

# SOLAR ENERGY TECHNOLOGIES PROGRAM NEWSLETTER

## MARCH 2009

### Stimulus Gives Solar a Big Boost

The solar industry is getting bigger, better, and brighter. On Feb. 17, 2009, President Obama signed into law the American Recovery and Reinvestment Act, cementing his support of solar and other renewable energy sources.

Billions of dollars will be invested in funding, tax incentives, loans, and grants to increase the use of solar energy, support energy efficiency, remove market barriers, and cultivate green jobs. The law promotes:

- Training programs for green jobs
- Solar and energy efficiency improvements for federal buildings and schools
- Smart grid enhancements
- Expanded research and development programs for renewable energy and energy efficiency
- Solar grant alternatives to the investment tax credit
- Incentives for solar manufacturers
- Incentives for solar water heating.

Of the \$16.8 billion allocated to the DOE Office of Energy Efficiency and Renewable Energy, the Solar Energy Technologies Program (SETP) expects to receive a significant share to further grow and support the solar industry.

Visit [www.eere.energy.gov](http://www.eere.energy.gov) for updates on the stimulus bill.

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U.S. DEPARTMENT OF ENERGY  
**ENERGY**

Energy Efficiency & Renewable Energy

## Key Activities within the DOE Solar Program

### Industry to Assess DOE Solar Program

Every two years, solar experts weigh in on SETP activities, efforts that are lacking or should be enhanced, and the program's future direction. The SETP Annual Meeting and Peer Review will be held March 9–11, 2009, in Denver, Colorado.

Peer reviewers have already been selected, but after the meeting, visit [www.solar.energy.gov/review\\_meeting](http://www.solar.energy.gov/review_meeting) to view the presentations.

### Solar Cities Plan Annual Meeting in March

Mayors, city solar coordinators, and technical experts will meet March 30–April 2, 2009, for the 2<sup>nd</sup> Solar America Cities Annual Meeting. More than 100 participants from the 25 participating cities are expected to share best practices, discuss lessons learned, and network. San Antonio, Texas, a Solar America City, will host the meeting.

### Training a Better Solar Workforce

SETP is working to ensure the U.S. solar workforce is ready to meet the needs of a clean energy future. The American Recovery and Reinvestment Act will provide the program with funds to launch a new workforce development solicitation in 2009. The goal will be to create solar energy educational centers and training programs.

These new activities, slated for the coming months, will provide high-quality solar education throughout the United States. A well-trained solar work force is critical for a strong U.S. solar industry.

These workforce development activities complement the Obama administration's focus on building a renewable energy infrastructure and creating millions of green jobs. Such efforts will help our nation harvest its renewable energy resources, reduce pollution, and conserve energy and natural resources.

### New Pre-Incubator Funds Move PV Concepts to Prototypes

Up to \$500,000 is available to small companies for turning their module-related technologies into prototypes. The Photovoltaic (PV) Technology Pre-Incubator solicitation, released on Jan. 27, 2009, is open to U.S. small businesses or teams led by a U.S. small business. The technologies should be innovative and capable of commercialization by 2015.

This financial opportunity is administered by DOE's National Renewable Energy Laboratory (NREL).

Before the opportunity closes on March 10, 2009, visit [www.nrel.gov/business\\_opportunities/solicitations\\_rfps.html](http://www.nrel.gov/business_opportunities/solicitations_rfps.html).

### NATIONAL LABORATORY TECHNOLOGY DEVELOPMENTS

#### SNL and SES Win Breakthrough Award

Chuck Andraka, engineer at Sandia National Laboratories (SNL), and Bruce Osborn, chief operating officer of Stirling Energy Systems (SES), received a Popular Mechanics magazine "Breakthrough Innovator Award" in October. The Breakthrough Awards celebrate both the innovations poised to change the world, as well as the personalities behind the innovations.

The award recognizes a solar-to-grid system conversion efficiency record set by an SES dish in January 2008 at SNL's National Solar Thermal Test Facility in Albuquerque, New Mexico. The previous 1984 record of 29.4% was topped by a new record of 31.25% net-efficiency. The conversion efficiency is calculated by measuring the net energy delivered to the grid and dividing it by the solar energy incident on the dish mirrors.

#### MOU with Chinese Academy of Sciences

In November, NREL and the Institute of Electrical Engineering at the Chinese Academy of Sciences (IEE CAS) signed a Memorandum of Understanding (MOU). The MOU formalized interactions with the NREL PV Cell and Module Performance Characterization group. The IEE CAS goal is to become an ISO 17025 accredited calibration facility, which will allow it to become part of the world terrestrial PV primary calibration community that includes NREL, AIST in Japan, PTB in Germany, and the European Solar Test Installation in Ispra, Italy.

## Three Awardees Show Diversity of Solar Showcases

Scottsdale and Phoenix, Arizona, and Philadelphia, Pennsylvania, are the locations of the most recent Solar America Showcases. Each showcase is a large-scale, high-visibility solar installation that can accelerate demand for solar technologies. All showcases receive free technical assistance from SETP solar experts. The newest awardees, announced Jan. 16, 2009, are:

- **The Hartman Company:** A 115-kilowatt (kW) PV installation at the Hyatt Regency Resort in Scottsdale. This showcase is part of a master plan to replicate solar energy technologies at other Hyatt facilities.
- **Philadelphia Water Department:** A PV installation that powers drinking-water treatment facilities and provides up to 7.6 megawatts (MW) of new capacity.
- **Southwest Solar Technologies, Inc:** A solar test and demonstration installation that provides 1 MW of combined solar and storage energy at the Riverpoint Solar Research Park in Phoenix.

The Solar America Showcase opportunity closes and reopens each quarter of 2009 for re-review of applications. Applications received before the end of each quarter (March 31, June 30, September 30, and December 31) will be reviewed during the following quarter.

## Progress in Identifying Lands for Renewable Energy

Three initiatives are expected to resolve generation and transmission issues faced at the state, regional, and national levels. Each initiative is objective and transparent and is being shaped by public input.

**The Bureau of Land Management (BLM) and DOE** are collaborating on a Solar Programmatic Environmental Impact Statement (PEIS). The PEIS will identify the impacts of and develop better management strategies for utility-scale solar development on the public lands of six states (Arizona, California, Colorado, New Mexico, Nevada, and Utah). The BLM and DOE expect to complete a draft PEIS in spring 2009 and make it available for public comment.

See details at <http://solareis.anl.gov>.

**The Western Renewable Energy Zone (WREZ) Initiative** involves working groups that are identifying high-resource areas and lands to exclude from energy-zone development. The assessment will be presented to the Western Governors' Association for approval in June 2009, concluding Phase One of the process. Subsequent phases will develop a modeling tool and a high-level transmission plan coordinated through the Western Electricity Coordinating Council.

More information is available at [www.westgov.org/wga/initiatives/wrez](http://www.westgov.org/wga/initiatives/wrez).

**The Renewable Energy Transmission Initiative (RETI)** is a collaboration between public and private entities in California. The objective is to provide information to policymakers and stakeholders on the transmission requirements to access cost-effective, environmentally sensitive renewable energy resources. Phase One

## NATIONAL LABORATORY TECHNOLOGY DEVELOPMENTS

### Alliance Becomes New Management Contractor of NREL

DOE selected the Alliance for Sustainable Energy, LLC (the Alliance) as the next management contractor of the National Renewable Energy Laboratory (NREL). Midwest Research Institute (MRI) and Battelle formed the Alliance, in a partnership that will enhance NREL's leadership and accelerate the achievement of national energy goals.

The Alliance's primary mission is to support DOE in developing and deploying innovative, high-impact renewable energy technologies. Its vision for the future of NREL includes:

- **Driving Market-Relevant Technology Innovations:** Strengthening NREL's scientific, technical, and analytical foundation by recruiting and retaining leading talent and by effectively partnering with premier research centers.
- **Accelerating Commercialization and Deployment:** Implementing new business strategies and partnership arrangements and rapidly moving revolutionary innovations from concept to consumer.
- **Leading Insightful Analysis:** Serving as the definitive source of objective, independent, quality analysis, providing the DOE Office of Energy Efficiency and Renewable Energy (EERE) with technical, economic, and policy insights to help direct and refine EERE's Research, Development, Demonstration, and Deployment program.

of the initiative identified and ranked zones in California and nearby states that can provide and competitively deliver renewable energy. Phase Two, which includes developing conceptual transmission plans and refining previous work, is under way.

Additional information is available at [www.energy.ca.gov/reti](http://www.energy.ca.gov/reti).

## Workshop Participants Analyze Impact of PV on Grid

Understanding how large amounts of PV impact the grid is critical to making solar energy a viable source of electricity. SETP brought together industry and research experts at a workshop, Feb. 24–25, 2009, in Ontario, California, to identify issues related to grid integration.

Workshop participants also determined activities for high priority research, development, and demonstration activities in the near term, mid-term, and long term. Participants also quantified performance requirements for these high-priority projects.

## Experts Address Need for Consistent Data on PV Systems

Solar experts, laboratory researchers, and SETP staff came together Feb. 25–26, 2009, in Ontario, California, to tackle the need for consistent performance data on PV systems, both in the lab and the field. The meeting followed SETP's information-gathering efforts, which began last fall through a Request for Information (RFI), titled PV Community Project.

The objective is to make performance data and analysis available to industry to improve PV system and module lifetime, while protecting the identity of individual manufacturers and products.

The meeting was held to define and prioritize data parameters, installation sites, and systems and components that will be included in the overall design of the PV Community Project.

## Workshop Focuses on Solar for Asian-Pacific Countries

The Renewable Energy Grid Integration Systems workshop brought together stakeholders to identify the extent to which renewables can be integrated into power grids, particularly in Asia-Pacific Economic Cooperation (APEC) countries. DOE and APEC hosted the workshop, which was held in Hawaii on Jan. 12–15, 2009.



*Systems Integration Team Lead Dan Ton (front center) at the Renewable Energy Grid Integration Systems Workshop in Hawaii with participants from China, Japan, New Zealand, Spain, Taiwan, and the United States.*

## NATIONAL LABORATORY TECHNOLOGY DEVELOPMENTS

### NREL Hosts Solar Resource Workshop

In October, NREL hosted a Solar Resource Workshop to present the state of the art in resource modeling to CSP developers and other stakeholders. Accurate assessment of solar irradiance is essential for siting solar power plants. Rapid data collection and analysis are key to calculating and forecasting system performance quickly.

More than 60 stakeholders attended. Feedback was overwhelmingly positive, with the following items noted as priorities:

- Produce documents such as a handbook and collection of best practices to help the industry and establish accepted evaluation protocols that can be used with financial sources.
- Establish a Web-based publications clearinghouse for easy access to CSP-relevant solar resource documents.
- Continue plans to expand the ground data network via the SOLRMAP project.
- Continue development of the Solar Power Prospector as a user-friendly solar resource tool.
- Improve satellite-based resource modeling and forecasting tools.

NREL is assessing how to best integrate these goals into the current budget and R&D plan. Presentations from the workshop are available at <http://rredc.nrel.gov/solar/pubs/RAWorkshopList.html>.

Dan Ton, SETP Systems Integration team lead, delivered a plenary presentation on DOE's activities in this area.

Workshop participants visited projects that are helping the State of Hawaii reach its goal of meeting 70% of all its energy needs (electricity and transportation) from renewables by 2030.

To find more information on the Hawaii Clean Energy Initiative, visit [www.eere-pmc.energy.gov/Hawaii.aspx](http://www.eere-pmc.energy.gov/Hawaii.aspx).

## PV Training in California

Dozens of educators and administrators took advantage of a 2-day PV training program that was offered in California, in the fall of 2008 and January 2009. The Interstate Renewable Energy Council (IREC) held the trainings, which were funded by SETP, in the northern and southern parts of the state.

Topics included task analyses, model programs, resources, and credentialing by the North American Board of Certified Energy Practitioners.

New sessions of these and other IREC courses are listed at [www.irecusa.org](http://www.irecusa.org).

## Reliability Workshop Held in China—a PV Hotbed



*Solar Program Manager John Lushetsky (center) with members of the US-China delegation at the International PV Reliability Workshop, sponsored by the Asian Pacific Partnership.*

China produces nearly one quarter of all PV modules in the world. Because of this, SETP organized an international workshop with local officials in Shanghai, China, Dec. 4–5, 2008, that focused on PV quality assurance, reliability, and testing practices.

Nearly 300 leading international scientists and industry and government professionals met at the International PV Reliability Workshop. Presentation and panel discussion topics included cells, materials, encapsulation, modules, systems, and building-integrated PV. SETP Program Manager John Lushetsky chaired the workshop and stressed the critical importance of PV reliability to total industry growth.

A follow-up workshop on PV reliability, codes and standards, and market acceptance, is tentatively scheduled for June 3-5, 2009, in Tempe, Arizona.

Details are available at [www.nrel.gov/pv/ipr\\_workshop\\_08.html](http://www.nrel.gov/pv/ipr_workshop_08.html).

## NATIONAL LABORATORY TECHNOLOGY DEVELOPMENTS

### IEC Working Group Prepares New Proposals

The solar industry needs common methods to characterize concentrator photovoltaics (CPV) modules, systems, and trackers. To address this need, the International Electrotechnical Commission (IEC) Working Group 7 held a meeting in November in California, following the 5<sup>th</sup> International Conference for Solar Concentrators. The meeting explored the purposes of two new standards for power and energy rating.

Writing each of these standards is complicated by the diversity of the products being developed today and the subtleties of different approaches to defining the metrics. A simple PV standard is needed for something comparable to a miles-per-gallon (MPG) rating, but the industry also needs a more complex model validation; banks want confident predictions of electricity generation over the life of a PV system. Meeting participants determined that one purpose of the power rating standard was laying the basis for the energy rating standard, mimicking the approach being taken for flat-plate modules under IEC 61853. A standard for defining tracker specifications was also discussed. These standards will be submitted as formal proposals to the IEC.

### NREL Gets Special Recognition at R&D 100 Awards

NREL's two R&D 100 award-winning technologies received an additional honor as the "most revolutionary technologies of the year" by R&D Magazine. This honor, given to the "Hybrid CIGS" and "IMM Solar Cell" technologies, was announced at the annual R&D 100 Awards ceremony in Chicago on October 16. Only four Editor's Choice Awards were given for the year, so the fact that NREL garnered half of them was an impressive showing.

The hybrid CIGS technology is a fast, low-cost process for making high-quality copper indium gallium diselenide (CIGS) photovoltaics. The research team was led by Dr. David Ginley. The Inverted Metamorphic Multijunction (IMM) solar cell technology is a new class of solar cells with a breakthrough design that yields ultra-light weight, high-flexibility, and world-record efficiencies. The research team was led by Dr. Mark Wanlass.

## International Conference Tackles Grid Integration

Grid integration issues were the hot topics at the Third International Conference on Integration of Renewable and Distributed Energy Resources. Held December 10–12, 2008, in Nice, France, the conference brought together scientists, utility operators, manufacturers, regulators, and policymakers to discuss the technical, market, and regulatory issues to prepare for massive distributed energy resources (DER) integration into power grids. SETP Systems Integration Team Lead Dan Ton presented a poster paper, titled *Renewable Energy Grid Integration – Distributed Photovoltaic Studies*.

Ton and personnel from the National Renewable Energy Laboratory (NREL) also visited the National Solar Institute of France to discuss potential areas of collaboration. This 2-year-old institute consolidates all of France's publicly funded solar research in one location. Potential partnership areas include module performance testing and characterization, PV and energy-storage integration, and PV grid integration.

## Market Transformation Team Seeks International Alliances

SETP is considering ways to collaborate with the international community on market transformation activities, including work on solar codes and standards.

On Dec. 3, 2008, solar market experts met at the International Energy Agency's PV Roadmap Workshop in Paris, France. The group evaluated the potential role of PV through 2050, identified milestones for reaching that goal, and determined policy measures needed to overcome existing barriers. Meeting results will be available in early 2009. Tom Kimbis and Kevin Lynn represented the SETP Market Transformation team.

## Wrap Up of Solar Power Conference Activities

At the Solar Power International (SPI) conference held Oct. 13–16, 2008, SETP staff informed hundreds of solar professionals about its activities aimed at making solar electricity become cost competitive by 2015. The panel session, entitled *Solar America Initiative – Entering a New Phase*, conveyed the perspective of each of the four SETP subprograms: PV, Concentrating Solar Power (CSP), Systems Integration, and Market Transformation. SETP was also a Kilowatt sponsor of SPI.

“The Solar Power International conference and expo is by far the biggest and best in the United States. It's a showcase for this industry whose time has really come. And the prospects for solar energy have never been brighter.”

California Governor  
Arnold Schwarzenegger,  
keynote speaker

Visit <http://blogs.renewableenergyworld.com/solarpower/video/> to view the video from the conference.

## NATIONAL LABORATORY TECHNOLOGY DEVELOPMENTS

### New SAM Version Available

NREL, in conjunction with SNL and in partnership with SETP, released version 2.5 of the Solar Advisor Model (SAM) in December 2008. This new version of SAM incorporates a variety of large and small upgrades and several key enhancements. Anyone currently using SAM is encouraged to upgrade to this new version.

The software allows users to investigate the impact of variations in physical, cost, and financial parameters to better understand their impact on key figures of merit. Figures of merit related to the cost and performance of these systems include—but are not limited to—system output, peak and annual system efficiency, levelized cost of electricity, system capital and operating and maintenance costs, and hourly system production.

The key enhancements to SAM are:

- Addition of the Parabolic Dish-Stirling Engine CSP model
- Updated California Energy Commission and Sandia PV Module and Inverter Databases
- Addition of time-of-use utility rates
- Automated optimization of the power purchase agreement price escalation rate and the load fraction for projects with Independent Power Producer (IPP) and Utility financing
- Availability of user documentation as both context-sensitive Help and as a PDF file.

Download the version at [www.nrel.gov/analysis/sam/download.html](http://www.nrel.gov/analysis/sam/download.html).

Also, join the SAM Google group at <http://groups.google.com/group/sam-user-group/> to share SAM project files (and compressed SCIF files) with other users. Members can communicate about issues, bugs, or helpful hints.

## Solar ABCs Holds First Stakeholder Meeting

The first annual stakeholder meeting of the Solar America Board for Codes and Standards (Solar ABCs) was held following the SPI conference. Attendees discussed safety issues, interconnection, and the National Electrical Code, and provided input into future directions.

Three technical reports were released, available at [www.solarabcs.org](http://www.solarabcs.org).

## Solar America Cities Kick Off Events Across the Nation

DOE's Solar America Cities partners are working to accelerate the adoption of solar energy at the local level. With the help of their mayors, several cities kicked off and showcased their efforts with successful public and media events during the past few months. Their local activities and accomplishments include:

- **Madison, Wisconsin:** Mayor Dave Cieslewicz helped dedicate a new PV installation on a public library.
- **Milwaukee, Wisconsin:** Mayor Tom Barrett kicked off the city's designation as a SAC at the Milwaukee Solar Decade Conference, where SETP team members also presented.
- **Knoxville, Tennessee:** Mayor Bill Haslam, the Tennessee Valley Authority, and several other partners discussed the possibility of installing PV on DOE's Office of Scientific and Technical Information facility in Oak Ridge, Tennessee, which is undergoing reroofing.
- **New Orleans, Louisiana:** The city celebrated the opening of the Alliance for Affordable Energy's BuildSmart Learning Center and the city's Solar America City designation. The BuildSmart Learning Center is a model New Orleans home that showcases techniques for energy efficiency, residential solar power, and eco-friendly construction.



*The Knoxville Solar America City team poses in front of its new road signs.*



*Market Transformation Team Lead Tom Kimbis (left) with members of the New Orleans Solar America City team at the dedication of the new BuildSmart Learning Center.*



*Tom Kimbis (right) presented Pittsburgh Mayor Luke Ravenstahl (2<sup>nd</sup> from left) and Pittsburgh team lead Jim Sloss (left) with the city's official Solar America City road sign on January 26.*

## NATIONAL LABORATORY TECHNOLOGY DEVELOPMENTS

### Rapid Mirror Characterization Developed for Production Monitoring

SNL researchers have developed a rapid mirror characterization system to detect manufacturing quality and errors on dish mirror facets. The system completes a detailed test of a facet in less than 10 seconds, which is suitable for 100% inspection of facets in production.

The facet characterization tool is based on Fringe Reflection Deflectometry, a methodology used for inspection in the automotive industry. Like the Video Scanning Hartmann Optical Test (VSHOT), this new tool reports the quality of the mirror in terms of slope error and focal length, and can plot the results. The system is customized to parabolic dish facets. Slight extensions to the methodology will make it useful for characterizing heliostat and trough facets. An extension of this technology is being developed for rapid, automated dish alignment for large field installations.

### New Pre-Production Prototype Dishes Installed at SNL

Four next-generation foundation/pedestal units from Stirling Energy Systems, Inc. (SES) are being installed at SNL. Each unit is a prototype single-piece, no-concrete installation, designed for rapid deployment. SES is funding the installation, but co-location on SNL property allows support from SNL dish/engine experts. SES will next install the electrical system using techniques developed for the large plants. The commercialized dish will be installed early in 2009 and fitted with new pre-production Stirling engines, fabricated by SES's partner Linamar.

SES is using its proprietary solar dish Stirling technology to develop two of the world's largest solar generating projects in southern California, which combined will initially produce 800 MW of power and up to 1,750 MW.

- **Philadelphia, Pennsylvania:** The SAC kick-off meeting was well attended by local stakeholders. The following day, Mayor Michael Nutter held a media event to announce the completion of a large solar thermal system at the Riverside Correctional Facility, which will ultimately save the city \$1 million.
- **Pittsburgh, Pennsylvania:** The city sponsored a solar training workshop that covered solar hot water systems, PV systems, permitting, working with the utility, and workforce development. Opening remarks were given by Mayor Luke Ravenstahl and State Senator Jim Ferlo.

## Industry Update

### Extension of ITC a Major Victory for Advancing Solar

The federal Investment Tax Credit (ITC) was extended 8 years, through 2016, as part of the Emergency Economic Stabilization Act of 2008. The act was signed into law on Oct. 3, 2008. The ITC provides a tax credit equal to 30% of the system cost of residential and nonresidential solar electricity installations.

Both PV and concentrating solar power (CSP) technologies are eligible for the ITC. The 8-year extension period was crucial for CSP because such projects require several years to be completed.

The ITC was extended not only in its duration but also in its application. First, Congress removed the restriction preventing regulated utilities from using the ITC. Second, the ITC cap of \$2,000 for residential solar installations was eliminated. Removing the cap tripled the available tax credit for a typical 3-kW residential system with an installed cost exceeding \$20,000. Finally, the extension allowed the ITC to be applied against the Alternative Minimum Tax, which had not previously been possible.

### SolarPACES Meeting Highlights CSP Activities

In November, CSP developments around the world were highlighted at the 75th Executive Committee Meeting of the International Energy Agency's SolarPACES in Almeria, Spain. SolarPACES is a cooperative of the International Energy Agency, focusing on the development and marketing of CSP systems. A snapshot of worldwide CSP highlights includes:

- **Algeria:** Three projects are part of natural-gas power plants—two are 400-MW power plants with 70 MW each generated from CSP and one is a 150-MW plant with 25 MW generated from CSP. Algeria plans to export power to Europe through high-voltage direct-current lines under the Mediterranean.
- **France:** The country established a 0.30 euro/kWh feed-in tariff for CSP in 2006 with a limit of 12 MW and capacity of 1,500 hours per year.
- **Mediterranean Countries:** The Mediterranean Solar Plan has a goal to generate 20 GW of CSP in North Africa that will be transmitted to Europe.

### NATIONAL LABORATORY TECHNOLOGY DEVELOPMENTS

#### Thin-Film Module Sets World Record

NREL has verified a 12.5% aperture-area conversion efficiency for a thin-film CdTe power module fabricated by First Solar. The company produced four thin-film cadmium telluride (CdTe) modules in the efficiency range of 12.0% to 12.5% by improving processing and module design. The present manufacturing efficiency is 10.6%, with a target manufacturing efficiency of 12.0% by 2012. The manufacturing cost of First Solar's thin-film CdTe power modules is reported at \$1.14 per watt, which is the lowest cost in the industry for any PV technology worldwide. The target for First Solar's manufacturing cost is \$0.92 per watt by December 2009.

#### German MOU Signed

In November, NREL signed a memorandum of understanding (MOU) with DLR, the German Aerospace Centre. DLR plays a leading role in international energy research and analysis and is actively involved in CSP research and development. Under this MOU, the two institutions will strengthen their collaboration on CSP testing and standards, CSP storage, and energy systems analysis. Next steps for joint work in each area include a plan for a February workshop at NREL on CSP testing and standards. CSP storage researchers were invited to visit DLR in April or May, and a joint NREL/DLR energy analysis workshop was proposed for later in 2009.



- **Spain:** Two projects are planned.
  - 700 MW of CSP projects are under construction. They include mostly troughs, but also tower and Fresnel systems. Some 1.2 GW of CSP will be installed by the end of 2010 and another 2 GW will be installed by the end of 2011.
  - Officials are commissioning the first large-scale commercial CSP plants in the world to incorporate thermal storage. Andasol 1 and 2 trough plants are each 50 MW with 7 hours of thermal storage. Andasol 1 is grid-tied and being commissioned. Andasol 2 is expected to begin operation in March 2009.

## Clean Energy Group Conducts National RPS Summit

On Nov. 6 and 7, 2008, the Clean Energy Group (CEG) held its national summit on Renewable Portfolio Standards (RPS) in Chicago. About 75 people attended the summit, including state RPS program administrators, public utility commissioners, and clean-energy policy experts and advocates from around the country. The summit was a culmination of CEG's first year of working with states on RPS practices and policies. CEG is funded by DOE and the Energy Foundation to facilitate a multi-state, multi-stakeholder collaborative and to provide a forum to explore interstate and state and federal cooperation, build bigger renewable energy markets, and foster strategies to ensure RPS success. Sarah Truitt, Market Transformation team member, represented SETP.

## New Organic PV Manufacturing Facility Unveiled

On Oct. 7, 2008, Konarka Technologies opened its 250,000-square-foot manufacturing facility in New Bedford, Massachusetts. Program Manager John Lushetsky attended the ribbon-cutting ceremony for this thin-film organic PV plant, which has a 1-GW nameplate capacity and will produce the company's patented Power Plastic® material. Konarka is one of SETP's Technology Pathway Partners. This project aims to develop PV components and system designs for production in order to deliver solar energy at grid parity by 2015.

## DOE Solar Program and Partner Publications

### A Historical Analysis of Investment in Solar Energy Technologies (2000 – 2007)

National Renewable Energy Laboratory (NREL), December 2008

This paper examines investment in solar energy technologies. Investment trends are analyzed by technology, region of the world, and source of investment.

[www.nrel.gov/docs/fy09osti/43602.pdf](http://www.nrel.gov/docs/fy09osti/43602.pdf)

### Own Your Power! A Consumer Guide to Solar Electricity for the Home

NREL, January 2009

This consumer guide provides an overview of solar technology basics as well as cost and incentives information.

[www.eere.energy.gov/solar/pdfs/43844.pdf](http://www.eere.energy.gov/solar/pdfs/43844.pdf)

### NATIONAL LABORATORY TECHNOLOGY DEVELOPMENTS

## SNL and NREL Experts Among the Most Cited in the World

SNL and NREL experts have seen a significant increase in global recognition for their work, and a recent analysis in Science Watch has the stats to prove it. The November/December featured analysis from Science Watch, "Energy Gauge: Who Exactly is in Power?," looked at roughly 100,000 articles in Thomson-indexed journals in the field of energy and fuels, published during the past decade, to identify the most-cited institutions, authors, and journals. SNL and NREL were repeatedly found near the top of the list.

SNL and NREL ranked first and second, respectively, among all institutions in total number of citations. As for citation impact, NREL and SNL ranked third and seventh, respectively. Overall, the most cited paper in this survey, from 1999, reports the achievement of 18.8% conversion efficiency in a thin-film solar cell at NREL. The Science Watch story is available at <http://sciencewatch.com/ana/fea/08novdecFea/>.

## ORNL Dedicates New Solar Array

On January 22, Oak Ridge National Laboratory (ORNL) dedicated its new 50-kW solar PV array, the second largest in Tennessee. The energy produced by the system is expected to offset nearly half of the electricity used in a nearby research facility. The installation is part of ORNL's Sustainable Campus Initiative, headed by Melissa Lapsa at ORNL.

## A Homebuilder's Guide to Going Solar

NREL, January 2009

This guide helps builders assess the benefits of installing solar equipment or making houses "solar ready" to both their businesses and customers. Builders will find information on the basics of solar technology, selling points for builders and realtors, a ballpark-cost estimator, and highlights of success stories from other builders who have integrated solar into their building plans.

[www.eere.energy.gov/solar/pdfs/44792.pdf](http://www.eere.energy.gov/solar/pdfs/44792.pdf)

## Utility Solar Tax Manual

Solar Electric Power Association (SEPA), January 2009

This new report provides clarity on solar tax credit changes for the utility and solar industries. The manual also sheds light on the implications of these changes on new business models for both industries and their customers. The full report may be downloaded for free by SEPA members and purchased for \$2,495 by nonmembers.

[www.solarelectricpower.org](http://www.solarelectricpower.org)

## Utility Procurement Study: Solar Electricity in the Utility Market

SEPA, January 2009

This is the first in a series of SEPA research reports to be released in 2009. The report, which is aimed at improving large scale solar acquisition by electric utilities, provides innovative ideas for future project procurement.

[www.solarelectricpower.org/docs/Procurement%20Report%20FINAL%20-%202012-16-08.pdf](http://www.solarelectricpower.org/docs/Procurement%20Report%20FINAL%20-%202012-16-08.pdf)

## Financing Non-Residential Photovoltaic Projects: Options and Implications

Lawrence Berkeley National Laboratory, January 2009

The purpose of this report is threefold: (1) to survey recent trends in the financing of non-residential PV projects in the United States, (2) to describe and compare the financing options available to both taxable and tax-exempt non-residential site hosts interested in PV, and (3) to analyze the impact of these various financing options on the cost of solar power.

<http://eetd.lbl.gov/EA/EMP/reports/lbnl-1410e.pdf>

## State Clean Energy Fund Support for Renewable Energy Projects: Key Findings from the CESA National Database

Clean Energy States Alliance (CESA), January 2009

This 4-page summary presents an overview of the findings from the Clean Energy States Alliance (CESA) National Database.

[www.cleanenergystates.org/Publications/cesa-database\\_summary\\_v8.pdf](http://www.cleanenergystates.org/Publications/cesa-database_summary_v8.pdf)

NATIONAL LABORATORY  
TECHNOLOGY DEVELOPMENTS

## Obama Environmental Advisor Visits NREL

Dan Kammen came to NREL with a specific interest in CSP on Nov. 17, 2008. Kammen is senior environmental policy advisor to President Barack Obama, professor at the University of California Berkeley, and founding director of the Renewable and Appropriate Energy Laboratory.

He observed the lab's work with SkyFuel's parabolic trough collector SkyTrough, using the VSHOT laser ray-trace system. SkyTrough uses Reflectech® mirror film, instead of glass mirrors. VSHOT is a laser ray-trace system designed to characterize the optical surfaces of solar concentrators and can be used to analyze both linear-focus and point-focus systems. SkyFuel has requested VSHOT analysis several times during the development of SkyTrough.

# Summary of DOE Solar Program Funding Opportunities

## Pipeline of Program Activities



The Solar Energy Technologies Program (SETP) is engaged with a range of stakeholders and activities along the solar pipeline. From Materials and Device Concepts to key Market Transformation efforts, SETP is supporting the development of innovative projects to accelerate the growth of the U.S. solar industry.

The winners of the PV Supply Chain and Cross-Cutting Technologies opportunity will be announced during the summer of 2009. To view all past opportunities, visit [www.solar.energy.gov/past\\_opportunities.html](http://www.solar.energy.gov/past_opportunities.html).

**Figure 1. Summary of DOE Solar Program Funding Opportunities**

OPEN  PROPOSED

FOA OR SOLICITATION	CLOSING DATE	FUNDING AMOUNT	DESCRIPTION	STATUS
Solar America Showcases	March 31, June 30, September 30, and December 31, 2009	Technical assistance only	A Notice of Technical Assistance (NOTA) for another round of Solar America Showcases has been released. To receive technical assistance for a Solar America Showcase, the project must be a large-scale (>250 kW), high-visibility solar installation that uses a novel solar technology and/or a novel application for a solar technology, and has replicable components.	NOTA released: January 28, 2009. Reopens every quarter. <a href="http://www.eere.energy.gov/solar/current_opportunities.html">www.eere.energy.gov/solar/current_opportunities.html</a>
PV Technology Pre-Incubator	March 10, 2009	Up to \$500,000 per 12-month award	The National Renewable Energy Laboratory (NREL) has issued a Solicitation for Letters of Interest (LOIs) to U.S. Small Businesses for the development of prototype photovoltaic (PV) cells and modules. This PV Technology Pre-Incubator project is positioned to bridge the gap between the concept verification stage of a technology and the development of a commercially viable prototype. This enhanced progress is achieved by taking demonstrated innovative technologies, with the potential for a disruptive improvement in solar energy production, and accelerating the transition to the prototype stage. The expected 12 month objective and result is a demonstrated PV cell or module prototype that incorporates the core innovations, meets the proposed level of performance, and is capable of meeting the entrance criteria and goals of the related SAI PV Incubator project.	LOI released: January 27, 2008 Net Conference: February 10, 2009, 9:30 A.M. Mountain Time. The Solicitation is available to view/download from NREL's website at <a href="http://www.nrel.gov/business_opportunities/solicitations_rfps.html">www.nrel.gov/business_opportunities/solicitations_rfps.html</a>

Continued on following page

Summary of DOE Solar Program Funding Opportunities, *Continued*

 OPEN  PROPOSED

FOA OR SOLICITATION	CLOSING DATE	FUNDING AMOUNT	DESCRIPTION	STATUS
<p><b>Minority University Research Associates</b></p>	<p>FY 2009</p>	<p>TBD by appropriations</p>	<p>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&amp;D opportunities in solar energy technologies. Will solicit applications from accredited universities and colleges defined as Minority Serving Institutions.</p>	<p>LOI expected to be released in March/April 2009.</p>
<p><b>PV Technology Incubator – Round 3</b></p>	<p>FY 2009</p>	<p>TBD by appropriations</p>	<p>Projects focused on solving technical challenges that must be overcome to scale-up manufacturing and commercialize new products by 2010-2011 and shortening the timeline for companies to transition pre-commercial PV technologies into full-scale manufacturing. PV Incubator is led by the National Renewable Energy Laboratory.</p>	<p>LOI expected to be released in March 2009.</p>
<p><b>Education, Training, and Certification</b></p>	<p>FY 2009</p>	<p>TBD by appropriations</p>	<p>SETP will release a new FOA this year for education, training, and certification. The goal will be to create solar energy educational centers and training programs.</p>	<p>FOA expected to be released March 2009.</p>

## SOLAR EVENTS CALENDAR

**Solar America Cities 2<sup>nd</sup> Annual Meeting**  
*March 30–April 2, 2009*  
*San Antonio, TX*

**National League of Cities Green Cities Conference and Expo**  
*April 18–22, 2009*  
*Portland, OR*  
[www.nlcgreencitiesconferenceandexpo.org](http://www.nlcgreencitiesconferenceandexpo.org)

**Nanotech Conference & Expo 2009**  
*May 3–7, 2009*  
*Houston, Texas*  
[www.nsti.org/Nanotech2009/](http://www.nsti.org/Nanotech2009/)

**Solar 2009**  
*May 12–16, 2009*  
*Buffalo, NY*  
[www.ases.org](http://www.ases.org)

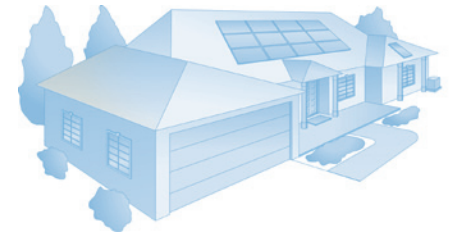
**34<sup>th</sup> IEEE Photovoltaic Specialists Conference**  
*June 7–12, 2009*  
*Philadelphia, PA*  
[www.34pvsc.org](http://www.34pvsc.org)

**PV America**  
*June 8–10, 2009*  
*Philadelphia, PA*  
<http://events.jspargo.com/seia09/public/enter.aspx>

**2009 Solar Decathlon**  
*October 9–18, 2009*  
*Washington, District of Columbia*  
[www.solardecathlon.org](http://www.solardecathlon.org)

## 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 at least every quarter. If you have any comments or suggestions about the newsletter, e-mail [solar@ee.doe.gov](mailto: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.

### For more information contact:

EERE Information Center  
1-877-EERE-INF (1-877-337-3463)  
[www.eere.energy.gov](http://www.eere.energy.gov)