

SunShot: Making Solar Energy Cost-Competitive Throughout the United States

The U.S. Department of Energy’s (DOE) SunShot Initiative funds projects that aggressively advance efforts to make solar energy cost competitive—without subsidy—by the end of the decade. Through game-changing innovations, SunShot projects are transforming the ways in which solar systems are conceived, designed, manufactured, and installed.

The SunShot Initiative is designed to re-establish American technological leadership, strengthen U.S. economic competitiveness in the global clean energy race, and help America obtain a secure energy future. The SunShot Initiative challenges America to effectively and affordably capture the sun’s energy. The initiative has brought together America’s best and brightest—combining the expertise of research laboratories, universities, and the private sector—to reach U.S. solar energy goals. SunShot is focused on driving down the cost of solar electricity to about 6 cents per kilowatt hour, thereby enabling solar to account for 15% to 18% of America’s electricity generation by 2030.

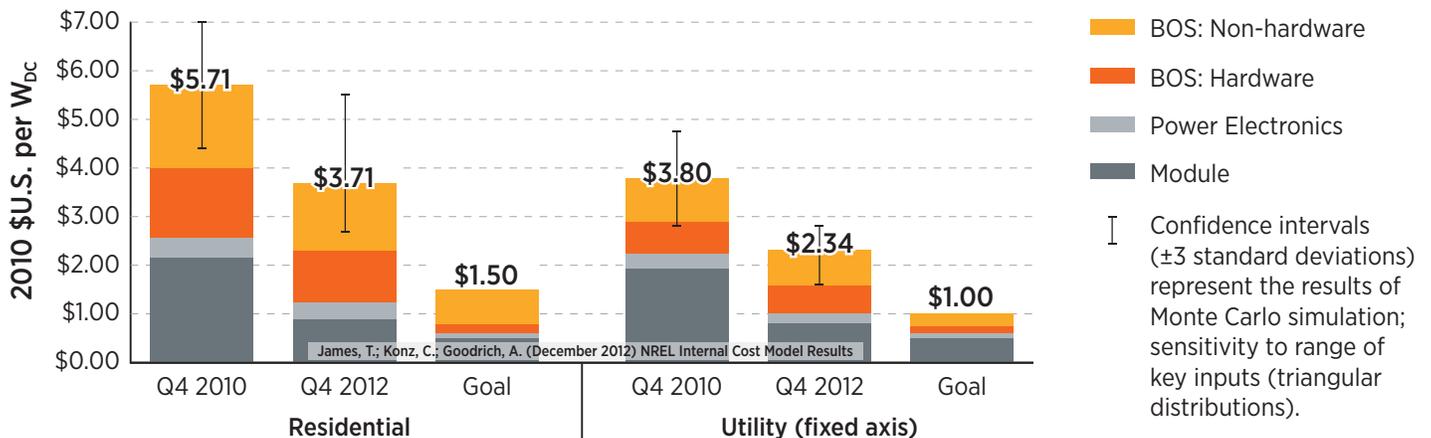
Achieving SunShot Goals

SunShot builds on DOE’s significant research and development (R&D) efforts in solar energy over the past several decades. Innovations in both science and technology have driven the cost of solar down 60 percent since 1995, and have yielded a number of critical breakthroughs in solar photovoltaic (PV) and concentrating solar power (CSP) performance and cost.

SunShot is accelerating and advancing those research efforts by refocusing DOE’s solar energy R&D and taking new approaches to lower the costs of the entire solar system—from modules to balance of systems costs (see chart below). SunShot not only invests in solar technology and manufacturing improvements, but also takes aggressive steps to reduce the soft costs of solar, such as those for installation and permitting, which greatly impact the overall cost.

Within DOE, SunShot leverages the strengths of different offices, including the Office of Energy Efficiency and Renewable Energy (EERE); the Office of Science; and the Advanced Research Projects Agency-Energy (ARPA-E). Each office brings distinct capabilities to the table, spanning the spectrum from early-stage scientific discoveries to applied R&D and transformative technology development. SunShot also leverages collaboration with other government agencies, such as Department of Defense (DoD). SunShot is a collaborative effort engaging the national laboratories, industry, universities, and government at the federal, state, and local levels.

SunShot Cost Goals



Since the SunShot Initiative was announced in February 2011, the Solar Program has funded more than 150 projects in PV, CSP, balance of systems (BOS), and systems integration (SI). Current SunShot projects include:

- Baseload Concentrating Solar Power Generation
- Bridging Research Interactions through Collaborative Development Grants in Energy
- Extreme Balance of Systems
- Foundational Program to Advance Cell Efficiency
- Grid Integration-Advanced Concepts
- Multidisciplinary University Research Initiative: High Operating Temperature Fluids Projects
- Next Generation PV
- Non-Hardware Balance of System
- Photovoltaic Manufacturing Initiative
- Plug-and-Play Photovoltaics
- PV Supply Chain and Cross-Cutting Technologies
- Rooftop Solar Challenge
- Small Business Innovation Research and Small Business Technology Transfer
- Solar Forecasting
- SUNPATH
- SunShot CSP Research and Development 2012
- SunShot Incubator
- SunShot Prize: Race to the Rooftops

SunShot projects aim to:

- Increase PV solar cell efficiency, reduce production costs, and open new markets for solar energy.
- Shorten the amount of time it takes to move promising new solar technologies from development to commercialization and strengthen the U.S. supply chain for solar manufacturing and commercializing cutting-edge photovoltaic technologies.
- Drive down the cost of CSP, fostering collaboration that leads to utility-scale solutions, and integrating solar into the electric grid—all of which help clear the way for high-penetration solar.
- Invest in education, policy analysis, and technical assistance to remove critical barriers and speed rapid penetration.

- Develop a well-trained workforce to foster U.S. job creation in the solar industry.
- Develop innovative, cost-effective solutions that allow increasing amounts of solar energy to integrate seamlessly with the national power grid, while mitigating associated risks and reducing system costs.
- Accelerate the adoption of solar energy technologies in the marketplace by reducing non-hardware costs, lowering barriers, and fostering market growth.

For More Information

Visit www.energy.gov/sunshot

Impacts of DOE Solar Investments

Job Creation: The solar industry is creating jobs six times faster than the overall job market.

Triple Return on Investment: DOE spent approximately \$2.3 billion on R&D to advance PV technology, with net economic benefits totaling more than \$15 billion with an estimated 17% internal rate of return.

50% Cost Reduction: Production costs per watt of PV modules fell from more than \$100 in the mid-1970s to between \$1 and \$2 per watt by 2008; system reliability increased from 2 to 25 years during this same period.

Significant Emission Reduction: About 6.8 million tons of carbon dioxide (CO₂) emissions were avoided, with approximately 1.1 million tons of those emissions directly attributable to EERE's investments.

Knowledge and Technology Transfer: DOE support of early solar PV research has yielded foundational knowledge that drives today's private sector innovation, including an estimated 274 patent families.

Front page photos: Dennis Schroeder, NREL 20300; Dennis Schroeder, NREL 18579; Tom McDonald, NREL 17432. Back page photo: Dennis Schroeder, NREL 21514; Mike Linenberger, NREL 15401; Abengoa Solar

U.S. DEPARTMENT OF
ENERGY

energy.gov

DOE/GO-102013-3900 • February 2013

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