



Notice of Intent No.: DE-FOA-0003138

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**This is a Notice of Intent to Issue:
Funding Opportunity Announcement No.: DE-FOA-0003139**

**Distributed Energy Systems Demonstrations Funding Opportunity
Announcement**

The Office of Clean Energy Demonstrations (OCED) intends to issue a Funding Opportunity Announcement (FOA) entitled “Distributed Energy Systems Demonstrations Funding Opportunity Announcement”. The goal of this new investment area is to support demonstrations that de-risk technologies needed to manage variable generation; control flexible loads; and integrate energy storage, electric vehicle (EV) charging, and other facilities into the U.S. transmission and distribution grids.¹

ANTICIPATED PROGRAM SCOPE AND CHARACTERISTICS	
Total DOE Funding	\$50 million
Project Funding	\$10M - \$25M DOE share, 50% minimum required non-Federal cost share
Project Count	2 – 4 projects
Key Objective	Build confidence among system operators of grid reliability and service provision at high levels of variable generation and flexible load utilizing diverse asset mixes to ensure replicability and extensibility of control approaches
Requirements	<ul style="list-style-type: none"> • OCED will define a minimum required capacity of distributed energy assets to be included in each project [MW] • OCED will define a minimum share of peak system load to be met by variable distributed generation and distributed energy assets [% peak load MW] • OCED will require a percentage of the assets be in place, under development, and/or under recruitment prior to project start [% asset capacity] • OCED will require a grid operator to participate on every project team, and may require that the grid operator lead the project team • OCED may set specific targets for system flexibility and service provision • OCED may set stretch targets for system composition and operability

¹ <https://www.energy.gov/sites/default/files/2022-04/doe-fy2023-budget-volume-3-oced-1.pdf>

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OCED anticipates funding commercial-scale projects that demonstrate approaches that integrate grid-edge renewable and distributed energy systems with broader energy networks. These projects will seek to demonstrate reliable operations and system-wide value in the context of distribution grids with high levels of variable renewable generation and flexible load assets.

This Notice of Intent (NOI or Notice) describes a preliminary plan that will evolve during the FOA development process.

Statutory Authority

On November 15, 2021, President Joseph R. Biden, Jr. signed the Infrastructure Investment and Jobs Act (IIJA, Public Law 117-58), also known as the Bipartisan Infrastructure Law (BIL). This law authorized the Office of Clean Energy Demonstrations (OCED).² Congress appropriated funds for clean energy demonstrations in the Consolidated Appropriations Act, 2023.³

Background

OCED was established in December 2021, building on DOE's expertise in clean energy research and development and expanding DOE's scope to fill a critical gap on the path to net-zero emissions by 2050. 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.

Electricity demand is expected to continue to increase through 2050, driven partially by population growth, but more significantly by electrification of various sectors and loads, including building sector heating and cooking, EVs and associated charging infrastructure, industrial processes, and others.^{4,5} In addition to demand, distributed energy assets are expected to grow significantly with distributed solar, EVs and associated charging infrastructure composing the majority of the new distributed capacity in generation, storage, and flexible demand.

These trajectories present both a challenge and an opportunity for distributed energy systems. The increased demand, as well as increased demand variability and bidirectional power flows, could necessitate major expansions and upgrades to the transmission and distribution systems. Conversely, the distributed energy assets have the potential to reduce grid demands and provide enhanced value to the grid operators if operated in a coordinated, flexible manner. High levels of flexibility from large-scale aggregations of distributed energy assets could reduce or avoid distribution grid integration costs, generation capacity additions, and potentially transmission upgrade costs as well.^{6,7}

² IIJA Section 41201 (42 U.S.C. § 18861).

³ See Division D – Title III – CLEAN ENERGY DEMONSTRATIONS of the Consolidated Appropriations Act, 2023, H.R. 2617, <https://www.congress.gov/bill/117th-congress/house-bill/2617/text>

⁴ NREL Electrification Futures Study, <https://www.nrel.gov/docs/fy21osti/79094.pdf>

⁵ Energy Information Administration, Annual Energy Outlook 2023, <https://www.eia.gov/outlooks/aeo/>

⁶ DOE, Updated Grid Modernization Initiative Strategy 2020, <https://www.energy.gov/oe/articles/gmi-updated-strategy-2020>

⁷ DOE, A National Roadmap for Grid-Interactive Efficient Buildings, <https://qebroadmap.lbl.gov/>

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Flexible aggregated systems in multiple configurations, including Virtual Power Plants (VPP) could provide value to the grid operator in terms of energy, capacity, and reliability services, and value to the asset owners through avoided integration costs and/or lower energy costs. Additionally, flexible distribution systems can increase electricity supply reliability and overall system resilience – providing direct benefits to host communities.

There are remaining challenges for aggregated distributed energy resources and systems from both technology and commercial adoption readiness perspectives.

Technology Readiness Level (TRL)⁸ is high for many distributed energy technologies; challenges are primarily in complex systems integration:

- Reliable grid operations with high levels of distributed variable generation, distributed storage and flexible load assets (>20% peak load) have not been widely demonstrated in large systems.
- Grid-forming inverters have not been demonstrated in large systems with multiple co-operated units.

Commercial Adoption Readiness Level (ARL)⁹ challenges center on operator and financier confidence in system performance and valuation:

- Functional performance – System operators lack confidence in system performance above a certain proportion of Distributed Energy Resources (DER) (closely linked to TRL above).
- Ease of use/complexity – Systems have complex architectures and there are challenges with combining legacy and new assets and recruiting participants.
- Demand maturity/market openness – In many regions there is a lack of clear valuation methods and a lack of clarity for aggregated DER participation in established markets.
- Capital flow – There may be reluctance to include these models in system planning and financing due to remaining TRL and ARL challenges.
- Regulatory environment – There is a lack of clear rules or a multi-year horizon for market participation of distributed energy assets in many cases (for example, FERC Order 2222 sets requirements but exact tariffs and implementation timelines are not fully defined).¹⁰

Commercial-scale demonstrations are necessary to help address these challenges.¹¹ Within the distributed energy systems area, OCED intends to complement and build on prior and existing DOE programming to target remaining technical and commercial adoption challenges. DOE has a broad range of related programming, including prior programs such as Sustainable and Holistic Integration of Energy Storage and Solar PV (SHINES)¹² and Connected Communities;¹³ ongoing planning and partnering through the Grid Modernization Initiative (GMI)¹⁴ and Clean Energy to Communities (C2C);¹⁵ and large demonstration and deployment support through the Energy

⁸ https://www.directives.doe.gov/directives-documents/400-series/0413.3-EGuide-04/@_@images/file

⁹ <https://www.energy.gov/technologytransitions/adoption-readiness-levels-arl-complement-trl>

¹⁰ <https://www.ferc.gov/media/ferc-order-no-2222-fact-sheet>; <https://www.govinfo.gov/content/pkg/FR-2021-03-30/pdf/2021-06089.pdf>

¹¹ DOE Grid Modernization Initiative. Multi-Year Program Plan, Chapter 8, <https://www.energy.gov/articles/grid-modernization-multi-year-program-plan-mypp>

¹² <https://www.energy.gov/eere/solar/sustainable-and-holistic-integration-energy-storage-and-solar-pv-shines>

¹³ <https://connectedcommunities.lbl.gov/>

¹⁴ <https://www.energy.gov/gmi/grid-modernization-initiative>

¹⁵ <https://www.energy.gov/eere/clean-energy-communities-program>

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Improvements in Rural and Remote Areas (ERA)¹⁶ and Grid Resilience and Innovation Partnerships (GRIP)¹⁷ programs.

This program seeks to tackle the challenges of demonstrating reliable system operations within **larger systems** using **more diverse flexible energy assets** at a **higher proportion of peak load** than has been widely demonstrated in the past. This program will seek to operate these systems for **sustained periods** to build **high levels of confidence** in the technical and commercial performance and **share best practice learnings, simplifying and accelerating adoption and replication** of these solutions.

This investment will allow the U.S. to develop more reliable, resilient, and cost-effective distribution grids and distributed energy systems while supporting climate action and providing benefits to communities and workers. It will also support the Biden Administration's decarbonization goals of a 50-52% reduction in GHG emissions from 2005 levels by 2030, a carbon-pollution-free power sector by 2035, and a net-zero GHG emissions economy by 2050.^{18,19}

Technical and Commercial Program Priorities

In this FOA, OCED intends to prioritize transformative at-scale projects within medium and large distribution systems that demonstrate reliable grid operations using higher contributions from distributed energy resources than has been previously demonstrated.

Projects should:

- Demonstrate reliable operations and value to the grid operator and end-users of distribution grids that leverage high levels of variable renewable generation and flexible load assets.
- Demonstrate interoperability and coordinated control of generation, grid, transportation, industrial and building energy systems.
- Demonstrate reliable grid service provision from diverse energy asset mixes.
- Support the development of best practices for planning, execution, and operation of similar projects.
- Ensure sharing of best practices and key learnings among system operators of grid reliability at high levels of penetration utilizing diverse asset mixes to ensure replicability and extensibility of control approaches.
- Share electricity usage and system performance data with communities to accelerate adoption and replication of successful solutions.
- Accelerate the incorporation of these solutions into utility planning processes.
- Reduce the cost of capital for implementation of similar, subsequent projects.

¹⁶ <https://www.energy.gov/oced/energy-improvements-rural-or-remote-areas-0>

¹⁷ <https://www.energy.gov/gdo/grid-resilience-and-innovation-partnerships-grip-program>

¹⁸ Executive Order 14057, Catalyzing Clean Energy Industries and Jobs Through Federal Sustainability, <https://www.federalregister.gov/documents/2021/12/13/2021-27114/catalyzing-clean-energy-industries-and-jobs-through-federal-sustainability>

¹⁹ FACT SHEET: President Biden sets 2030 Greenhouse Gas Pollution Reduction Target Aimed at Creating Goodpaying Union Jobs and Securing U.S. Leadership on Clean Energy Technologies, <https://www.whitehouse.gov/briefing-room/statements-releases/2021/04/22/fact-sheet-president-biden-sets-2030-greenhouse-gas-pollution-reduction-target-aimed-at-creating-good-paying-union-jobs-and-securing-u-s-leadership-on-clean-energy-technologies>

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In addition to these priorities, programmatic considerations will include **technical merit and impact, financial and market viability, workplan, project team and partners, and community benefits plan.**

To support the goals of building a clean and equitable energy economy, DOE anticipates supporting projects that define a robust Community Benefits Plan, including:

- Supporting meaningful community and labor engagement;
- Investing in America's workforce and support good jobs;
- Advancing diversity, equity, inclusion, and accessibility; and,
- Contributing to the President's goal that 40% of the overall benefits of certain federal investments flow to disadvantaged communities (the Justice40 Initiative).²⁰

DOE anticipates providing awards to teams that are led by a single entity. All applicants are encouraged to partner with experts in technical engineering support or analysis, lifecycle analysis, and/or community benefits, if none exist within the applicant's team.

Guidance on specific application and reporting requirements will be included in the FOA but examples are available on OCED Exchange.²¹ Additional details on Selection Criteria will be provided in the FOA.

Implementation Approach

This FOA is expected to make available \$50 million of federal funds through financial assistance for competitively selected, cost-shared demonstration projects. DOE anticipates project costs to generally range from approximately \$10M to \$25M DOE share for each award, with a minimum of 50% non-federal cost share (at least 50% of the total project cost, including both DOE share and recipient cost share).²² Funds are anticipated to support primarily system planning, enhancements to sensing, communications and control infrastructure, and sustained operational demonstrations, with a limited portion of funds supporting direct deployment or implementation of distributed energy assets.

In the interest of maximizing funding impact and differentiating this program from related prior and current DOE efforts, OCED may set requirements for system composition as well as performance targets, such as:

- Given the level of funding available for this solicitation, OCED may require applicants to have the majority of distributed generation, grid, and load assets in place prior to project start, with a clear plan to recruit or install remaining assets to meet minimum requirements for system capacity.

²⁰ The Justice40 initiative, established by E.O. 14008, states that 40% of the overall benefits of certain federal investments should flow to disadvantaged communities. The J40 Interim Guidance defines benefits as direct and indirect investments (program outcomes) that positively impact disadvantaged communities and provides examples starting on page 4: <https://www.whitehouse.gov/wp-content/uploads/2021/07/M-21-28.pdf> ; DOE's definition of disadvantaged communities is available at: <https://www.energy.gov/diversity/justice40-initiative>

²¹ See for example Community Benefits Plan Guidance for DE-FOA-0002779, DE-FOA-0002970 or DE-FOA-0003009 (under Application Forms and Templates); available for download at <https://oced-exchange.energy.gov>

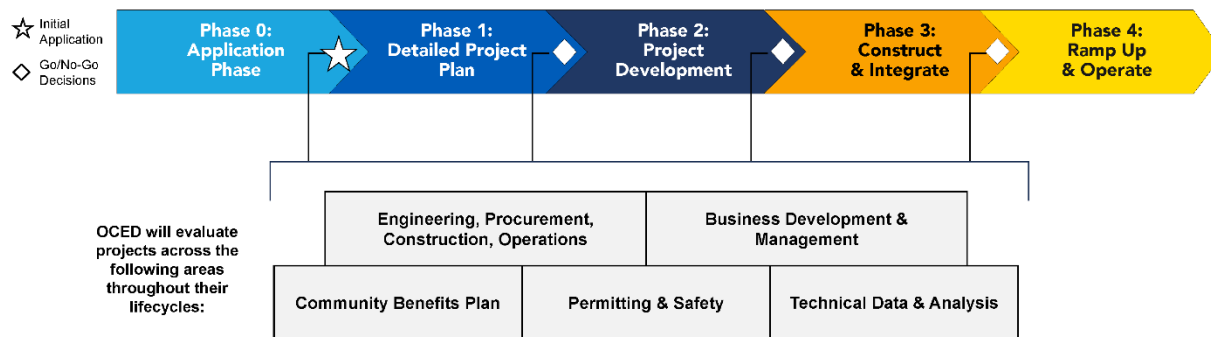
²² Section 988(c) of the Energy Policy Act of 2005 (42 U.S.C. § 16352).

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- OCED may require that any project meet a minimum system capacity [MW] and a minimum distributed energy resource capacity as a percentage of the peak load of their system [%].
- OCED may set performance targets for system flexibility and provision of specific grid services.
- OCED may set stretch targets for both system composition and operability.

OCED anticipates that projects awarded through a subsequent FOA will follow a phased structure similar to that shown in the following image.



To facilitate long term project planning, such as securing potential strategic partners or commercial third-party financing, DOE envisions that the FOA will solicit applications that cover all four Phases of the project. While only Phase 1 of selected projects will be funded initially, additional funding for subsequent Phases will be released based on successful completion of Go/No-Go decisions, subject to the availability of funds appropriated by Congress for the purpose of this program. DOE will review and evaluate progress and deliverables against expected milestones. Projects may be discontinued during or at the end of any Phase at the sole discretion of DOE if the Go/No-Go criteria, project, or program requirements are not met.

More details on activities and deliverables likely expected to be completed in each Phase will be provided in the FOA or during pre-award and pre-Phase negotiations. Phase lengths may be adjusted based on the readiness and status of the proposed project and applicant team. For example, it may be possible to accelerate Phase 1 and Phase 2 if substantial work has already been conducted that meets OCED standards for the relevant Phase.

If funded through all four Phases, DOE envisions that the demonstrations will reach technical and financial viability under the FOA. Though DOE’s goal will be to support projects that will maintain operation after the period of performance, projects may include disposition and decommissioning plans as part of future decision points to mitigate the risk for stranded assets.

Achieving OCED’s and DOE’s broad end goals will necessitate review and evaluation of proposed project characteristics that include cost, schedule, and scope; technology; business; market; financial; management; community support; or other factors. Each subsequent Phase will be structured to ensure that each project meets a standard level of maturity, employs a robust execution approach, delivers meaningful community benefits while minimizing negative impacts,

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and that technical and non-technical project risk is adequately and appropriately managed throughout DOE's engagement.

Submission and Registration Requirements for Full Applications

OCED envisions awarding multiple financial assistance awards in the form of cooperative agreements. The FOA will be released on or about September 2023 and may require concept papers. If OCED requires concept papers, OCED would issue encourage or discourage notifications to applicants based upon the concept papers and applicants would be required to submit an eligible concept paper to be eligible to submit a full application, which will be requested following the concept paper notifications. OCED intends to announce selections in mid-2024.

This Notice is issued so that interested parties are aware of the OCED's intention to issue this FOA in the near term. All the information contained in this Notice is subject to change. **OCED will not accept questions at this time regarding issuance of the potential FOA. Details on how to submit questions and comments will be provided in the FOA, when issued.**

OCED plans to issue the FOA via the OCED eXCHANGE website <https://oced-eXCHANGE.energy.gov/>. If applicants wish to receive official notifications and information from OCED regarding this FOA, they should register in OCED eXCHANGE. When the FOA is released, applications will be accepted only through OCED eXCHANGE.

In anticipation of the FOA being released, applicants are advised to complete the following steps, which are required for application submission:

- Register and create an account in OCED eXCHANGE at <https://oced-eXCHANGE.energy.gov/>. This account will allow the user to apply to any open OCED FOAs that are currently in OCED eXCHANGE. Please note that potential applicants must create an account in OCED eXCHANGE even if the organization has already registered for an EERE eXCHANGE account. It is recommended that each organization or business unit, whether acting as a team or a single entity, use only one account as the contact point for each submission. Questions related to the registration process and use of the OCED Exchange website should be submitted to: OCED-ExchangeSupport@hq.doe.gov
- Register with the System for Award Management (SAM) at <https://www.sam.gov>. Designating an Electronic Business Point of Contact (EBiz POC) and obtaining a special password called a Marketing Partner Identification Number (MPIN) are important steps in SAM registration. Please update your SAM registration annually. Upon registration, SAM will automatically assign a Unique Entity Identifier (UEI).
- Register in FedConnect at <https://www.fedconnect.net/>. To create an organization account, your organization's SAM MPIN is required. For more information about the SAM MPIN or other registration requirements, review the FedConnect Ready, Set, Go! Guide at https://www.fedconnect.net/FedConnect/Marketing/Documents/FedConnect_Ready_Set_Go.pdf

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- Register in Grants.gov to receive automatic updates when Amendments to a FOA are posted. However, please note that applications will not be accepted through Grants.gov. <http://www.grants.gov/>. All applications must be submitted through OCED eXCHANGE.

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