U.S. DEPARTMENT OF ENERGY

Office of ENERGY EFFICIENCY & RENEWABLE ENERGY

Solar Energy Technologies Office

Overview and Funding Programs

About the Solar Energy Technologies Office

The U.S. Department of Energy Solar Energy Technologies Office (SETO) supports early-stage solar research and development with the goal of improving the affordability, reliability, and performance of solar technologies on the grid. Key activities include:

- Cutting-edge technology development that drives U.S. leadership in solar energy and supports a growing and skilled workforce
- Research to address challenges related to the integration of solar to the nation's electricity grid
- Relevant and objective technical information on solar technologies to stakeholders and decision-makers

Through over 350 active projects, the office conducts research and development in five program areas:

- Photovoltaics (PV): The PV program works to halve the cost of energy produced by solar photovoltaics by 2030 by increasing the performance and reliability and lowering the cost of PV technologies.
- Concentrating Solar-Thermal Power (CSP): The CSP program works to lower the cost of CSP to enable the technology to be competitive with other dispatchable power generators.
- Systems Integration: The systems integration program works to enable the safe, reliable, and cost-effective integration of solar energy on the nation's electricity grid.
- Soft Costs/Balance of Systems: The soft costs program works to lower the soft costs of solar, which are the expenses associated with the non-hardware components of a solar energy system. These include the time and money associated with the design, siting, permitting, installing, interconnecting, and financing of a solar energy system, as well as workforce development.
- Technology to Market: The technology to market program—also known as Innovations in Manufacturing Competitiveness—investigates and validates groundbreaking, early-stage solar technology to strengthen early-stage concepts and move them toward readiness for greater private sector investment and scale-up to commercialization.

SETO issues funding opportunity announcements, known as FOAs, to solicit applications that work to achieve specific outcomes. All FOAs are developed through a collaborative process that involves stakeholder feedback and adheres to an open, highly competitive solicitation process. These funding opportunities encourage collaborative partnerships among industries; universities; national laboratories; federal, state, and local governments; and nongovernment organizations.

After FOA applications undergo a rigorous peer review process, projects are selected for negotiation to receive DOE funding. Upon the successful completion of this negotiation process, including collaboration on a statement of project objectives, milestones, and budgets, projects can begin.

Funding Programs

A selection of SETO's active funding programs by program area include:

Office-wide

- Funding Opportunity Announcement: Solar Energy Technologies Office Fiscal Year 2019 Funding Program ($130 million, funding announced in 2019): This opportunity provides up to $130 million in funding for as many as 80 projects that will advance research in solar energy technologies. The funding program will target five research areas: PV, CSP, soft costs reduction, innovations in manufacturing, and solar systems integration. These projects will help achieve the solar office's goal of improving the affordability, reliability, and performance of solar technologies on the grid.
- Solar Energy Technologies Office Fiscal Year 2018 ($81 million, selections announced in 2018): This office-wide funding program addresses the affordability, flexibility, and performance of solar technologies on the grid. This program funds early-stage research projects that advance both PV and CSP technologies and supports efforts that prepare the solar workforce for the industry's future needs.

Photovoltaics

- Photovoltaic Research and Development 2: Modules and Systems (PVRD2) ($20 million, selections announce in 2017): This program aims to develop technologies with the potential to create new classes of commercial PV products that improve module performance, reliability, and manufacturability.

Concentrating Solar Power

- Solar Desalination ($21 million, selections announced in 2018): These projects explore novel technologies that use solar-thermal energy to assist in creating freshwater from

otherwise unusable waters like seawater, brackish water, and contaminated water. Projects will advance thermal desalination technologies and explore low-cost, integrated designs for solar-thermal collection and storage that can reduce the cost of desalination and create smaller and more portable systems.

- Generation 3 Concentrating Solar Power Systems (Gen3 CSP) ($79 million, selections announced in 2018): This program focuses on advancing high-temperature components and designs for CSP plants with thermal energy storage that can reach high operating temperatures. CSP plant operating temperatures greater than 700 °C have the potential to reduce the cost of CSP systems by increasing the efficiency of the plant. There are several pathways to achieving higher temperatures for CSP plants—using either liquid, solid particle, or gaseous materials—and this funding program aims to identify and create a cost-effective and reliable integrated solution.

Systems Integration

- Advanced Systems Integration for Solar Technologies (ASSIST) ($36 million, selections announced in 2019): The program will enable grid operators to rapidly detect physical and cyber-based abnormalities in the power system and utilize solar generation to recover quickly from power outages, in many cases without human control, at critical infrastructure sites.

- Solar Forecasting 2 ($12 million, selections announced in 2017): This funding program supports projects enable grid operators to better predict how much solar energy will be added to the grid in two time frames: 24 to 48 hours in advance for day-ahead planning, and from one to six hours in advance for real-time grid operation. These efforts will improve the management of solar power's variability and uncertainty, enabling its more reliable and cost-effective integration onto the grid.

- Sustainable and Holistic Integration of Energy Storage and Solar PV (SHINES) ($18 million, selections announced in 2016): This program plans to develop and demonstrate integrated PV and energy storage solutions that are scalable, secure, reliable, and cost-effective. The projects will work to dramatically increase solar-generated electricity that can be dispatched at any time – day or night – to meet consumer electricity needs while ensuring the reliability of the nation's electricity grid.

Technology to Market

- American-Made Solar Prize Round 2 ($3 million, launched in 2018): This prize competition is designed to revitalize U.S. solar manufacturing. Through a series of three contests, the competition encourages innovators to transform concepts into early-stage prototypes ready for industry testing. To help competitors succeed, the Solar Prize also creates the American-Made Network, which is a diverse and powerful support network comprised of national laboratories, energy incubators, solar companies, facilities and other resources across the country.

- Technology to Market 3 (T2M3) ($25 million): These projects address early-stage, pre-commercial risks for new technologies so that those projects can subsequently attract private follow-on funding.

Soft Costs

- Solar Energy Evolution and Diffusion Studies 2 – State Energy Strategies (SEEDS2-SES) ($21 million, selections announced in 2016): This funding program aims to increase foundational understanding of technology evolution, soft costs, and barriers to U.S. solar deployment. It also tackles solar market barrier challenges at the state and regional levels by maximizing the benefits of solar electricity through energy and economic strategic planning.

- Solar Training and Education for Professionals ($10 million, selections announced in 2016): This program tackles soft costs by addressing gaps in solar training and energy education, both within the solar workforce and in related fields such as real estate, finance, insurance, fire and code enforcement, and state regulations. The program also supports the continuation of current training programs, including Solar Ready Vets and Grid Engineering for Accelerated Renewable Energy Deployment.

National Laboratories

SETO also partners with the national laboratories and its researchers to develop innovations that lower the costs of solar energy. Today, 40-50 percent of SETO's funding is awarded to national labs through funding opportunity announcements, multi-year funding programs specially designed for national labs, and collaborative research projects with industry stakeholders and other offices and initiatives in the Energy Department.

The office's current laboratory support program, Solar Energy Technologies Office Lab Call FY19-21 includes support for core capabilities at the national labs as well as research and development projects that facilitate a more resilient, reliable, and affordable electric grid. This funding program supports innovative projects that will have a measurable and significant impact within the research areas of photovoltaics, systems integration, concentrating solar-thermal power, and market analysis. In fiscal year 2019, project funding will total $61.6 million.

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SOLAR ENERGY TECHNOLOGIES OFFICE

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