

SOLAR ENERGY TECHNOLOGIES PROGRAM NEWSLETTER

Solar America Cities: A Bright Idea Takes Off

Department of Energy (DOE) staff have been busy assisting the 13 Solar America Cities since they were selected in June, as well as soliciting additional Solar America Cities through a Funding Opportunity Announcement (FOA) released in October.

Solar America Cities award recipients will review regulatory and other policy structures affecting solar technology adoption and will create a plan to develop a sustainable solar infrastructure for their respective cities. Several cities have already set ambitious early goals. Here are a few examples:

- **Austin** will focus on collaborating with local school districts in the development of public school curriculum material.
- **Boston** will establish the nonprofit, Solar Boston, Inc., to handle bulk procurement and installation of photovoltaic (PV) equipment.
- **Berkeley** is developing a program to finance the cost of solar panels that allows property owners to pay back the costs through a 20-year assessment on their property tax bills.



Tom Kimbis, SETP Acting Program Manager, speaks at the Solar America Cities kickoff in Salt Lake City

Participating cities must have populations of at least 100,000 in order to apply for grants of up to \$200,000. The Solar America Cities 2008 effort encourages cities to commit to achieving a sustainable solar infrastructure, not simply completing a series of experimental solar projects. For more information, please visit http://www1.eere.energy.gov/solar/solar_america/open_upcoming_fund_opps.html.

DOE will host the 1st annual meeting with awardees from 2007 and 2008 in April in Tuscon, Arizona. The meeting will allow each Solar America City to discuss best practices and lessons learned.

FEBRUARY 2008

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Nellis Air Force Base Installs 14MW PV System

On December 17, the switch was thrown on the new 14MW photovoltaic system at Nellis Air Force Base in Clark County, Nevada—the nation's largest PV system. Paul Dickerson, the Chief Operating Officer of DOE's Office of Energy Efficiency and Renewable Energy, along with representatives from other key partners were in attendance at the dedication ceremony. The public-private partnership between the U.S. Air Force, MMA Renewable Ventures, SunPower, and the Nevada Power Company allowed construction to begin in April on the third party owned PV system.

The array supplies approximately 25 percent of the base's power needs to the 12,000 personnel working and living on the base. The system sits on 140 acres on the western edge of the base, which used to be a landfill. It is estimated that with the acquisition of the system, the base will save approximately \$1 to \$2 million per year in electricity consumption.

Solar Energy Grid Integration Systems RFQ Announced

On November 28, 2007, Sandia National Laboratories (SNL) issued a Request for Quotation (RFQ) for the Solar Energy Grid Integration Systems (SEGIS) program. The SEGIS program is a 3-year, 3-stage effort (approximately one year per stage) that emphasizes the development of advanced inverters, controllers, and other balance-of-system (BOS) components for distributed PV power applications. The critical components to be developed in this effort are highly integrated and innovative inverters/controllers and associated BOS elements (including communications technologies, energy storage, energy management, and numerous interface options) for residential and commercial solar energy applications. The closing date for the RFQ is February 4, 2008.

Stage 1: Concept and Marketing Analysis consists of feasibility studies including the design and analysis of components for advanced integrated inverter/controller and/or energy management control systems. This stage requires the development of a preliminary product design; analysis of estimated performance, product cost (first-cost and operating cost), and its effect on overall system cost; and investigation of the primary technical barriers and approaches to overcoming these barriers. Finally, Stage 1 requires the submittal of an updated proposal for Stage 3 to include a conceptual design, as well as estimated performance and cost.

Stage 2: Prototype Development is geared toward the design, construction, and testing of the prototype, followed by cost estimates for a variety of quantities manufactured per year. Value-added features, as well as the prototype's ability to mitigate any potential negative effects of high-penetration PV distributed generation will be assessed.



An F-18 flies over the new 14MW system at Nellis Air Force Base

NATIONAL LABORATORY TECHNOLOGY
DEVELOPMENTS & DOE NEWS

NREL Achieves 19.9% Cell Efficiency for CIGS Thin Film Solar Cell

NREL has demonstrated a new record total-area efficiency of 19.9% for a CuInGaSe_2 (CIGS) thin-film solar cell measured under the AM1.5 global spectrum at 25°C. The cell was made by NREL using a “three-stage” co-evaporation process with a slight modification to the surface region of the CIGS absorber. The device layers, reported in previous publications, are in brief: a soda-lime glass substrate with a sputtered Mo back contact, a CdS layer deposited by a chemical bath, a ZnO bi-layer, Ni/Al grids, and an MgF₂ antireflective coating using a photolithographic device isolation method. The new device is similar to previous devices in terms of CdS thickness, optical bandgap, open-circuit voltage, and short-circuit density. The improved performance was due to a higher fill factor, which exceeds previous thin-film records at 81.2%. Device analysis revealed significant reduction in minority carriers' recombination. The new record efficiency demonstrates the potential of CIGS to achieve very high conversion efficiency. Higher conversion efficiency is a primary driver for developing products that require higher power per area, lower cost per watt, and could serve as the benchmark for a variety of deposition processes.

Publication: NREL's result will be published in the *Progress in Photovoltaics* journal in the paper titled, “19.9%-Efficient ZnO/CdS/ CuInGaSe_2 Solar Cell with 81.2% Fill Factor.”

Stage 3: Toward Commercialization includes the completion of R&D and the initiation of a pilot production run of newly developed hardware and concepts. This Stage includes hardware development, testing, and delivering hardware to SNL, or other agreed upon facilities, for validation of specifications and performance. Stage 3 also includes execution of a commercialization and manufacturing plan with financing options available for scale-up.

For more information on this funding opportunity, please visit www1.eere.energy.gov/solar/solar_america/pdfs/segis_rfp_nov2807.pdf.

Concentrating Solar Power Awards

DOE announced in November that it will invest \$5.2 million in projects supporting the development of low-cost Concentrating Solar Power (CSP), with Assistant Secretary Karsner making the announcement at the American Council on Renewable Energy's National Policy Conference. "Under the President's leadership, DOE is not only supporting research and development of clean energy technologies, but is accelerating their commercialization to a rate and scale necessary to meet growing energy demand and combat climate change," Assistant Secretary Karsner said. "Our National Laboratories lead the world in energy innovation and DOE is now giving them the support to commercialize their innovations."

CSP systems can use energy immediately or save it as thermal energy for later use. Storage of solar energy in this manner removes the intermittency of sunlight, which makes CSP a "dispatchable" source of electricity enabling it to provide energy to homes and businesses day or night. Project categories include: (1) thermal storage; (2) trough component manufacturing; and (3) advanced CSP systems and/or components.

The twelve CSP projects selected for negotiation of awards include:

- 3M (St. Paul, MN)
- Alcoa (Alcoa Center, PA)
- Brayton Energy (Hampton, NH)
- Hamilton Sundstrand (Canoga Park, CA)
- Infinia (Kennewick, WA)
- PPG Industries (Pittsburgh, PA)
- Skyfuel (New York, NY)
- Solar Millennium (Berkeley, CA)
- Solucar (Lakewood, CO)

For more information, including project descriptions, please visit www1.eere.energy.gov/solar/pdfs/csp_prospectus_112807.pdf.

NATIONAL LABORATORY TECHNOLOGY DEVELOPMENTS & DOE NEWS

SNL Conducts Stage-Gate Testing on GreenRay's Micro-Inverter

Sandia National Laboratories' Distributed Energy Technologies Laboratory (DETL) has conducted preliminary evaluations of a Solar America Initiative (SAI) deliverable from GreenRay, Inc. GreenRay has submitted an alpha micro-inverter to Sandia's DETL for thermal and surge suppression evaluations, and results indicate GreenRay is on track to fulfill stage-gate requirements.

NATIONAL LABORATORY TECHNOLOGY DEVELOPMENTS & DOE NEWS

New "Robotic" Silicon Cluster Tool Available at NREL

NREL has created a new research tool that will significantly improve the quality of silicon cell testing and silicon device fabrication. The Silicon Cluster Tool is part of NREL's Process Development Integration Laboratory (PDIL). What makes the tool unique are the seven vacuum-sealed deposition chambers instead of the traditional single chamber, and a computer-operated robotic arm that removes and delivers substrates being tested from chamber to chamber. Scientists working at PDIL are also developing tools for thin film solar cell researchers as well as research equipment for new atmospheric processing. (Atmospheric processing uses spray and ink jets to produce solar cells instead of the traditional screen printing process, which can break fragile solar cells. Atmospheric processing research may lead to higher throughput and cheaper equipment for solar cell manufacturers.) When completed, there will also be more than a dozen characterization capabilities within PDIL. For more information or to see an educational video, visit www.nrel.gov/pv/process_integration_approach.html.

“Future Gen” Award Announcement

DOE will invest \$21.7 million in next generation PV technology to help accelerate the widespread use of advanced solar power. “These projects help create a pipeline for the development of next generation solar technology,” Secretary Bodman said. “Our goal is to make solar power a more mainstream source of energy—to increase energy security and maintain America’s competitive edge. With a continued commitment from this Administration to develop and deploy clean, cutting-edge technologies, the Department is helping change the landscape for how this Nation utilizes its resources and produces energy.”

Projects selected represent an important early-stage investment from DOE in advanced PV technologies, which will help drive U.S. industry competitiveness. These new solar technologies have the potential to produce electricity at costs well below the current costs of grid-supplied electricity. The device and manufacturing process research used by the selected projects is expected to produce prototype cells and/or processes by 2015, with the potential for full commercialization shortly thereafter.

The 25 projects selected by DOE will be implemented at 15 universities and 6 companies over the three-year project period. They include:

- Arizona State University (Tempe, AZ)
- California Institute of Technology (Pasadena, CA)
- Massachusetts Institute of Technology (Cambridge, MA)
- Pennsylvania State University (University Park, PA)
- Rochester Institute of Technology (Rochester, NY)
- Stanford University (Stanford, CA)
- University of California, Davis (Davis, CA)
- University of California, San Diego (La Jolla, CA)
- University of Colorado (Boulder, CO)
- University of Delaware (Newark, DE)
- University of Florida (Gainesville, FL)
- University of Illinois (Urbana, IL)
- University of Michigan (Ann Arbor, MI)
- University of South Florida (Tampa, FL)
- University of Washington (Seattle, WA)
- Mayaterials, Inc (Ann Arbor, MI)
- Solasta, Inc. (Newton, MA)
- Solexant, Inc. (Sunnyvale, CA)
- Soltaix, Inc. (Los Altos, CA)
- Voxtel, Inc. (Beaverton, OR)
- Wakonda Technologies (Fairport, NY)

For more information, including project descriptions, please visit www1.eere.energy.gov/solar/solar_america/future_generation_pv.html.

NATIONAL LABORATORY TECHNOLOGY
DEVELOPMENTS & DOE NEWS

NREL Hosts the 22nd International Conference on Amorphous and Nanocrystalline Semiconductors

NREL hosted the 22nd International Conference on Amorphous and Nanocrystalline Semiconductors (ICANS 22) held in Breckenridge, Colorado in late August 2007. ICANS is the premier forum for scientific and technological exchange among researchers investigating amorphous semiconductors and related materials. Topics ranged from the physics and chemistry of fundamental phenomena to the engineering of materials and devices. In addition to the traditional emphases on amorphous thin films and bulk glasses, the conference featured key sessions on amorphous and nanocrystalline electronic oxides and organic semiconductors. Specialists on film growth mechanisms, medium-range order, defects, metastability, and electronic transport and optical properties provided opportunities for dialogue among researchers studying diverse material systems. For more information, visit www.icans22.org.

NATIONAL LABORATORY TECHNOLOGY
DEVELOPMENTS & DOE NEWS

17th Annual Photovoltaic Science and Engineering Conference (PVSEC) Held in Fukuoka, Japan

The 17th PVSEC was held in December in Fukuoka, Japan, on the island of Kyushu. With 1440 participants it was the biggest PV conference ever held in Japan or Asia. The choice to hold the conference in Kyushu was appropriate because there are several PV manufacturing plants there. Dan Ton, head of DOE SETP Grid and Building Integration program, chaired the PV Systems and BOS (Balance of Systems) session. DOE, NREL, and SNL representatives also gave a presentation on the “Renewable Systems Interconnection Studies.” The next conference (PVSEC18) is scheduled for January 2009 in India.

DOE, NREL, and Sandia Staff Visit Japanese PV Grid Integration Testing Sites

In early December, scientists from DOE's SETP and NREL visited two PV Grid Integration testing sites in Japan: one belonging to the New Energy and Industrial Technology Development Organization (NEDO) and the other belonging to the Central Research Institute of Electric Power Industry (CRIEPI).

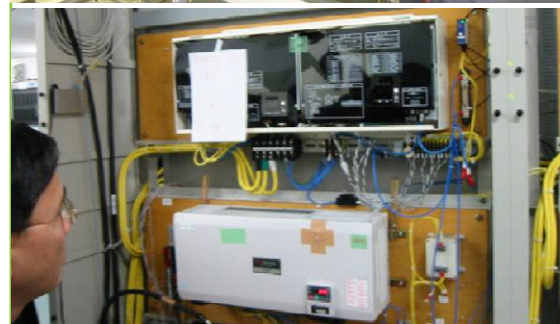
NEDO is Japan's largest public R&D management organization for promoting the development of advanced industrial, environmental, new energy, and energy conservation technologies. While there, Dan Ton (DOE) and Robert Margolis (NREL) met with staff and managers, and were given a presentation on current NEDO activities regarding PV grid integration efforts, high penetration PV studies, and mega-solar projects. The presentation included information on the demonstration project at Ota City on "Grid Interconnection of Clustered PV Power Generation Systems." This project has 553 solar homes (2.13 MW total) in one sub-development, nicknamed "PV Town." Most of the homes have energy storage batteries and are being operated under a variety of control algorithms.

The Ota City project intends to examine reduction in PV output due to high voltages and development of a new unintentional islanding function (islanding is the process of separating part of a distribution system from the rest of the power grid). The Ota City project is similar to new U.S. sub-developments being constructed, with the exception being that Japanese systems come equipped with energy storage. Results from the Japanese project have highlighted potential technical barriers in the U.S. where there may be some issues with inverters automatically turning off due to high voltage levels in high PV penetration areas. The presentation closed with an explanation of two new projects currently underway that look at verification of grid stabilization within large-scale PV power systems and the development of an electric energy storage system for new, grid-connected energy resources.

While visiting CRIEPI, Ton and Margolis gave a presentation on the current DOE Renewable Systems Interconnection study. CRIEPI staff then presented on their current research regarding PV grid integration efforts, high penetration PV studies, and inverter testing. CRIEPI staff also gave a tour of the demonstration test facility for grid interconnection techniques of distributed generation. This test facility is designed to understand the impacts on the grid from large amounts of distributed generation (DG)—e.g. voltage impacts, islanding impacts, and protection impacts (similar impacts were identified for further study by DOE's Renewable Systems Interconnection study).

The CRIEPI test facility includes a complete distribution system consisting of four locations of DG and loads. There are a total of six rotating generators, 16 PV arrays, and 16 large inverter-based systems. While similar to the U.S. test facilities at NREL, Sandia, and PG&E (San Ramon), the Japanese facilities are larger and more comprehensive than any facility in the U.S. CRIEPI scientists have developed and are testing a loop power controller (LPC) that compensates for voltage and load flow control on the distribution system.

Concluding their visit, Ton and Margolis visited one other inverter test facility where up to 30 inverters can be tested at one time. The three inverters from the Ota City project were being evaluated alongside a number of energy storage technologies (lead-acid batteries, NiH batteries, and supercaps).



(Top to bottom) 1. Most homes at Ota City have a relatively large PV array (4-5kW). 2. A street with high penetration of PV systems at Ota City. 3. CRIEPI PV arrays for DG test site. 4. CRIEPI distribution system control panel. 5. CRIEPI inverters under test.

Solar Energy Technologies Program (SETP) Sees Change in Leadership

The former Acting Program Manager of the Solar Energy Technologies Program, Craig Cornelius, has left DOE to serve as a Principal at the newly launched clean energy private equity firm, Hudson Clean Energy Partners, based in Teaneck, New Jersey. The firm invests in companies focused on renewable power, alternative fuels, energy storage, and demand-side energy management.

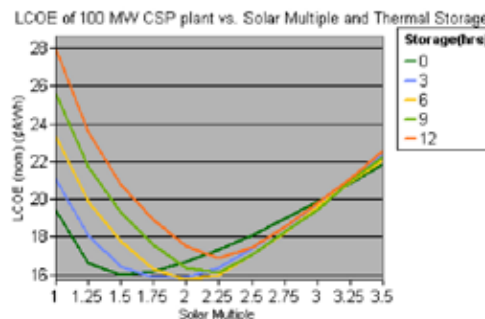
Under Cornelius' leadership in 2007, the SETP implemented a significant number of new programs, which were successful in accelerating the rate of deployment for proven CSP and PV technologies by supporting market transformation activities, as well as continuing to aggressively support innovative research to fill the technology development pipeline. Cornelius was one of the primary architects of DOE's funding of more than 100 corporations across the United States through programs such as Technology Pathway Partnerships, PV Solar Incubators, the recently announced Future Generation PV Devices and Processes, and Advanced Concentrating Solar Power awards.

DOE has put a tremendous effort into recruiting a top-notch leader for the Program, and will soon announce a selection. During the interim, Tom Kimbis, the former SETP Market Transformation Team Lead, will serve as the Acting Program Manager.

NREL Solar Planning Software Updated, Increasing Usability

The comprehensive solar technology systems analysis model, SAM (Solar Advisor Model), is undergoing a facelift to increase its applications for industry and government. Released first in 2005, SAM was originally designed as an internal solar R&D planning tool for DOE. However, over the past two years, industry planners and developers have begun utilizing SAM, necessitating a suite of SAM software updates to make the program even more useful to the solar industry.

SAM provides the user with a consistent framework for comparing and analyzing overall system costs, performance, internal rate of return (IRR), and leveled cost of electricity (LCOE) across multiple solar technologies (currently included are PV and CSP parabolic troughs, with solar thermal and other technologies to be added) and across different markets (residential, commercial and utility). The software is also capable of accounting for the effects of federal and state incentives and tax credits on project cash flow. Notable solar industry members to have utilized SAM to date include, Acciona, EPRI, GE, Dow, Evergreen Solar, SunEdison, Raytheon, FPL, and Navigant Consulting.



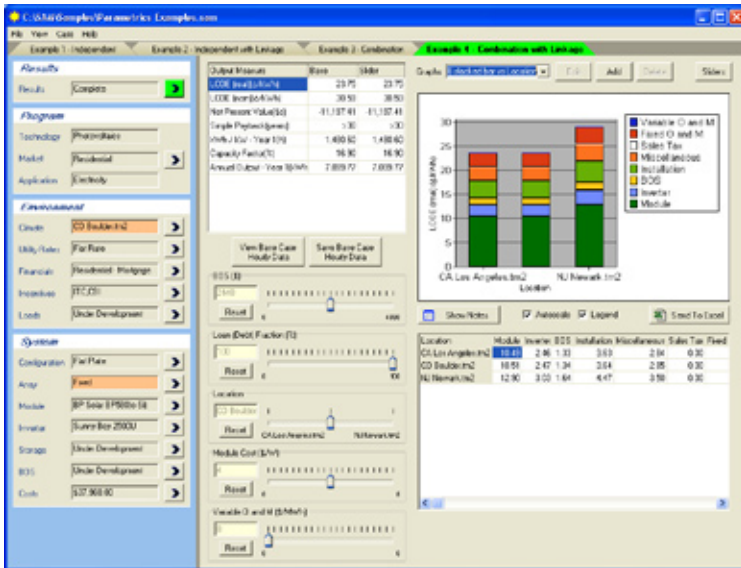
Example of a graph comparing LCOE generated by SAM.

NATIONAL LABORATORY TECHNOLOGY DEVELOPMENTS & DOE NEWS

NREL Publishes New Land Use Requirements for Solar

The land required for photovoltaics (PV) to provide significant amounts of electricity to the grid continues to be an important issue for advancing renewable energy technologies. Several estimates of the total land use required to meet electricity demand from PV have been published over the past few years. NREL recently examined the impact of distributing varying configurations (flat, fixed tilt, tracking) of PV (and required storage) geographically throughout the United States. The NREL report quantifies the state-by-state per-capita "solar electric footprint" for the United States, where the solar electric footprint is defined as the land area required to supply all end-use electricity from PV. The goals of the analysis were to provide a state-by-state breakdown of end-use electricity use (accounting for the embodied energy in produced goods); evaluate the solar energy density, or land use required to produce a given amount of solar energy (based on a range of PV configurations); estimate the state-by-state per-capita solar electric footprint for recent electricity use patterns and current PV system performance; and compare the per-capita solar footprint to several other per-capita demands for land use. NREL based the solar electric footprint on meeting the entire nation's electricity needs with PV. While this scenario is extreme, it does provide insight into the potential scale of land-use impacts associated with meeting a large fraction of the nation's electricity requirements from PV.

Publication: The results of NREL's study were published in the technical paper titled, "The Regional Per Capita Solar Electric Footprint for the United States" available at: www.nrel.gov/docs/fy08osti/42463.pdf.



Screenshot from SAM software.

NATIONAL LABORATORY TECHNOLOGY DEVELOPMENTS & DOE NEWS

DOE Convenes Workshop on Computational Research Needs for Renewable Energy

DOE's Office of Science and its Office of Energy Efficiency and Renewable Energy convened a workshop on the computational research needs for renewable energy on September 19-20, 2007, in Rockville, Maryland. Dr. Steve Hammond, director of NREL's Materials and Computational Science Center, was co-chair of the workshop that had participation from universities, industry, and other national labs. The workshop was divided into five parallel breakout panels: Renewable Fuels, Bioenergy Conversion, Renewable Electricity from Solar Energy, Renewable Electricity from Wind Energy, and Energy Distribution. Each panel developed a set of priority research directions for a program of computational research in alternative and renewable energy. The Solar Energy panel's priorities correlated to a number of different photovoltaic device technologies. Computer simulation is a key part of research for the development of novel solar materials with specific optical and electrical properties or for optimizing processes for different solar energy conversion technologies. Addressing the computational research needs identified in this workshop will reap tremendous benefits in advancing the basic science underlying alternative and renewable energy technologies. A workshop report is in progress.

As more users come online, a team from NREL and Sandia have been working to add new features to make SAM a more integral business tool. These new features include performance and cost metrics for additional solar technologies such as dish/Stirling and power towers; enhanced access to weather data; integration of the Sandia inverter model to simulate how inverter performance affects overall system performance; and integration of a PV module performance model (specific to manufacturer) similar to the model currently used by the California Energy Commission.

For the most recent version of SAM, please visit <https://www.nrel.gov/analysis/sam/download.html>.

Former SETP Director Participates in PV Quality Control Forum Hosted in China

On December 12, 2007, Craig Cornelius participated in a well-attended quality control forum hosted by Suntech, Inc. in Wuxi, China. The event focused on enhanced quality control and reliability of solar PV modules along the whole value chain. In addition to participation from DOE's SETP, the U.S. delegation included representatives from national laboratories and Underwriters Laboratories, Inc. (UL). Continued collaboration with Chinese partners under the auspices of the Asia Pacific Partnership program is expected to insure that PV manufacturers adopt state-of-the-art reliability practices for long-term competitiveness of the global industry.



Cornelius speaks to the forum convened in Wuxi, China.

Figure 1. Summary of Solar Program Funding Opportunities

■ CLOSED
 ■ PENDING
 ■ OPEN
 ■ PROPOSED

FUNDING OPPORTUNITY ANNOUNCEMENT (FOA) OR SOLICITATION	AWARD DATE	FUNDING AMOUNT	DESCRIPTION	STATUS
Systems Development and Manufacturing: Technology Pathway Partnerships (TPP)	March 8, 2007	\$168 M over 3 years	Cost-shared industry-led projects for PV systems development, and manufacturing demonstrations. Collective portfolio of projects will reduce direct manufacturing and installation costs by at least 30% by 2010, and will deliver up to 2.4 GW of new manufacturing capacity by year-end 2010.	<ul style="list-style-type: none"> • Amonix (CA) • Boeing (CA) • BP Solar (MD) • Dow Chemical (MI) • General Electric (DE) • GreenRay (MA) • Konarka (MA) • Miasole (CA) • Nanosolar (CA) • Soliant (CA) • SunPower (CA), includes PowerLight (CA) • United Solar Ovonic (MI)
Market Transformation: Codes and Standards	March 26, 2007	\$4.2 M over 5 years	Working Group will address code development and outreach activities in areas of critical importance to solar market penetration (e.g., interconnection procedures, net metering, product safety, international standards coordination). Will lead to a major improvement in the responsiveness, effectiveness, and accessibility of codes and standards to U.S. solar stakeholders at all levels.	<p>Solar America Board of Codes and Standards (SolarABCs)</p> <p>PV Capacity Credit Valuation Study:</p> <ul style="list-style-type: none"> • State University of New York (NY) • Tucson Electric Power (AZ)
Market Transformation: State/Utility Solar Technical Outreach	March 27, 2007	\$1.7 M over 3 years	Will conduct tailored solar technical outreach to states and utilities and will provide resources and best practices to address solar issues faced by states and utilities.	<p>Utility Technical Outreach:</p> <ul style="list-style-type: none"> • Solar Electric Power Association (DC) <p>State Technical Outreach:</p> <ul style="list-style-type: none"> • Clean Energy Group (VT) • National Association of Regulatory Utility Commissioners (DC) • National Conference of State Legislatures (CO)
Component and Pilot Scale Production: PV Module Incubators	March 27, 2007	\$27 M over 18 months	Projects focused on solving technical challenges that must be overcome to scale-up manufacturing and commercialize new products by 2010 and shortening the timeline for companies to transition pre-commercial PV technologies into full-scale manufacturing.	<ul style="list-style-type: none"> • AVA Solar (CO) • Blue Square Energy (MD) • CaliSolar (CA) • EnFocus Engineering (CA) • MicroLink Devices (IL) • Plextronics (PA) • PrimeStar Solar (CO) • Solaria (CA) • SolFocus (CA) • SoloPower (CA)

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Summary of Solar Program Funding Opportunities, *Continued*

 CLOSED  PENDING  OPEN  PROPOSED

FOA OR SOLICITATION	AWARD DATE	FUNDING AMOUNT	DESCRIPTION	STATUS
<p>Market Transformation: Solar America Showcases (SAS)</p>	<p>May 16, 2007</p>	<p>Technical assistance only</p>	<p>Showcases are designed to help facilitate large-scale installations that involve cutting-edge solar technologies, novel applications of solar, high-visibility sites, and/or high likelihood of replicability. SAS does not provide financial assistance; instead, it provides technical assistance through teams of DOE-funded solar experts from the National Renewable Energy Laboratory, Sandia National Laboratories, the Southeast and Southwest Regional Experiment Stations, and private firms.</p>	<ul style="list-style-type: none"> • City of San Jose (CA) • Forest City Military Communities (HI) • Orange County Convention Center (FL)
<p>Market Transformation: Solar America Cities</p>	<p>June 21, 2007</p>	<p>\$2.5 M and technical support over 2 years</p>	<p>Cities will integrate solar technologies into city energy planning, zoning, and facilities; streamline city-level regulations and practices that affect solar adoption by residents and local businesses (e.g., permitting, inspections, local codes); and promote solar technology among residents and local businesses (e.g., outreach, curriculum development, and/or implementation, incentive programs).</p>	<ul style="list-style-type: none"> • Ann Arbor (MI) • Austin (TX) • Berkeley (CA) • Boston (MA) • Madison (WI) • New Orleans (LA) • New York (NY) • Pittsburgh (PA) • Portland (OR) • Salt Lake City (UT) • San Diego (CA) • San Francisco (CA) • Tucson (AZ)
<p>Device and Process Proof of Concept: Future Generation PV Devices and Processes</p>	<p>November 8, 2007</p>	<p>\$21.7 M over 3 years</p>	<p>For companies to perform exploratory R&D for developing innovative, highly disruptive future-generation solar electric technologies. Device and manufacturing process research targeted here is expected to produce prototype cells and/or processes by 2015, with full commercialization in the 2020–2030 timeframe.</p>	<ul style="list-style-type: none"> • Arizona State University (Tempe, AZ) • California Institute of Technology (Pasadena, CA) • Massachusetts Institute of Technology (Cambridge, MA) • Mayaterials, Inc. (Ann Arbor, MI) • Pennsylvania State University (University Park, PA) • Rochester Institute of Technology (Rochester, NY) • Solasta, Inc. (Newton, MA) • Solexant, Inc. (Sunnyvale, CA) • Soltaix, Inc. (Los Altos, CA) • Stanford University (Stanford, CA) • University of California, Davis (Davis, CA) • University of California, San Diego (La Jolla, CA) • University of Colorado (Boulder, CO) • University of Delaware (Newark, DE) • University of Florida (Gainesville, FL) • University of Illinois (Urbana, IL) • University of Michigan (Ann Arbor, MI) • University of South Florida (Tampa, FL) • University of Washington (Seattle, WA) • Voxtel, Inc. (Beaverton, OR) • Wakonda Technologies (Fairport, NY)

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Summary of Solar Program Funding Opportunities, *Continued*

 CLOSED  PENDING  OPEN  PROPOSED

FOA OR SOLICITATION	AWARD DATE	FUNDING AMOUNT	DESCRIPTION	STATUS
Concentrating Solar Power Funding Opportunity Announcement	November 29, 2007	\$5.2M for Phase 1	For companies to develop storage solutions, manufacturing approaches, and new system concepts for large-scale concentrating solar power (CSP) plants. Collaborative public/private partnerships established herein will work to reduce the nominal levelized cost of energy of CSP power plants from 13-17 ¢/kWh in 2007 to 7-10¢/kWh by 2015 and 5-7¢/kWh by 2020.	<ul style="list-style-type: none"> • 3M (St. Paul, MN) • Alcoa (Alcoa Center, PA) • Brayton Energy (Hampton, NH) • Hamilton Sundstrand (Canoga Park, CA) • Infinia (Kennewick, WA) • PPG Industries (Pittsburgh, PA) • Skyfuel (New York, NY) • Solar Millennium (Berkeley, CA) • Solucar (Lakewood, CO)
FOA OR SOLICITATION	CLOSING DATE	FUNDING AMOUNT	DESCRIPTION	STATUS
Systems Development and Manufacturing: University Product and Process Development Support	October 16, 2007	Up to \$30M over 3 years	For universities to perform targeted materials science and process engineering research that offers direct, near-term improvements in PV products and development processes for commercialization by 2010.	Applications were received. In Merit Review process, decisions expected in February 2008.
Solar America Cities	January 10, 2008	\$2-\$3 M over 2 years	Building on the success of the initial Solar America Cities FOA, the Solar Program plans to issue a similar FOA to allow more cities to participate. This initiative may select up to 10 cities for awards. Solar America Cities are recognized as partners who are highly committed to solar technology adoption at the local level.	Applications due January 10, 2008, and decisions expected by late March 2008.
Component and Pilot Scale Production: Solar Energy Grid Integration Systems	February 4, 2008	Up to \$24 M over 3 years	To perform exploratory R&D targeting dramatic improvements in inverters and energy management technologies for solar electricity production.	The Solar Program released this FOA on November 28, 2007, which will provide up to \$6.25 M per year for 3 years. There will be up to fourteen Phase 1 recipients in FY 2008. Applications are due on February 4, 2008, and decisions are expected by mid April 2008.
FOA OR SOLICITATION	CLOSING DATE	FUNDING AMOUNT	DESCRIPTION	STATUS
Solar America Showcases	March 12, 2008 June 12, 2008	Technical assistance only	To receive technical assistance for a Solar America Showcase, the project must be a large-scale (>100 kW), high-visibility solar installation that uses a novel solar technology, a novel application for a solar technology, and replicable components.	Notice of Technical Assistance currently open, see: http://e-center.doe.gov/iips/faopor.nsf/

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Summary of Solar Program Funding Opportunities, *Continued*

■ CLOSED
 ■ PENDING
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 ■ PROPOSED

FOA OR SOLICITATION	RELEASE DATE	FUNDING AMOUNT	DESCRIPTION	STATUS
Component and Pilot Scale Production: PV Module Incubators	FY 2008	TBD by appropriations	Projects focused on solving technical challenges that must be overcome to scale-up manufacturing and commercialize new products by 2010 and shortening the timeline for companies to transition pre-commercial PV technologies into full-scale manufacturing.	
Minority University Research Associates	FY 2008	TBD by appropriations	DOE plans to provide support to attract and encourage qualified science, engineering, and business minority undergraduate and graduate students to pursue advanced degrees and careers in science and technology by providing scientific and technical R&D opportunities in solar energy technologies. Will solicit applications from accredited universities and colleges defined as Minority Serving Institutions.	

SOLAR EVENTS CALENDAR

FEBRUARY '08

Concentrating Solar Power Congress
Feb 5 -6, 2008, Barcelona, Spain
www.greenpowerconferences.com

3rd International Solar Cities Congress 2008
Feb 17-21, 2008, Adelaide, SA, Australia
www.solarcitiescongress.com.au

Power Gen 2008
Feb 19-21, 2008, Las Vegas, NV
pgre08.events.pennnet.com/fl/index.cfm

Solar 08 "Putting Light to Work"
Feb 24-28, 2008, Cairo, Egypt
www.solar.sabrycorp.com

PV Expo 2008: 1st International Photovoltaic Power Generation Expo
Feb 27-29, 2008, Tokyo, Japan
www.pvexpo.jp

MARCH '08

Washington International Renewable Energy Conference (WIREC)
March 3-7, 2008, Washington, DC
www.americanrenewables.org

23rd Photovoltaic Symposium
March 5-7, 2008, Bad Staffelstein, Germany
www.otti.de (not in English)

Asia Solar Energy PV Exhibition and Forum
March 5-7, 2008, Shanghai, China
www.asiasolarexpo.com

4th Newgrace China International Solar Energy and PV Exhibition (CSPE 2008)
March 31-April 2, 2008, Shanghai, China
www.ch-solar.com/exhibitionbrief.html

APRIL '08

PV Technology and Investor Conference
April 2-4, 2008, Munich, Germany
www.photon-expo.com

Organic Photovoltaics 2008
April 2-4, 2008, Philadelphia, PA
www.intertechpira.com/alternativeenergy

MAY '08

Solar 2008
May 3-10, 2008, San Diego, CA
www.ases.org/programs/conference.htm

Semicon Singapore 2008
May 5-7, 2008, Singapore
semiconsingapore.semi.org/index.htm

33rd IEEE Photovoltaic Specialists Conference
May 11-16, 2008, San Diego, CA
www.33pvsc.org/public

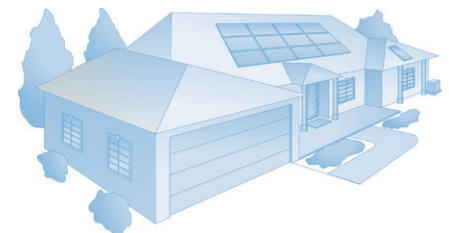
International Green Energy Expo Korea 2008
May 21-23, 2008, Daegu, Korea
www.energyexpo.co.kr/eng

Energethica 2008
May 22-24, 2008, Genoa, Italy
www.emtrad.it (not in English)

4th European PV Hybrid & Minigrad Conference
May 29-30th, 2008, Athens, Greece
www.otti.de/kolleg.htm

WE WANT TO HEAR FROM YOU

This *DOE Solar Energy Technologies Program Newsletter* is for you—the participants and stakeholders in the DOE Solar Program and the Solar America Initiative. We envision sending this newsletter every quarter. If you have any comments or suggestions about the frequency or content of the newsletter, please e-mail solar@ee.doe.gov.



A Strong Energy Portfolio for a Strong America

Energy efficiency and clean, renewable energy will mean a stronger economy, a cleaner environment, and greater energy independence for America. Working with a wide array of state, community, industry, and university partners, the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy invests in a diverse portfolio of energy technologies.

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