ITIF | INFORMATION TECHNOLOGY & INNOVATION FOUNDATION

October 29, 2021

The Honorable Jennifer Granholm
Secretary
U.S. Department of Energy
1000 Independence Ave, SW
Washington, DC 20585

Dear Secretary Granholm,

The establishment of the Office of Clean Energy Demonstrations, proposed in the President's Department of Energy FY2022 Budget Request and included in the Infrastructure and Jobs Act (IIJA) (H.R.3684), provides a tremendous opportunity to advance the DOE mission to accelerate the clean energy transition. The OCED would be unlike any other office at DOE, bridging the demonstration gap by providing resources and financial, market, and program management expertise to accelerate the transition of innovative clean energy technologies from R&D to the commercial market.

To ensure proper stewardship of taxpayer dollars, the office needs to be well-structured and well-managed, with appropriate performance targets. To achieve this objective, the Center for Clean Energy Innovation at the Information Technology and Innovation Foundation (ITIF) developed the attached white paper that outlines eight Management Principles and subsequent Implementation Recommendations. The paper was developed through extensive discussions with current and former executive branch officials and informed by numerous reports on the federal government's current approach to large-scale demonstration. ITIF would like to acknowledge the contributions to this document from clean energy technology policy experts from the Bipartisan Policy Center, Breakthrough Energy, ClearPath, Clean Air Task Force, Energy Futures Initiative, Environmental Defense Fund, Nuclear Innovation Alliance, and Third Way.

We would be pleased to meet with you or members of your staff to discuss our recommendations with you in more detail and explore ways in which we can support DOE in building an OCED with the tools and expertise it needs to successfully solicit, select, and manage large-scale demonstrations.

Sincerely,
David Hart, Director, and Jetta Wong, Senior Fellow, Center for Clean Energy Innovation, ITIF

CC: Deputy Secretary, David Turk; Acting Under Secretary for Science and Energy, Katheen Hogan; Director of the Loan Programs Office, Jigar Shah; Director of the Office of Technology Transitions, Vanessa Chan, Acting Assistant Secretary for the Office of Energy Efficiency and Renewable Energy, Kelly Speakes-Backman; Acting Assistant Secretary for the Office of Electricity, Patricia Hoffman; Acting Assistant Secretary for the Office of Nuclear Energy, Kathryn Hoff; Acting Assistant Secretary for the Office of Fossil Energy and Carbon Management, Jennifer Wilcox; Director of the Office of Management, Ingrid Kolb; Secretarial Advisor on Equity and Deputy Director for Energy Justice, Shalanda H. Baker; Chief Human Capital Officer, Erin Moore; and Principal Deputy Director for the Office of Policy, Carla Frisch.

Attached: DOE Office of Clean Energy Demonstration: Implementation Recommendations

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DOE Office of Clean Energy Demonstration: Implementation Recommendations

Purpose of Office

The purpose of the OCED is to conduct large-scale demonstrations where both economic and technical viability of new clean energy technologies can be validated through a process that instills confidence in technology developers, users, investors, and other stakeholders that a technology will perform predictably and meet market demands.

Background

To ensure the country transitions to a clean energy economy, wins the international energy innovation race, and mitigates the worst effects of climate change, a broad array of new, effective, reliable, and affordable technologies must be brought to the market. Some of the most promising climate solutions require complex, capital-intensive, large-scale technologies. Many of these promising solutions remain on the cusp of commercial deployment because they have not been effectively demonstrated. Demonstration is required because it is difficult to extrapolate the cost and performance of commercial-scale systems from experience with a smaller prototype. The main way to extrapolate this information is to build integrated large-scale systems. The knowledge and skills of how to build and finance these systems is primarily held by the private sector. Therefore, strong public-private partnerships must be created to ensure successful demonstration of technologies.

Unfortunately, the federal government has a mixed track record in large-scale demonstration. A good example of a successful U.S. demonstration policy is natural gas production from shale through hydraulic fracturing and horizontal drilling. These technologies precipitated a revolution in the industry, driving down costs remarkably.[1] FutureGen, the largest project supported by the 2009 Recovery Act, is an example of a failed federal effort. After numerous design changes and an expenditure of some $130 million dollars—DOE ultimately pulled its support for the project.[2] The number of projects needed to scale a technology reducing risk to tolerable levels varies by technology and situation. In some cases, a series of projects may be required to satisfy all stakeholders, with each successful project marking a step down the risk ladder. DOE can conduct these projects, but they must be in collaboration with the private sector and managed by trusted individuals with technical and financial expertise.

In 2019, Energy Futures Initiative and IHS Markit published, *Advancing the Landscape of Clean Energy Innovation*, which suggested consolidating DOE's many large-scale demonstrations into one office where oversight and management could be handled by a team of project management experts. Then in 2020, the Information Technology and Innovation Foundation published, *More and Better: Building and Managing a Federal Energy Demonstration Project Portfolio*. This report highlighted government's varied history in large-scale demonstrations and the need for increased federal funding to fill this

[1] Alex Trembath et al., "Where the Shale Gas Revolution Came From" (Breakthrough Institute, 2012), https://thebreakthrough.org/issues/energy/where-the-shale-gas-revolution-came-from.

[2] Peter Folger, "The FutureGen Carbon Capture and Sequestration Project: A Brief History and Issues for Congress" (Congressional Research Service, February 24, 2010), https://digital.library.unt.edu/ark:/67531/metadc282312/m1/1/high_res_d/R43028_2014Feb10.pdf.

innovation gap. The report also discusses ways to reform the management of large-scale demonstrations and recommends establishing an Office of Major Demonstrations with project management and finance expertise. Both reports, and many others, have drawn similar conclusions focused on increased private sector engagement earlier in the innovation process, and the need for stronger project management and financial expertise focused on commercial viability at scale throughout the solicitation, selection, and project management process.

To overcome the checkered history of the Department in large-scale demonstrations, the group of NGOs in the cover letter recommend the following Implementation and Management Principles for the OCED.

OCED Management Principles and Implementation Recommendations

The eight Management Principles and subsequent Implementation Recommendations below are based on several discussions with current and former executive branch officials and numerous reports on the federal government's current approach to large-scale demonstration. Increased private sector engagement and the use of private sector management practices along with a well-coordinated and commercialization focused office that owns the full lifecycle of a demonstration project should alleviate previous barriers to the commercial application of new energy technology. Additionally, strong stakeholder engagement, cross-agency collaboration, and independent and transparent processes will ensure the OCED meets the social, economic, and environmental challenges of the country while encouraging appropriate risk-taking as a necessary part of the innovation process.[3]

1) **Focus on large-scale demonstration**: The OCED should focus on very large and complex projects that seek to validate the cost and performance characteristics of technologies and systems at commercial scale. Candidates for support should:
   a) Be on the last step before commercial application (i.e., equipment is at or ready to scale to commercial scale and project is fully integrated) and therefore proven on a smaller scale or in different commercial applications; and able to provide critical information needed by stakeholders, especially the private sector, to move a technology to a commercial application; *or*
   b) Require high levels of investment to achieve commercial scale, generally more than $25 million in combined federal and non-federal funding over the life of the project.[4]

      Implementation

      - In FY 2022, OCED should work with the Applied Program offices, OTT, and LPO to determine an appropriate threshold cutoff (i.e., cost, capacity, complexity) for projects that it would manage. This threshold may be different for projects in different

[3] Needless to say, the Department must follow all public laws when the recommendations below conflict. Therefore, we recommend the principles as an implementation framework to address items that may not be clear in the legislation, not mentioned at all, or needed to achieve the intended goal to conduct large-scale demonstrations.

[4] $50 million was the threshold in Sec.8302 Management of Demonstration Projects passed in the House energy bill last year (H.R.4447eh). However, we do not recommend that a specific dollar threshold be the only requirement that OCED should focus on for a project.

technology areas. This recommendation excludes those funded under IIJA, which already specifies project requirements.

- In FY 2022, OCED should prioritize conducting cross-cutting technology demonstrations (i.e., technologies that can serve multiple market applications).
- In FY 2023 and beyond, the threshold should be used to identify projects that need more than $25 million in total funding, but it should allow exceptions based on the needs of the specific projects.
- OCED should prioritize projects that have market pull and a clear path to deployment after the large-scale demonstration.
- In FY 2023, DOE should begin to transition management and funding of *new* large-scale demonstration projects of 1-2 Applied Program offices to the OCED. By the end of the first three years, all *new* large-scale demonstrations of all Applied Program offices should be managed by OCED.
- *Existing* large-scale projects should continue to be conducted by the Applied Program Offices in collaboration with the OCED, unless otherwise specified by Congress through the IIJA (i.e., the two ARDP demonstrations which are now funded through the OCED) or other legislation. If an existing project is transferred to the OCED, DOE program managers overseeing that project should be encouraged to detail to the OCED part-time until the project is closed. Every effort should be made by both the OCED and the Applied Program Office to ensure a smooth transition.

2) **Private Sector Management Expertise (Human capital)**: The OCED must have a mix of technical, financial, and project management experience. It should include long-term career employees with DOE or other federal government experience, as well as short-term employees with specific technology, financial, or private sector expertise.

Implementation

- In FY2022, the Secretary should create an Implementation Tiger Team made up of LPO, OTT, Applied Offices, ARPA-E, Office of Management (MA), Office of the Chief Human Capital Officer (HC), General Counsel, and Office of Economic Impact and Diversity (ED) to work in a coordinated fashion to establish the OCED.
- In FY2022, DOE should establish OCED as a parallel office to LPO in the Under Secretary for Science and Energy's Office[5], with the head of LPO also as acting Director of the OCED. DOE should hire an OCED Director as soon as possible for the office with private sector expertise and a Deputy Director with DOE expertise to operationalize the office.
- In FY2022, OCED should leverage DOE special and emergency hiring authorities, including Direct Hire authorities, to the maximum extent possible. Additionally, it should receive significant Department Administration dollars to establish the office and hire employees quickly.

[5] Alternatively, if a new Under Secretary for Deployment is created, LPO and OCED could both be moved into that new office. See organizational structure section below.

- In FY2022, OCED should establish an internal leadership structure and contract support with specific commercialization, project management, and financial expertise. The expectation is that these skills will help ascertain a project's ability to meet a market demand while staying on time and budget. Final staff structure and staffing plans should be developed by the Director and their leadership team.
- OCED should be staffed with detailees from other parts of the DOE and the National Labs, especially the Applied Programs. The detailees should be encouraged to coordinate with their home offices. Customized positions where career staff can be "dual hatted" or "part-time" in the OCED should be created and when possible standardized, so the process can be replicated.
- In FY2022, OCED should work with the Applied Program offices, OTT, and LPO to build up the internal expertise so OCED can manage the demonstration projects that are funded by the IIJA.
- The OCED should incorporate specific employee performance metrics into Performance Plans focused on achieving results that can be used to further the large-scale demonstration and follow-on commercialization of risky technologies. Performance metrics should reward evidence-based risk-taking by employees.

3) **Project Management Responsibility (Internal Process, Policy, and Structure):** The OCED should solicit, select, and manage demonstration projects – owning the full lifecycle.

Implementation

- In FY2022, the Implementation Tiger Team should evaluate the potential applicability of DOE Order 413.3b, Program and Project Management for Acquisitions of Capital Assets[6] as an effective management tool for large-scale demonstrations.
- In FY2022, the OCED should establish an acceptable failure rate for the whole portfolio of projects conducted by the office. (As an example, the Senate proposed legislation for a Clean Energy Deployment Administration which included a 10% project default rate.[7]) Failures should be tolerated if managed appropriately. Information and lessons learned gathered from those failures should be used to benefit future projects.
- The OCED should ensure that solicitations are based on information gathered through engagement with the Applied Programs, the private sector, and local communities.

[6] DOE O 413.3B, Program and Project Management for the Acquisition of Capital Assets. Available at: https://www.directives.doe.gov/directives-documents/400-series/0413.3-BOrder-b

[7] 21st Century Energy Technology Deployment Act (S.949), Section 7. Administration Functions, April 30, 2009, 111th Congress.

- The OCED selection process should start with an Independent Merit Review Panel. A majority of the reviewers should come from the private sector, additional reviewers should represent the Applied Programs, labs, and community groups. Selection criteria should include a mix of local engagement qualifications, technical feasibility, financial viability, a demonstrable market, and project management plans. Additionally, eligible projects must be led by the private sector.
- The OCED should establish a Selection Board, rather than a Selection Official. This structure is similar to LPO's Credit Review Board and what DOE uses for some of its major procurements. All officials on the Board should be career federal officials, but a majority of the officials should have private sector project management, financial, or commercialization experience. Additionally, the Board should include officials from LPO, OTT, and the appropriate Applied Program office(s).
- Appropriate DOE Conflict of Interest rules should apply to all merit reviewers and the Selection Board. Additionally, OCED should be as transparent as possible, and its selection processes should be based and justified on publicly stated criteria from the outset.
- The OCED should work closely with project sponsors to develop flexible funding agreements, including the use of Technology Investment Agreements (TIAs), as an alternative to more conventional contracts, cooperative agreements, and grants to ensure the funding mechanism appropriately and cost effectively addresses both public and private sector interests. OCED also should be encouraged to develop shared funding arrangements with different DOE offices, and other federal agencies.
- In addition to IIJA and Reconciliation funding, in general, DOE should work with OMB and Congress to secure a large upfront appropriation for OCED to fund projects either fully upfront or in large segments over a multi-year period.
- The Secretary should delegate to the OCED the authority to reduce the cost sharing requirements of Sec. 998 of the Energy Policy Act of 2005 where appropriate. Cost-share requirements should be established at the beginning of a project and if a project is transferred from an Applied Program to the OCED, cost-share should not be renegotiated.
- The OCED may carry-out its projects as Milestone-based demonstration projects (42 U.S. Code § 7256c) including termination criteria, risk/cost thresholds, and hardware, technical and financial milestones.

4) **Technologies**: The OCED should be technology inclusive, and it should focus on any clean energy technology that needs to be demonstrated at a large-scale and could feasibly play a significant role in achieving net zero emissions by 2050. When assembling its portfolio, OCED should consider energy technologies with applications across sectors, including power, transportation, buildings, and industry.

<u>Implementation</u>

- The OCED should initially focus on demonstrating technologies funded through the IIJA, Reconciliation, and annual appropriations.

- In addition to the authorized technology demonstrations in the IIJA, OCED should be responsible for identifying which technologies to include in its portfolio using annually appropriated funds. It should do this through ARPA-E style technology workshops that involve the private sector and academic energy R&D communities, the Applied Program offices, and National Laboratories.
- In addition to authorized programs, OCED should ensure it manages a broad-based and balanced portfolio. Technologies demonstrated should address a broad range of energy end uses and approaches to greenhouse gas emissions reductions. The portfolio may also be balanced geographically and by degree of risk. Technology risk should be balanced with market and financial viability. Some technologies may be quickly transitioned to commercial application while others may need multiple or longer-term demonstrations.

5) **Strong Stakeholder Engagement**: The OCED should have its own stakeholder engagement function. It should engage a diverse set of industry, technical, finance, NGO, labor, state government, and community stakeholders. Specifically, disadvantaged and frontline communities must be involved in shaping projects and gain the benefits of the demonstration of new technologies, while mitigating any local impacts.

Implementation

- In FY2022, to ensure appropriate engagement, the OCED should establish a Federal Advisory Committee, which among other duties, would advise the office on engagement strategies, suggest community best practices for the development of demonstration projects, and recommend community engagement criteria to include in solicitations. The FACA would follow all normal conflict of interest policies.
- OCED should hire staff with expertise in working with vulnerable communities to inform outreach and engagement strategies with such communities.
- The OCED should coordinate with Applied Programs Offices, OTT, and the Office of Congressional and Intergovernmental Affairs on stakeholder engagement, especially with state and local government entities.
- The OCED should reach out to the DOE Office of Economic Impact and Diversity to align with its activities and ensure that the OCED's portfolio of projects benefit frontline communities.
- The OCED should prioritize knowledge sharing with upstream and downstream organizations. It should focus on promoting and sharing data with private sector organizations, research institutions, community organizations, and NGOs.

6) **Private Sector Engagement**: Enhanced private sector collaboration and coordination should be a priority of the OCED. This should include engagement with the end users of these technologies to ensure that there is truly a commercial application.

Implementation

- OCED should use ARPA-E like workshops to engage the private sector, including supply chain vendors, investors and end users when determining what technologies to include in its portfolio.
- OCED should include private sector experts in the Independent Merit Review process and Federal Advisory Committee.
- OCED should identify opportunities to appropriately provide information to the private sector on large-scale demonstration projects and the projects should be valued for their ability to provide critical data to the private sector and other stakeholders so the project can be improved upon and replicated.
- OCED should follow all normal tech transfer and intellectual property laws, while also abiding by the executive branches open data policies.
- OCED should establish conflict of interest policies for the engagement of the non-federal participants in workshops, merit reviews, and FACA bodies.

7) **DOE Coordination**: The OCED should coordinate across DOE and with specific Applied Program offices.

Implementation

- Internal coordination structures should be put into place with the Applied Program offices, ARPA-E, LPO, OTT, MA, and Office of Policy. These offices will be able to provide technical and analytical support throughout the life of a project and the OCED will be able to provide feedback to the Applied Programs about which technologies would be good targets for earlier stage demonstration work.
- Information dissemination on commercialization best practices within DOE should be the responsibility of OTT working with OCED.
- Details from other parts of DOE should be used to encourage additional informal coordination and information sharing.

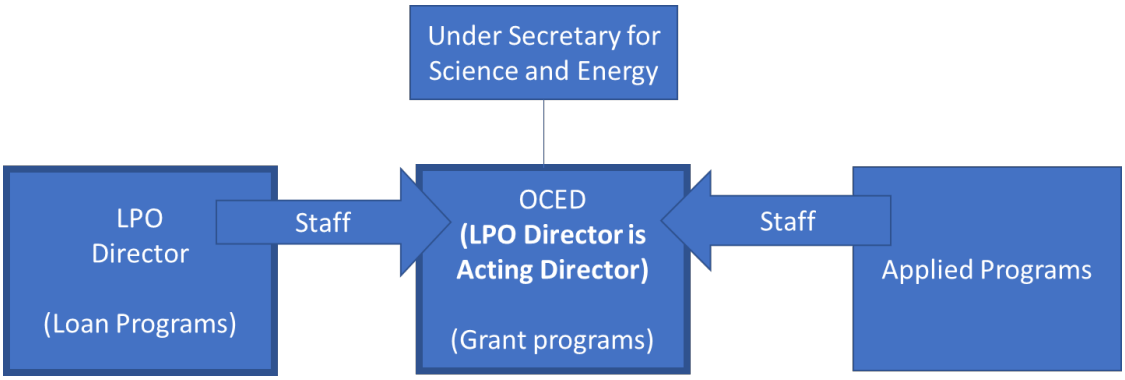
8) **Independence in Project Selection and Management**: The OCED should be as transparent as possible and should be accountable to Congress and DOE senior leadership, but the selection process should be based on merit and free from political interference.

Implementation

- Only the OCED's Selection Board, comprised of federal career staff, shall be involved in project selection. Specifically, OMB should not be able to veto or select projects.
- The OCED should not use large-scale demonstrations as a tool solely for job growth in specific regions, states, or communities. Energy and climate innovation is the main purpose of the demonstration portfolio.

Suggested Organizational Structure

In FY2022, DOE should establish OCED as a parallel office to LPO and the Applied Programs, with the head of LPO also as acting Director of the OCED. OCED should have strong ties to LPO and be able to rely on LPO's expertise but should not be established within LPO.[8] OCED should run its own solicitations. In FY2023, OCED should be assigned its own Director and has no direct tie to LPO except through normal coordination.



[8]Alternatively, if a new Under Secretary for Deployment is created, LPO and OCED could both be moved into that new office.