



U.S. DEPARTMENT OF  
**ENERGY**

Energy Efficiency &  
Renewable Energy

# DOE SBIR/STTR Fiscal Year 2013: Phase 1 Release 2 – EERE Topics Webinar

Monday, November 5, 2012

**Tina Kaarsberg, Ph.D.**  
**Wes Anderson**

EERE SBIR Lead  
EERE Deputy SBIR Lead

# EERE Topics and POCs

Topic/Technology	POC(s)	Topic #
EERE Overview/Update	Tina Kaarsberg <a href="mailto:tina.kaarsberg@ee.doe.gov">tina.kaarsberg@ee.doe.gov</a> Wes Anderson <a href="mailto:wes.anderson@ee.doe.gov">wes.anderson@ee.doe.gov</a>	N/A
Advanced Manufacturing	Bhima Sastri <a href="mailto:bhima.sastri@ee.doe.gov">bhima.sastri@ee.doe.gov</a>	2
Biomass	Travis Tempel <a href="mailto:travis.tempel@ee.doe.gov">travis.tempel@ee.doe.gov</a> Prasad Gupte <a href="mailto:prasad.gupte@ee.doe.gov">prasad.gupte@ee.doe.gov</a>	3
Buildings	James Brodrick <a href="mailto:james.brodrick@ee.doe.gov">james.brodrick@ee.doe.gov</a> Jessica Knapstein <a href="mailto:jessica.knapstein@ee.doe.gov">jessica.knapstein@ee.doe.gov</a>	4
Geothermal	Joshua Mengers <a href="mailto:joshua.mengers@ee.doe.gov">joshua.mengers@ee.doe.gov</a>	5
Hydrogen Technologies	Erika Sutherland <a href="mailto:erika.sutherland@ee.doe.gov">erika.sutherland@ee.doe.gov</a> Grace Ordaz <a href="mailto:grace.ordaz@ee.doe.gov">grace.ordaz@ee.doe.gov</a>	6
Solar	Victor Kane, Michael Cliggett, and Joseph Stekli <a href="mailto:solar.sbir@ee.doe.gov">solar.sbir@ee.doe.gov</a>	7
Vehicles	Brian Cunningham <a href="mailto:brian.cunningham@ee.doe.gov">brian.cunningham@ee.doe.gov</a> Gurpreet Singh <a href="mailto:gurpreet.singh@ee.doe.gov">gurpreet.singh@ee.doe.gov</a> Steven Przesmitzki <a href="mailto:steven.przesmitzki@ee.doe.gov">steven.przesmitzki@ee.doe.gov</a> Steven Boyd <a href="mailto:steven.boyd@ee.doe.gov">steven.boyd@ee.doe.gov</a>	8
Water	Tim Ramsey <a href="mailto:tim.ramsey@ee.doe.gov">tim.ramsey@ee.doe.gov</a> Rajesh Dham <a href="mailto:rajesh.dham@ee.doe.gov">rajesh.dham@ee.doe.gov</a>	9
Wind	Joel Cline <a href="mailto:joel.cline@ee.doe.gov">joel.cline@ee.doe.gov</a> Mark Higgins <a href="mailto:mark.higgins@ee.doe.gov">mark.higgins@ee.doe.gov</a>	10
Joint: Buildings/Solar	Bahman Habibzadeh <a href="mailto:bahman.habibzadeh@ee.doe.gov">bahman.habibzadeh@ee.doe.gov</a> Carmen Cioc <a href="mailto:carmen.cioc@ee.doe.gov">carmen.cioc@ee.doe.gov</a>	11
Technology Transfer - PV	Victor Kane and Carmen Cioc (emails above)	12

# EERE Overview/Update and Where to Find Topic Q&A

**Topics:** The 12 EERE FY13 Phase I Release 2 Topics and 22 subtopics are a hybrid of broad and focused topics with most falling in between. Like the broad topics of FY12 Phase I Release 3, all are performance oriented and support the goals of the respective program office.

**Web Page:** EERE has its own SBIR web page that will link to the DOE SBIR page (and the recorded webinar). It also will include broadly applicable

## **questions and answers**

we have received on these topics, so visit early and often:

[http://www1.eere.energy.gov/office\\_eere/oe\\_sbir.html](http://www1.eere.energy.gov/office_eere/oe_sbir.html)

**EERE Reforms:** Like the rest of EERE, the EERE SBIR team is working to become more accountable, user friendly and transparent for our stakeholders. Please send your suggestions on how EERE SBIR can better itself to:

[tina.kaarsberg@ee.doe.gov](mailto:tina.kaarsberg@ee.doe.gov) or [wes.anderson@ee.doe.gov](mailto:wes.anderson@ee.doe.gov)

# Advanced Manufacturing Office

**Topic 2:** The EERE [Advanced Manufacturing Office](#) seeks transformational manufacturing process technologies and in-situ metrology and process controls that will **reduce energy consumption and cost in manufacturing by 50%**.

- (a) Manufacturing Process
- (b) In-Situ Metrology and Process Controls

**Subtopic 2(a) Manufacturing Process:** Manufacturing technology innovations that can address challenges associated with multi-material joining techniques:

1. Thermal expansion mismatch;
2. Reduced temperature and load ranges; and
3. Increased directionality

**Subtopic 2(b) In-Situ Metrology and Process Controls:** Characterizing materials and monitoring processes in real time allows for tighter process control which can contribute to reducing cost, halving energy use, and improving the quality of final products. **Projects are sought that could contribute to > 50% energy savings in the manufacturing sector.**

Of particular interest are projects that develop integrated metrology solutions for in-situ, real-time, non-contact, and non-destructive measurement, incorporate numerical techniques (e.g. statistical analysis) and demonstrate value to industry with improved product performance, yield, reduce failure rate, etc. with a cost-competitive solution for different applications.

**Questions – contact: Bhima Sastri, [bhima.sastri@ee.doe.gov](mailto:bhima.sastri@ee.doe.gov)**

# Office of the Biomass Program

**Topic 3:** The EERE [Office of the Biomass Program](#) supports research, development, deployment, and demonstration activities to support diverse, cost-effective bioenergy technologies including:

- (a) Measuring and Improving Biomass Quality throughout the Feedstock Supply Chain
- (b) Design and Fabrication of Solids Handling for Biomass Conversion Systems

**Subtopic 3(a) Measuring and Improving Biomass Quality:** The development of innovative methods or tools to harvest, store, preprocess, or transport biomass feedstock and to measure feedstock specifications throughout the supply chain. The feedstock specifications to be measured must be directly linked to a specific downstream conversion process to adequately assess the impact of each step. **Methods and tools directed towards high-moisture biomass supply chains (i.e. sorghum, energy cane, wood chips, other feedstocks with >30% moisture) are encouraged.**

By the end of Phase I, projects should benchmark the performance of existing technology and demonstrate that the proposed technology can effectively improve and/or measure relevant biomass specifications throughout the supply chain.

Questions – contact: Travis Tempel, [travis.tempel@ee.doe.gov](mailto:travis.tempel@ee.doe.gov)

# Office of the Biomass Program

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**Subtopic 3(b) Solids Handling for Biomass Conversion Systems:** Applications are sought for designs and prototype equipment that will enable continuous biomass solids handling into a controlled reactor environment. Consideration will be given to ideas that would allow for multiple feedstocks, easy manufacturability including use of non-specialized materials of construction, or other features that would appeal to multiple conversion technology providers. Applications are also sought for innovative methods to remove and/or upgrade the solids from biomass conversion reactors, such as ash, char, or lignin.

Questions – contact: Prasad Gupte, [prasad.gupte@ee.doe.gov](mailto:prasad.gupte@ee.doe.gov)

# Building Technologies Program

**Topic 4:** The EERE [Building Technologies Program](#) is looking for efforts that will encourage and accelerate SSL adoption in buildings and other lit spaces, such as parking lots or roadways, by identifying innovations whose commercial successes are likely to have a profound impact on the evolution of SSL.

(a) Energy Conservation Applications for Solid-State Lighting (OLEDs)

**Subtopic 4(a):** Only applications of emerging Organic Light Emitting Diodes (OLED) technology specifically applied to energy conservation, efficient and practical OLED luminaries, panels, or constituents are sought. Since OLED technology currently has only a small fraction of the overall LED market, key enabling, and even disruptive applications are relevant to this topic.

Successful applications must:

1. Be consistent and have performance metrics linked to the [DOE SSL Multi-Year Program Plan](#);
2. Clearly define the proposed application and innovation; and
3. Include quantitative projections for price and/or performance improvement (fully justify performance claims).

**Questions – contact: James Brodrick, [james.brodrick@ee.doe.gov](mailto:james.brodrick@ee.doe.gov)**

# Geothermal Technologies Program

**Topic 5:** The EERE [Geothermal Technologies Program](#) works to establish geothermal as an economically competitive contributor to the U.S. energy supply. Areas of interest include identifying, accessing, creating, and sustaining hydrothermal and enhanced geothermal system (EGS) reservoirs. **Technologies for electricity generation from marine geothermal resources will NOT be considered under this topic.**

(a) Non-Prime Mover Technologies that Reduce Energy Costs

**Subtopic 5(a) Non-Prime Mover Technologies that Reduce Energy Costs:** Seeks non-prime mover technologies that may reduce the levelized cost of electricity from **new hydrothermal development to 6¢/ kWh by 2020** and **Enhanced Geothermal Systems (EGS) to 6¢/ kWh by 2030**.

Applicants should consider using the Geothermal Electricity Technology Evaluation Model ([GETEM](#)) developed by GTO to model power generation costs and the potential for technology improvements to affect these costs.

**NOT** seeking and will **NOT consider** “prime mover” technologies (i.e., technologies for electricity generation from geothermal heat and fluid resources). Excluded technologies include both conventional Rankine/binary power conversion units and other prime mover technologies for transforming the energy contained in the geothermal resource into electricity.

**Questions – contact:** Joshua Mengers, [joshua.mengers@ee.doe.gov](mailto:joshua.mengers@ee.doe.gov)



# Fuel Cell Technologies Program

**Topic 6:** The EERE [Fuel Cell Technologies Program](#) enables the widespread commercialization and near-term use of fuel cell technologies for stationary, portable, and transportation applications. **For this topic, Fuel Cell Technologies is looking for applications focused on hydrogen dispenser systems.**

- (a) Hydrogen Dispenser Hose Assemblies
- (b) Other

**Subtopic 5(a) Hydrogen Dispenser Hose Assemblies:** Seeks proposals to develop hose assemblies that can ensure reliability and safety in hydrogen service at 700 bar while:

1. helping to **lower the cost of the overall dispenser system from the current status of \$50,000 to the 2015 target \$40,000 for an 860 bar dispenser.** This target assumes there are two hoses on each dispenser, one on each side of the dispenser, similar to gasoline dispensers.
2. have a maximum working pressure of at least 860 bars, **meet or exceed the requirements of ANSI/CSA HGV 4.2-2012 for class D hoses, and improve upon the reliability and safety of hose assemblies in use.** Additionally the hose should be designed such that, if integrated into a dispenser system, the dispenser could be made **compliant with SAE TIR J2601 and NIST Handbook 44 where relevant.**

**Subtopic 5(b) Other:** In addition to the specifics of subtopic a, Fuel Cells is seeking applications in other areas that fall within the scope of **hydrogen dispenser systems.**

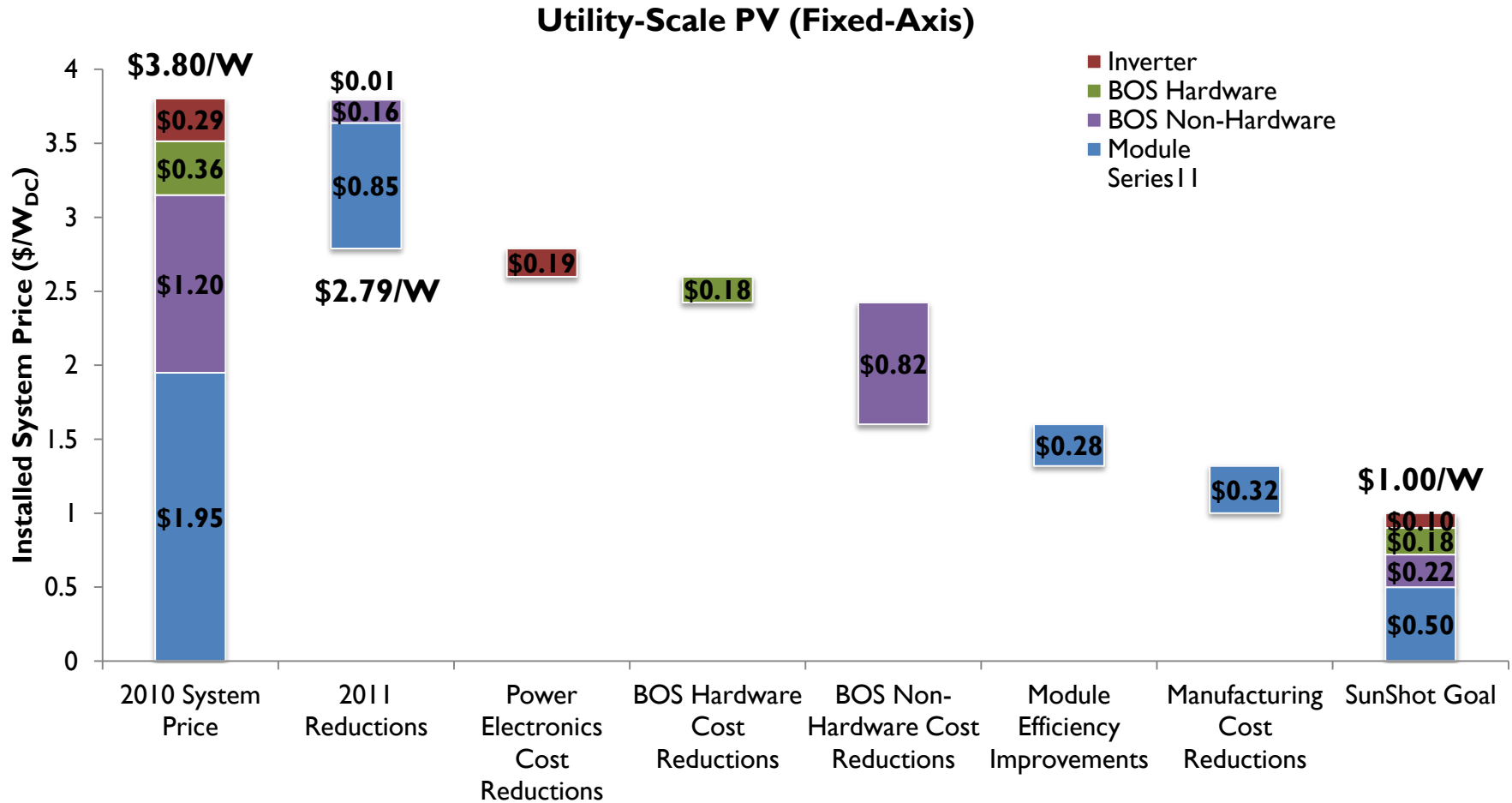
**Questions – contact:** Erika Sutherland, [erika.sutherland@ee.doe.gov](mailto:erika.sutherland@ee.doe.gov)

# SunShot Initiative

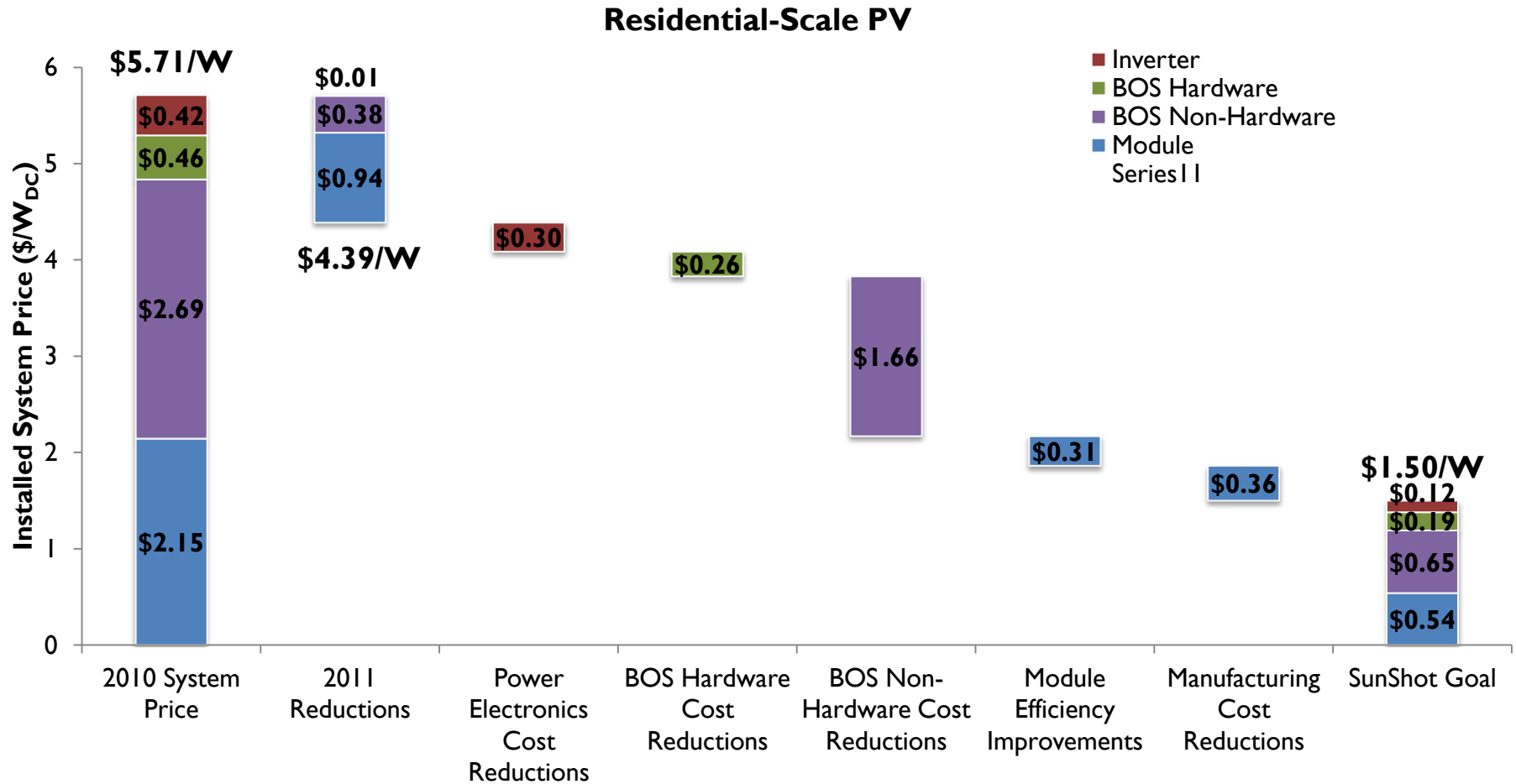
**Topic 7:** The EERE [SunShot Initiative](#) aims to achieve subsidy-free, cost competitive solar power by the end of the decade.

- (a) PV Module Degradation;
- (b) Module and System Manufacturing Metrology, Diagnostics, and Process Control;
- (c) Balance of System (non-hardware); and
- (d) Concentrated Solar Power.

# SunShot Initiative: PV System Pathway to SunShot



# SunShot Initiative: PV System Pathway to SunShot



# SunShot Initiative

**Subtopic 7(a) PV Module Degradation:** Seeking applications to commercialize technologies that solve module degradation and failure issues, such as water ingress and temperature stress are sought. Successful applicants should offer solutions to model or eliminate all or some causes of module degradation through physics based degradation software for lifetime predictions, novel cost-effective photovoltaics module components, new module architectures, or innovative low cost and small floor print manufacturing methods, processes, and tests of modules and module subcomponents.

**Subtopic 7(b) Module and System Manufacturing Metrology, Diagnostics, and Process Control:** Seeking applications for innovative, high performance, intelligent process control, and real-time nondestructive material characterization devices for use in metrology, diagnostics, and process quality control on the manufacturing lines for PV modules and systems.

**Questions – contact: Victor Kane, [solar.sbir@ee.doe.gov](mailto:solar.sbir@ee.doe.gov)**

# SunShot Initiative

**Subtopic 7(c): Balance of System (NON-HARDWARE)** Applications that develop an online, graphical user interface-friendly calculator of the wind-loads on PV ground-mount and roof-mount systems are sought.

The developed calculator **must**:

1. **Be able to perform preliminary assessments of the uplift and downforce loads on a PV mounting system, and provide viable solutions from available mounting systems, with the final goal of reducing the cost of the mounting system and installation.**
2. **Be based on the existing code-writing bodies that apply directly to PV systems, like the American Society of Civil Engineers (ASCE) - 7 standards, and Solar America Board for Codes and Standards (Solar ABCs).**

The user **must**:

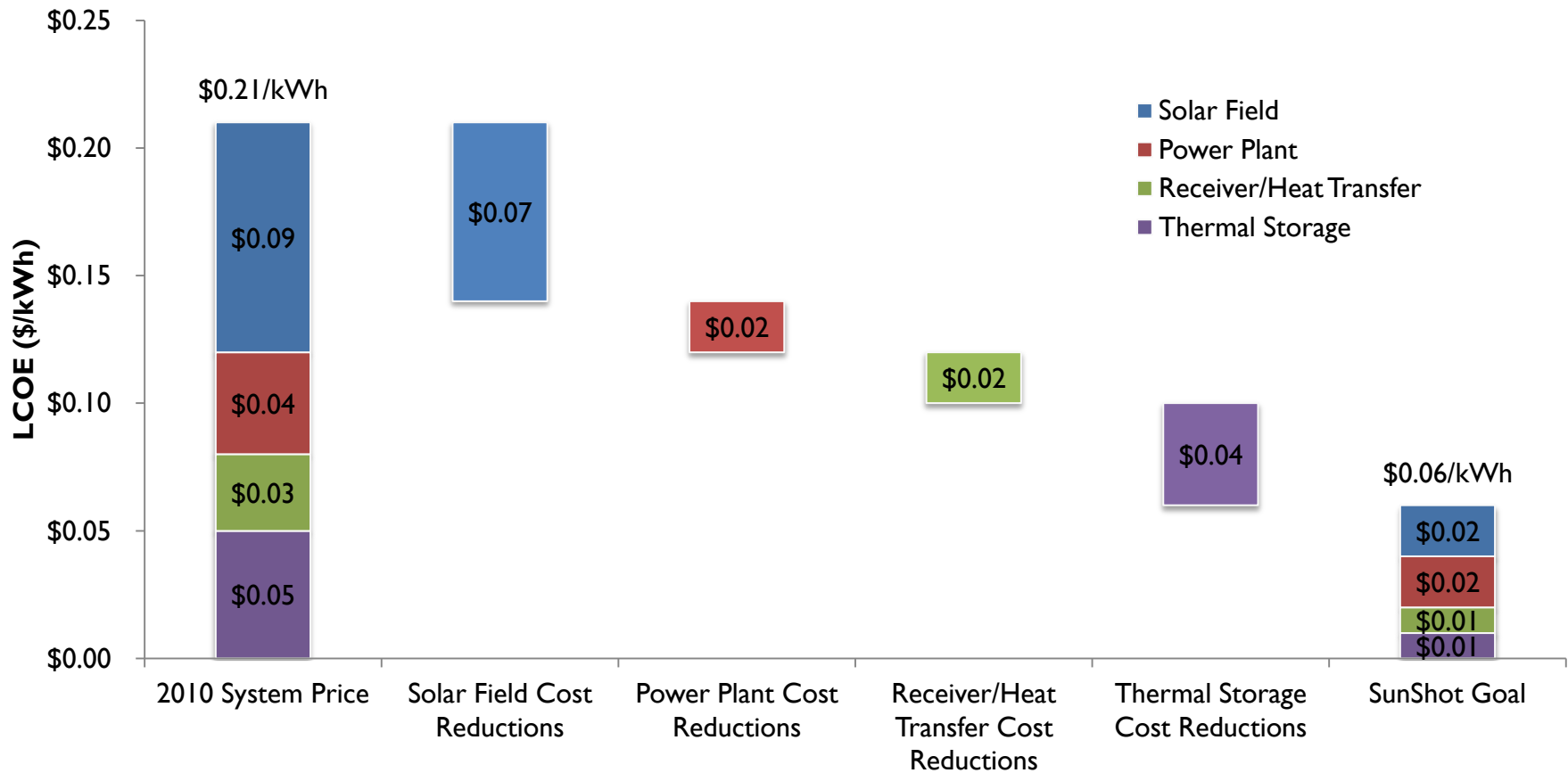
1. **Be able to enter the location, topography, desired roof dimensions and pitch, PV panel dimensions, total number of PV panels, local weather patterns, etc.**

The software **output should**:

1. **yield an assessment of the wind loads on the given design, best configuration of PV system on the roof, and the wind loads that the PV mounting system and that configuration needs to overcome.**
2. **Additionally, solutions for fastening methods should be provided (ballast requirements, or structural fasteners).**

Questions – contact: Mike Cliggett, [solar.sbir@ee.doe.gov](mailto:solar.sbir@ee.doe.gov)

# SunShot Initiative: CSP System Pathway to SunShot



# SunShot Initiative

**Subtopic 7(d): Concentrating Solar Power (CSP)** DOE defines CSP as solar technology that converts sunlight to heat before converting it to electricity; CPV systems, which concentrate light onto a Photovoltaic cell, are not included in this topic

1. CSP system **should fall within the size range of 1kW to 1MW.**
2. The storage technology the system is coupled to **should be capable of at least 6 hours of electricity generation when running at full capacity.**
3. Any technology proposed should be capable of achieving the SunShot target of **6cents/kWh by 2020.**
4. All systems proposed **must generate electricity as the main function of the system.**
5. The system **may additionally provide combined heat and power (CHP), solar hot water, or any other useful product; however,  $\geq 50\%$  of the incident sunlight on the system should be used for electricity generation in order to be considered responsive to the topic.**

Questions – contact: Joseph Stekli, [solar.sbir@ee.doe.gov](mailto:solar.sbir@ee.doe.gov)



# Vehicle Technologies Program

**Topic 8:** EERE's [Vehicle Technologies Program](#) is focused on developing technologies to enable average new vehicle fuel economy of more than 60 miles per gallon for cars and more than 43 miles per gallon for trucks by 2025.

- (a) Electric Drive Vehicle Batteries;
- (b) Combustion;
- (c) Dual-Fuel Vehicle Technologies; and
- (d) Electric Drive Vehicle Power Electronics Subcomponent Improvements

**Subtopic 8(a) Electric Drive Vehicle Batteries:** Applications are sought for electrochemical energy storage technologies that support commercialization of micro, mild, and full HEVs, PHEVs, and EVs. Proposals must clearly demonstrate how they advance the current state of the art and address the performance [metrics](#).

When appropriate, evaluation of the technology should be performed in accordance with [applicable test procedures or recommended practices](#) as published by the Department of Energy (DOE) and the U.S Advanced Battery Consortium (USABC).

Proposals **will be deemed non-responsive** if the proposed technology is cost prohibitive to market penetration; requires substantial infrastructure investments or industry standardization to be commercially viable; or cannot accept high power recharge pulses from regenerative braking.

**Questions – contact:** Brian Cunningham, [brian.cunningham@ee.doe.gov](mailto:brian.cunningham@ee.doe.gov)

# Vehicle Technologies Program

**Subtopic 8(b): Combustion** Advanced ignition concepts are sought that

1. Extend the lean ignition limit to air/fuel ratio  $> 20$ ,
2. Enable reliable ignition under high in-cylinder pressures (up to 100 bar at the time of ignition) thus enabling high load operation,
3. Enable operation under high levels of exhaust gas recirculation, and
4. Lower or maintain ignitability (coefficient of variance of IMEP  $< 3\%$ ).

Advanced ignition systems such as, laser ignition, microwave ignition, plasma jet ignition, or those using advanced concepts such as pulse trains, pre-chamber spark plugs, etc. are considered candidates.

Questions – contact: **Gurpreet Singh**, [gurpreet.singh@ee.doe.gov](mailto:gurpreet.singh@ee.doe.gov)

# Vehicles Technologies Program

**Subtopic 8(c): Dual-Fuel Vehicle Technologies** Dual-fuel concepts are sought for light-duty passenger car applications that

1. Increase engine efficiency by exploiting the fuel properties,
2. Displace/reduce petroleum usage,
3. Enable use of existing emissions controls,
4. Meet all emissions and on-board diagnostic requirements, and
5. Where the engine can switch between operation on 100% gasoline, 100% other fuel, or a combination of both without having to refuel.

The technology **must be able to be retrofitted into existing on-road vehicles or incorporated into current production models and demonstrate at least a 50% petroleum reduction**. Fuel savings must occur over a typical drive cycle and the technology must be capable of being retrofit into multiple models of 2005 model year or newer vehicles. The cost of retrofitting or additional production costs must be recovered by fuel savings within 15,000 miles.

Questions – contact: Steven Przesmitzki, [steven.przesmitzki@ee.doe.gov](mailto:steven.przesmitzki@ee.doe.gov)

# Vehicles Technologies Program

**Subtopic 8(d): Electric Drive Vehicle Power Electronics Subcomponent Improvements** Applicants are sought to develop subcomponent-level improvements to power electronic inverters or converters which would support commercialization of micro, mild, and full HEVs, PHEVs, and EVs. Specific improvements sought for this topic are:

1. Small, lightweight low loss magnetic materials for passive inductors
2. High temperature (250°C capable) thermal interface materials with low electrical resistivity
3. High temperature (250°C capable) on-chip high voltage gate drivers

Questions – contact: Steven Boyd, [steven.boyd@ee.doe.gov](mailto:steven.boyd@ee.doe.gov)

# Water Power Technology Program

**Topic 9:** EERE's [Water Power Technology Program](#) seeks proposals that contribute to large cost reductions in the deployment of U.S. water, hydro- and marine, power resources including

- (a) Marine and Hydrokinetic Energy; and
- (b) Hydropower Applications

**Subtopic 9(a) Marine and Hydrokinetic Energy:** Areas of interest include wave energy converters and energy conversion technologies for tidal, river, and ocean currents. DOE will fund analytical studies of innovative concepts (TRL 1-3) or projects that propose a sound but novel approach to a potentially important water power technology, science, or engineering breakthrough that can be applied to, or add to the portfolio of, innovative water power technologies. This can be a solution or an improvement to an existing component or system, or the pursuit of a new technology or system, with the principal focus on systems capable of producing utility-scale electricity.

These concepts **must demonstrate the potential for a 20% improvement in performance or cost relative to existing devices or technologies of similar function.**

Questions – contact: Tim Ramsey, [tim.ramsey@go.doe.gov](mailto:tim.ramsey@go.doe.gov)

# Water Power Technology Program

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**Subtopic 9(b): Hydropower Applications** Seeking proposals that can dramatically reduce costs and improve performance, specifically proposals in the following areas:

1. Advanced Coatings;
2. Water Quality Sensors;
3. Low-cost Flow and Velocity Sensors; and
4. Small Hydropower Turbine-Generator Technology

Questions – contact: Rajesh Dham, [rajesh.dham@ee.doe.gov](mailto:rajesh.dham@ee.doe.gov)

# Wind Technology Program

**Topic 10:** EERE's [Wind Technology Program](#) seeks proposals for innovations that significantly advance the goal of large cost reductions in the deployment of U.S. wind power resources, including

- (a) Development of a Met-Ocean Package for Offshore Wind; and
- (b) Wide Band-gap Semiconductors for Wind Turbine Power Conversion

**Subtopic 10(a): Development of a Met-Ocean Package for Offshore Wind** Proposals that substantially contribute to development of a Standardized Met-Ocean Monitoring Package that would serve as one of the core elements of a standardized backbone data collection network for the offshore renewable energy industry are urgently sought. Key requirements are that

1. Measurements must support improved assessment of wind speed and direction, atmospheric stability, ocean waves, swells and currents, data sampling and communication rates consistent with advanced rapid refresh weather modeling data assimilation needs.
2. Serve as companion measurement platforms to specialized floating LIDAR systems for now in early stages of application.
3. Justify the economic viability of the proposed package assuming near term (< 5 years) industry deployment for project resource characterization.

**Questions – contact: Joel Cline, [joel.cline@ee.doe.gov](mailto:joel.cline@ee.doe.gov)**

# Wind Technology Program

**Subtopic 10(b): Wide Band-gap Semiconductor for Turbine Power Conversion** Development of semiconductor components that permit direct generation of electricity at grid connection voltages could significantly reduce wind turbine balance of station costs and thus reduce wind's levelized cost of energy. Direct generation at up to 13.6 kV would provide several benefits such as enabling the use of less copper and more flexible integration at medium voltage (MV) distribution voltages in wind farms as well as eliminating the need for a pad-mounted transformer at ground level. Projects are sought to develop higher voltage rated SiC or GaN (Wide Band-gap Semiconductors) for up-tower wind applications.

Questions – contact: **Tina Kaarsberg**, [tina.kaarsberg@ee.doe.gov](mailto:tina.kaarsberg@ee.doe.gov)



# Buildings – Solar Joint Topic

**Topic 11:** EERE’s Solar and Buildings Technologies Programs are cosponsoring a topic at the nexus of the two programs -

- (a) Low-Cost Solar Cogeneration Systems for Residential and Commercial Buildings Application

## **Subtopic 11(a) Low-Cost Solar Cogeneration Systems for Residential and Commercial Buildings**

**Applications:** Cost-effective solar cogeneration technology must be capable of producing site electricity at a levelized cost of **less than 10¢ /kWh for residential** applications or **less than 8¢/kWh for commercial** applications when savings from reduced building energy consumption related to heating, cooling, and/or water heating demand are included.

Applicants are encouraged to identify a specific target market segment for their solutions and the potential national impact. All performance claims must be fully justified with calculations, theoretical predictions, and/or relevant experimental data.

**Questions – contact: Bahman Habibzadeh, [bahman.habibzadeh@ee.doe.gov](mailto:bahman.habibzadeh@ee.doe.gov)**

# Solar PV Technology Transfer Opportunity

**Topic 12:** A Technology Transfer Opportunity (TTO) is an opportunity to leverage technology that has been developed at a DOE National Laboratory. Each TTO will be described in a particular subtopic and additional information may be obtained by using the link in the subtopic to the DOE National Laboratory that has developed the technology. Typically the technology was developed with DOE funding of either basic or applied research at a DOE National Laboratory and is available for transfer to the private sector. The level of technology maturity will vary and applicants are encouraged to contact the appropriate Laboratory prior to submitting an application.

Those selected for award under a TTO subtopic, will be assigned rights to perform research and development of the technology during their Phase I or Phase II grants. **Please note that these are NOT commercial rights which allow you to license, manufacture, or sell, but only rights to perform research and development.**

- (a) Alternating Current PV Building Block

# Solar PV Technology Transfer Opportunity

**Subtopic 12(a) Alternating Current PV Building Block:** This technology ([US Patent: 6750391,6/15/2004](#)) provides a fully integrated and self-containing alternating current (AC) photovoltaic (PV) Building Block device and method that allows photovoltaic applications to become true plug-and-play devices. The Building Block combines, contains, and integrates almost all of the electrical and mechanical elements of a PV system while eliminating the traditional DC voltage concerns of today's PV systems. The building block consists of an innovative module and method by which AC PV power is generated in the form of direct current (DC). Furthermore, the DC will be converted to AC and power will be exported through one or more power conversion and transfer units attached to the module. The Building Block can be used as a PV power source that has only AC power out and can be used alone or in an array.

## **Sandia National Laboratories Information**

TTO tracking number: SD 6968.1

Contact: Elizabeth Kistin Keller, 505-844-1017, [ejkisti@sandia.gov](mailto:ejkisti@sandia.gov)

Website: <https://ip.sandia.gov/>

Questions – contact: **Victor Kane**, [solar.sbir@ee.doe.gov](mailto:solar.sbir@ee.doe.gov)