# Secretary Chu Announces up to $62 Million for Concentrating Solar Power Research and Development

US Department of Energy

Washington, DC ? U.S. Department of Energy Secretary Steven Chu today announced the selections of projects for investment of up to $62 million over five years to research, develop, and demonstrate Concentrating Solar Power (CSP) systems capable of providing low-cost electrical power. This funding will support improvements in CSP systems, components, and thermal energy storage to accelerate the market-readiness of this renewable energy technology. Accelerating breakthroughs in renewable energy technologies supports the Administration's strategy of diversifying the U.S. energy portfolio to increase our energy independence while fostering a fast-growing clean-energy economy.

"Developing low-cost, renewable energy generation is crucial to meeting our nation's increasing demands for electricity," said Secretary Chu. "By investing in the development of low-cost solar technologies we can create new jobs and pave the way towards a clean-energy future."

CSP technologies concentrate the sun's energy and capture that energy as heat, which then drives an engine or turbine to produce electrical power. CSP plants can include low-cost energy storage, allowing them to provide electricity even when the sun is not shining. Boosting these technologies today will generate the clean-technology careers of tomorrow and will help expand the market for utility-scale solar energy. The projects announced today will seek to improve component and system designs to extend operation to an average of about 18 hours per day, a level of production that would make it possible for these plants to displace traditional coal-burning power plants.

The thirteen award selections announced today fall into two areas:

**Concentrating Solar Power Systems Studies** ? projects awarded under this category will evaluate the feasibility of a complete CSP baseload system and support development of prototype systems for field testing. These selections include:

- **Abengoa Solar, Inc. ? Lakewood, CO** *? up to $10.6 million*
  Abengoa Solar will develop a new power tower technology that captures heat in a high-temperature receiver at the top of an elevated tower. The system will focus the sun's rays to the tower using a 360-degree, surround reflector field on the ground and collect the heat in a salt fluid, which is used to make steam and drive a turbine. The system will also incorporate a

thermal storage system to allow it to operate for a period when the sun isn't shining. The ability to operate at higher temperatures will translate into more energy produced with the same size power plant. Abengoa is currently the only company with a full-scale, operational power tower, and thus proving this technology could help it reach commercial maturity.

- **eSolar, Inc. ? Pasadena, CA** *? up to $10.8 million*
  eSolar will design, build, and test a CSP power plant system with fundamentally new components. Instead of one central tower and receiver, the plant will employ multiple, modular towers. Using reflective mirrors, the sun's radiation will heat a liquid salt within each receiver. A specialized molten salt transport system will then move the high-temperature fluid to a molten-salt steam generator that produces electricity. The system will also feature a thermal storage system. Eventually, this technology could deliver lower-cost solar energy at a utility scale.
- **Pratt & Whitney Rocketdyne ? Canoga Park, CA** *? up to $10.2 million*
  Pratt & Whitney Rocketdyne will build on and advance the current solar power tower plant design. The project will explore new materials for the central power tower receiver. A novel thermal storage system will be developed and used, representing the first time such technology has been integrated into a CSP plant design. A more efficient power cycle will help produce more electricity. These improvements will all be made in the hopes of driving down the cost of solar energy.

**Concentrating Solar Power Component Feasibility Studies** ? awards under this category focus on research and development of concepts and components that could be part of a CSP baseload system. These selections include:

- **General Atomics ? San Diego, CA** *? up to $2.1 million*
  General Atomics will carry out feasibility and design studies to validate the concept of supplying reliable, steady baseload power using a concentrating solar power plant integrated with sulfur-based energy storage. The energy is stored through a chemical reaction, which potentially allows the energy to be stored for a much longer period of time. The ability to store the heat captured by a CSP system during the day and continue running the power plant at night or when it's cloudy makes solar power plants more reliable.
- **HiTek Services, Inc. ? Owens Cross Roads, AL** *? up to $3.0 million*
  HiTek Services will focus on optimizing reflector array, or heliostat, designs in order to reduce the cost of using heliostats in a solar field. All CSP systems use reflectors to collect and focus the sun's rays to heat a receiving material, and heliostats represent the most expensive component of a CSP system. By driving down the cost of reflector arrays, this project could significantly lower the up-front cost of CSP power plants.
- **Infinia Corporation ? Kennewick, WA** *? up to $3.0 million*
  Infinia Corporation is developing a large-scale thermal energy storage solution that can be used with solar dishes. The system will be essentially maintenance-free and will allow large amounts of energy to be stored in a cost-effective and efficient manner. There is currently no commercial storage mechanism that is compatible with CSP solar dishes, and thus this

storage technology could be a breakthrough for the CSP solar dish industry.

- **PPG Industries, Inc. ? Cheswick, PA** *? up to $3.0 million*
  PPG Industries will develop a next-generation, low-cost reflector with increased reflectivity, increased durability, and larger dimensions. Increasing the performance of reflectors while pushing down the cost of materials and manufacturing will serve as an enabling technology for utility-scale CSP power plants. The most significant maintenance cost of a CSP plant is cleaning and replacing the mirrors, and thus this new reflector design could have a significant impact on total plant cost.
- **SENER Engineering and Systems Inc. ? San Francisco, CA** *? up to $3.1 million*
  SENER is developing a high-efficiency thermal storage system for solar plants with technology that can extend the operating range of thermal storage using solid, modular blocks. Higher temperature storage has a direct impact upon the amount of energy that can be extracted and converted into electricity, and is an essential component for CSP plants to become competitive with coal-burning plants.
- **SkyFuel, Inc. ? Albuquerque, NM** *? up to $4.3 million*
  SkyFuel will develop a low-cost CSP trough system with significantly larger dimensions than today's troughs for use in baseload concentrating solar power generation. Increasing the operating temperature and output of CSP power plants that use a trough-shaped reflector to heat a receiving fluid will help make CSP a viable technology for baseload power.
- **SunTrough Energy, Inc. ? Chatsworth, CA** *? up to $4.5 million*
  SunTrough Energy will develop a new class of solar concentrators and build a pilot manufacturing facility to evaluate the cost-effectiveness of the new technology. The design will place an emphasis on lightweight materials and mass-manufacturability. A focus on manufacturing will lead to smaller and fewer parts, simpler assembly procedures, and more rapid field installation, all of which will drive the total cost of a CSP facility down.
- **Terrafore, Inc. ? Riverside, CA** *? up to $1.4 million*
  Terrafore is developing an efficient and economical thermal storage system for baseload power generation that takes advantage of the energy that is transferred when materials melt and solidify. One of the primary challenges for solar energy is dealing with the issue of intermittency; in other words, how to supply reliable power when the sun is not shining. Therefore, optimizing the design of CSP systems to store the heat for later use could help build confidence in the widespread adoption of solar energy.
- **University of South Florida ? Tampa, FL** *? up to $2.5 million*
  The University of South Florida will develop and demonstrate an innovative thermal energy storage system based on materials that absorb heat when changing from a solid to a liquid and release heat when changing from a liquid to a solid. Integrating thermal energy storage into CSP plants makes CSP a reliable source of baseload electricity.
- **Wilson TurboPower, Inc. ? Woburn, MA** *? up to $3.7 million*
  Wilson TurboPower is utilizing a small transportable turbine power system in a modular CSP solar power tower configuration. By building a more compact CSP power block, the power block can be assembled in-factory and shipped to the worksite. The power block design also incorporates an

advanced cooling method that reduces water usage. This novel design will operate at high temperatures and allow for super-efficient operation.

Please visit the Solar Energy Technologies Program home page [1] for more information about the program and selections.

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