaces that are critical to the current OCED BIL and Inflation Reduction Act (IRA) funded portfolio, including: advanced nuclear, clean hydrogen, carbon management, industrial decarbonization, and energy storage.[5]

OCED is exploring effective means of engagement with a broad diversity of organizations, especially small businesses, to expand accessibility to its programs and opportunities associated with the energy transition. The Department of Energy currently has two different SBIR/STTR programs, one administered by the Office of Science on behalf of all the basic and applied science and technology offices[6], and one managed by ARPA-E.[7] Both programs are based on the structure and framework established by the Small Business Administration (SBA).[8] A portion of the program discussed in this request for information may be executed through the Small Business Innovation Research (SBIR) and Small business Technology Transfer Research (STTR) authority[9] with a new DOE SBIR/STTR effort.

OCED's mandate includes ensuring an equitable energy transition, so that every American can participate and benefit from the nascent clean energy industries. To advance this mandate, OCED intends to leverage this potential program to diversify, to the extent possible, the pool of applicants and the portfolio of small businesses selected

[5] https://www.energy.gov/oced/portfolio
[6] https://science.osti.gov/sbir
[7] https://arpa-e.energy.gov/project-guidance/sbir-sttr-guidance
[8] https://www.sbir.gov/about
[9] https://www.sbir.gov/

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for funding. Projects under this program will also require design an execution of a credible community benefit plan.

Request for Information Response Guidelines

Responses to this RFI must be submitted electronically to oced.proveit@hq.doe.gov no later than **5:00pm (ET) on July 31, 2023**. Responses must be provided as attachments to an email. It is recommended that attachments with file sizes exceeding 25MB be compressed (i.e., zipped) to ensure message delivery. Responses must be provided as a Microsoft Word (.docx) attachment to the email, and no more than 3 pages in length, 12 point font, 1 inch margins. Only electronic responses will be accepted.

Please identify your answers by responding to a specific question or topic if applicable. Respondents may answer as many or as few questions as they wish.

OCED will not respond to individual submissions or publish publicly a compendium of responses. A response to this RFI will not be viewed as a binding commitment to develop or pursue the project or ideas discussed.

Respondents are requested to provide the following information at the start of their response to this RFI:

- Company / institution name and type of organization;
- Company / institution point of contact;
- Contact's address, phone number, and e-mail address.

Request for Information Categories and Questions

Category 1: **Type of work and funding amount**

Given OCED's scope and mission, the Office intends to support efforts at a technology readiness level higher than traditional entrepreneurial support and to focus on de-risking commercial adoption barriers[4] in addition to solving technical challenges. The scope of this program would be focused on operational validation of technology components and subsystems.

1. What are the specific gaps and challenges, if any, that a pilot-scale clean energy technology validation program could address?
2. What is the ideal funding amount that an entity would need to execute a pilot-scale validation project?
3. What would be the ideal length of a project solving both technology and adoption issues (see Figure 2)?

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4. What is the ideal structure of such project?

Category 2: **Funding mechanism, application process, reporting requirements**

OCED can issue solicitations as financial assistance announcements or procurement and acquisition requests.[10]

1. Which mechanism (financial assistance or procurement / acquisition[11]) would be more effective at achieving the program goals – execute a pilot-scale, sub-scale, and/or full-scale pilot project? Why?
2. The typical application for funding consists of a technical volume in a narrative format, a budget justification, a community benefits plan, and additional documents specific to each solicitation (e.g., commercialization plan, project management plan, techno-economic analysis). However, other Government agencies and, more often, the private sector adopt different application formats (e.g., a slide deck; a pitch competition; or a mix of narrative documents and interview with reviewers). What is the most effective application to convey the technical details and potential impact of a proposed project without creating additional burden to potential applicants, especially if from small or minority-owned businesses? What resources, tools, or templates would help your organization, or organizations in your industry, better respond to federal programs? Please provide specific examples that can help DOE better understand the suggested approach.
3. In many funding announcements, DOE requires submission of a short concept paper or a pre-application (typically 5-10 pages of technical content) before the submission of the application package, with the opportunity of receiving preliminary feedback and an encourage/discourage recommendation or decision from DOE. The intent of the concept paper or pre-application process is to lessen the burden on potential applicants, as well as provide early feedback to applicants. On the other hand, this step makes the application process longer. Does the concept paper stage add significant value to potential applicants? Should DOE include this step in a potential procurement or financial assistance solicitation focused on small businesses?
4. What should an ideal application review process focus on? How should an application be reviewed?

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[10] Financial assistance awards are issued based on the regulations established in 2CFR 200 (https://www.ecfr.gov/current/title-2/subtitle-A/chapter-II/part-200?toc=1) as amended in 2 CFR 910 (https://www.ecfr.gov/current/title-2/subtitle-B/chapter-IX/part-910). Procurement contracts are instead regulated by the Federal Acquisition Regulations – FAR (https://www.acquisition.gov/browse/index/far as amended in the Department of Energy Acquisition Regulation – DEAR (https://www.acquisition.gov/dears)

[11] A pilot scale project is usually defined as a system operating in a similar environment than a large commercial infrastructure, but at a smaller size (typically 1/10th of the scale of the commercial system).

5. What is your ideal timeline between submission of an application and receiving an award?
6. What is your ideal technical and financial reporting frequency and format that would allow OCED to provide proper oversight while avoiding an excessive burden on small businesses?
7. Describe major administrative burden(s) during the application phase or during the execution or close-out of a Federally funded project?

Category 3: Community Benefits Planning

DOE requires Community Benefits Plans[12] as part of all BIL and IRA funding opportunities. Community Benefits Plans are based on a set of four core policy priorities: investing in America's workforce; engaging communities and labor; advancing diversity, equity, inclusion, and accessibility; and implementing Justice 40. When incorporated into projects, these priorities help to ensure broadly shared prosperity in the clean energy transition. Community Benefits Plan are intentionally flexible to generate the best approaches from applicants and their partners.

1. What resources, knowledge, or tools would your organization require to better understand and address community impact?
2. What issues, if any, would your organization face in the design and implementation of a community benefits plan? What barriers might exist to implementation of community benefits plans?
3. What entities would need to be involved to meet the community benefit plans requirements (please describe the roles of these entities)? What barriers exist for forming or strengthening relationships with these entities?

Category 4: **Technical, Business, and Commercialization Assistance**

DOE funding announcements are generally very competitive, with a low percentage of applicants receiving funding. The application process and the execution of an award are particularly challenging for entities that have never sought funding from a government agency, have been overwhelmed by the application process and administrative burdens, or that are based in historically underserved communities. OCED recognizes that establishing a program for later stage technologies may carry additional barriers for new entrants. For example, the requirement of having a product already developed and proven, even if in a laboratory setting; or the difficulties of developing a technology that is bankable, insured, certified, with verified and diversified supply chain, adequate manufacturing capacity, and sustainable revenue stream.

[12] DOE's approach to community benefits plans and how they are integrated in Federal Assistance instruments is detailed here: https://www.energy.gov/infrastructure/about-community-benefits-plans

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1. How can OCED support potential applicants and make sure they can meet the minimum readiness level required to apply to a potential program?
2. How can OCED support awardees during the execution of their project to tackle all technical and adoption barriers to commercialization?
3. How can OCED facilitate, as part of these projects, the use of existing test bed facilities and other capabilities offered by National Laboratories and other third-party entities to validate technical performances of new technologies?
4. A successful outcome for a project out of this program would be securing a purchase order from a clean energy or industrial plant developer or securing debt financing to expand manufacturing capabilities of the components, subsystems, or systems for the technology. How can OCED support awardees for a successful off-ramp at the end of the project?

Category 5: **Diversity, Equity, Inclusion, and Accessibility**

OCED is committed to supporting an equitable energy transition to ensure that every American can benefit from the nascent clean energy industry. OCED's mandate includes specific engagement with minority-owned small businesses and small businesses located in historically underserved communities with the goal of enabling them to being part of a first-of-a-kind integrated demonstration project and being part of the nascent clean energy industry. In addition, on April 14, 2022, DOE published the U.S. Department of Energy's Equity Action Plan.[13] One of the key tasks aims at diversifying the type of entities selected for a SBIR or STTR award:

> *Women- and minority-owned Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) award recipients appear to be underrepresented when compared to the overall population of women- and minority-owned small businesses in the broader market. For example, women- and minority-owned small businesses make up between 10-11% of SBIR/STTR grant recipients, compared to 15- 18% women- or minority-owned businesses in the overall small business population. DOE will endeavor to distribute 15% of SBIR/STTR Phase I awards to women, and 15% to minority-owned businesses by FY25.*[14]

[13] https://www.energy.gov/diversity/articles/roadmap-equity-implementing-racial-equity-and-support-underserved-communities. DOE Equity Action Plan has been developed in response to Executive Order 13985 on "Advancing Racial Equity and Support for Underserved Communities Through the Federal Government " (https://www.whitehouse.gov/briefing-room/presidential-actions/2021/01/20/executive-order-advancing-racial-equity-and-support-for-underserved-communities-through-the-federal-government/) and to the Justice40 initiative established by Executive Order 14008 on "Tackling the Climate Crisis at Home and Abroad" (https://www.energy.gov/diversity/justice40-initiative).

[14] https://www.energy.gov/sites/default/files/2022-04/DOE%20Equity%20Action%20Plan_Letterhead.pdf

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1. How can OCED effectively reach out to minority-owned small businesses, make them aware of the program, and ensure they are prepared to submit a successful application?
2. What forums, associations, and communications channels does your organization and industry use to access information on programs like this effort? How can OCED increase awareness of this potential program, and the diversity of organizations aware of this opportunity?
3. What changes should OCED make to the application and review process to be easily accessible by all potential applicants?
4. How can OCED leverage a program focused on small businesses to train the clean energy workforce of the future reflecting the diversity of the country?
5. How can OCED better connect minority-owned small businesses receiving an award with potential customer and off-takers to ensure sustainable and profitable long-term business operations?

Disclaimer and Important Notes

This RFI is not a Funding Opportunity Announcement (FOA); therefore, OCED is not accepting applications at this time. OCED may issue a FOA in the future based on or related to the content and responses to this RFI; however, OCED may also elect not to issue 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 applicants if OCED chooses to issue a FOA regarding the subject matter. Final details, including the anticipated award size, quantity, and timing of OCED funded awards, will be subject to the availability of appropriations.

Any information obtained because of this RFI is intended to be used by the Government on a non-attribution basis for planning and strategy development; this RFI does not constitute a formal solicitation for proposals or abstracts. Your response to this notice will be treated as information only. OCED 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. OCED will not provide reimbursement for costs incurred in responding to this RFI. Respondents are advised that OCED is under no obligation to acknowledge receipt of the information received or provide feedback to respondents with respect to any information submitted under this RFI. Responses to this RFI do not bind OCED to any further actions related to this topic.

Freedom of Information Act

Responses received under this RFI are subject to public disclosure under the Freedom of Information Act. Because information received in response to this RFI may be used to structure future programs and funding opportunity announcements and/or otherwise be

made available to the public, respondents are strongly advised to NOT include any information in their responses that might be considered business sensitive (e.g., commercial or financial information that is privileged or confidential), trade secrets, proprietary, or otherwise confidential.

If an RFI response includes business sensitive, trade secrets, proprietary, or otherwise confidential information, it is furnished to the Federal Government (Government) in confidence with the understanding that the information shall be withheld from public disclosure to the extent permitted by law, including the Freedom of Information Act. If your response contains business sensitive, trade secrets, proprietary, or otherwise confidential information, you must mark the specific pages containing business sensitive, trade secrets, proprietary, or otherwise confidential information. Without assuming any liability for inadvertent disclosure, DOE will seek to limit disclosure of such information to its employees and contractors or as otherwise authorized by law. This restriction does not limit the Government's right to use the information if it is obtained from another source.

Evaluation and Administration by Federal and Non-Federal Personnel

Federal employees are subject to the non-disclosure requirements of a criminal statute, the Trade Secrets Act, 18 USC 1905. The Government may seek the advice of qualified non-Federal personnel. The Government may also use non-Federal personnel to conduct routine, nondiscretionary administrative activities. The respondents, by submitting their response, consent to OCED providing their response to non-Federal parties. Non-Federal parties given access to responses must be subject to an appropriate obligation of confidentiality prior to being given the access. Submissions may be reviewed by support contractors and private consultants.