Department of Energy (DOE)
Office of Energy Efficiency and Renewable Energy (EERE)

SunShot Technology to Market (Incubator Program Round 12, SolarMat Program Round 5)

Funding Opportunity Announcement (FOA) Number: DE-FOA-0001640
FOA Type: Initial
CFDA Number: 81.087

FOA Issue Date:	11/14/16
Submission Deadline for Letter of Intent (to SunShot.T2M@ee.doe.gov):	11/28/16 5:00 PM ET
Informational Webinar:	11/22/16 2:00 PM ET
Submission Deadline for Concept Papers:	12/12/16 5:00 PM ET
Submission Deadline for Full Applications:	2/21/17 5:00 PM ET
Expected Submission Deadline for Replies to Reviewer Comments:	3/30/17 5:00 PM ET
Expected Date for EERE Selection Notifications:	June 2017
Expected Timeframe for Award Negotiations	June-July 2017

- Applicants must submit a Concept Paper by 5:00 p.m. ET on the due date listed above to be eligible to submit a Full Application.

- To apply to this FOA, applicants must register with and submit application materials through EERE Exchange at https://eere-Exchange.energy.gov, EERE's online application portal.

- Applicants must designate primary and backup points-of-contact in EERE Exchange with whom EERE will communicate to conduct award negotiations. If an application is selected for award negotiations, it is not a commitment to issue an award. It is imperative that the applicant/selectee be responsive during award negotiations and meet negotiation deadlines. Failure to do so may result in cancelation of further award negotiations and rescission of the Selection.

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FOA SUMMARY

Means of Submission	Letters of Intent (optional), Concept Papers, Full Applications, and Replies to Reviewer Comments (optional) must be submitted through EERE Exchange at https://eere-Exchange.energy.gov, EERE's online application portal. EERE will not review or consider applications submitted through other means. The Users' Guide for Applying to the Department of Energy EERE Funding Opportunity Announcements is found at https://eere-Exchange.energy.gov/Manuals.aspx.
Total Amount to be Awarded	$30 Million
Average Award Amount	EERE anticipates making awards that range from $300,000 to $5 Million.
Types of Funding Agreements	Cooperative Agreements
Period of Performance	Up to 24 months
Eligible Applicants	Only For-Profit entities are eligible to apply as a prime recipient under this FOA. Please see Section **Error! Reference source not found.**. for additional details.
Cost Share Requirement	20-50% of Total Project Costs depending on Tier
Submission of Multiple Applications	Applicants may only submit one Full Application for each topic area of this FOA. If an applicant submits more than one Full Application to the same topic area, EERE will only consider the last timely submission for evaluation. Any other submissions received listing the same applicant for the same topic area will be considered noncompliant and not eligible for further consideration. This limitation does not prohibit an applicant from collaborating on other applications (e.g., as a potential Subrecipient or partner) so long as the entity is only listed as the prime applicant on one Full Application submitted under this FOA.
Application Forms	Required forms and templates for Full Applications are available on EERE Exchange at https://eere-Exchange.energy.gov.
FOA Summary	The mission of the Solar Energy Technology Office's Tech-to-Market sub-program is to enable the widespread market penetration of highly impactful solar technologies and solutions through technology research, development and demonstration to overcome technical, institutional and market challenges. The FOA is divided into Tiers that are based on the technology type, hardware or software, as well as its stage in the development cycle, e.g. prototype refinement, manufacturing tooling, beta testing, etc. In addition to achieving rigorous technical milestones, awardees are expected to deliver on business development and commercial metrics that de-risk the technology/solution and enable its progression to the next phase of commercial development. Successful awardees will be well positioned for investment from the private sector and have a path to market impact.

Questions about this FOA? Email SunShot.T2M@ee.doe.gov.
Problems with EERE Exchange? Email EERE- EERE-ExchangeSupport@hq.doe.gov Include FOA name and number in subject line.

I. Funding Opportunity Description

A. Description/Background

This Funding Opportunity Announcement (FOA) is being issued by the U.S. Department of Energy's (DOE), Office of Energy Efficiency and Renewable Energy (EERE), Solar Energy Technologies Office (SETO), Technology-to-Market (T2M) subprogram. This section describes the overall goals of the SETO SunShot Initiative and the type of projects that it is interested in funding. This FOA is structured to support for-profit entities on the development, testing and certification of a new product or solution at specific stages of development. If your product or solution is outside of the scope of this FOA, you should not apply to this funding opportunity. Other EERE funding opportunities can be found at https://eere-exchange.energy.gov/.

Rationale for this Funding Opportunity

SunShot investments have sought to drive technology innovations that contribute to a significant drop in the cost of solar in the U.S. and increase deployment nationwide. Five years into the decade-long SunShot Initiative, the solar industry is already more than 65% of the way to achieving SunShot's cost target of $0.06/kWh without subsidies for electricity generated by utility-scale photovoltaics (PV) (based on 2010 baseline figures). Since the SunShot Initiative's inception, the average price per kWh of a utility-scale PV project has dropped from about $0.21 to $0.10.[1] In addition to the cost goal, SunShot aims to make solar power ubiquitous, by addressing current and impending barriers preventing solar from being the obvious and optimal energy choice. SETO and its SunShot Initiative seek to enable the widespread deployment of solar energy throughout the U.S., to provide an increasing proportion of the nation's electricity generation portfolio. As the SunShot Initiative cost targets are achieved, an entirely new set of challenges will arise. SETO wants to partner with American businesses to bring products and solutions to market that achieve the SunShot cost goals and solve the next set of challenges preventing the broad adoption of solar power.

The purpose of this funding program is to remove barriers to ubiquitous solar that are addressable by technology and business innovation. These solutions span the solar value chain, covering hardware and manufacturing innovation, software solutions to drive down costs to deploy and integrate solar on the grid, and new business models to expand access to solar. The funding program enables both technical and commercial development of the proposed technologies to de-risk

[1] Fu, Ran, Donald Chung, Travis Lowder, David Feldman, Kristen Ardani, and Robert Margolis, "U.S. Solar Photovoltaic System Cost Benchmark: Q1 2016," National Renewable Energy Laboratory Report, NREL/TP-6A20-66532, September 2016.

the solution as it progresses to the market. Successful awardees will have a path to market impact and be well positioned for investment from the private sector (venture, strategic, philanthropic, internal, etc.). Due to the commercial nature of the projects, funding is available to for-profit entities, and teams led by for-profit entities.

SETO provides a variety of funding opportunities to address needs across the solar energy industry. Organizations are strongly discouraged from submitting applications with similar scopes of work to multiple FOAs. EERE will only provide funding for a specific scope of work under one Funding Opportunity Announcement. If an organization submits the same or similar technically meritorious applications to multiple FOAs, EERE will determine which application will be funded, and under which funding opportunity.. In order to aid applicants in deciding where their application should be submitted please refer to Figure 1, below.

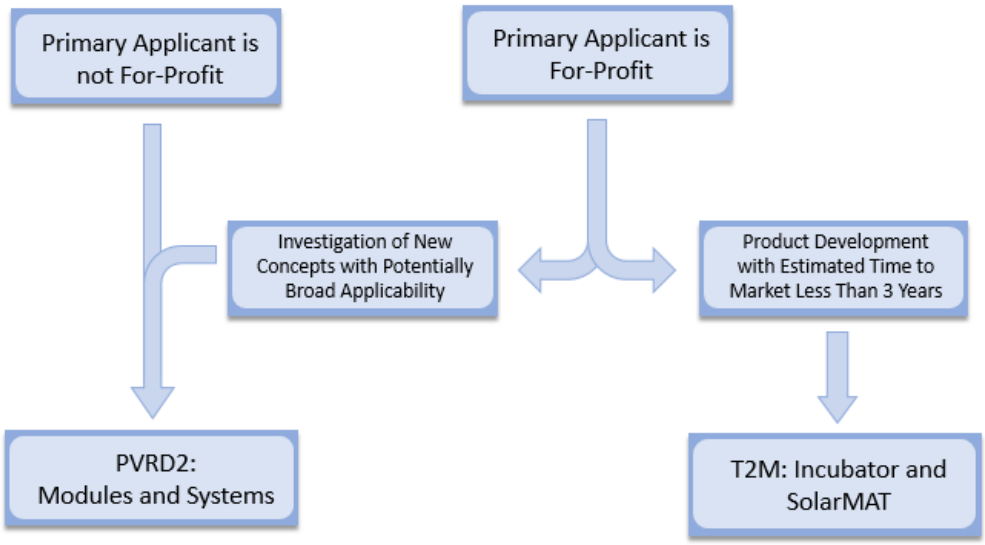


Figure 1: FOA decision tree

Please note, it is incumbent upon the applicant to choose the proper funding opportunity for their proposed project. The submission of the same application to both funding opportunities is highly discouraged.

Industry Perspective

Cumulatively, the U.S. now has over 31 gigawatts (GW) of solar capacity installed, enough to power the equivalent of more than 6 million average American homes.[2] In 2015, solar contributed 30% of new installed electricity generation capacity in the U.S.[3] Despite these impressive gains, solar energy provided only 0.9% [38.6 gigawatt hours (GWh)] of cumulative electricity generation in the United States in 2015.[4]

The DOE Solar Energy Technology Office has recently released a series of eight reports examining the challenges and opportunities the industry will encounter in the coming years[5]. The reports identify the key research, development and market opportunities that can help ensure that solar energy technologies are widely available to, and affordable for, more American homes and businesses. One major barrier to greater industry growth is that private capital has been reluctant to fund innovations, especially in the hardware space, due to failures associated with the most recent economic downturn and industry consolidation. Since that time, solar energy companies have been seen as risky investments by private industry.

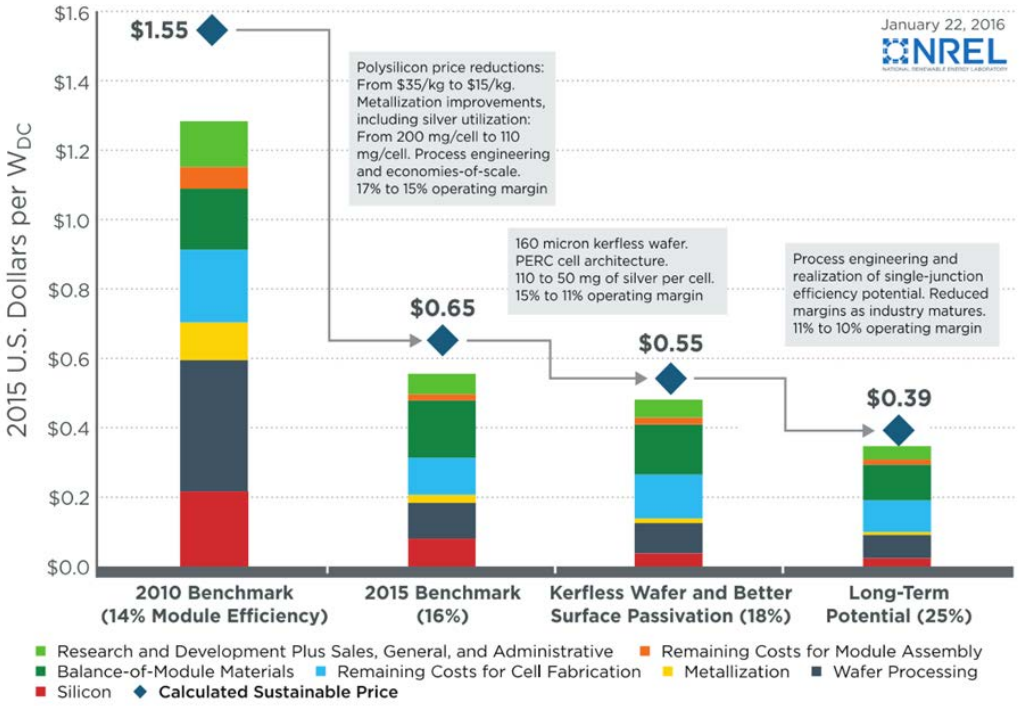
Diminished R&D capital available from the solar energy industry combined with low margins registered by the main players and the required high capital expenditures have hindered the development of the technologies and business solutions needed to achieve SunShot Initiative targets by the end of the decade. EERE's experience with previous Technology-to-Market funding programs has been that the private sector often finds these innovative technologies to be attractive targets for investment only after the significant product development and risk mitigation has been completed. Therefore, this funding program aims to accelerate the development and *systematically reduce the risk* of next generation technologies and innovative businesses whose products and services will directly reduce the levelized cost of electricity (LCOE) of solar energy or eliminate barriers to ubiquitous solar.

Advancements in Photovoltaic System Efficiency, Reliability, and Costs

Hardware components such as PV cells and modules, installation materials (racking, wiring, etc.), and inverters, as well as the efficiency and reliability of PV systems, still represent major barriers to achieve SunShot cost targets. Although improvements to standard PV modules have produced significant cost reductions over the past 5 years, the returns on such incremental improvements appear to be

[2] *US Solar Market Insight Report 2016 Q3*. GTM Research and SEIA. September 2016.
[3] See Citation 2
[4] Feldman, D.; Boff, D.; Margolis, M. *National Survey Report of PV Power Applications in the United States 2014*. International Energy Agency Photovoltaic Power Systems Programme. August 2015.
[5] On The Path to SunShot, http://energy.gov/eere/sunshot/path-sunshot

diminishing, and more dramatic innovations in module design and manufacturing are required to continue along the path of rapid progress. As an example, we show in Figure 2 the historical, current, and two possible roadmap scenarios for crystalline-silicon (c-Si) module manufacturing cost reductions. Similar models have been published for other technologies[6]. PV costs can be reduced by implementing innovative manufacturing technologies that affect key production metrics, such as increasing manufacturing throughput, yield, and product performance (e.g., conversion efficiency), and reducing bill-of-materials, labor and installation costs, while improving the reliability of the products. Of particular interest are technologies that reduce capital expense, enable supply chain innovation via alternative materials or processes, and develop and demonstrate low-cost automation, while improving or having no impact on product performance. This FOA seeks scalable manufacturing innovations which enable a realistic path to achieving domestic production costs below best-in-class when implemented at scale. While c-Si module designs and manufacturing processes represent the most mature technology in the industry, this FOA is also open to innovation in other technology areas, as long as a clear path to market diffusion and deployment is articulated.



[6] *The Role of Advancements in Solar Photovoltaic Efficiency, Reliability, and Costs* On the Path to SunShot http://www.nrel.gov/docs/fy16osti/65872.pdf

Figure 2 Historical, current, and two possible roadmap scenarios for crystalline-silicon module manufacturing cost reductions. Efficiencies shown are for module area. Input data assumes no tax exemptions or tariffs and 243 cm^2 cells.

Additionally, for a system of any size, all components integrated with the module must have a minimum service life that matches the modules and all the other components that are being deployed in the field today. For example, as modules are made with longer service lives, the lifetime of other components of the systems may need to be extended (through replacement or better design) to complement the longest lifetime component of the system with no impact on LCOE. Besides driving down traditional hardware component prices, other factors may need to be considered to spur solar adoption, such as module form factors. For example, some consumers do not find traditional modules to be aesthetically pleasing. Products that make solar more palatable or even invisible to the consumer are of interest. Ultra-light-weight modules for weight-constrained scenarios are also of interest.

Other hardware components which could enable significant balance of system hardware cost reductions will be considered in this FOA. As an example, some opportunities might come from novel racking and installation materials, methods, and designs; optimal structural design codes for PV systems; standardized racking systems for specific module types; advanced tracking systems; new methods for integrating power electronics that reduce the overall effort for installing modules; modular construction of PV systems; in general, any solution moving the bulk of the installation process from the final site to the factory. Moreover, solutions allowing extreme automation of any process in the industry value chain will be considered.

The U.S. Department of Energy (DOE) has set a goal of increasing America's market share for manufacturing value added commensurate with domestic market demand. Growth in solar manufacturing is critical to achieving the SunShot cost and deployment targets.[7] Of particular interest are manufacturing technologies that reduce capital expense, enable supply chain innovation via alternative materials or processes, and develop and demonstrate low-cost automation.

Integrating 100s of GWs onto the Grid

As system prices fall, solar energy will be more attractive to a large customer base. With an increase in users wanting to own solar assets and integrate with the grid, grid stability becomes an issue due to the time dependent nature of solar energy.

[7] *Emerging Opportunities and Challenges in U.S. Solar Manufacturing* On the Path to SunShot http://www.nrel.gov/docs/fy16osti/65788.pdf

Figure 3 (left), from the California Independent System Operator, depicts an extreme case that has already happened in California where net load in the middle of the day is depressed and the evenings see extreme ramping events as solar output drops (also known as the duck curve). Compounding grid integration challenges are the minute to minute variations in PV generation due to cloud cover and other factors (Figure 3, right). These spikes in generation can lead to local grid voltage and frequency stability issues which must be mitigated. If unresolved, these effects can, in extreme cases, cause damage to or failure of distribution equipment.

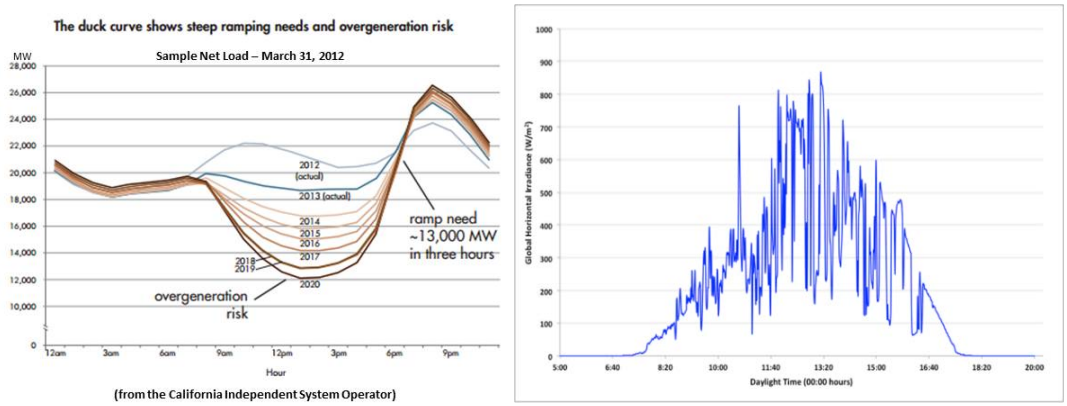


Figure 3 (left) California ISO "Duck Curve". (right) Illustrative variability in solar power output based on measured 1 minute irradiance data.

At the distribution system level, increased variable generation due to high penetrations of distributed PV (typically rooftop and smaller ground-mounted systems) could challenge the management of distribution voltage, potentially increase wear and tear on electromechanical utility equipment, and complicate the configuration of circuit-breakers and other protection systems—all of which could increase costs, limit further PV deployment, or both. However, improved analysis of distribution system hosting capacity—the amount of distributed PV that can be interconnected without changing the existing infrastructure or prematurely wearing out equipment—has overturned previous assumptions such as the idea that distributed PV penetrations higher than 15% require detailed impact studies. New analysis suggests that the hosting capacity for distributed PV could rise from approximately 170 GW using traditional inverters to about 350 GW with the use of advanced inverters for voltage management, and it could be even higher using accessible and low-cost strategies such as careful siting of PV systems within a distribution feeder and additional minor changes in distribution operations.[8]

[8] Palmintier, Bryan, Robert Broderick, Barry Mather, Michael Coddington, Kyri Baker, Fei Ding, Matthew Reno, Matthew Lave, and Ashwini Bharatkumar. 2016. On the Path to SunShot: Emerging Issues and Challenges in

Software and hardware technology innovation enables the creation of new value streams from distributed solar arrays. For example, systems which integrate smart inverters and/or storage can provide services like frequency and voltage regulation to the grid when called upon to do so. Not only can these services offer added value that can be monetized by the system owner (depending on local markets), they make for a more robust grid. Pairing additional technologies, or distributed energy resources (DERs) like energy management and batteries, can enable minimized curtailment in cases of over generation and maximize self-consumption of solar energy to realize its greatest value. To reach the full penetration levels possible for solar energy, robust, reliable, and secure communications are needed between system components, the system and the grid, and the system and site-based loads (demand response). As more systems are equipped with sensory and communications products, there is the potential that communications will be needed between systems in the same service territories in order to ensure grid stability at the distribution level. Communications solutions must have greater than 99.999% availability, response times of less than 1 second, and they must be scalable, preferably up to 5 million nodes (this can vary based on application).

With the increasing deployment of solar energy, and the creation of new state policies, new technologies are required to satisfy new needs in the market. Hardware and software solutions aimed at managing the energy load of buildings (both in the residential and commercial & industrial segments) to coincide with on-site, installed solar energy production are encouraged. In particular, this FOA will look for new technologies able to maximize self-consumption while minimizing curtailment, shifting energy loads, and communicating with smart appliances and smart home tools, establishing a software-controlled smart ecosystem including generation and consumption hardware.

Utility planning and operations is not trivial in a grid with two-way power flows at both the distribution and transmission level (depicted in Figure 4). Denholm et al. show that increasing the use of grid-flexibility options (improved grid management, demand response, and energy storage) could enable 25% or higher penetration of PV at low costs.[9]

Integrating Solar with the Distribution System. Golden, CO: National Renewable Energy Laboratory. NREL/TP-5D00-65331. http://www.nrel.gov/docs/fy16osti/65331.pdf.

[9] Denholm, Paul, Kara Clark, and Matt O'Connell. 2016. On the Path to SunShot: Emerging Issues and Challenges in Integrating High Levels of Solar into the Electrical Generation and Transmission System. Golden, CO: National Renewable Energy Laboratory. NREL/TP-6A20-65800. http://www.nrel.gov/docs/fy16osti/65800.pdf.

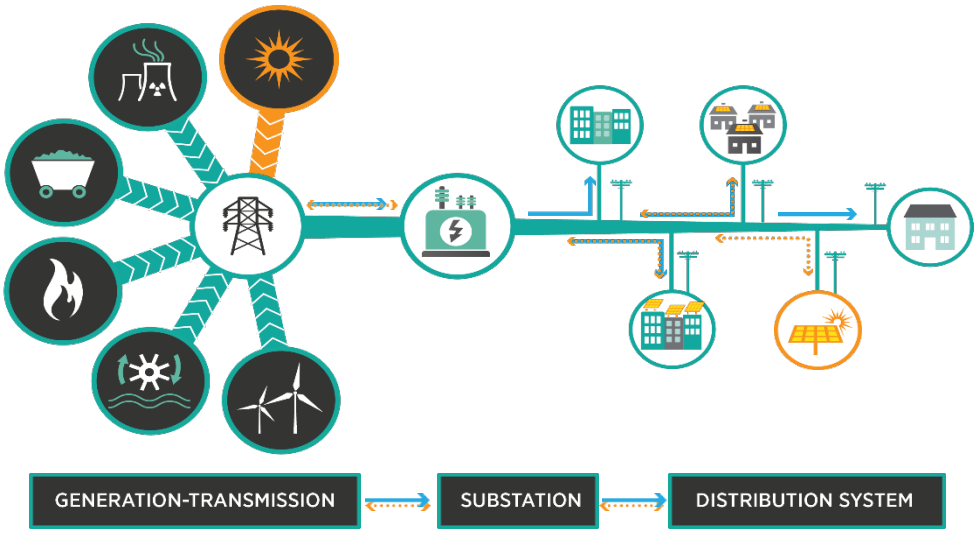


Figure 4 Schematic of system integration at transmission and distribution level

Overcoming Market Barriers and Reducing the 'Soft Costs' of Deploying Solar

Technology development, declining material costs, and manufacturing scaling have contributed significantly to rapid reductions in hardware costs since the inception of the SunShot Initiative. By 2013, soft—or non-hardware—costs made up the majority of costs in residential installations and a major fraction of commercial and utility installation costs.[10] Soft costs consist of costs associated with customer acquisition, installer overhead, financing, contracting, permitting, inspection, interconnection, and installation as well as costs incurred due to barriers to deployment (see Figure 5). In order to achieve the goals of the SunShot Initiative, average soft costs need to fall to less than half of today's values (e.g., from $1.56/W to approximately $0.65/W for residential systems and from $1.07/W to $0.44/W for commercial systems by 2020).[11] Soft costs are of particular concern to the residential and commercial space, as systems tend to be custom designed and smaller in scale leading to a number of non-recurring engineering and process costs that must be defrayed over a smaller system size (number of watts).

[10] Friedman et al., "Benchmarking Non-Hardware Balance-of-System (Soft) Costs for U.S. Photovoltaic Systems, Using a Bottom-Up Approach and Installer Survey–Second Edition," October, 2013. http://www.nrel.gov/docs/fy14osti/60412.pdf

[11] Numbers reported in $2010. Source: Feldman D.; Barbose, G.; Margolis, R.; Darghouth, N.; James, T.; Weaver, S.; Fu, R.; Davidson, C.; Wiser. R. 2014. *Photovoltaic System Pricing Trends: Historical, Recent, and Near-Term Projections. 2014 Edition.* National Renewable Energy Laboratory. September 2014.

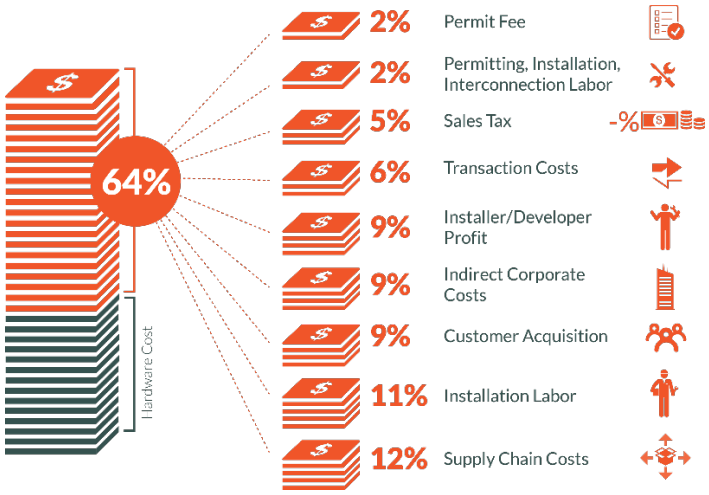


Figure 5 Representative breakdown of solar soft costs

SETO addresses soft costs by working with a broad range of stakeholders to expand access and overcome institutional barriers to solar energy.[12] While these initiatives play a role in expanding solar deployment, many opportunities exist for technological and business solutions to further drive down these costs, including but not limited to:

- *Financing and Access to Capital:* Financial innovations—independent of technology-cost improvements—could cut the cost of solar energy to customers and businesses by 30%–60%.[13] As with most nascent industries, the average cost of capital is high (on the order of 6-9% or greater)[14] due to a variety of factors including, but not limited to, insufficient data and system performance transparency, lack of competition among finance providers (debt, tax equity, etc.), and perceived technology risks (system lifetimes and performance). To make this cost reduction a reality, new financial models and means by which to open new pools of capital are needed. SETO encourages solutions that reduce investment risks and increase market liquidity, financing, and insurance options.
- *Operations & Maintenance:* For financiers to feel comfortable that their solar investment will remain profitable, low-cost advanced automation to monitor system performance and reduce operations and maintenance (O&M) costs is critical as well as access to data and decision-support tools that help with risk

[12] http://energy.gov/eere/sunshot/soft-costs
[13] Feldman, David, and Mark Bolinger. 2016. On the Path to SunShot: Emerging Opportunities and Challenges in Financing Solar. Golden, CO: National Renewable Energy Laboratory. NREL/TP-6A20-65638. http://www.nrel.gov/docs/fy16osti/65638.pdf.
[14] Feldman, David, Travis Lowder, and Paul Schwabe. (2016). "Terms, Trends, and Insights: PV Project Finance in the United States, 2016." National Renewable Energy Lab, NREL/BR-6A20-66991, September 2016.

assessment. These solutions will help to reduce a solar system's lifecycle cost of ownership. O&M costs are influenced by up-front investments in design, engineering, and installation, as well as lifetime system upkeep costs related to performance monitoring and cleaning.

- *Permitting, Interconnection, and Inspection:* Permitting processes for solar projects and installations can involve various local, state, and federal entities. There are over 18,000 jurisdictions and 5,000 service territories in the United States, many of which have their own manual or paper-based permitting, interconnection, and billing process.[15] As installers expand, they are faced with the burden of learning and setting up processes for each jurisdiction and utility, which increases costs. To achieve ubiquitous solar, scalable, sustainable and profitable solutions, and data standards are needed that can help installers, utilities, and Authorities Having Jurisdiction (AHJs) work together in a streamlined and automated way.
- *Installation:* Installation cost is comprised of the time it takes to do any pre-installation prep work through completion of on-site installation and connection with the grid. Currently, it takes U.S. installers 9.4 hrs/kW to install a residential system, which means a single system can take multiple days to install. Reductions in cost can be found not only in component costs through optimized design for reduction in material usage, but also in installation efficiency gains, pre-installation supply chain optimization, etc.
- *Customer Acquisition:* Customer acquisition costs are extremely high for the solar industry, on the order of $1,100 for a 5kW residential installation in 2014.[16] Customers are not efficiently identified and targeted, new customer groups are not being sufficiently enabled (i.e. community solar), sales-people are not effectively educating people about the opportunity or the opportunity is not compelling enough, and this cumbersome and confusing process is resulting in lost sales, etc. For ubiquitous solar to be achieved, new low cost methods of identifying, educating, and selling to millions of customers will need to be developed for residential, mid and large-scale solar installations, and customers that range from individuals, to non-profits, to major corporations.

Innovation in Concentrating Solar Power (CSP)

CSP systems, although they currently have higher capital and operating costs than PV, offer the unique advantage of directly producing thermal energy, making

[15] Feldman, David, Dan Boff, Robert Margolis, "National Survey Report of PV Power Applications in the United States 2013," International Energy Agency Photovoltaic Power Systems Programme. August 2014.

[16] Davidson, Carolyn, Ted L. James, Robert Margolis, Ran Fu, David Feldman, "U.S. Residential Photovoltaic (PV) System Prices, Q4 2013 Benchmarks: Cash Purchase, Fair Market Value, and Prepaid Lease Transaction Prices," National Renewable Energy Laboratory, NREL/TP-6A20-62671, October 2014.

energy storage cost-effective on timescales of hours and days, relative to other energy storage technologies. Recent price drops in PV had led to a decrease in interest for CSP systems. As a result, there is an interest in further reducing the capital and operating costs of CSP systems that incorporate thermal energy storage.[17] Current state-of-the-art CSP tower systems operate at a highest temperature of 565 °C (transported via a molten nitrate salt) and approximately 400 °C for less efficient, but more commercially developed trough technology. Third generation CSP plants targeted by DOE are expected to have a peak operating temperature of approximately 720 °C to integrate with next-generation, high-efficiency supercritical CO_2-based power cycles. Management and delivery of this high temperature thermal energy as well as integration with thermal energy storage (TES) constitute the highest technical risks of these new CSP technologies. De-risking investments in the CSP industry additionally involves reducing plant level costs through technology innovations that improve the efficiency of collectors, receivers, and the power cycle. As variable renewable deployment increases, the value of CSP also increases due to the added value of dispatchable energy that can be delivered based on the demand load. Innovative ideas are welcome to help meet the goal of a $0.06/kWh$_e$ LCOE for CSP systems with thermal energy storage and to increase the market value through storage integration and utilization.

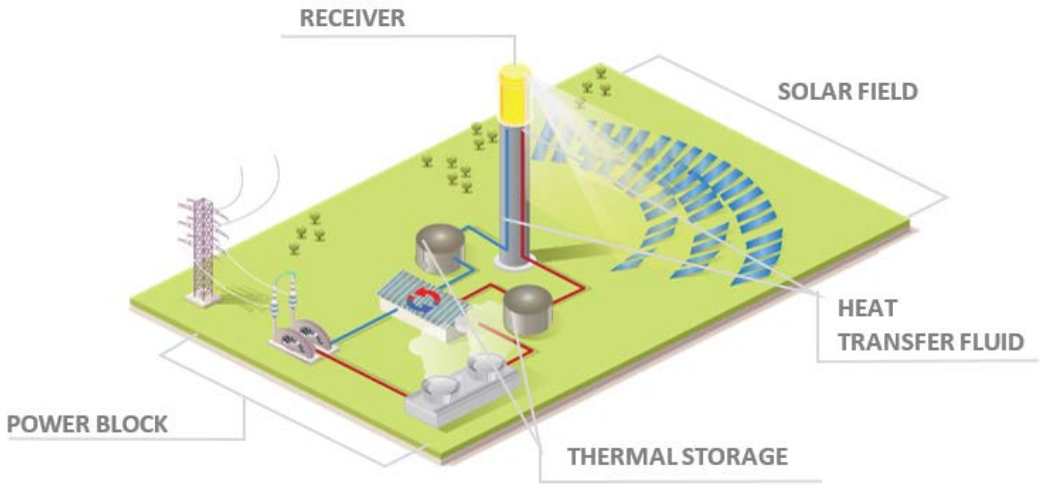


Figure 6 CSP tower field with sub-components listed.

Specific areas of interest include subsystem (see Figure 6) as well as innovations in operations and maintenance (O&M). See previous DOE solicitations for specific

[17] Mehos, Mark, Craig Turchi, Jennie Jorgenson, Paul Denholm, Clifford Ho, and Kenneth Armijo, "On the Path to SunShot: Advancing Concentrating Solar Power Technology, Performance, and Dispatchability" http://www.nrel.gov/docs/fy16osti/65688.pdf

discussions of technical targets for subsystems.[18] Innovations in O&M may include advances in rapid, cost-effective heliostat aiming and canting; real-time receiver incident flux monitoring; turbine operation and TES dispatch optimization; high temperature monitoring systems; as well as others. In addition to high efficiency sub-systems, next generation CSP plants will also possess individual components that will require demonstration in a fully integrated facility at a commercially relevant scale. Specific components that have been identified include, but are not limited to, TES containment, high temperature molten salt pumps, seals and bearings resistive to a highly corrosive environment, mitigation of water and oxygen from high temperature molten salts, and high temperature sensing platforms.

B. Topic Areas/Technical Areas of Interest

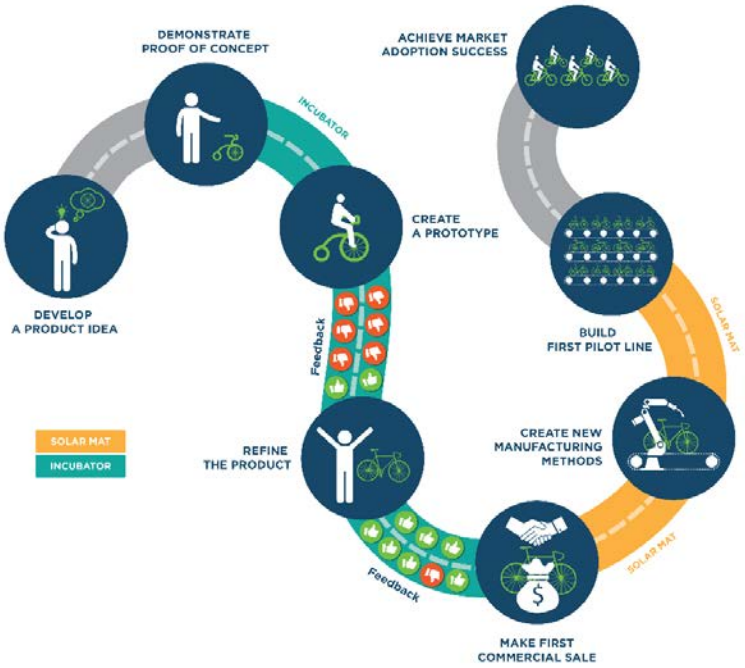


Figure 7 The path of product development. The Topic Areas (or "Tiers") of this funding program are meant to take a product from proof of concept to pilot manufacture (for hardware) or product launch (for software).

[18] DE-FOA-0001186: CONCENTRATING SOLAR POWER: ADVANCED PROJECTS OFFERING LOW LCOE OPPORTUNITIES (CSP: APOLLO)

This FOA will be separated into multiple topic areas ("Tiers") based on the stage and type of technology development to provide a more streamlined and consistent SETO Tech-to-Market strategy (see Figure 7 above). For reference, in previous years the SETO Tech-to-Market group worked with early stage technology/business developers and solar manufactures separately, via the Incubator and SolarMaT (Solar Manufacturing Technology) programs, respectively, rather than through different tiers in the same FOA, as done here. Table 1 includes additional details about cost share, maximum available budget, and period of performance for each tier.

Table 1 FOA Tier Structure

Tier	Technology Type	Cost Share*	Available Funding	Period of Performance	Description
0	Hardware	20%	Up to $1M	Up to 24 months	Accelerate transition from a proof-of-concept of all critical components to an early stage functional prototype
1	Hardware	20%	Up to $2M	Up to 24 months	Accelerate transition of an early stage functional prototype to a lab-made, manufacturing- and commercially-relevant prototype whose full functionality has been proven in all possible commercial use cases.
2	Hardware	50%	Up to $3M	Up to 24 months	Accelerate transition of a lab-made, manufacturing and commercially relevant prototype to a full developed prototype whose initial reliability and certification testing has been passed and is ready to begin/develop pilot manufacture.
3	Hardware	50%	Up to $5M	Up to 24 months	Develop and demonstrate innovative manufacturing technology, step processes, or equipment that enable a

					globally best-in class cost advantage.
1S	Soft Cost/ Software	20%	Up to $800k	Up to 24 months	Accelerate the transition of a proof-of-concept or business plan to alpha capability and early customer trials.
2S	Soft Cost/ Software	50%	Up to $2M	Up to 24 months	Transition alpha software capability through beta launch and full commercialization.

*Please refer to Appendix A for more details on Cost Share calculations

SETO encourages applicants to apply and work as teams. For example to prove a high efficiency end product such as a module, a solar cell manufacturer can team up with a module integration partner to design and demonstrate an innovative, high efficiency module based on the cell technology. Similarly a module provider can team up with a system integration entity to deliver an integrated, optimized solution. Teams can be formed with any entity such as another for-profit or a research institute so long as the prime recipient incurs >60% of the total project costs (see Section III. A).

This funding program is OPEN to any for-profit business product or solution which directly and significantly impacts at least one of the following SETO goals:

1. Achieve the SunShot Initiative goal ahead of the 2020 cost target of $0.06/kWh. Preferably, solutions should enable $0.03/kWh by 2030.
2. Expand domestic solar manufacturing and supply chain to be commensurate with the level of domestic deployment.
3. Expand the domestic market for solar to be a significant fraction (tens of percents) of our nation's electricity generating capacity.
4. Enable the integration of hundreds of GW of solar on the nation's grid.

This funding program seeks to fund innovations that advance the SETO goals in two primary ways:

1. Radical breakthroughs that result in disruptive industry solutions (Figure 8a); and/or
2. Major (not minor/incremental) improvements to components that affect the solar system cost structure (Figure 8b).

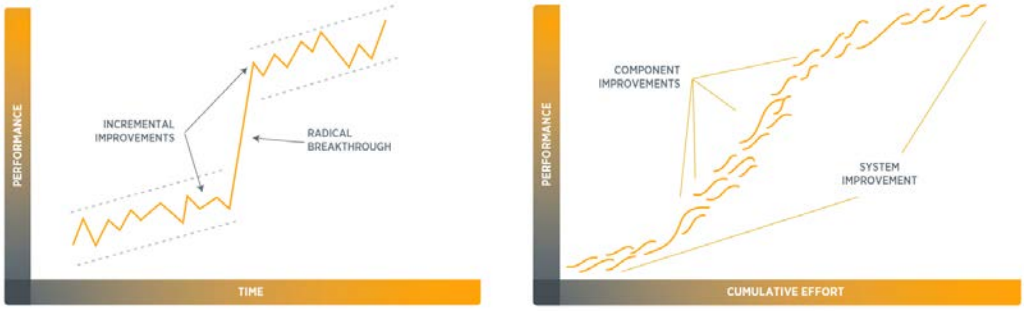


Figure 8a (left): Radical breakthroughs have the ability to make a step function change to the performance of, or complete replacement of, an established industry solution. Figure 8b (right): Many small improvements in performance, when aggregated, can have a similar impact to overall performance as a radical breakthrough

Below, Table 2, is non-exhaustive list of themes applicants could address:

Tier 0-2, Tier 1S-2S Hardware/Software (including Soft Costs)		Tier 3 Manufacturing
• Wafer/cell/module innovation • Power and module level electronics • Monitoring/testing/ metrology for manufacturing and O&M • Data analysis and management for finance, O&M, real estate, etc. • Automation of business operations • Automation of installation and manufacturing	• Solar asset management, aggregation • Energy management, maximize self-consumption • Minimization of curtailment • Grid integration, monitoring, and communications • Utility planning and operations • Concentrating solar power system components and design	• Module/system integration • High efficiency cells/modules (e.g., back contact modules) • Low Cap-Ex manufacturing approaches • Hardware balance of system
Disclaimer: This is a non-exhaustive list of themes applicants could address.		

Products that do not fall into one of the examples mentioned above may still be of interest to this funding program. *Importantly, all proposed ideas need to provide a rational argument for how they will help reach one of the four goals listed on the previous page.*

All work under EERE funding agreements must be performed in the United States. See Section IV.K.iii and Appendix C.

C. Applications Specifically Not of Interest

The following types of applications will be deemed nonresponsive and will not be reviewed or considered (See Section III.D of the FOA):

- Applications for proposed technologies that are not based on sound scientific principles (e.g., violates the laws of thermodynamics).
- Business plans or proofs-of-concepts that do not include documentation of market research and/or experience to support and prove the necessity of the plan or concept should not apply to this FOA. Market segment and competitors in this market segment should be clearly defined in your application.
- Undifferentiated products: This FOA seeks innovative solutions that enable the SunShot Initiative's aggressive goals. Evolutionary advancement of undifferentiated or duplicative products is insufficient to meet SunShot goals and is not of interest to this FOA.
- Projects lacking influential impact from federal funds: This FOA intends to fund projects where federal funds will provide a clear and measurable impact, (e.g. retiring risk sufficiently for follow-on investment or catalyzing development.) Projects that have sufficient monies and resources to be executed regardless of federal funds are not of interest.
- Re-funding the same idea at the same technology readiness level: This FOA does not intend to re-fund prior SunShot awardees for the same idea at the same technology readiness level. Previous awardees can apply with the same idea at an increased technology readiness level or a new idea.
- Entities which require continued support: This funding opportunity seeks to assist the creation of independent businesses which can fully support themselves and continue to grow. This opportunity is not intended for creating a product, organization, service, or other entity or item which requires continued government support to operate.
- Applications focusing exclusively on HVAC and water heating applications are not of interest.
- Products or solutions for systems which do not tie to the grid (i.e. wholly off-grid applications and portable power).
- Fundamental battery/storage materials research – SETO is not able to fund storage materials research.

Any Concept Papers or Full Applications that focus on "Areas Specifically Not of Interest" will be rejected as nonresponsive and will not be considered for award.

D. Authorizing Statutes

The programmatic authorizing statute is EPACT 2005, Section 931 (a)(2)(A).

Awards made under this announcement will fall under the purview of 2 CFR Part 200 as amended by 2 CFR Part 910.

II. Award Information

A. Award Overview

i. Estimated Funding

EERE expects to make approximately $30,000,000 of Federal funding available for new awards under this FOA, subject to the availability of appropriated funds. EERE anticipates making approximately 10-25 awards under this FOA. EERE may issue one, multiple, or no awards. Individual awards may vary between $300,000 and $5,000,000 million.

EERE may issue awards in one, multiple, or none of the following topic areas:

Hardware Tiers:

- **Tier 0**: SunShot Incubator Program Round 12 - 20% cost share, up to $1M in funding, up to 24 month project periods - Accelerate transition from a proof-of-concept of all critical components to an early stage functional prototype.
- **Tier 1**: SunShot Incubator Program Round 12 - 20% cost share, up to $2M in funding, up to 24 month project period- Accelerate transition of an early stage functional prototype to a lab made, manufacturing- and commercially-relevant prototype whose full functionality has been proven in all possible commercial use cases.
- **Tier 2**: SunShot Incubator Program Round 12 - 50% cost share, up to $3M in funding, up to 24 months project periods – Accelerate transition of a lab-made, manufacturing and commercially relevant prototype to a full developed prototype whose initial reliability and certification testing has been passed and is ready to begin/develop pilot manufacture.
- **Tier 3**: Solar Manufacturing Technology (SolarMat) Round 5 - 50% cost share, up to $5 in funding, up to 24 months project periods - Develop and

demonstrate innovative manufacturing technology, step process(es), or equipment that enable a globally best-in class cost advantage.

Soft cost (Non-Hardware) Tiers:

- **Tier 1S:** SunShot Incubator Round 12 - 20% cost share, up to $800k in funding, 24 month project periods - Accelerate the transition of a proof-of-concept or business plan to alpha capability and early customer trials.
- **Tier 2S:** SunShot Incubator program Round 12 - 50% cost share, up to $2M in funding, 24 month project periods - Transition alpha software capability through beta launch and full commercialization.

EERE may establish more than one budget period for each award and fund only the initial budget period(s). Funding for all budget periods, including the initial budget period, is not guaranteed.

ii. Period of Performance

EERE anticipates making awards that will run up to 24 months in length comprised of one or more budget periods. Project continuation will be contingent upon satisfactory performance and go/no-go decision review. At the go/no-go decision points, EERE will evaluate project performance, project schedule adherence, meeting milestone objectives, compliance with reporting requirements, and overall contribution to the program goals and objectives. As a result of this evaluation, EERE will make a determination to continue the project, re-direct the project, or discontinue funding the project.

iii. New Applications Only

EERE will accept only new applications under this FOA. EERE will not consider applications for renewals of existing EERE-funded awards through this FOA.

B. EERE Funding Agreements

Through Cooperative Agreements and other similar agreements, EERE provides financial and other support to projects that have the potential to realize the FOA objectives. EERE does not use such agreements to acquire property or services for the direct benefit or use of the United States Government.

i. Cooperative Agreements

EERE generally uses Cooperative Agreements to provide financial and other support to Prime Recipients.

Through Cooperative Agreements, EERE provides financial or other support to accomplish a public purpose of support or stimulation authorized by Federal statute. Under Cooperative Agreements, the Government and Prime Recipients share responsibility for the direction of projects.

EERE has substantial involvement in all projects funded via Cooperative Agreement. See Section VI.B.x of the FOA for more information on what substantial involvement may involve.

ii. Funding Agreements with FFRDCs

In most cases, Federally Funded Research and Development Centers (FFRDC) are funded independently of the remainder of the Project Team. The FFRDC then executes an agreement with any non-FFRDC Project Team members to arrange work structure, project execution, and any other matters. Regardless of these arrangements, the entity that applied as the Prime Recipient for the project will remain the Prime Recipient for the project.

III. Eligibility Information

To be considered for substantive evaluation, an applicant's submission must meet the criteria set forth below. If the application does not meet these initial requirements, it will be considered non-responsive, removed from further evaluation, and ineligible for any award.

A. Eligible Applicants

Standalone Applicants: Only for-profit entities are eligible to apply for funding as Standalone Applicants.[19]

Project Teams: Only project teams led by for-profit businesses are eligible to apply for funding. The for-profit business designated as the Prime Recipient must incur at least 60% of expenditures under the project, as measured by the Total Project Cost. Expenditures incurred for the use of facilities including laboratories, and fees paid to vendors by the Prime Recipient count towards the Prime Recipient's expenditure under the award.

i. Individuals

U.S. citizens and lawful permanent residents are eligible to apply for funding as a Prime Recipient or Subrecipient provided they are part of a Project Team which is led by a for-profit entity.

[19] A standalone applicant is an applicant that applies for funding on its own, rather than being part of a Project Team

ii. Domestic Entities

For- profit entities that are incorporated (or otherwise formed) under the laws of a particular State or territory of the United States are eligible to apply for funding as a Prime Recipient or Subrecipient.

Educational institutions, nonprofits, and state, local, and tribal government entities are not eligible to apply for funding as a Prime Recipient, but are eligible to be a Project Team partner as a Subrecipient or vendor.

DOE/NNSA Federally Funded Research and Development Centers (FFRDCs) and DOE Government-Owned, Government-Operated laboratories (GOGOs) are eligible to apply for funding only as a Subrecipient.

Non-DOE/NNSA FFRDCs and non-DOE GOGOs are eligible to apply for funding as a Subrecipient, but are not eligible to apply as a Prime Recipient.

Federal agencies and instrumentalities (other than DOE) are eligible to apply for funding as a subrecipient, but are not eligible to apply as a Prime Recipient.

iii. Foreign Entities

Foreign entities, whether for-profit or otherwise, are eligible to apply for funding under this FOA.

Other than as provided in the "Individuals" or "Domestic Entities" sections above, all Prime Recipients receiving funding under this FOA must be incorporated (or otherwise formed) under the laws of a State or territory of the United States and be a for-profit entity. If a foreign entity applies for funding as a Prime Recipient, it must designate in the Full Application a subsidiary or affiliate incorporated (or otherwise formed) under the laws of a State or territory of the United States to be the Prime Recipient. The Full Application must state the nature of the corporate relationship between the foreign entity and domestic subsidiary or affiliate.

Foreign entities may request a waiver of the requirement to designate a subsidiary in the United States as the Prime Recipient in the Full Application (i.e., a foreign entity may request that it remains the Prime Recipient on the award). To do so, the Applicant must submit an explicit waiver request in the Full Application, which includes the following information:

- Entity name;

- Country of incorporation;
- Description of the work to be performed by the entity for whom the waiver is being requested; and
- Countries where the work will be performed.

In the waiver request, the Applicant must demonstrate to the satisfaction of EERE that it would further the purposes of this FOA and is otherwise in the interests of EERE to have a foreign entity serve as the Prime Recipient. The Contracting Officer may require additional information before considering the waiver request. Save the waiver request(s) in a single PDF file using the following convention for the title: "ControlNumber_LeadOrganization_Waiver". EERE's decision to grant or deny the waiver request is not appealable.

A foreign entity may receive funding as a Subrecipient.

iv. Incorporated Consortia

Incorporated consortia, which may include domestic and/or foreign entities, are eligible to apply for funding as a Subrecipient only. For consortia incorporated (or otherwise formed) under the laws of a State or territory of the United States, please refer to "Domestic Entities" above. For consortia incorporated in foreign countries, please refer to the requirements in "Foreign Entities" above.

Each incorporated consortium must have an internal governance structure and a written set of internal rules. Upon request, the consortium must provide a written description of its internal governance structure and its internal rules to the EERE Contracting Officer.

v. Unincorporated Consortia

Unincorporated consortia will not be eligible for funding in this funding announcement.

B. Cost Sharing

Cost Share 20% and 50%

The cost share must be at least 20% of the total allowable costs (i.e., the sum of the Government share, including FFRDC costs if applicable, and the recipient share of allowable costs equals the total allowable cost of the project) for research and development projects and 50% of the total allowable costs for demonstration and

commercial application projects, and must come from non-Federal sources unless otherwise allowed by law. (See 2 CFR 200.306 and 2 CFR 910.130 for the applicable cost sharing requirements.) Please see the table below for the required minimum cost share for each FOA Topic Area.

Topic Area	Minimum Awardee Cost Share
Tier 0	20%
Tier 1	20%
Tier 1S	20%
Tier 2	50%
Tier 2S	50%
Tier 3	50%

To assist applicants in calculating proper cost share amounts, EERE has included a cost share information sheet and sample cost share calculation as Appendices A and B to this FOA.

i. Legal Responsibility

Although the cost share requirement applies to the project as a whole, including work performed by members of the project team other than the Prime Recipient, the Prime Recipient is legally responsible for paying the entire cost share. The Prime Recipient's cost share obligation is expressed in the Assistance Agreement as a static amount in U.S. dollars (cost share amount) and as a percentage of the Total Project Cost (cost share percentage). If the funding agreement is terminated prior to the end of the project period, the Prime Recipient is required to contribute at least the cost share percentage of total expenditures incurred through the date of termination.

The Prime Recipient is solely responsible for managing cost share contributions by the Project Team and enforcing cost share obligation assumed by Project Team members in subawards or related agreements.

ii. Cost Share Allocation

Each Project Team is free to determine how best to allocate the cost share requirement among the team members. The amount contributed by individual Project Team members may vary, as long as the cost share requirement for the project as a whole is met.

iii. Cost Share Types and Allowability

Every cost share contribution must be allowable under the applicable Federal cost principles, as described in Section IV.K.i. of the FOA. In addition, cost share must be verifiable upon submission of the Full Application.

Project Teams may provide cost share in the form of cash or in-kind contributions. Cash contributions may be provided by the Prime Recipient or Subrecipients. Allowable in-kind contributions include, but are not limited to: rental value of buildings or equipment, the value of a donated service or resource by third parties, or third party in-kind contribution.

Project teams may use funding or property received from state or local governments to meet the cost share requirement, so long as the funding was not provided to the state or local government by the Federal Government.

The Prime Recipient may not use the following sources to meet its cost share obligations including, but not limited to:

- Revenues or royalties from the prospective operation of an activity beyond the project period;
- Proceeds from the prospective sale of an asset of an activity;
- Federal funding or property (e.g., Federal grants, equipment owned by the Federal Government); or
- Expenditures that were reimbursed under a separate Federal Program.

Project Teams may not use the same cash or in-kind contributions to meet cost share requirements for more than one project or program.

Cost share contributions must be specified in the project budget, verifiable from the Prime Recipient's records, and necessary and reasonable for proper and efficient accomplishment of the project. As all sources of cost share are considered part of total project cost, the cost share dollars will be scrutinized under the same Federal regulations as Federal dollars to the project. Every cost share contribution must be reviewed and approved in advance by the Contracting Officer and incorporated into the project budget before the expenditures are incurred.

Applicants are encouraged to refer to 2 CFR 200.306 as amended by 2 CFR 910.130 & 10 CFR 603.525-555 for additional guidance on cost sharing.

iv. Cost Share Contributions by FFRDCs

Because FFRDCs are funded by the Federal Government, costs incurred by FFRDCs generally may not be used to meet the cost share requirement. FFRDCs may contribute cost share only if the contributions are paid directly from the contractor's Management Fee or another non-Federal source.

v. Cost Share Verification

Applicants are required to provide written assurance of their proposed cost share contributions in their Full Applications.

Upon selection for award negotiations, applicants are required to provide additional information and documentation regarding their cost share contributions. Please refer to Appendix A of the FOA.

vi. Cost Share Payment

EERE requires Prime Recipients to contribute the cost share amount incrementally over the life of the award. Specifically, the Prime Recipient's cost share for each billing period must always reflect the overall cost share ratio negotiated by the parties (i.e., the total amount of cost sharing on each invoice when considered cumulatively with previous invoices must reflect, at a minimum, the cost sharing percentage negotiated).

In limited circumstances, and where it is in the government's interest, the EERE Contracting Officer may approve a request by the Prime Recipient to meet its cost share requirements on a less frequent basis, such as monthly or quarterly. Regardless of the interval requested, the Prime Recipient must be up-to-date on cost share at each interval. Such requests must be sent to the Contracting Officer during award negotiations and include the following information: (1) a detailed justification for the request; (2) a proposed schedule of payments, including amounts and dates; (3) a written commitment to meet that schedule; and (4) such evidence as necessary to demonstrate that the Prime Recipient has complied with its cost share obligations to date. The Contracting Officer must approve all such requests before they go into effect.

C. Compliance Criteria

Concept Papers and Full Applications must meet all Compliance criteria listed below or they will be considered noncompliant. EERE will not review or consider noncompliant submissions, including Concept Papers, Full Applications, and Replies to Reviewer Comments that were: submitted through means other than

EERE Exchange; submitted after the applicable deadline; and/or submitted incomplete. EERE will not extend the submission deadline for applicants that fail to submit required information due to server/connection congestion.

i. Compliance Criteria

1. Concept Papers
Concept Papers are deemed compliant if:

- The Concept Paper complies with the content and form requirements in Section IV.C. of the FOA; and
- The applicant successfully uploaded all required documents and clicked the "Submit" button in EERE Exchange by the deadline stated in this FOA.

2. Full Applications
Full Applications are deemed compliant if:

- The applicant submitted a compliant Concept Paper;
- The Full Application is substantially similar in technical scope as the Concept Paper;
- The Full Application complies with the content and form requirements in Section IV.D. of the FOA; and
- The applicant successfully uploaded all required documents and clicked the "Submit" button in EERE Exchange by the deadline stated in the FOA.

3. Replies to Reviewer Comments
Replies to Reviewer Comments are deemed compliant if:

- The Reply to Reviewer Comments complies with the content and form requirements in Section IV.E. of the FOA; and
- The applicant successfully uploaded all required documents to EERE Exchange by the deadline stated in the FOA.

D. Responsiveness Criteria

All "Applications Specifically Not of Interest," as described in Section I.C of the FOA, are deemed nonresponsive and are not reviewed or considered.

E. Other Eligibility Requirements

i. Requirements for DOE/NNSA and non-DOE/NNSA Federally Funded Research and Development Centers Included as a Subrecipient

DOE/NNSA and non-DOE/NNSA FFRDCs may be proposed as a Subrecipient on another entity's application subject to the following guidelines:

1. **Authorization for non-DOE/NNSA FFRDCs**
   The Federal agency sponsoring the FFRDC must authorize in writing the use of the FFRDC on the proposed project and this authorization must be submitted with the application. The use of a FFRDC must be consistent with its authority under its award.

2. **Authorization for DOE/NNSA FFRDCs**
   The cognizant Contracting Officer for the FFRDC must authorize in writing the use of the FFRDC on the proposed project and this authorization must be submitted with the application. The following wording is acceptable for this authorization:

   Authorization is granted for the [Enter Laboratory Name] Laboratory to participate in the proposed project. The work proposed for the laboratory is consistent with or complementary to the missions of the laboratory, and will not adversely impact execution of the DOE assigned programs at the laboratory.

3. **Value/Funding**
   The value of and funding for the FFRDC portion of the work will not normally be included in the award to a successful applicant. Usually, DOE will fund a DOE/NNSA FFRDC contractor through the DOE field work proposal system and non-DOE/NNSA FFRDC through an interagency agreement with the sponsoring agency.

4. **Cost Share**
   Although the FFRDC portion of the work is usually excluded from the award to a successful applicant, the applicant's cost share requirement will be based on the total cost of the project, including the applicant's and the FFRDC's portions of the project.

5. **Responsibility**
   The Prime Recipient will be the responsible authority regarding the settlement and satisfaction of all contractual and administrative issues including, but not limited to disputes and claims arising out of any agreement between the Prime Recipient and the FFRDC contractor.

6. **Limit on FFRDC Effort**

   The FFRDC effort, in aggregate, shall not exceed 40% of the total estimated cost of the project, including the applicant's and the FFRDC's portions of the effort.

F. Limitation on Number of Concept Papers and Full Applications Eligible for Review

Applicants may only submit one Full Application for each topic area of this FOA. If an applicant submits more than one Full Application to the same topic area, EERE will only consider the last timely submission for evaluation. Any other submissions received listing the same applicant for the same topic area will be considered noncompliant and not eligible for further consideration. This limitation does not prohibit an applicant from collaborating on other applications (e.g., as a potential Subrecipient or partner) so long as the entity is only listed as the prime applicant on one Full Application submitted under this FOA.

G. Questions Regarding Eligibility

EERE will not make eligibility determinations for potential applicants prior to the date on which applications to this FOA must be submitted. The decision whether to submit an application in response to this FOA lies solely with the applicant.

IV. Application and Submission Information

A. Application Process

The application process will include two formal phases: a Concept Paper phase and a Full Application phase. **Only applicants who have submitted an eligible Concept Paper will be eligible to submit a Full Application**. At each phase, EERE performs an initial eligibility review of the applicant submissions to determine whether they meet the eligibility requirements of Section III of the FOA. EERE will not review or consider submissions that do not meet the eligibility requirements of Section III. All submissions must conform to the following form and content requirements,

including maximum page lengths (described below) and must be submitted via EERE Exchange at https://eere-exchange.energy.gov/, unless specifically stated otherwise. **EERE will not review or consider submissions submitted through means other than EERE Exchange, submissions submitted after the applicable deadline, and incomplete submissions**. EERE will not extend deadlines for applicants who fail to submit required information and documents due to server/connection congestion. A control number will be issued when an applicant begins the Exchange application process. This control number must be included with all Application documents, as described below.

The Concept Paper, Full Application, and Reply to Reviewer Comments must conform to the following requirements:

- Each must be submitted in Adobe PDF format unless stated otherwise.
- Each must be written in English.
- All pages must be formatted to fit on 8.5 x 11 inch paper with margins not less than one inch on every side. Use Times New Roman typeface, a black font color, and a font size of 12 point or larger (except in figures or tables, which may be 10 point font). A symbol font may be used to insert Greek letters or special characters, but the font size requirement still applies. References must be included as footnotes or endnotes in a font size of 10 or larger. Footnotes and endnotes are counted toward the maximum page requirement.
- The Control Number must be prominently displayed on the upper right corner of the header of every page. Page numbers must be included in the footer of every page.
- Each submission must not exceed the specified maximum page limit, including cover page, charts, graphs, maps, and photographs when printed using the formatting requirements set forth above and single spaced. If applicants exceed the maximum page lengths indicated below, EERE will review only the authorized number of pages and disregard any additional pages.

Applicants are responsible for meeting each submission deadline. **Applicants are strongly encouraged to submit their Concept Papers and Full Applications at least 48 hours in advance of the submission deadline**. Under normal conditions (i.e., at least 48 hours in advance of the submission deadline), applicants should allow at least 1 hour to submit a Letter of Intent, Concept Paper, Full Application, or Reply to Reviewer Comments. Once the Letter of Intent, Concept Paper, Full Application, or Reply to Reviewer Comments is submitted in EERE Exchange, applicants may revise or update that submission until the expiration of the

applicable deadline. If changes are made, the applicant must resubmit the Letter of Intent, Concept Paper, Full Application, or Reply to Reviewer Comments before the applicable deadline.

EERE urges applicants to carefully review their Letters of Intent, Concept Papers, and Full Applications and to allow sufficient time for the submission of required information and documents. All Full Applications that pass the initial eligibility review will undergo comprehensive technical merit review according to the criteria identified in Section V.A.ii. of the FOA.

i. Additional Information on EERE Exchange

EERE Exchange is designed to enforce the deadlines specified in this FOA. The "Apply" and "Submit" buttons will automatically disable at the defined submission deadlines. Should applicants experience problems with Exchange, the following information may be helpful.

Applicants that experience issues with submission PRIOR to the FOA deadline: In the event that an applicant experiences technical difficulties with a submission, the Application should contact the Exchange helpdesk for assistance (EERE-ExchangeSupport@hq.doe.gov). The Exchange helpdesk and/or the EERE Exchange system administrators will assist Applicants in resolving issues.

Applicants that experience an issue with submissions that result in late submissions: In the event that an applicant experiences technical difficulties so severe that they are unable to submit their application by the deadline, the applicant should contact the Exchange helpdesk for assistance (EERE-ExchangeSupport@hq.doe.gov). The Exchange helpdesk and/or the EERE Exchange system administrators will assist the applicant in resolving all issues (including finalizing submission on behalf of and with the applicant's concurrence). PLEASE NOTE, however, those applicants who are unable to submit their application on time due to their waiting until the last minute when network traffic is at its heaviest to submit their materials will not be able to use this process.

B. Application Forms

The application forms and instructions are available on EERE Exchange. To access these materials, go to https://eere-Exchange.energy.gov and select the appropriate funding opportunity number.

Note: The maximum file size that can be uploaded to the EERE Exchange website is 10MB. Files in excess of 10MB cannot be uploaded, and hence cannot be submitted for review. If a file exceeds 10MB but is still within the maximum page limit specified in the FOA, it must be broken into parts and denoted to that effect. For example:
ControlNumber_LeadOrganization_Project_Part_1
ControlNumber_LeadOrganization_Project_Part_2, etc.

i. Content and Form of the Letter of Intent

Letters of Intent are optional and will be used by EERE to plan for the merit review process. The letters should not contain any proprietary or sensitive business information. The letters will not be used for down-selection purposes, and do not commit an applicant to submit an application. Letters of Intent should be submitted to SunShot.T2M@ee.doe.gov by the date listed on the cover page of this FOA.

Each applicant must provide the following information as part of the Letter of Intent:

- Project Title;
- Lead Organization;
- Lead Organization Type (Business < 500 Employees; Business > 1000 Employees; Business 500-1000 Employees);
- Whether the Application has been previously submitted to EERE;
- % of effort contributed by the Lead Organization;
- The Project Team (known at the time of submission), including:
  - The Principal Investigator for the Prime Recipient;
  - Team Members (i.e., Subrecipients); and
  - Key Participants (i.e., individuals who contribute in a substantive, measureable way to the execution of the proposed project);
- Technical Topic or Area.

C. Content and Form of the Concept Paper

To be eligible to submit a Full Application, applicants must submit a Concept Paper by the specified due date and time.

i. Concept Paper Content Requirements

EERE will not review or consider ineligible Concept Papers (see Section III of the FOA).

Each Concept Paper must be limited to a single concept or technology. Unrelated concepts and technologies should not be consolidated into a single Concept Paper.

The Concept Paper must conform to the following content requirements:

Section	Page Limit	Description
Cover Page	1 page maximum	The cover page should include the project title, company names (and sub-applicants, if applicable) the specific FOA Tier being addressed, both the technical and business points of contact, names of all team member organizations, proposed budget and cost share, and any statements regarding confidentiality. No additional information, such as an application abstract, should be included on this page
Technology Description	4 pages maximum	Applicants are required to describe succinctly: • The proposed technology, including its basic operating principles and how it is unique and innovative; • The proposed technology's target level of performance (Applicants should provide technical data or other support to show how the proposed target could be met); • The current state-of-the-art in the relevant field and application, including key shortcomings, limitations, and challenges; • How the proposed technology will overcome the shortcomings, limitations, and challenges in the relevant field and application; • The potential impact that the proposed project would have on the relevant field and application; • The key technical risks/issues associated with the proposed technology development plan; • (Mandatory) How the target outcomes support the SunShot Initiative goal in $/W and/or LCOE; and • How the target outcome eliminates a barrier to ubiquitous solar.
Addendum	1 page maximum	Applicants may provide graphs, charts, or other data to supplement their Technology Description. Applicants are required to describe succinctly the qualifications, experience, and capabilities of the proposed Project Team, including:

		• Whether the Principal Investigator (PI) and Project Team have the skill and expertise needed to successfully execute the project plan; • Whether the Applicant has prior experience which demonstrates an ability to perform tasks of similar risk and complexity; • Whether the Applicant has worked together with its teaming partners on prior projects or programs; and • Whether the Applicant has adequate access to equipment and facilities necessary to accomplish the effort and/or clearly explain how it intends to obtain access to the necessary equipment and facilities.

EERE makes an independent assessment of each Concept Paper based on the criteria in Section V.A.i of the FOA. EERE will encourage a subset of applicants to submit Full Applications. Other applicants will be discouraged from submitting a Full Application. An applicant who receives a "discouraged" notification may still submit a Full Application. EERE will review all eligible Full Applications. However, by discouraging the submission of a Full Application, EERE intends to convey its lack of programmatic interest in the proposed project in an effort to save the applicant the time and expense of preparing an application that is unlikely to be selected for award negotiations.

EERE may include general comments provided from reviewers on an applicant's Concept Paper in the encourage/discourage notification sent to applicants at the close of that phase.

D. Content and Form of the Full Application

Applicants must submit a Full Application by the specified due date and time to be considered for funding under this FOA. Applicants must complete the following application forms found on the EERE Exchange website at https://eere-Exchange.energy.gov/, in accordance with the instructions.

Applicants will have approximately 30 days from receipt of the Concept Paper Encourage/Discourage notification to prepare and submit a Full Application. Regardless of the date the applicant receives the Encourage/Discourage notification, the submission deadline for the Full Application remains the date and time stated on the FOA cover page.

All Full Application documents must be marked with the Control Number issued to the applicant. Applicants will receive a control number upon submission of their Concept Paper, and should include that control number in the file name of their Full Application submission (i.e., Control number_Applicant Name_Full Application)."

i. Full Application Content Requirements

EERE will not review or consider ineligible Full Applications (see Section III of the FOA).

Each Full Application shall be limited to a single concept or technology. Unrelated concepts and technologies shall not be consolidated in a single Full Application.

Full Applications must conform to the following requirements:

Submission	Components	File Name
Full Application (Adobe PDF)	Technical Volume (See Chart in Section IV.D.ii.)	ControlNumber_LeadOrganization_TechnicalVolume
	Statement of Project Objectives (6 page limit)	ControlNumber_LeadOrganization_SOPO
	SF-424 Application for Federal Assistance	ControlNumber_LeadOrganization_App424
	Budget Justification (EERE 335) (Microsoft Excel format. Applicants must use the template available in EERE Exchange)	ControlNumber_LeadOrganization_Budget_Justification
	Summary Slide (1 page limit, Microsoft PowerPoint format)	ControlNumber_LeadOrganization_Slide
	Subaward Budget Justification, if applicable (EERE 335) (Microsoft Excel format. Applicants must use the template available in EERE Exchange)	ControlNumber_LeadOrganization_Subawardee_Budget_Justification
	Budget for FFRDC, if applicable	ControlNumber_LeadOrganization_FWP
	Authorization from cognizant Contracting Officer for FFRDC, if applicable	ControlNumber_LeadOrganization_FFRDCAuth
	SF-LLL Disclosure of Lobbying Activities	ControlNumber_LeadOrganization_SF-LLL
	Foreign Entity and Performance of Work in the United States waiver requests, if applicable	ControlNumber_LeadOrganization_Waiver
	U.S. Manufacturing Plans (excluding applications to Topics 1S and 2S)	ControlNumber_LeadOrganization_USMP

Note: The maximum file size that can be uploaded to the EERE Exchange website is 10MB. Files in excess of 10MB cannot be uploaded, and hence cannot be submitted for review. If a file exceeds 10MB but is still within the maximum page limit specified in the FOA it must be broken into parts and denoted to that effect. For example:

ControlNumber_LeadOrganization_TechnicalVolume_Part_1
ControlNumber_LeadOrganization_TechnicalVolume_Part_2, etc.

EERE will not accept late submissions that resulted from technical difficulties due to uploading files that exceed 10MB.

EERE provides detailed guidance on the content and form of each component below.

ii. Technical Volume

The Technical Volume must be submitted in Adobe PDF format. The Technical Volume must conform to the following content and form requirements, including maximum page lengths. If applicants exceed the maximum page lengths indicated below, EERE will review only the authorized number of pages and disregard any additional pages. This volume must address the Merit Review Criteria as discussed in Section V.A.ii of the FOA. Save the Technical Volume in a single PDF file using the following convention for the title: "ControlNumber_LeadOrganization_TechnicalVolume".

Applicants must provide sufficient citations and references to the primary research literature to justify the claims and approaches made in the Technical Volume. However, EERE and reviewers are under no obligation to review cited sources.

The Technical Volume to the Full Application may not be more than 20 pages, including the cover page, table of contents, and all citations, charts, graphs, maps, photos, or other graphics, and must include all of the information in the table below. The applicant should consider the weighting of each of the evaluation criteria (see Section V.A.ii of the FOA) when preparing the Technical Volume.

SECTION/PAGE LIMIT	DESCRIPTION
Cover Page, 1 page maximum (5% of the Technical Volume)	The cover page should include the project title, the specific FOA Topic Area being addressed, both the technical and business points of contact, names of all team member organizations, and any statements regarding confidentiality. No additional information, such as an application abstract, should be included on this page
Project Overview (This section should constitute approximately 10% of the Technical Volume)	• The Project Overview can be organized in the following way and contain the following information: o *Background:* ▪ (Mandatory) Discuss the history, successes, and current status of the Applicant's product development. ▪ Note: This section (or any other section) is not for discussing the merits of solar energy in general or the proposed technology in regard to other non-solar technologies. o *Objectives:* ▪ (Mandatory) A high-level discussion introducing the project objectives that will be pursued under this effort over its duration. A baseline, appropriate for the specific entrance criteria of the chosen tier, must be provided. The baseline data will be the starting point for the detailed objectives of the proposed project. This section should explicitly identify targeted improvements to the baseline performance and critical success factors. o *Conclusion:* ▪ (Mandatory) The impact that EERE funding would have on the proposed project. Applicants should specifically explain how EERE funding, relative to prior, current, or anticipated funding from other public and private sources, is necessary to achieve the project objectives. ▪ Any closing remarks the Applicant feels should be discussed prior to the technical work plan.

Technical Description, Innovation, and Impact (This section should constitute approximately 25% of the Technical Volume)	The Technical Description should contain the following information: • Relevance and Outcomes: The applicant should provide a detailed description of the technology, including the scientific and other principles and objectives that will be pursued during the project. This section should describe the relevance of the proposed project to the goals and objectives of the FOA, including the potential to meet specific DOE technical targets or other relevant performance targets. The applicant should clearly specify the expected outcomes of the project. • Feasibility: The applicant should demonstrate the technical feasibility of the proposed technology and capability of achieving the anticipated performance targets, including a description of previous work done and prior results. • Innovation and Impacts: The applicant should describe the current state of the art in the applicable field, the specific innovation of the proposed technology, the advantages of proposed technology over current and emerging technologies, and the overall impact on advancing the state of the art/technical baseline if the project is successful.
Workplan (This section should constitute approximately 30% of the Technical Volume)	The Workplan should include a summary of the Project Objectives, Technical Scope, Work Breakdown Structure, Milestones, Go/No-Go Decision Points, and Project Schedule. A detailed Statement of Project Objectives (SOPO) is separately requested. The Workplan should contain the following information: • Project Objectives: The applicant should provide a clear and concise (high-level) statement of the goals and objectives of the project as well as the expected outcomes. • Technical Scope Summary: The applicant should provide a summary description of the overall work scope and approach to achieve the objective(s). The overall work scope is to be divided by performance periods that are separated by discrete, approximately annual decision points (see below for more information on go/no-go decision points). The applicant should describe the specific expected end result of each performance period. • Work Breakdown Structure (WBS) and Task Description Summary: The Workplan should describe the work to be accomplished and how the applicant will achieve the milestones, will accomplish the final project goal(s), and will produce all deliverables. The Workplan is to be structured with a hierarchy of performance period (approximately annual), task and subtasks, which is typical of a standard work breakdown structure (WBS) for any project. The Workplan shall contain a concise description of the specific activities to be conducted over the life of the project. The description shall be a full explanation and disclosure of the project being proposed (i.e., a statement such as "we will then complete a

	proprietary process" is unacceptable). It is the applicant's responsibility to prepare an adequately detailed task plan to describe the proposed project and the plan for addressing the objectives of this FOA. The summary provided should be consistent with the SOPO. The SOPO will contain a more detailed description of the WBS and tasks. • Milestone Summary: The applicant should provide a summary of appropriate milestones throughout the project to demonstrate success. A milestone may be either a progress measure (which can be activity based) or a SMART technical milestone. SMART milestones should be **S**pecific, **M**easurable, **A**chievable, **R**elevant, and **T**imely, and must demonstrate a technical achievement rather than simply completing a task. Unless otherwise specified in the FOA, the minimum requirement is that each project must have at least one milestone per quarter for the duration of the project with at least one SMART technical milestone per year (depending on the project, more milestones may be necessary to comprehensively demonstrate progress). The applicant should also provide the means by which the milestone will be verified. The summary provided should be consistent with the Milestone Summary Table in the SOPO. • Go/No-Go Decision Points: The applicant should provide a summary of project-wide go/no-go decision points at appropriate points in the Workplan. A go/no-go decision point is a risk management tool and a project management best practice to ensure that, for the current phase or period of performance, technical success is definitively achieved and potential for success in future phases or periods of performance is evaluated, prior to actually beginning the execution of future phases. Unless otherwise specified in the FOA, the minimum requirement is that each project must have at least one project-wide go/no-go decision point for each budget period (12 to 18-month period) of the project. The Applicant should also provide the specific technical criteria to be used to make the go/no-go decision. The summary provided should be consistent with the SOPO. Go/no-go decision points are considered "SMART" and can fulfill the requirement for an annual SMART milestone. • End of Project Goal: The applicant should provide a summary of the end of project goal(s). Unless otherwise specified in the FOA, the minimum requirement is that each project must have one SMART end of project goal. The summary provided should be consistent with the SOPO. • Project Schedule (Gantt Chart or similar): The applicant should provide a schedule for the entire project, including task and subtask durations, milestones, and go/no-go decision points. • Project Management: The applicant should discuss the team's proposed management plan, including the following:

	○ The overall approach to and organization for managing the work ○ The roles of each Project Team member ○ Any critical handoffs/interdependencies among Project Team members ○ The technical and management aspects of the management plan, including systems and practices, such as financial and project management practices ○ The approach to project risk management ○ A description of how project changes will be handled ○ If applicable, the approach to Quality Assurance/Control ○ How communications will be maintained among Project Team members
Commercialization Plan (This section should constitute approximately 20% of the Technical Volume)	▪ (Mandatory) Identification of the specific target market(s) for commercialization of products developed under this funding program, linking the requirements for the products servicing the target market(s). Show the linkages of the issues to success in the target markets. The discussion of the target markets should include a review of the market(s)' historical trends, growth projections, and the competitive advantage needed to secure the market share required to warrant scale-up. Applicants should be as quantitative as possible in this discussion and discuss their current status within the context of desired project outcomes. **Clearly state how revenue will be generated**. ▪ The approach of this funding program is to specifically accelerate the development of demonstrated solutions to meet aggressive SunShot Initiative installed-cost, LCOE and market-penetration goals in the United States. Applicants need to address how they plan to achieve these goals in terms of a cost breakdown demonstrating their relevance. The cost breakdown should demonstrate the ability to significantly drive down the cost of solar installations. ▪ Description of the target market ecosystem, including competitors, partners, and distribution channels for proposed technology along with known or perceived barriers to market penetration, including a mitigation plan ▪ Identification of a product bankability and/or service plan, commercialization timeline, financing, product marketing, legal/regulatory considerations including intellectual property, freedom-to-operate, infrastructure requirements, data dissemination, and product distribution. ▪ Statement of intent to license proposed technology, if applicable. ▪ Discussion of transition plan to advance the technology after SunShot's support, including current financial resources, potential sources of additional funding, strategic partnerships (current or anticipated).

Technical Qualifications and Resources (Approximately 10% of the Technical Volume)	The Technical Qualifications and Resources should contain the following information: • Describe the Project Team's unique qualifications and expertise, including those of key Subrecipients. • Describe the Project Team's existing equipment and facilities that will facilitate the successful completion of the proposed project; include a justification of any new equipment or facilities requested as part of the project. • This section should also include relevant, previous work efforts, demonstrated innovations, and how these enable the applicant to achieve the project objectives. • (Mandatory) Describe the time commitment of the key team members to support the project. • Attach one-page resumes for key participating team members as an appendix. Resumes do not count towards the page limit. Multi-page resumes are not allowed. • Describe the technical services to be provided by DOE/NNSA FFRDCs, if applicable. • Attach letters of commitment from all Subrecipient/third party cost share providers as an appendix. Letters of commitment do not count towards the page limit. • Attach any letters of support from partners/end users as an appendix (1 page maximum per letter). Letters of support do not count towards the page limit. • For multi-organizational or multi-investigator projects, describe succinctly: o The roles and the work to be performed by each PI and Key Participant; o Business agreements between the applicant and each PI and Key Participant; o How the various efforts will be integrated and managed; o Process for making decisions on scientific/technical direction; o Publication arrangements; o Intellectual Property issues; and o Communication plans

iii. Statement of Project Objectives

Applicants are required to complete a Statement of Project Objectives (SOPO). A SOPO template is available on EERE Exchange at https://eere-Exchange.energy.gov/. The SOPO, including the Milestone Table, must not exceed 6 pages when printed using standard 8.5 x 11 paper with 1" margins (top, bottom, left, and right) with font not smaller than 12 point. Save the

SOPO in a single Adobe PDF file using the following convention for the title "ControlNumber_LeadOrganization_SOPO".

iv. SF-424: Application for Federal Assistance

Complete all required fields in accordance with the instructions on the form. The list of certifications and assurances in Field 21 can be found at http://energy.gov/management/office-management/operational-management/financial-assistance/financial-assistance-forms, under Certifications and Assurances. Note: The dates and dollar amounts on the SF-424 are for the complete project period and not just the first project year, first phase or other subset of the project period. Save the SF-424 in a single PDF file using the following convention for the title "ControlNumber_LeadOrganization_App424".

v. Budget Justification Workbook (EERE 335)

Applicants are required to complete the Budget Justification Workbook. This form is available on EERE Exchange at https://eere-Exchange.energy.gov/. Prime Recipients must complete each tab of the Budget Justification Workbook for the project as a whole, including all work to be performed by the Prime Recipient and its Subrecipients and Contractors, and provide all requested documentation (e.g., a Federally-approved rate agreement, vendor quotes). Applicants should include costs associated with required annual audits and incurred cost proposals in their proposed budget documents. The "Instructions and Summary" included with the Budget Justification Workbook will auto-populate as the applicant enters information into the Workbook. Applicants must carefully read the "Instructions and Summary" tab provided within the Budget Justification Workbook. Save the Budget Justification Workbook in a single Microsoft Excel file using the following convention for the title "ControlNumber_LeadOrganization_Budget_Justification".

vi. Summary Slide

Applicants are required to provide a single PowerPoint slide summarizing the proposed project. The slide must be submitted in Microsoft PowerPoint format. This slide is used during the evaluation process. Save the Summary Slide in a single file using the following convention for the title "ControlNumber_LeadOrganization_Slide".

The Summary Slide template requires the following information:

- A technology Summary;

- A description of the technology's impact;
- Proposed project goals;
- Any key graphics (illustrations, charts and/or tables);
- The project's key idea/takeaway;
- Project title, Prime Recipient, Principal Investigator, and Key Participant information; and
- Requested EERE funds and proposed applicant cost share.

vii. Subaward Budget Justification (EERE 335) (if applicable)

Applicants must provide a separate budget justification, EERE 335 (i.e., budget justification for each budget year and a cumulative budget) for each subawardee that is expected to perform work estimated to be more than $250,000 or 25 percent of the total work effort (whichever is less). The budget justification must include the same justification information described in the "Budget Justification" section above. Save each subaward budget justification in a Microsoft Excel file using the following convention for the title "ControlNumber_LeadOrganization_Subawardee_Budget_Justification".

viii. Budget for DOE/NNSA FFRDC (if applicable)

If a DOE/NNSA FFRDC contractor is to perform a portion of the work, the applicant must provide a DOE Field Work Proposal (FWP) in accordance with the requirements in DOE Order 412.1, Work Authorization System. DOE Order 412.1 and DOE O 412.1 (Field Work Proposal form) area available at the following link, under "DOE Budget Forms": https://www.directives.doe.gov/directives/0412.1-BOrder-a/view. Save the FWP in a single PDF file using the following convention for the title "ControlNumber_LeadOrganization_FWP".

ix. Authorization for non-DOE/NNSA or DOE/NNSA FFRDCs (if applicable)

The Federal agency sponsoring the FFRDC must authorize in writing the use of the FFRDC on the proposed project and this authorization must be submitted with the application. The use of a FFRDC must be consistent with the contractor's authority under its award. Save the Authorization in a single PDF file using the following convention for the title "ControlNumber_LeadOrganization_FFRDCAuth".

x. SF-LLL: Disclosure of Lobbying Activities

Prime Recipients and Subrecipients may not use any Federal funds to influence or attempt to influence, directly or indirectly, congressional action on any legislative or appropriation matters.

Prime Recipients and Subrecipients are required to complete and submit SF-LLL, "Disclosure of Lobbying Activities" (http://www.whitehouse.gov/sites/default/files/omb/grants/sfllin.pdf) if any non-Federal funds have been paid or will be paid to any person for influencing or attempting to influence any of the following in connection with your application:

- An officer or employee of any Federal agency;
- A Member of Congress;
- An officer or employee of Congress; or
- An employee of a Member of Congress.

Save the SF-LLL in a single PDF file using the following convention for the title "ControlNumber_LeadOrganization_SF-LLL".

xi. Waiver Requests: Foreign Entities and Performance of Work in the United States (if applicable)

1. **Foreign Entity Participation***:*
   As set forth in Section III.A.iii, all Prime Recipients receiving funding under this FOA must be incorporated (or otherwise formed) under the laws of a State or territory of the United States. To request a waiver of this requirement, the applicant must submit an explicit waiver request in the Full Application. Appendix C lists the necessary information that must be included in a request to waive this requirement.

2. **Performance of Work in the United States**
   As set forth in Section IV.K.iii, all work under EERE funding agreements must be performed in the United States. This requirement does not apply to the purchase of supplies and equipment, so a waiver is not required for foreign purchases of these items. However, the Prime Recipient should make every effort to purchase supplies and equipment within the United States. Appendix C lists the necessary information that must be included in a request to waive the Performance of Work in the United

States requirement.

xii. U.S. Manufacturing Commitments

As part of the application, applicants to Topic 0, Topic 1, Topic 2 and Topic 3 are required to submit a U.S. Manufacturing Plan. The U.S. Manufacturing Plan represents the applicant's measurable commitment to support U.S. manufacturing as a result of its award. Applicants to Topic 1S and Topic 2S are not required to submit a U.S. Manufacturing Plan.

The weight given to the U.S. Manufacturing Plans during the review and selection process varies based on the particular FOA. Applicants should review Section V.A.ii of this FOA to determine the weight given to the U.S. Manufacturing Plans under this FOA.

A U.S. Manufacturing Plan should contain the following or similar preamble: "If selected for funding, the applicant agrees to the following commitments as a condition of that funding:" and, after the preamble, the plan should include one or more specific and measureable commitments. For example, an applicant may commit particular types of products to be manufactured in the U.S. In addition to or instead of making a commitment tied to a particular product, the applicant may make other types of commitments still beneficial to U.S. manufacturing. An applicant may commit to a particular investment in a new or existing U.S. manufacturing facility, keep certain activities based in the U.S. (i.e., final assembly) or support a certain number of jobs in the U.S. related to the technology and manufacturing. For an applicant which is likely to license the technology to others, especially universities for which licensing may be the exclusive means of commercialization the technology, the U.S. manufacturing plan may indicate the applicant's plan and commitment to use a licensing strategy that would likely support U.S. manufacturing.

When an applicant that is a domestic small business, domestic educational institution, or nonprofit organization is selected for an award, the U.S. Manufacturing Plan submitted by the applicant becomes part of the terms and conditions of the award. The applicant/awardee may request a waiver or modification of the U.S. Manufacturing Plan from DOE upon a showing that the original U.S. Manufacturing Plan is no longer economically feasible.

When an applicant that is a domestic large business is selected for an award, a class patent waiver applies as set forth in Section VIII. L. Under this class patent waiver, domestic large businesses may elect title to their subject

inventions similar to the right provided to the domestic small businesses, educational institutions, and nonprofits by law. In order to avail itself of the class patent waiver, a domestic large business must agree that any products embodying or produced through the use of an invention conceived or first actually reduced to practice under the award will be substantially manufactured in the United States, unless DOE agrees that the commitments proposed in the U.S. Manufacturing Plan are sufficient.

For other entity types that are selected for award, please see Section VIII.L regarding U.S. manufacturing commitments.

E. Content and Form of Replies to Reviewer Comments

EERE will provide applicants with reviewer comments following evaluation of all eligible Full Applications. Applicants will have a brief opportunity to review the comments and to prepare a short Reply to Reviewer Comments responding to comments however they desire or supplementing their Full Application. The Reply to Reviewer Comments is an optional submission; applicants are not required to submit a Reply to Reviewer Comments. EERE will notify applicants via email when the Reviewer Comments are available for reply. The expected submission deadline is on the cover page of the FOA; however, it is the applicant's responsibility to monitor email in the event that the expected date changes. The deadline will not be extended for applicants who are unable to timely submit their reply due to failure to check email or relying on the expected date alone. Applicants should anticipate having approximately three (3) business days to submit Replies to Reviewer Comments.

EERE will not review or consider ineligible Replies to Reviewer Comments (see Section III of the FOA). EERE will review and consider each eligible Full Application, even if no Reply is submitted or if the Reply is found to be ineligible.

Replies to Reviewer Comments must conform to the following content and form requirements, including maximum page lengths, described below. If a Reply to Reviewer Comments is more than three pages in length, EERE will review only the first three (3) pages and disregard any additional pages.

SECTION	PAGE LIMIT	DESCRIPTION
Text	2 pages max	Applicants may respond to one or more reviewer comments or supplement their Full Application. These pages include any citations.

Optional	1 page max	Applicants may use this page however they wish; text, graphs, charts, or other data to respond to reviewer comments or supplement their Full Application are acceptable.

F. Post-Award Information Requests

If selected for award, EERE reserves the right to request additional or clarifying information for any reason deemed necessary, including but not limited to:

- Indirect cost information
- Other budget information
- Commitment Letters from Third Parties Contributing to Cost Share, if applicable
- Name and phone number of the Designated Responsible Employee for complying with national policies prohibiting discrimination (See 10 CFR 1040.5)
- Representation of Limited Rights Data and Restricted Software, if applicable
- Environmental Questionnaire

G. Dun and Bradstreet Universal Numbering System Number and System for Award Management

Each applicant (unless the applicant is an individual or Federal awarding agency that is excepted from those requirements under 2 CFR §25.110(b) or (c), or has an exception approved by the Federal awarding agency under 2 CFR §25.110(d)) is required to: (1) Be registered in the System for Award Management (SAM) at https://www.sam.gov before submitting its application; (2) provide a valid Dun and Bradstreet Universal Numbering System (DUNS) number in its application; and (3) continue to maintain an active SAM registration with current information at all times during which it has an active Federal award or an application or plan under consideration by a Federal awarding agency. DOE may not make a Federal award to an applicant until the applicant has complied with all applicable DUNS and SAM requirements and, if an applicant has not fully complied with the requirements by the time DOE is ready to make a Federal award, the DOE may determine that the applicant is not qualified to receive a Federal award and use that determination as a basis for making a Federal award to another applicant.

H. Submission Dates and Times

Concept Papers, Full Applications, and Replies to Reviewer Comments must be submitted in EERE Exchange no later than 5 p.m. Eastern on the dates provided on the cover page of this FOA.

I. Data Management Plan

For research projects, Applicants whose Full Applications are selected for award negotiations will be required to submit a Data Management Plan during the award negotiations phase. The Data Management Plan is a document that outlines the proposed plan for data sharing or preservation. Submission of this plan is required, and failure to submit the plan may result in the termination of award negotiations. At a minimum, the Data Management Plan must describe how data sharing and preservation will enable validation of the results from the proposed work, or how results could be validated if data are not shared or preserved. The Data Management Plan must provide a plan for making all research data displayed in publications resulting from the proposed work digitally accessible at the time of publication. As a courtesy, guidance for preparing a Data Management Plan is provided in Appendix D of the FOA.

J. Intergovernmental Review

This FOA is not subject to Executive Order 12372 – Intergovernmental Review of Federal Programs.

K. Funding Restrictions

i. Allowable Costs

All expenditures must be allowable, allocable, and reasonable in accordance with the applicable Federal cost principles.

Refer to the following applicable Federal cost principles for more information:

- FAR Part 31 for For-Profit entities; and
- 2 CFR Part 200 Subpart E - Cost Principles for all other non-federal entities.

ii. Pre-Award Costs

Selectees must request prior written approval to charge pre-award costs. Pre-award costs are those incurred prior to the effective date of the Federal award directly pursuant to the negotiation and in anticipation of the Federal award where such costs are necessary for efficient and timely performance of the scope of work. Such costs are allowable only to the extent that they

would have been allowable if incurred after the date of the Federal award and **only** with the written approval of the Federal awarding agency, through the Contracting Officer assigned to the award.

Pre-award costs cannot be incurred prior to the Selection Official signing the Selection Statement and Analysis. Pre-award costs can only be incurred if such costs would be reimbursable under the agreement if incurred after award.

Pre-Award expenditures are made at the Selectee's risk; EERE is not obligated to reimburse costs: (1) in the absence of appropriations; (2) if an award is not made; or (3) if an award is made for a lesser amount than the Selectee anticipated.

1. **Pre-Award Costs Related to National Environmental Policy Act (NEPA) Requirements**
   EERE's decision whether and how to distribute Federal funds under this FOA is subject to NEPA. Applicants should carefully consider and should seek legal counsel or other expert advice before taking any action related to the proposed project that would have an adverse effect on the environment or limit the choice of reasonable alternatives prior to EERE completing the NEPA review process.

   EERE does not guarantee or assume any obligation to reimburse costs where the Prime Recipient incurred the costs prior to receiving written authorization from the Contracting Officer. If the applicant elects to undertake activities that may have an adverse effect on the environment or limit the choice of reasonable alternatives prior to receiving such written authorization from the Contracting Officer, the applicant is doing so at risk of not receiving Federal funding and such costs may not be recognized as allowable cost share. Likewise, if a project is selected for negotiation of award, and the Prime Recipient elects to undertake activities that are not authorized for Federal funding by the Contracting Officer in advance of EERE completing a NEPA review, the Prime Recipient is doing so at risk of not receiving Federal Funding and such costs may not be recognized as allowable cost share. Nothing contained in the pre-award cost reimbursement regulations or any pre-award costs approval letter from the Contracting Officer override these NEPA requirements to obtain the written authorization from the Contracting Officer prior to taking any action that may have an adverse effect on the

environment or limit the choice of reasonable alternatives.

iii. Performance of Work in the United States

1. Requirement

All work performed under EERE Awards must be performed in the United States. This requirement does not apply to the purchase of supplies and equipment; however, the Prime Recipient should make every effort to purchase supplies and equipment within the United States. The Prime Recipient must flow down this requirement to its Subrecipients.

2. Failure to Comply

If the Prime Recipient fails to comply with the Performance of Work in the United States requirement, EERE may deny reimbursement for the work conducted outside the United States and such costs may not be recognized as allowable recipient cost share. The Prime Recipient is responsible should any work under this Award be performed outside the United States, absent a waiver, regardless of if the work is performed by the Prime Recipient, Subrecipients, contractors or other project partners.

3. Waiver

There may be limited circumstances where it is in the interest of the project to perform a portion of the work outside the United States. To seek a waiver of the Performance of Work in the United States requirement, the applicant must submit a written waiver request to EERE. Appendix C lists the necessary information that must be included in a request to waive the Performance of Work in the United States requirement.

The applicant must demonstrate to the satisfaction of EERE that a waiver would further the purposes of the FOA and is in the economic interests of the United States. EERE may require additional information before considering a waiver request. Save the waiver request(s) in a single PDF file titled "ControlNumber_PerformanceofWork_Waiver". The applicant does not have the right to appeal EERE's decision concerning a waiver request.

iv. Construction

Recipients are required to obtain written authorization from the Contracting Officer before incurring any major construction costs.

v. Foreign Travel

If international travel is proposed for your project, please note that your organization must comply with the International Air Transportation Fair Competitive Practices Act of 1974 (49 USC 40118), commonly referred to as the "Fly America Act," and implementing regulations at 41 CFR 301-10.131 through 301-10.143. The law and regulations require air transport of people or property to, from, between, or within a country other than the United States, the cost of which is supported under this award, to be performed by or under a cost-sharing arrangement with a U.S. flag carrier, if service is available. Foreign travel costs are allowable only with the written prior approval of the Contracting Officer assigned to the award.

vi. Equipment and Supplies

To the greatest extent practicable, all equipment and products purchased with funds made available under this FOA should be American-made. This requirement does not apply to used or leased equipment.

Property disposition will be required at the end of a project if the current fair market value of property exceeds $5,000. The rules for property disposition are set forth in 2 CFR 200.310 – 200.316 as amended by 2 CFR 910.360.

vii. Lobbying

Recipients and Subrecipients may not use any Federal funds to influence or attempt to influence, directly or indirectly, congressional action on any legislative or appropriation matters.

Recipients and Subrecipients are required to complete and submit SF-LLL, "Disclosure of Lobbying Activities" (http://www.whitehouse.gov/sites/default/files/omb/grants/sfllin.pdf) if any non-Federal funds have been paid or will be paid to any person for influencing or attempting to influence any of the following in connection with your application:

- An officer or employee of any Federal agency;
- A Member of Congress;
- An officer or employee of Congress; or
- An employee of a Member of Congress.

viii. Risk Assessment

Prior to making a Federal award, the DOE is required by 31 U.S.C. 3321 and 41 U.S.C. 2313 to review information available through any OMB-designated repositories of government-wide eligibility qualification or financial integrity information, such as SAM Exclusions and "Do Not Pay."

In addition, DOE evaluates the risk(s) posed by applicants before they receive Federal awards. This evaluation may consider: results of the evaluation of the applicant's eligibility; the quality of the application; financial stability; quality of management systems and ability to meet the management standards prescribed in this part; history of performance; reports and findings from audits; and the applicant's ability to effectively implement statutory, regulatory, or other requirements imposed on non-Federal entities.

In addition to this review, DOE must comply with the guidelines on government-wide suspension and debarment in 2 CFR 180, and must require non-Federal entities to comply with these provisions. These provisions restrict Federal awards, subawards and contracts with certain parties that are debarred, suspended or otherwise excluded from or ineligible for participation in Federal programs or activities.

ix. Invoice Review and Approval

DOE employs a risk-based approach to determine the level of supporting documentation required for approving invoice payments. Recipients may be required to provide some or all of the following items with their requests for reimbursement:

- Summary of costs by cost categories
- Timesheets or personnel hours report
- Invoices/receipts for all travel, equipment, supplies, contractual, and other costs
- UCC filing proof for equipment acquired with project funds by for-profit recipients and subrecipients
- Explanation of cost share for invoicing period
- Analogous information for some subrecipients
- Other items as required by DOE

V. Application Review Information

A. Technical Review Criteria

i. Concept Papers

Concept Papers are evaluated based on consideration the following factors. All sub-criteria are of equal weight.

Criterion 1: Innovation & Impact (50%)

This criterion involves consideration of the following factors:

- **Mission** – Extent to which this project will enable the achievement of SETO goals as described in areas of interest in the FOA
- **Innovation** - Extent to which the proposed product represents a significant market improvement with respect to existing commercial products or solutions.
- **Market Impact** –
  - Extent to which the proposed technology will result in a commercially successful product and company.
  - Extent to which the project will result in either a product or solution that transforms or replaces existing industry approaches or a new product or solution that can be widely used by the existing industry and represents a significant improvement of industry approaches (an improvement leveraged across the entire industry can be as valuable as a new transformational standalone product).

Criterion 2: Project Feasibility and Team (50%)

This criterion involves consideration of the following factors:

- **Team** - The extent to which the capability of the Principal Investigator(s) and the proposed team, including sub-recipients and partnerships, can address all aspects of the proposed project with a good chance of success, including, but not limited to, qualifications, relevant expertise, and time commitment of the individuals on the team.
- **Plan** - Adequacy, value, and reasonableness of the schedule and quality of the plan to achieve stated project outcomes, while identifying and addressing the expected barriers and risks.
- **Measurable goals** - Extent to which the proposed activities in the proposal are validated through explicitly stated measurable milestones

ii. Full Applications

Applications will be evaluated against the merit review criteria shown below. All sub-criteria are of equal weight.

Criterion 1: Technical Merit, Innovation, and Impact

Weighting

Tier 0	Tier 1, 1S	Tier 2, 2S	Tier 3
40%	30%	25%	

Technical Merit and Innovation

- Extent to which the proposed technology or process is innovative and has the potential to advance the state of the art and enable the achievement of SunShot goals;
- Degree to which the current state of the technology and the proposed advancement are clearly described;
- Extent to which the application specifically and convincingly demonstrates how the applicant will move the state of the art to the proposed advancement; and
- Sufficiency of technical detail in the application to assess whether the proposed work is scientifically meritorious and revolutionary, including relevant data, calculations, and discussion of prior work in the literature with analysis that supports the viability of the proposed work.

Impact of Technology Advancement

- How the project supports the topic area objectives and target specifications and metrics; and
- The potential impact of the project on advancing the state of the art.

Criterion 2: Project Plan and Risk Identification

Weighting

Tier 0	Tier 1	Tier 2	Tier 3
25%			

Research Approach, Workplan and SOPO

- Degree to which the approach and critical path have been clearly described and thoughtfully considered; and
- Degree to which the task descriptions are clear, detailed, timely, and reasonable, resulting in a high likelihood that the proposed Workplan and SOPO will succeed in meeting the project goals.

Identification of Technical Risks

- Extent to which applicant discusses and demonstrates understanding of the key technical and commercial risks involved in the proposed work. Hardware applications must include manufacturing risks; and
- Adequacy, specificity, and reasonableness of the schedule and plan and degree to which it convincingly conveys how the applicant will move the technology from its current state to the proposed advancement.

Baseline, Metrics, and Deliverables

- The level of clarity in the definition of the baseline, metrics, and milestones; and
- Relative to a clearly defined experimental baseline, the strength of the quantifiable metrics, milestones, and mid-point deliverables defined in the application, such that meaningful interim progress will be made.

Criterion 3: Team and Resources

Weighting

Tier 0	Tier 1	Tier 2	Tier 3
25%			

- The capability of the Principal Investigator(s) and the proposed team to address all aspects of the proposed work with a good chance of success. Qualifications, relevant expertise, and time commitment of the individuals on the team;
- The sufficiency of the facilities to support the work;
- Degree to which the proposed consortia/team demonstrates the ability to facilitate and expedite further development and commercial deployment of the proposed technologies;
- Extent to which the final team, facilities and equipment required to complete this project is fully in place, assembled and committed to the project (e.g., are there any key members that are "to be hired at a later date?");
- Level of participation by project participants as evidenced by letter(s) of commitment and how well they are integrated into the Workplan; and
- Reasonableness of budget and spend plan for proposed project and objectives.

Criterion 4: - US Manufacturing and/or Commercialization Strategy

Weighting

Tier 0	Tier 1, 1S	Tier 2, 2S	Tier 3
10%	20%	25%	

- **Contribution to Domestic Manufacturing** [applications to hardware Topics 0, 1, 2, and 3 only]: Extent to which the project will strengthen the competitiveness of domestic PV manufacturing and/or supply chain as demonstrated in the U.S. Manufacturing Plan and the commercialization plan; likelihood of the proposed technology achieving best-in-class cost when implemented at its intended scale; and extent to which those expectations are supported by a realistic, factually based, financially sound implementation approach.
- **Quality and reasonableness** – Quality and reasonableness of the Applicant's business plan for market penetration/adoption and the associated assumptions used to form the business strategy (e.g., market research, analysis, and assessment; competitive analysis of firms and products; identified product specifications).
- **Viability** - Strength of business plan, including customer letters of intent, current sales and identification of commercialization pathways. Identification of realistic target market(s), discussion of competitive advantage, and the clarity of the business strategy in identifying market objectives (segment, price, volume/size, region, etc.) and that these objectives are aligned with the Applicant's capabilities and resources; and
- **Capitalization** - Adequacy of the plan to secure the required funding for the project costs, including the strength of financial commitments made to the project and clarity of the capital plan for commercialization as well as anticipated funds required to commercialize/publicly release the proposed project or solution.

iii. Criteria for Replies to Reviewer Comments

EERE has not established separate criteria to evaluate Replies to Reviewer Comments. Instead, Replies to Reviewer Comments are attached to the original applications and evaluated as an extension of the Full Application.

B. Standards for Application Evaluation

Applications that are determined to be eligible will be evaluated in accordance with this FOA, by the standards set forth in EERE's Notice of Objective Merit Review Procedure (76 Fed. Reg. 17846, March 31, 2011) and the guidance provided in the "Department of Energy Merit Review Guide for Financial Assistance," which is available at: http://energy.gov/management/downloads/merit-review-guide-financial-assistance.

C. Other Selection Factors

i. Program Policy Factors

In addition to the above criteria, the Selection Official may consider the following program policy factors in determining which Full Applications to select for award negotiations:

- The degree to which the proposed project, including proposed cost shares, optimizes the use of available EERE funding to achieve programmatic objectives;
- The level of industry involvement and demonstrated ability to commercialize energy or related technologies;
- Whether the proposed project is likely to lead to increased employment and manufacturing in the United States;
- The degree to which the proposed project directly addresses EERE's statutory mission and strategic goals;
- The degree to which there is portfolio diversity associated with time to market and/or development of pipeline;
- The degree to which there is diversity of technologies, approaches, methods, and institutions (including the degree to which proposed technologies, approaches, and methods would be complementary to and support a diversity of geographic locations and of technical approaches and methods that, in conjunction with the existing portfolio of projects funded by EERE, best achieve the overall goals and objectives of the Solar Energy Technologies Office);
- Whether the proposed project will accelerate transformational technological advances in areas that industry by itself is not likely to undertake because of technical and financial uncertainty; and
- Whether the applicant is a Climate Action Champion[20] designated under DOE's Request for Applications DE-FOA-0001189 (RFA) or the applicant has a letter of support from a Climate Action Champion designated under the above referenced RFA.

[20] In recognition of the importance of the dual policy goals of reducing greenhouse gas emissions and enhancing climate resilience, the U.S. Department of Energy (DOE) – in close collaboration with other Federal agencies – launched the Climate Action Champion initiative to identify and showcase U.S. local and tribal governments that have proven to be climate leaders through pursuing opportunities to advance both of these goals in their communities. Recently, DOE selected sixteen (16) U.S. local governments and tribal governments – or regional collaborations or consortia thereof – that demonstrated a strong and ongoing commitment to implementing strategies that both reduce greenhouse gas emissions and enhance climate resilience, with a particular emphasis on strategies that further both goals. http://www.whitehouse.gov/blog/2014/12/03/announcing-first-class-climate-action-champions

D. Evaluation and Selection Process

i. Overview

The evaluation process consists of multiple phases; each includes an initial eligibility review and a thorough technical review. Rigorous technical reviews of eligible submissions are conducted by reviewers that are experts in the subject matter of the FOA. Ultimately, the Selection Official considers the recommendations of the reviewers, along with other considerations such as program policy factors, in determining which applications to select.

ii. Pre-Selection Interviews

As part of the evaluation and selection process, EERE may invite one or more applicants to participate in Pre-Selection Interviews. Pre-Selection Interviews are distinct from and more formal than pre-selection clarifications (See Section V.D.iii of the FOA). The invited applicant(s) will meet with EERE representatives to provide clarification on the contents of the Full Applications and to provide EERE an opportunity to ask questions regarding the proposed project. The information provided by applicants to EERE through Pre-Selection Interviews contributes to EERE's selection decisions.

EERE will arrange to meet with the invited applicants in person at EERE's offices or a mutually agreed upon location. EERE may also arrange site visits at certain applicants' facilities. In the alternative, EERE may invite certain applicants to participate in a one-on-one conference with EERE via webinar, videoconference, or conference call.

EERE will not reimburse applicants for travel and other expenses relating to the Pre-Selection Interviews, nor will these costs be eligible for reimbursement as pre-award costs.

EERE may obtain additional information through Pre-Selection Interviews that will be used to make a final selection determination. EERE may select applications for funding and make awards without Pre-Selection Interviews. Participation in Pre-Selection Interviews with EERE does not signify that applicants have been selected for award negotiations.

Pre-Selection Interviews Process:

The applicants will be invited via email, to their stated points of contact in EERE Exchange to participate in an interview. Interviews will be optional for

the applicant. The applicant will be given a minimum of 5 business days advance warning for the interview and at least two possible times for the interview.

Interviews will take place at a location of the program's choosing. The program will have two locations (preferably one on each coast) where interviews can take place to minimize travel burden for applicants. Awardees will be given the option to travel to program staff for the interviews or to participate in the interview via webinar. Any direct cost to participate in the interview is borne by the applicant and will not be reimbursable even if an award is made.

The interview format will be the same for all applications in a given Tier of the FOA. Tiers vary by technological maturity and potential DOE funding amount, and applicants self-select into them. During each interview applicants will be given an uninterrupted period to present slides about their proposed project. Following the presentation there will be time for questions from program staff. The presentation and the questions will address the awardees application and the FOA. All interviews will be a maximum of 90 minutes and only four representatives from each applicant may attend the interview.

iii. Pre-Selection Clarification

EERE may determine that pre-selection clarifications are necessary from one or more applicants. Pre-selection clarifications are distinct from and less formal than pre-selection interviews. These pre-selection clarifications will solely be for the purposes of clarifying the application, and will be limited to information already provided in the application documentation. The pre-selection clarifications may occur before, during or after the merit review evaluation process. Information provided by an applicant that is not necessary to address the pre-selection clarification question will not be reviewed or considered. Typically, a pre-selection clarification will be carried out through either written responses to EERE's written clarification questions or video or conference calls with EERE representatives.

The information provided by applicants to EERE through pre-selection clarifications is incorporated in their applications and contributes to the merit review evaluation and EERE's selection decisions. If EERE contacts an applicant for pre-selection clarification purposes, it does not signify that the applicant has been selected for negotiation of award or that the applicant is among the top ranked applications.

EERE will not reimburse applicants for expenses relating to the pre-selection clarifications, nor will these costs be eligible for reimbursement as pre-award costs.

iv. Recipient Integrity and Performance Matters

DOE, prior to making a Federal award with a total amount of Federal share greater than the simplified acquisition threshold, is required to review and consider any information about the applicant that is in the designated integrity and performance system accessible through SAM (currently FAPIIS) (see 41 U.S.C. 2313).

The applicant, at its option, may review information in the designated integrity and performance systems accessible through SAM and comment on any information about itself that a Federal awarding agency previously entered and is currently in the designated integrity and performance system accessible through SAM.

DOE will consider any written comments by the applicant, in addition to the other information in the designated integrity and performance system, in making a judgment about the applicant's integrity, business ethics, and record of performance under Federal awards when completing the review of risk posed by applicants as described in 2 C.F.R. § 200.205.

v. Selection

The Selection Official may consider the technical merit, the Federal Consensus Board's recommendations, program policy factors, and the amount of funds available in arriving at selections for this FOA.

E. Anticipated Notice of Selection and Award Dates

EERE anticipates notifying applicants selected for negotiation of award by June 2017 and making awards by August 2017.

VI. Award Administration Information

A. Award Notices

i. Ineligible Submissions

Ineligible Concept Papers and Full Applications will not be further reviewed or considered for award. The Contracting Officer will send a notification letter by email to the technical and administrative points of contact

designated by the applicant in EERE Exchange. The notification letter will state the basis upon which the Concept Paper or the Full Application is ineligible and not considered for further review.

ii. Concept Paper Notifications

EERE will notify applicants of its determination to encourage or discourage the submission of a Full Application. EERE will send a notification letter by email to the technical and administrative points of contact designated by the applicant in EERE Exchange.

Applicants may submit a Full Application even if they receive a notification discouraging them from doing so. By discouraging the submission of a Full Application, EERE intends to convey its lack of programmatic interest in the proposed project. Such assessments do not necessarily reflect judgments on the merits of the proposed project. The purpose of the Concept Paper phase is to save applicants the considerable time and expense of preparing a Full Application that is unlikely to be selected for award negotiations.

A notification letter encouraging the submission of a Full Application does not authorize the applicant to commence performance of the project. Please refer to Section IV.K.ii of the FOA for guidance on pre-award costs.

iii. Full Application Notifications

EERE will notify applicants of its determination via a notification letter by email to the technical and administrative points of contact designated by the applicant in EERE Exchange. The notification letter will inform the applicant whether or not its Full Application was selected for award negotiations. Alternatively, EERE may notify one or more applicants that a final selection determination on particular Full Applications will be made at a later date, subject to the availability of funds or other factors.

iv. Successful Applicants

Receipt of a notification letter selecting a Full Application for award negotiations does not authorize the applicant to commence performance of the project. If an application is selected for award negotiations, it is not a commitment by EERE to issue an award. Applicants do not receive an award until award negotiations are complete and the Contracting Officer executes the funding agreement, accessible by the Prime Recipient in FedConnect.

The award negotiation process will take approximately 60 days. Applicants must designate a primary and a backup point-of-contact in EERE Exchange

with whom EERE will communicate to conduct award negotiations. The applicant must be responsive during award negotiations (i.e., provide requested documentation) and meet the negotiation deadlines. If the applicant fails to do so or if award negotiations are otherwise unsuccessful, EERE will cancel the award negotiations and rescind the Selection. EERE reserves the right to terminate award negotiations at any time for any reason.

Please refer to Section IV.K.ii of the FOA for guidance on pre-award costs.

v. Alternate Selection Determinations

In some instances, an applicant may receive a notification that its application was not selected for award and EERE designated the application to be an alternate. As an alternate, EERE may consider the Full Application for Federal funding in the future. A notification letter stating the Full Application is designated as an alternate does not authorize the applicant to commence performance of the project. EERE may ultimately determine to select or not select the Full Application for award negotiations.

vi. Unsuccessful Applicants

EERE shall promptly notify in writing each applicant whose application has not been selected for award or whose application cannot be funded because of the unavailability of appropriated funds.

B. Administrative and National Policy Requirements

i. Registration Requirements

There are several one-time actions before submitting an application in response to this FOA, and it is vital that applicants address these items as soon as possible. Some may take several weeks, and failure to complete them could interfere with an applicant's ability to apply to this FOA, or to meet the negotiation deadlines and receive an award if the application is selected. These requirements are as follows:

1. **EERE Exchange**
   Register and create an account on EERE Exchange at https://eere-Exchange.energy.gov.
   This account will then allow the user to register for any open EERE FOAs that are currently in EERE Exchange. 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. Applicants

should also designate backup points of contact so they may be easily contacted if deemed necessary. **This step is required to apply to this FOA.**

The EERE Exchange registration does not have a delay; however, **the remaining registration requirements below could take several weeks to process and are necessary for a potential applicant to receive an award under this FOA**.

2. **DUNS Number**
   Obtain a Dun and Bradstreet Data Universal Numbering System (DUNS) number (including the plus 4 extension, if applicable) at http://fedgov.dnb.com/webform.

3. **System for Award Management**
   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 an MPIN are important steps in SAM registration. Please update your SAM registration annually.

4. **FedConnect**
   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.

5. **Grants.gov**
   Register in Grants.gov (http://www.grants.gov) to receive automatic updates when Amendments to this FOA are posted. However, please note that Letters of Intent, Concept Papers, and Full Applications will not be accepted through Grants.gov.

6. **Electronic Authorization of Applications and Award Documents**
   Submission of an application and supplemental information under this FOA through electronic systems used by the Department of Energy, including EERE Exchange and FedConnect.net, constitutes the authorized representative's approval and electronic signature.

ii. Award Administrative Requirements

The administrative requirements for DOE grants and cooperative agreements are contained in 2 CFR Part 200 as amended by 2 CFR Part 910.

iii. Foreign National Access to DOE Sites

All applicants that ultimately enter into an award resulting from this FOA will be subject to the following requirement concerning foreign national involvement. Upon DOE's request, Prime Recipients must provide information to facilitate DOE's responsibilities associated with foreign national access to DOE sites, information, technologies, and equipment. A foreign national is defined as any person who was born outside the jurisdiction of the United States, is a citizen of a foreign government, and has not been naturalized under U.S. law. If the Prime Recipient or Subrecipients, contractors or vendors under the award, anticipate utilizing a foreign national person in the performance of an award, the Prime Recipient is responsible for providing to the Contracting Officer specific information of the foreign national(s) to satisfy compliance with all of the requirements for access approval.

iv. Limitations on Compensation Costs

For personnel costs, there is a $200,000 salary cap per person per year, which is equivalent to an unburdened hourly cap at $96.16 per hour (assuming a 2080 hour work year). This $200,000 cap includes salary paid and reimbursed by the Federal government, and salary paid by the recipient and counted as cost share. An individual is free to receive compensation greater than this cap but it must be paid with funds outside of the award (neither from federal nor cost share contribution). The proposed salary will be closely scrutinized. Also, an individual cannot provide hours which (s)he is being paid by another entity (i.e. 40 hours a week cannot be contributed in kind if those same 40 hours were spent at another job).

Per 2 CFR 200.306(e) and (f):
(e) Volunteer services furnished by third-party professional and technical personnel, consultants, and other skilled and unskilled labor may be counted as cost sharing or matching if the service is an integral and necessary part of an approved project or program. Rates for third-party volunteer services must be consistent with those paid for similar work by the non-Federal entity. In those instances in which the required skills are not found in the non-Federal entity, rates must be consistent with those paid for similar work in the labor market in which the non-Federal entity competes for the kind of services involved. In either case, paid fringe benefits that are reasonable,

necessary, allocable, and otherwise allowable may be included in the valuation.
(f) When a third-party organization furnishes the services of an employee, these services must be valued at the employee's regular rate of pay plus an amount of fringe benefits that is reasonable, necessary, allocable, and otherwise allowable, and indirect costs at either the third-party organization's approved federally negotiated indirect cost rate or, a rate in accordance with §200.414 Indirect (F&A) costs, paragraph (d), provided these services employ the same skill(s) for which the employee is normally paid. Where donated services are treated as indirect costs, indirect cost rates will separate the value of the donated services so that reimbursement for the donated services will not be made.

Per 2 CFR 200.96, the definition of Third-party in-kind contributions is:
Third-party in-kind contributions means the value of non-cash contributions (i.e., property or services) that—
(a) Benefit a federally assisted project or program; and
(b) Are contributed by non-Federal third parties, without charge, to a non-Federal entity under a Federal award

v. Subaward and Executive Reporting

Additional administrative requirements necessary for DOE grants and cooperative agreements to comply with the Federal Funding and Transparency Act of 2006 (FFATA) are contained in 2 CFR Part 170. Prime Recipients must register with the new FFATA Subaward Reporting System database and report the required data on their first tier Subrecipients. Prime Recipients must report the executive compensation for their own executives as part of their registration profile in SAM.

vi. National Policy Requirements

The National Policy Assurances that are incorporated as a term and condition of award are located at: http://www.nsf.gov/awards/managing/rtc.jsp.

vii. Environmental Review in Accordance with National Environmental Policy Act (NEPA)

EERE's decision whether and how to distribute federal funds under this FOA is subject to the National Environmental Policy Act (42 USC 4321, *et seq.*). NEPA requires Federal agencies to integrate environmental values into their decision-making processes by considering the potential environmental impacts of their proposed actions. For additional background on NEPA, please see DOE's NEPA website, at http://nepa.energy.gov/.

While NEPA compliance is a Federal agency responsibility and the ultimate decisions remain with the Federal agency, all recipients selected for an award will be required to assist in the timely and effective completion of the NEPA process in the manner most pertinent to their proposed project. If DOE determines certain records must be prepared to complete the NEPA review process (e.g., biological evaluations or environmental assessments), the costs to prepare the necessary records may be included as part of the project costs.

viii. Applicant Representations and Certifications

1. **Lobbying Restrictions**
   By accepting funds under this award, the Prime Recipient agrees that none of the funds obligated on the award shall be expended, directly or indirectly, to influence Congressional action on any legislation or appropriation matters pending before Congress, other than to communicate to Members of Congress as described in 18 U.S.C. §1913. This restriction is in addition to those prescribed elsewhere in statute and regulation.

2. **Corporate Felony Conviction and Federal Tax Liability Representations**
   In submitting an application in response to this FOA, the applicant represents that:

   a. It is **not** a corporation that has been convicted of a felony criminal violation under any Federal law within the preceding 24 months, and
   b. It is **not** a corporation that has any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability.

   For purposes of these representations the following definitions apply:

   A Corporation includes any entity that has filed articles of incorporation in any of the 50 states, the District of Columbia, or the various territories of the United States [but not foreign corporations]. It includes both for-profit and non-profit organizations.

3. Nondisclosure and Confidentiality Agreements Representations
In submitting an application in response to this FOA the applicant represents that:

a. It **does not and will not** require its employees or contractors to sign internal nondisclosure or confidentiality agreements or statements prohibiting or otherwise restricting its employees or contactors from lawfully reporting waste, fraud, or abuse to a designated investigative or law enforcement representative of a Federal department or agency authorized to receive such information.

b. It **does not and will not** use any Federal funds to implement or enforce any nondisclosure and/or confidentiality policy, form, or agreement it uses unless it contains the following provisions:

(1) *''These provisions are consistent with and do not supersede, conflict with, or otherwise alter the employee obligations, rights, or liabilities created by existing statute or Executive order relating to (1) classified information, (2) communications to Congress, (3) the reporting to an Inspector General of a violation of any law, rule, or regulation, or mismanagement, a gross waste of funds, an abuse of authority, or a substantial and specific danger to public health or safety, or (4) any other whistleblower protection. The definitions, requirements, obligations, rights, sanctions, and liabilities created by controlling Executive orders and statutory provisions are incorporated into this agreement and are controlling.''*

(2) The limitation above shall not contravene requirements applicable to Standard Form 312, Form 4414, or any other form issued by a Federal department or agency governing the nondisclosure of classified information.

(3) Notwithstanding the provision listed in paragraph (a), a nondisclosure or confidentiality policy form or agreement that is to be executed by a person connected with the

conduct of an intelligence or intelligence-related activity, other than an employee or officer of the United States Government, may contain provisions appropriate to the particular activity for which such document is to be used. Such form or agreement shall, at a minimum, require that the person will not disclose any classified information received in the course of such activity unless specifically authorized to do so by the United States Government. Such nondisclosure or confidentiality forms shall also make it clear that they do not bar disclosures to Congress, or to an authorized official of an executive agency or the Department of Justice, that are essential to reporting a substantial violation of law.

ix. Statement of Federal Stewardship

EERE will exercise normal Federal stewardship in overseeing the project activities performed under EERE Awards. Stewardship Activities include, but are not limited to, conducting site visits; reviewing performance and financial reports, providing assistance and/or temporary intervention in usual circumstances to correct deficiencies that develop during the project; assuring compliance with terms and conditions; and reviewing technical performance after project completion to ensure that the project objectives have been accomplished.

x. Statement of Substantial Involvement

EERE has substantial involvement in work performed under Awards made as a result of this FOA. EERE does not limit its involvement to the administrative requirements of the Award. Instead, EERE has substantial involvement in the direction and redirection of the technical aspects of the project as a whole. Substantial involvement includes, but is not limited to, the following:

1. EERE shares responsibility with the recipient for the management, control, direction, and performance of the Project.

2. EERE may intervene in the conduct or performance of work under this Award for programmatic reasons. Intervention includes the interruption or modification of the conduct or performance of project activities.

3. EERE may redirect or discontinue funding the Project based on the outcome of EERE's evaluation of the Project at the Go/No Go decision point(s).

4. EERE participates in major project decision-making processes.

xi. Subject Invention Utilization Reporting

In order to ensure that Prime Recipients and Subrecipients holding title to subject inventions are taking the appropriate steps to commercialize subject inventions, EERE may require that each Prime Recipient holding title to a subject invention submit annual reports for 10 years from the date the subject invention was disclosed to EERE on the utilization of the subject invention and efforts made by Prime Recipient or their licensees or assignees to stimulate such utilization. The reports must include information regarding the status of development, date of first commercial sale or use, gross royalties received by the Prime Recipient, and such other data and information as EERE may specify.

xii. Intellectual Property Provisions

The standard DOE financial assistance intellectual property provisions applicable to the various types of recipients are located at http://www1.eere.energy.gov/financing/resources.html.

xiii. Reporting

Reporting requirements are identified on the Federal Assistance Reporting Checklist, attached to the award agreement. The checklist can be accessed at http://www1.eere.energy.gov/financing/resources.html.

xiv. Go/No-Go Review

Each project selected under this FOA will be subject to a periodic project evaluation referred to as a Go/No-Go Review. Federal funding beyond the Go/No Go decision point (continuation funding), is contingent on (1) the availability of funds appropriated by Congress for the purpose of this program and the availability of future-year budget authority; (2) meeting the objectives, milestones, deliverables, and decision point criteria of recipient's approved project and obtaining approval from EERE to continue work on the project; and (3) the submittal of required reports in accordance with the Statement of Project Objectives.

As a result of the Go/No Go Review, DOE may, at its discretion, authorize the following actions: (1) continue to fund the project, contingent upon the availability of funds appropriated by Congress for the purpose of this program and the availability of future-year budget authority; (2) recommend redirection of work under the project; (3) place a hold on federal funding for

the project, pending further supporting data or funding; or (4) discontinue funding the project because of insufficient progress, change in strategic direction, or lack of funding.

The Go/No-Go decision is distinct from a non-compliance determination. In the event a recipient fails to comply with the requirements of an award, EERE may take appropriate action, including but not limited to, redirecting, suspending or terminating the award.

xv. Conference Spending

The recipient shall not expend **any** funds on a conference not directly and programmatically related to the purpose for which the grant or cooperative agreement was awarded that would defray the cost to the United States Government of a conference held by any Executive branch department, agency, board, commission, or office for which the cost to the United States Government would otherwise exceed $20,000, thereby circumventing the required notification by the head of any such Executive Branch department, agency, board, commission, or office to the Inspector General (or senior ethics official for any entity without an Inspector General), of the date, location, and number of employees attending such conference.

xvi. UCC Financing Statements

Per 2 CFR 910.360 (Real Property and Equipment) when a piece of equipment is purchased by a for-profit recipient or subrecipient with Project Funds (Federal and Cost-Share), and when the Federal share of the financial assistance agreement is more than $1,000,000, the recipient or subrecipient must:

Properly record, and consent to the Department's ability to properly record if the recipient fails to do so, UCC financing statement(s) for all equipment in excess of $5,000 purchased with project funds. These financing statement(s) must be approved in writing by the contracting officer prior to the recording, and they shall provide notice that the Recipient's title to all equipment (not real property) purchased with Federal funds under the financial assistance agreement is conditional pursuant to the terms of this section, and that the Government retains an undivided reversionary interest in the equipment. The UCC financing statement(s) must be filed before the Contracting Officer may reimburse the recipient for the Federal share of the equipment unless otherwise provided for in the relevant financial assistance agreement. The recipient shall further make any amendments to the financing statements or

additional recordings, including appropriate continuation statements, as necessary or as the contracting officer may direct.

VII. Questions/Agency Contacts

Upon the issuance of a FOA, EERE personnel are prohibited from communicating (in writing or otherwise) with applicants regarding the FOA except through the established question and answer process as described below. Specifically, questions regarding the content of this FOA must be submitted to: SunShot.T2M@ee.doe.gov. Questions must be submitted not later than 3 business days prior to the application due date and time.

All questions and answers related to this FOA will be posted on EERE Exchange at: https://eere-exchange.energy.gov. **Please note that you must first select this specific FOA Number in order to view the questions and answers specific to this FOA**. EERE will attempt to respond to a question within 3 business days, unless a similar question and answer has already been posted on the website.

Questions related to the registration process and use of the EERE Exchange website should be submitted to: EERE-ExchangeSupport@hq.doe.gov.

VIII. Other Information

A. FOA Modifications

Amendments to this FOA will be posted on the EERE Exchange website and the Grants.gov system. However, you will only receive an email when an amendment or a FOA is posted on these sites if you register for email notifications for this FOA in Grants.gov. EERE recommends that you register as soon after the release of the FOA as possible to ensure you receive timely notice of any amendments or other FOAs.

B. Informational Webinar

EERE will conduct one informational webinar during the FOA process. It will be held after the initial FOA release but before the due date for Concept Papers.

Attendance is not mandatory and will not positively or negatively impact the overall review of any applicant submissions. As the webinar will be open to all applicants who wish to participate, applicants should refrain from asking questions or communicating information that would reveal confidential and/or proprietary information specific to their project. Specific dates for the webinar can be found on the cover page of the FOA.

C. Government Right to Reject or Negotiate

EERE reserves the right, without qualification, to reject any or all applications received in response to this FOA and to select any application, in whole or in part, as a basis for negotiation and/or award.

D. Commitment of Public Funds

The Contracting Officer is the only individual who can make awards or commit the Government to the expenditure of public funds. A commitment by anyone other than the Contracting Officer, either express or implied, is invalid.

E. Treatment of Application Information

In general, EERE will only use data and other information contained in applications for evaluation purposes, unless such information is generally available to the public or is already the property of the Government.

Applicants should not include trade secrets or commercial or financial information that is privileged or confidential in their application unless such information is necessary to convey an understanding of the proposed project or to comply with a requirement in the FOA.

The use of protective markings such as "Do Not Publicly Release – Trade Secret" or "Do Not Publicly Release – Confidential Business Information" is encouraged. However, applicants should be aware that the use of protective markings is not dispositive as to whether information will be publicly released pursuant to the Freedom of Information Act, 5 U.S.C. §552, et. seq., as amended by the OPEN Government Act of 2007, Pub. L. No. 110-175. (See Section I of this document, "Notice of Potential Disclosure Under the Freedom of Information Act (FOIA)" for additional information regarding the public release of information under the Freedom of Information Act.

Applicants are encouraged to employ protective markings in the following manner:

The cover sheet of the application must be marked as follows and identify the specific pages containing trade secrets or commercial or financial information that is privileged or confidential:

> Notice of Restriction on Disclosure and Use of Data:
> Pages [list applicable pages] of this document may contain trade secrets or commercial or financial information that is privileged or confidential, and is exempt from public disclosure. Such information shall be used or disclosed only for evaluation purposes or in accordance with a financial

assistance or loan agreement between the submitter and the Government. The Government may use or disclose any information that is not appropriately marked or otherwise restricted, regardless of source. [End of Notice]

The header and footer of every page that contains trade secrets or commercial or financial information that is privileged must be marked as follows: "May contain trade secrets or commercial or financial information that is privileged or confidential and exempt from public disclosure."

In addition, each line or paragraph containing trade secrets or commercial or financial information that is privileged or confidential must be enclosed in brackets.

F. Evaluation and Administration by Non-Federal Personnel

In conducting the merit review evaluation, the Go/No-Go Review and Peer Review, the Government may seek the advice of qualified non Federal personnel as reviewers. The Government may also use non-Federal personnel to conduct routine, nondiscretionary administrative activities. The applicant, by submitting its application, consents to the use of non-Federal reviewers/administrators. Non-Federal reviewers must sign conflict of interest and non-disclosure agreements prior to reviewing an application. Non-Federal personnel conducting administrative activities must sign a non-disclosure agreement.

G. Notice Regarding Eligible/Ineligible Activities

Eligible activities under this FOA include those which describe and promote the understanding of scientific and technical aspects of specific energy technologies, but not those which encourage or support political activities such as the collection and dissemination of information related to potential, planned or pending legislation.

H. Notice of Right to Conduct a Review of Financial Capability

EERE reserves the right to conduct an independent third party review of financial capability for applicants that are selected for negotiation of award (including personal credit information of principal(s) of a small business if there is insufficient information to determine financial capability of the organization).

I. Notice of Potential Disclosure Under Freedom of Information Act (FOIA)

Under the Freedom of Information Act, (FOIA), 5 U.S.C. §552, et. seq., as amended by the OPEN Government Act of 2007, Pub. L. No. 110-175, any information received from the Applicant is considered to be an agency record, and as such, subject to public release under FOIA. The purpose of the FOIA is to afford the public the right to request and receive agency records unless those agency records are protected from disclosure under one or more of the nine FOIA exemptions. Decisions to disclose or withhold information received from the Applicant are based upon the applicability of one or more of the nine FOIA exemptions, not on the existence or nonexistence of protective markings or designations. Only the agency's designated FOIA Officer may determine if information received from the Applicant may be withheld pursuant to one of the nine FOIA exemptions. All FOIA requests received by DOE are processed in accordance with 10 C.F.R. Part 1004.

J. Requirement for Full and Complete Disclosure

Applicants are required to make a full and complete disclosure of all information requested. Any failure to make a full and complete disclosure of the requested information may result in:

- The termination of award negotiations;
- The modification, suspension, and/or termination of a funding agreement;
- The initiation of debarment proceedings, debarment, and/or a declaration of ineligibility for receipt of Federal contracts, subcontracts, and financial assistance and benefits; and
- Civil and/or criminal penalties.

K. Retention of Submissions

EERE expects to retain copies of all Letters of Intent, Concept Papers, Full Applications, Replies to Reviewer Comments, and other submissions. No submissions will be returned. By applying to EERE for funding, applicants consent to EERE's retention of their submissions.

L. Title to Subject Inventions

Ownership of subject inventions is governed pursuant to the authorities listed below.

- Domestic Small Businesses, Educational Institutions, and Nonprofits: Under the Bayh-Dole Act (35 U.S.C. § 200 et seq.), domestic small businesses,

educational institutions, and nonprofits may elect to retain title to their subject inventions.

- All other parties: The Federal Non-Nuclear Energy Act of 1974, 42. U.S.C. 5908, provides that the Government obtains title to new inventions unless a waiver is granted (see below).
- Class Patent Waiver:

DOE has issued a class waiver that applies to this FOA. Under this class waiver, domestic large businesses may elect title to their subject inventions similar to the right provided to the domestic small businesses, educational institutions, and nonprofits by law. In order to avail itself of the class waiver, a domestic large business must agree that any products embodying or produced through the use of a subject invention first created or reduced to practice under this program will be substantially manufactured in the United States, unless DOE agrees that the commitments proposed in the U.S. Manufacturing Plan are sufficient.

- Advance and Identified Waivers: Applicants may request a patent waiver that will cover subject inventions that may be invented under the award, in advance of or within 30 days after the effective date of the award. Even if an advance waiver is not requested or the request is denied, the recipient will have a continuing right under the award to request a waiver for identified inventions, i.e., individual subject inventions that are disclosed to EERE within the timeframes set forth in the award's intellectual property terms and conditions. Any patent waiver that may be granted is subject to certain terms and conditions in 10 CFR 784.

- Determination of Exceptional Circumstances (DEC): [applications to hardware Topics 0, 1, 2, 3 only] Each applicant is required to submit a U.S. Manufacturing Plan as part of its application. If selected, the U.S. Manufacturing Plan shall be incorporated into the award terms and conditions for domestic small businesses and nonprofit organizations. DOE has determined that exceptional circumstances exist that warrants the modification of the standard patent rights clause for small businesses and non-profit awardees under Bayh-Dole to the extent necessary to implement and enforce the U.S. Manufacturing Plan. For example, the commitments and enforcement of a U.S. Manufacturing Plan may be tied to subject inventions. Any Bayh-Dole entity (domestic small business or nonprofit organization) affected by this DEC has the right to appeal it.

M. Government Rights in Subject Inventions

Where Prime Recipients and Subrecipients retain title to subject inventions, the U.S. Government retains certain rights.

i. Government Use License

The U.S. Government retains a nonexclusive, nontransferable, irrevocable, paid-up license to practice or have practiced for or on behalf of the United States any subject invention throughout the world. This license extends to contractors doing work on behalf of the Government.

ii. March-In Rights

The U.S. Government retains march-in rights with respect to all subject inventions. Through "march-in rights," the Government may require a Prime Recipient or Subrecipient who has elected to retain title to a subject invention (or their assignees or exclusive licensees), to grant a license for use of the invention to a third party. In addition, the Government may grant licenses for use of the subject invention when a Prime Recipient, Subrecipient, or their assignees and exclusive licensees refuse to do so.

DOE may exercise its march-in rights only if it determines that such action is necessary under any of the four following conditions:

- The owner or licensee has not taken or is not expected to take effective steps to achieve practical application of the invention within a reasonable time;
- The owner or licensee has not taken action to alleviate health or safety needs in a reasonably satisfied manner;
- The owner has not met public use requirements specified by Federal statutes in a reasonably satisfied manner; or
- The U.S. Manufacturing requirement has not been met.

Any determination that march-in rights are warranted must follow a fact-finding process in which the recipient has certain rights to present evidence and witnesses, confront witnesses and appear with counsel and appeal any adverse decision. To date, DOE has never exercised its march-in rights to any subject inventions.

N. Rights in Technical Data

Data rights differ based on whether data is first produced under an award or instead was developed at private expense outside the award.

"Limited Rights Data": The U.S. Government will not normally require delivery of confidential or trade secret-type technical data developed solely at private expense prior to issuance of an award, except as necessary to monitor technical progress and evaluate the potential of proposed technologies to reach specific technical and cost metrics.

Government rights in Technical Data Produced Under Awards: The U.S. Government normally retains unlimited rights in technical data produced under Government financial assistance awards, including the right to distribute to the public. However, pursuant to special statutory authority, certain categories of data generated under EERE awards may be protected from public disclosure for up to five years after the data is generated ("Protected Data"). For awards permitting Protected Data, the protected data must be marked as set forth in the awards intellectual property terms and conditions and a listing of unlimited rights data (i.e., non-protected data) must be inserted into the data clause in the award. In addition, invention disclosures may be protected from public disclosure for a reasonable time in order to allow for filing a patent application.

O. Copyright

The Prime Recipient and Subrecipients may assert copyright in copyrightable works, such as software, first produced under the award without EERE approval. When copyright is asserted, the Government retains a paid-up nonexclusive, irrevocable worldwide license to reproduce, prepare derivative works, distribute copies to the public, and to perform publicly and display publicly the copyrighted work. This license extends to contractors and others doing work on behalf of the Government.

P. Personally Identifiable Information (PII)

All information provided by the Applicant must to the greatest extent possible exclude Personally Identifiable Information (PII). The term "personally identifiable information" refers to information which can be used to distinguish or trace an individual's identity, such as their name, social security number, biometric records, etc. alone, or when combined with other personal or identifying information which is linked or linkable to a specific individual, such as date and place of birth, mother's maiden name, etc. (See OMB Memordum M-07-16 dated May 22, 2007, found at: https://www.whitehouse.gov/sites/default/files/omb/memoranda/fy2007/m07-16.pdf

By way of example, Applicants must screen resumes to ensure that they do not contain PII such as personal addresses, phone/cell numbers, personal emails and/or SSNs. In short, if the PII is not essential to the application, it should not be in the application.

Q. Annual Compliance Audits

If a for-profit entity is a Prime Recipient and has expended $750,000 or more of DOE funds, including cost share, during the entity's fiscal year, an annual compliance audit performed by an independent auditor is be required. For additional information, please refer to 2 C.F.R. § 910.501 and Subpart F.

If an educational institution, non-profit organization, or state/local government is a Prime Recipient or Subrecipient and has expended $750,000 or more of Federal funds during the non-Federal entity's fiscal year, then a single or program-specific audit is required. For additional information, please refer to 2 C.F.R. § 200.501 and Subpart F.

Applicants and sub-recipients (if applicable) should propose sufficient costs in the project budget to cover the costs associated with the audit. EERE will share in the cost of the audit at its applicable cost share ratio.

Appendix A – Cost Share Information

Cost Sharing or Cost Matching

The terms "cost sharing" and "cost matching" are often used synonymously. Even the DOE Financial Assistance Regulations, 2 CFR 200.306, use both of the terms in the titles specific to regulations applicable to cost sharing. EERE almost always uses the term "cost sharing," as it conveys the concept that non-federal share is calculated as a percentage of the Total Project Cost. An exception is the State Energy Program Regulation, 10 CFR 420.12, State Matching Contribution. Here "cost matching" for the non-federal share is calculated as a percentage of the Federal funds only, rather than the Total Project Cost.

How Cost Sharing Is Calculated

As stated above, cost sharing is calculated as a percentage of the Total Project Cost. FFRDC costs must be included in Total Project Costs. Following is an example of how to calculate cost sharing amounts for a project with $1,000,000 in federal funds with a minimum 20% non-federal cost sharing requirement:

- Formula: Federal share ($) divided by Federal share (%) = Total Project Cost
  Example: $1,000,000 divided by 80% = $1,250,000

- Formula: Total Project Cost ($) minus Federal share ($) = Non-federal share ($)
  Example: $1,250,000 minus $1,000,000 = $250,000

- Formula: Non-federal share ($) divided by Total Project Cost ($) = Non-federal share (%)
  Example: $250,000 divided by $1,250,000 = 20%

What Qualifies For Cost Sharing

While it is not possible to explain what specifically qualifies for cost sharing in one or even a couple of sentences, in general, if a cost is allowable under the cost principles applicable to the organization incurring the cost and is eligible for reimbursement under an EERE grant or cooperative agreement, then it is allowable as cost share. Conversely, if the cost is not allowable under the cost principles and not eligible for reimbursement, then it is not allowable as cost share. In addition, costs may not be counted as cost share if they are paid by the Federal Government under another award unless authorized by Federal statute to be used for cost sharing.

The rules associated with what is allowable as cost share are specific to the type of organization that is receiving funds under the grant or cooperative agreement, though are generally the same for all types of entities. The specific rules applicable to:

- FAR Part 31 for For-Profit entities, (48 CFR Part 31); and
- 2 CFR Part 200 Subpart E - Cost Principles for all other non-federal entities.

In addition to the regulations referenced above, other factors may also come into play such as timing of donations and length of the project period. For example, the value of ten years of donated maintenance on a project that has a project period of five years would not be fully allowable as cost share. Only the value for the five years of donated maintenance that corresponds to the project period is allowable and may be counted as cost share.

Additionally, EERE generally does not allow pre-award costs for either cost share or reimbursement when these costs precede the signing of the appropriation bill that funds the award. In the case of a competitive award, EERE generally does not allow pre-award costs prior to the signing of the Selection Statement by the EERE Selection Official.

DOE Financial Assistance Rules 2 CFR Part 200 as amended by 2 CFR Part 910

As stated above, the rules associated with what is allowable cost share are generally the same for all types of organizations. Following are the rules found to be common, but again, the specifics are contained in the regulations and cost principles specific to the type of entity:

(A) Acceptable contributions. All contributions, including cash contributions and third party in-kind contributions, must be accepted as part of the Prime Recipient's cost sharing if such contributions meet all of the following criteria:

(1) They are verifiable from the recipient's records.

(2) They are not included as contributions for any other federally-assisted project or program.

(3) They are necessary and reasonable for the proper and efficient accomplishment of project or program objectives.

(4) They are allowable under the cost principles applicable to the type of entity incurring the cost as follows:

a. For-profit organizations. Allowability of costs incurred by for-profit organizations and those nonprofit organizations listed in Attachment C to OMB Circular A–122 is determined in accordance with the for-profit cost principles in 48 CFR Part 31

in the Federal Acquisition Regulation, except that patent prosecution costs are not allowable unless specifically authorized in the award document. (v) Commercial Organizations. FAR Subpart 31.2—Contracts with Commercial Organizations

b. Other types of organizations. For all other non-federal entities, allowability of costs is determined in accordance with 2 CFR Part 200 Subpart E.

(5) They are not paid by the Federal Government under another award unless authorized by Federal statute to be used for cost sharing or matching.

(6) They are provided for in the approved budget.

(B) Valuing and documenting contributions

(1) Valuing recipient's property or services of recipient's employees. Values are established in accordance with the applicable cost principles, which mean that amounts chargeable to the project are determined on the basis of costs incurred. For real property or equipment used on the project, the cost principles authorize depreciation or use charges. The full value of the item may be applied when the item will be consumed in the performance of the award or fully depreciated by the end of the award. In cases where the full value of a donated capital asset is to be applied as cost sharing or matching, that full value must be the lesser or the following:

a. The certified value of the remaining life of the property recorded in the recipient's accounting records at the time of donation; or
b. The current fair market value. If there is sufficient justification, the Contracting Officer may approve the use of the current fair market value of the donated property, even if it exceeds the certified value at the time of donation to the project. The Contracting Officer may accept the use of any reasonable basis for determining the fair market value of the property.

(2) Valuing services of others' employees. If an employer other than the recipient furnishes the services of an employee, those services are valued at the employee's regular rate of pay, provided these services are for the same skill level for which the employee is normally paid.

(3) Valuing volunteer services. Volunteer services furnished by professional and technical personnel, consultants, and other skilled and unskilled labor may be counted as cost sharing or matching if the service is an integral and necessary part of an approved project or program. Rates for volunteer services must be consistent with those paid for similar work in the recipient's organization. In those markets in

which the required skills are not found in the recipient organization, rates must be consistent with those paid for similar work in the labor market in which the recipient competes for the kind of services involved. In either case, paid fringe benefits that are reasonable, allowable, and allocable may be included in the valuation.

(4) Valuing property donated by third parties.

a. Donated supplies may include such items as office supplies or laboratory supplies. Value assessed to donated supplies included in the cost sharing or matching share must be reasonable and must not exceed the fair market value of the property at the time of the donation.

b. Normally only depreciation or use charges for equipment and buildings may be applied. However, the fair rental charges for land and the full value of equipment or other capital assets may be allowed, when they will be consumed in the performance of the award or fully depreciated by the end of the award, provided that the Contracting Officer has approved the charges. When use charges are applied, values must be determined in accordance with the usual accounting policies of the recipient, with the following qualifications:

i. The value of donated space must not exceed the fair rental value of comparable space as established by an independent appraisal of comparable space and facilities in a privately-owned building in the same locality.
ii. The value of loaned equipment must not exceed its fair rental value.

(5) Documentation. The following requirements pertain to the recipient's supporting records for in-kind contributions from third parties:

a. Volunteer services must be documented and, to the extent feasible, supported by the same methods used by the recipient for its own employees.

b. The basis for determining the valuation for personal services and property must be documented.

Appendix B – Sample Cost Share Calculation for Blended Cost Share Percentage

The following example shows the math for calculating required cost share for a project with $2,000,000 in Federal funds with four tasks requiring different Non-federal cost share percentages:

Task	Proposed Federal Share	Federal Share %	Recipient Share %
Task 1 (R&D)	$1,000,000	80%	20%
Task 2 (R&D)	$500,000	80%	20%
Task 3 (Demonstration)	$400,000	50%	50%
Task 4 (Outreach)	$100,000	100%	0%

Federal share ($) divided by Federal share (%) = Task Cost

Each task must be calculated individually as follows:

Task 1
$1,000,000 divided by 80% = $1,250,000 (Task 1 Cost)
Task 1 Cost minus federal share = Non-federal share
$1,250,000 - $1,000,000 = $250,000 (Non-federal share)

Task 2
$500,000 divided 80% = $625,000 (Task 2 Cost)
Task 2 Cost minus federal share = Non-federal share
$625,000 - $500,000 = $125,000 (Non-federal share)

Task 3
$400,000 / 50% = $800,000 (Task 3 Cost)
Task 3 Cost minus federal share = Non-federal share
$800,000 - $400,000 = $400,000 (Non-federal share)

Task 4
Federal share = $100,000
Non-federal cost share is not mandated for outreach = $0 (Non-federal share)

The calculation may then be completed as follows:

Tasks	$ Federal Share	% Federal Share	$ Non-Federal Share	% Non-Federal Share	Total Project Cost
Task 1	$1,000,000	80%	$250,000	20%	$1,250,000
Task 2	$500,000	80%	$125,000	20%	$625,000
Task 3	$400,000	50%	$400,000	50%	$800,000
Task 4	$100,000	100%	$0	0%	$100,000
Totals	$2,000,000		$775,000		$2,775,000

Blended Cost Share %
Non-federal share ($775,000) divided by Total Project Cost ($2,775,000) = 27.9% (Non-federal)
Federal share ($2,000,000) divided by Total Project Cost ($2,775,000) = 72.1% (Federal)

Appendix C – Waiver Requests: Foreign Entity Participation as the Prime Recipient and Performance of Work in the United States

1. Waiver for Foreign Entity Participation as the Prime Recipient

As set forth in Section III.A.iii, all Prime Recipients receiving funding under this FOA must be incorporated (or otherwise formed) under the laws of a State or territory of the United States. To request a waiver of this requirement, an applicant must submit an explicit waiver request in the Full Application.

Overall, the applicant must demonstrate to the satisfaction of EERE that it would further the purposes of this FOA and is otherwise in the economic interests of the United States to have a foreign entity serve as the Prime Recipient. A request to waive the *Foreign Entity Participation as the Prime Recipient* requirement must include the following:

- Entity name;
- The rationale for proposing a foreign entity to serve as the Prime Recipient;
- Country of incorporation;
- A description of the project's anticipated contributions to the US economy;
    - How the project will benefit U.S. research, development and manufacturing, including contributions to employment in the U.S. and growth in new markets and jobs in the U.S.;
    - How the project will promote domestic American manufacturing of products and/or services;
- A description of how the foreign entity's participation as the Prime Recipient is essential to the project;
- A description of the likelihood of Intellectual Property (IP) being created from the work and the treatment of any such IP;
- Countries where the work will be performed (Note: if any work is proposed to be conducted outside the U.S., the applicant must also complete a separate request for waiver of the Performance of Work in the United States requirement).

EERE may require additional information before considering the waiver request.

The applicant does not have the right to appeal EERE's decision concerning a waiver request.

2. Waiver for Performance of Work in the United States

As set forth in Section IV.K.iii, all work under EERE funding agreements must be performed in the United States. This requirement does not apply to the purchase of supplies and equipment,

so a waiver is not required for foreign purchases of these items. However, the Prime Recipient should make every effort to purchase supplies and equipment within the United States. There may be limited circumstances where it is in the interest of the project to perform a portion of the work outside the United States. To seek a waiver of the Performance of Work in the United States requirement, the applicant must submit an explicit waiver request in the Full Application. A separate waiver request must be submitted for each entity proposing performance of work outside of the United States.

Overall, a waiver request must demonstrate to the satisfaction of EERE that it would further the purposes of this FOA and is otherwise in the economic interests of the United States to perform work outside of the United States. A request to waive the *Performance of Work in the United States* requirement must include the following:

- The rationale for performing the work outside the U.S. ("foreign work");
- A description of the work proposed to be performed outside the U.S.;
- An explanation as to how the foreign work is essential to the project;
- A description of the anticipated benefits to be realized by the proposed foreign work and the anticipated contributions to the US economy;
    - The associated benefits to be realized and the contribution to the project from the foreign work;
    - How the foreign work will benefit U.S. research, development and manufacturing, including contributions to employment in the U.S. and growth in new markets and jobs in the U.S.;
    - How the foreign work will promote domestic American manufacturing of products and/or services;
- A description of the likelihood of Intellectual Property (IP) being created from the foreign work and the treatment of any such IP;
- The total estimated cost (DOE and Recipient cost share) of the proposed foreign work;
- The countries in which the foreign work is proposed to be performed; and
- The name of the entity that would perform the foreign work.

EERE may require additional information before considering the waiver request.

The applicant does not have the right to appeal EERE's decision concerning a waiver request.

Appendix D - Data Management Plan

A data management plan ("DMP") explains how data generated in the course of the work performed under an EERE award will be shared and preserved or, when justified, explains why data sharing or preservation is not possible or scientifically appropriate.

DMP Requirements

In order for a DMP to be considered acceptable, the DMP must address the following:

At a minimum, the DMP must describe how data sharing and preservation will enable validation of the results from the proposed work, or how results could be validated if data are not shared or preserved.

The DMP must provide a plan for making all research data displayed in publications resulting from the proposed work digitally accessible at the time of publication. This includes data that are displayed in charts, figures, images, etc. In addition, the underlying digital research data used to generate the displayed data should be made as accessible as possible in accordance with the principles stated above. This requirement could be met by including the data as supplementary information to the published article, or through other means. The published article should indicate how these data can be accessed.

The DMP should consult and reference available information about data management resources to be used in the course of the proposed work. In particular, a DMP that explicitly or implicitly commits data management resources at a facility beyond what is conventionally made available to approved users should be accompanied by written approval from that facility. In determining the resources available for data management at DOE User Facilities, researchers should consult the published description of data management resources and practices at that facility and reference it in the DMP. Information about other DOE facilities can be found in the additional guidance from the sponsoring program.

The DMP must protect confidentiality, personal privacy, Personally Identifiable Information, and U.S. national, homeland, and economic security; recognize proprietary interests, business confidential information, and intellectual property rights; avoid significant negative impact on innovation, and U.S. competitiveness; and otherwise be consistent with all laws (i.e., export control laws), and DOE regulations, orders, and policies.

Data Determination for a DMP

The Principal Investigator should determine which data should be the subject of the DMP and, in the DMP, propose which data should be shared and/or preserved in accordance with the DMP Requirements noted above.

For data that will be generated through the course of the proposed work, the Principal Investigator should indicate what types of data should be protected from immediate public disclosure by DOE (referred to as "protected data") and what types of data that DOE should be able to release immediately. Similarly, for data developed outside of the proposed work at private expense that will be used in the course of the proposed work, the Principal Investigator should indicate whether that type of data will be subject to public release or kept confidential (referred to as "limited rights data"). Any use of limited rights data or labeling of data as "protected data" must be consistent with the DMP Requirements noted above.

Suggested Elements for a DMP

The following list of elements for a DMP provides suggestions regarding the data management planning process and the structure of the DMP:

Data Types and Sources: A brief, high-level description of the data to be generated or used through the course of the proposed work and which of these are considered digital research data necessary to validate the research findings or results.

Content and Format: A statement of plans for data and metadata content and format including, where applicable, a description of documentation plans, annotation of relevant software, and the rationale for the selection of appropriate standards. Existing, accepted community standards should be used where possible. Where community standards are missing or inadequate, the DMP could propose alternate strategies for facilitating sharing, and should advise the sponsoring program of any need to develop or generalize standards.

Sharing and Preservation: A description of the plans for data sharing and preservation. This should include, when appropriate: the anticipated means for sharing and the rationale for any restrictions on who may access the data and under what conditions; a timeline for sharing and preservation that addresses both the minimum length of time the data will be available and any anticipated delay to data access after research findings are published; any special requirements for data sharing, for example, proprietary software needed to access or interpret data, applicable policies, provisions, and licenses for re-use and re-distribution, and for the production of derivatives, including guidance for how data and data products should be cited; any resources and capabilities (equipment, connections,

systems, software, expertise, etc.) requested in the research proposal that are needed to meet the stated goals for sharing and preservation (this could reference the relevant section of the associated research proposal and budget request); and whether/where the data will be preserved after direct project funding ends and any plans for the transfer of responsibilities for sharing and preservation.

Protection: A statement of plans, where appropriate and necessary, to protect confidentiality, personal privacy, Personally Identifiable Information, and U.S. national, homeland, and economic security; recognize proprietary interests, business confidential information, and intellectual property rights; and avoid significant negative impact on innovation, and U.S. competitiveness.

Rationale: A discussion of the rationale or justification for the proposed data management plan including, for example, the potential impact of the data within the immediate field and in other fields, and any broader societal impact.

Additional Guidance

In determining which data should be shared and preserved, researchers must consider the data needed to validate research findings as described in the Requirements, and are encouraged to consider the potential benefits of their data to their own fields of research, fields other than their own, and society at large.

DMPs should reflect relevant standards and community best practices and make use of community accepted repositories whenever practicable.

Costs associated with the scope of work and resources articulated in a DMP may be included in the proposed research budget as permitted by the applicable cost principles.

To improve the discoverability of and attribution for datasets created and used in the course of research, EERE encourages the citation of publicly available datasets within the reference section of publications, and the identification of datasets with persistent identifiers such as Digital Object Identifiers (DOIs). In most cases, EERE can provide DOIs free of charge for data resulting from DOE-funded research through its Office of Scientific and Technical Information (OSTI) DataID Service.

Definitions

Data Preservation: Data preservation means providing for the usability of data beyond the lifetime of the research activity that generated them.

Data Sharing: Data sharing means making data available to people other than those who have generated them. Examples of data sharing range from bilateral communications with colleagues, to providing free, unrestricted access to anyone through, for example, a web-based platform.

Digital Research Data: The term digital data encompasses a wide variety of information stored in digital form including: experimental, observational, and simulation data; codes, software and algorithms; text; numeric information; images; video; audio; and associated metadata. It also encompasses information in a variety of different forms including raw, processed, and analyzed data, published and archived data.

Research Data: The recorded factual material commonly accepted in the scientific community as necessary to validate research findings, but not any of the following: preliminary analyses, drafts of scientific papers, plans for future research, peer reviews, or communications with colleagues. This 'recorded' material excludes physical objects (e.g., laboratory samples). Research data also do not include:

> (A) Trade secrets, commercial information, materials necessary to be held confidential by a researcher until they are published, or similar information which is protected under law; and
>
> (B) Personnel and medical information and similar information the disclosure of which would constitute a clearly unwarranted invasion of personal privacy, such as information that could be used to identify a particular person in a research study."

Validate: In the context of DMPs, validate means to support, corroborate, verify, or otherwise determine the legitimacy of the research findings. Validation of research findings could be accomplished by reproducing the original experiment or analyses; comparing and contrasting the results against those of a new experiment or analyses; or by some other means.