Solar Energy Technologies supports the SunShot goal to make solar energy technologies cost-competitive with conventional energy sources by 2020. Reducing the total installed cost for utility-scale solar electricity by approximately 75% (2010 baseline) to roughly $.06/kWh without subsidies will enable rapid, large-scale adoption of solar electricity across the United States. This investment will help re-establish American technological and market leadership in solar energy, reduce environmental impacts of electricity generation, and strengthen U.S. economic competitiveness.

What We Do

Solar Energy Technologies uses an integrated, five-pronged approach to deliver results toward the SunShot Initiative's objectives:

- ✓ **Photovoltaic Research and Development** advances R&D that has resulted in U.S. leadership in world records, scientific publications, and patents to provide U.S. solar industry technology advantages.
- ✓ **Concentrating Solar Power (CSP)** develops advanced thermal storage to enable CSP to provide dispatchable electricity, and improves system efficiency to meet SunShot objectives.
- ✓ **Systems Integration** develops technologies to enable improved integration of solar power with the grid including power electronics and systems level research on renewables integration.
- ✓ **Balance of Systems Soft Cost Reduction** works with stakeholders at the state and local levels to cut red tape; these soft costs can account for more than 50 percent of system costs.
- ✓ **Innovations in Manufacturing Competitiveness** invests in technologies that provide U.S. companies defensible competitive advantages focusing on segments of the solar manufacturing value chain, such as equipment and process automation.

Program Goals/Metrics

Solar Energy Technologies' performance goals are designed to achieve the following targets by 2020:

- Average utility-scale installed system price of $\$1.00/W_{dc}$.
- Average commercial-scale installed system price of $\$1.25/W_{dc}$.
- Average residential-scale installed system price of $\$1.50/W_{dc}$.
- In the 4th quarter of 2012, utility-scale solar priced at $\$2.27/W_{dc}$. Current 2013 bids are about $\$2/W_{dc}$, down 47 percent from the 2010 baseline and halfway to the 2020 goal.
- The current CSP price is about $0.185/kWh; the goal is $3.50/W, including 16 hours of storage (equivalent to $0.06/kWh).

FY 2014 Priorities

- **Grid Integration Initiative** is a joint program with Building Technologies and Vehicle Technologies offices that will deliver systems-level, behind-the-meter solutions to grid integration challenges.
- **Thermal Storage** will develop advanced energy storage approaches to enable CSP to provide dispatchable electricity, which will improve the ability to integrate renewables to the nation's electricity grid.
- **SolarMat II** will continue to invest in innovations that can provide U.S. manufactures a competitive advantage in a challenging global marketplace.
- **Transformational Science and Technology** will develop revolutionary next-generation PV technologies, leading

(Dollars in Thousands)	FY 2012 Current	FY 2013 Request	FY 2013 Annualized CR*	FY 2014 Request
Concentrating Solar Power	44,922	45,660	—	90,053
Photovoltaic R&D	75,563	66,885	—	79,061
Systems Integration	47,916	43,717	—	64,262
Balance of Systems Soft Cost Reduction	31,897	42,626	—	61,081
Innovations in Manufacturing Competitiveness	84,404	111,112	—	50,043
NREL Site Wide Facility Support	—	—	—	12,000
Total, Solar Energy Technologies	**284,702**	**310,000**	**290,719**	**356,500**

*FY 2013 amounts shown reflect the P.L. 112-175 continuing resolution level annualized to a full year. These amounts are shown only at the "congressional control" level and above; below that level, a dash (—) is shown.

to prototype PV cells and/or processes, directly impacting the $1/Watt (W) paradigm.

- **Partnering with States and Local Governments and Utilities** to harmonize and streamline permitting, interconnection, and inspection processes that will result in reduced costs to the consumer and businesses.

Key Accomplishments

- **Technology Leadership:** Over the past 35 years, the Department of Energy has supported R&D that has resulted in more than 50 percent of the world records for solar cell efficiency. In 2012, new world records came from 3 awardees.
- **Leverage of Federal Funds:** Since 2007, the SunShot Incubator Program has leveraged about $90 million in federal funds to support technology development at about 50 small businesses, with over $1.7 billion in follow-on private financing.
- **Reducing Red Tape:** Partnering with state and local governments has led to lower time and financial costs. For example, Broward County, Florida was able to use online permitting to reduce a months-long process to about 30 minutes. Solarize Massachusetts was able to reduce consumer costs by 25 percent through group purchasing.
- **Enabling a Talented and Trained Workforce:** The Solar Instructor Training Network (SITN) of 493 instructors at 261 community colleges developed workforce development programs to train/retrain workers to be skilled professionals in the solar industry and led to 9,780 people preparing to enter the solar job space to support our nation's increased solar demand; according to one industry assessment, the solar industry had a job growth rate of 13.2 percent from 2011 to 2012.

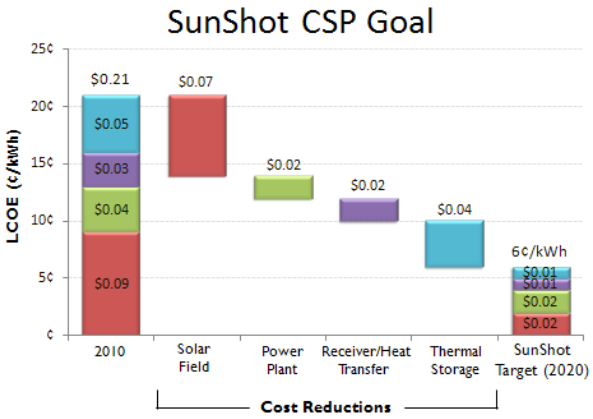

Figure 1. The subprogram has identified critical areas for cost reductions to achieve 2020 objectives. As shown, improvements in the solar field and in thermal storage are particularly critical for CSP.

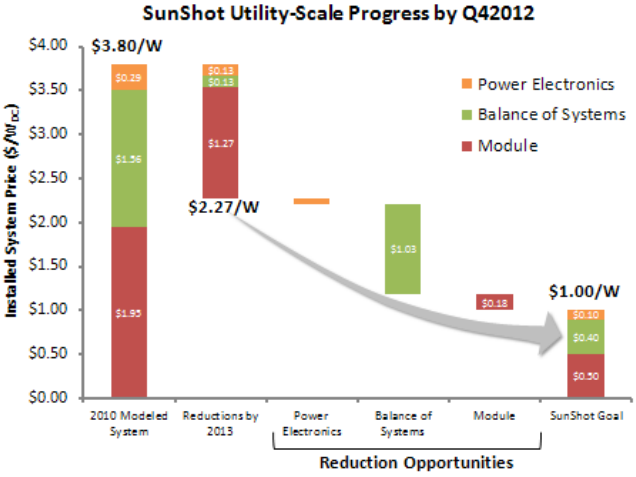

Figure 2. The SunShot Initiative is more than halfway towards the goal of $1/W for utility scale solar PV by 2020.

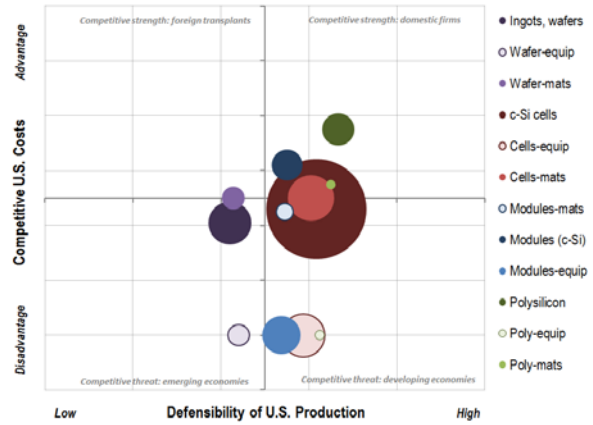

Figure 3[a]. Analysis by NREL has identified different segments of the value chain where the United States has unique manufacturing opportunities and can have defensible long term advantages. For example, the US continutes to have strength in high-technology materials manufacturing such as polysilicon and polymers, as well as manufacturing equipment, and a focus on manufacturing that can take advantage of some indigenous factors such as low cost and reliable electricity and abundant natural gas to support a resurgence in this sector.

[a] 2013 Source: A. Goodrich and T. James, NREL internal analysis (unpublished), March 2013.