



Program Overview for ASERTTI-NASEO Meeting

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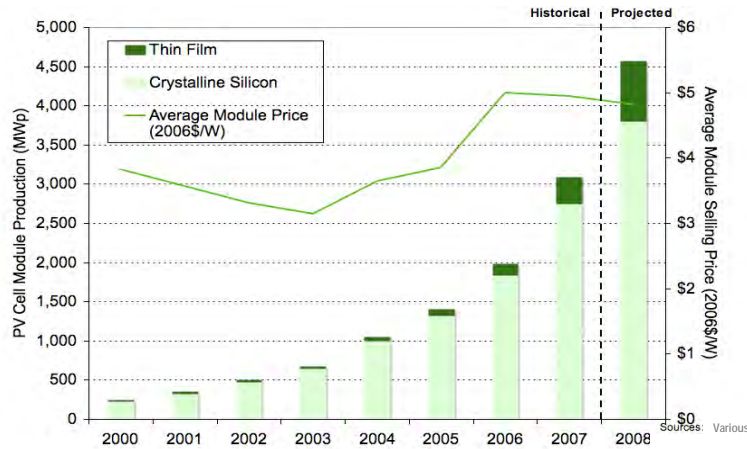
Key messages

- SETP is a multi-faceted program charged with the accelerate of solar technologies to achieve high penetration across the US and grid parity by 2015.
- SETP funds technology development for a portfolio of photovoltaic and concentrated solar power technologies through both the national labs and directly to industry.
- System Integration and Market Transformation are key sub-programs that address issues related to commercialization and wide-spread penetration of solar technology.
- The SETP going forward will adjust to dynamic industry conditions, new public renewable energy investments, and changes in technology and market requirements to cost effectively reach program goals.



The PV market has enjoyed strong growth over the last 5 years

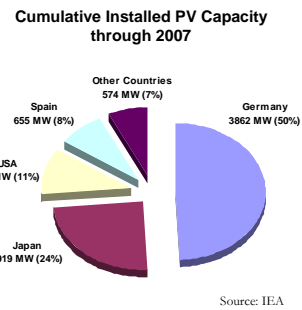
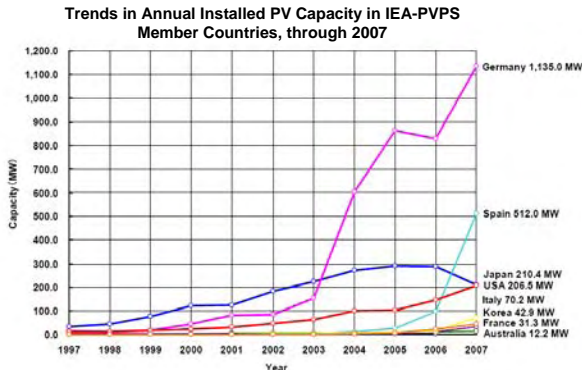
PV module production has grown significantly, but the rise in silicon feedstock prices has temporarily reversed the historical trend of declining average module selling prices



The PV industry is being driven by markets outside the US

At the end of 2007, cumulative installed PV capacity was estimated to be 7,800 MW world-wide, 93% of which is located in Germany, Japan, the US and Spain

- 7,200 MW is grid-connected
- In addition, there is 430 MW of installed concentrating solar power (CSP), including 419 MW in the US and 11 MW in Spain



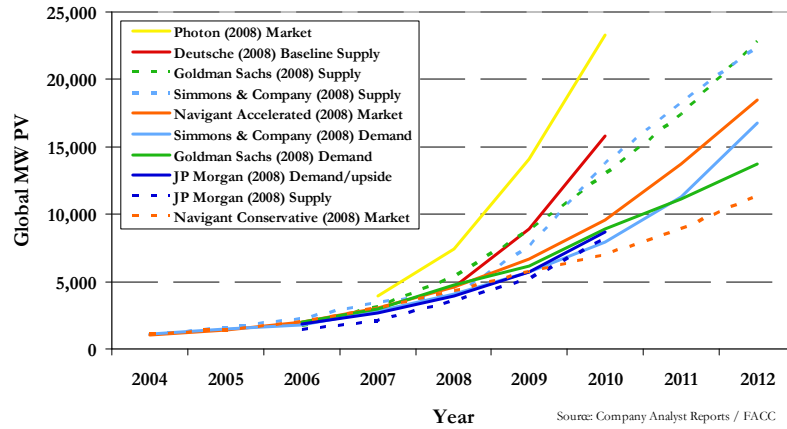
Source: IEA



There has been considerable uncertainty on PV market size growth projections due to a number of industry factors

This uncertainty has been compounded by the recent global economic slowdown and financial crisis

Global PV Market Projections

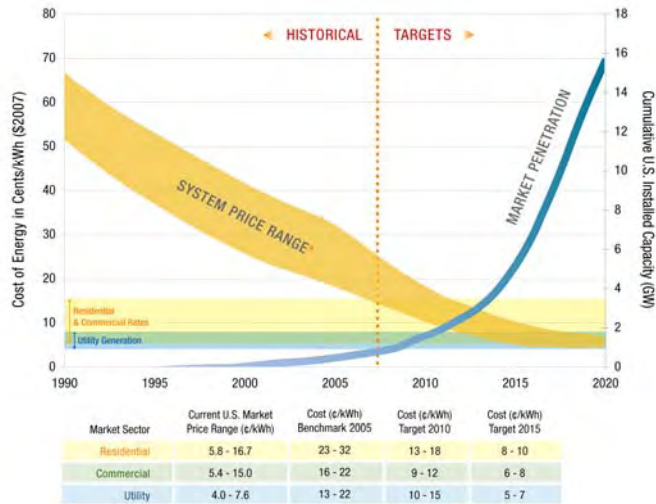


The mission of DOE's Solar Program is to **Accelerate** the wide-spread adoption of solar electric technologies across the United States

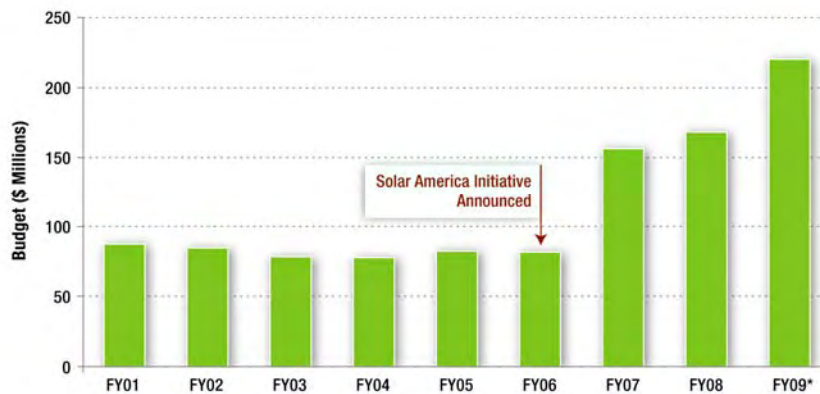




The SETP is focused on enabling high penetration of solar energy technologies and achieving grid parity by 2015



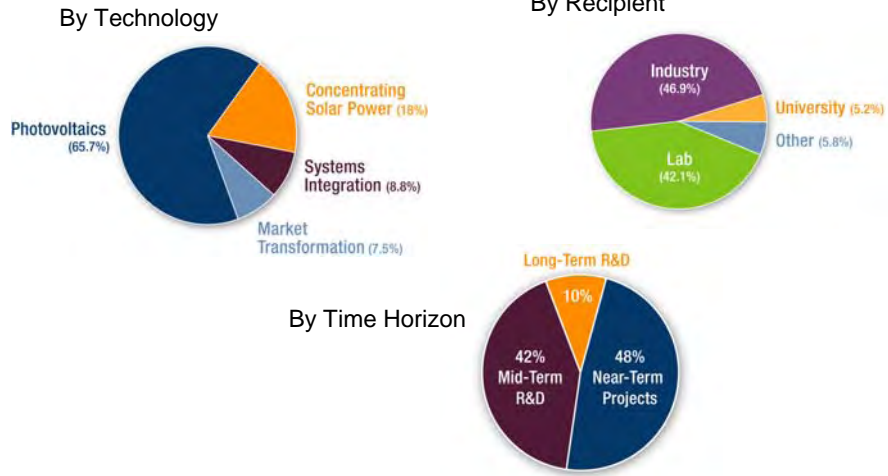
Funding for the SETP has been increased in response to the Solar America Initiative



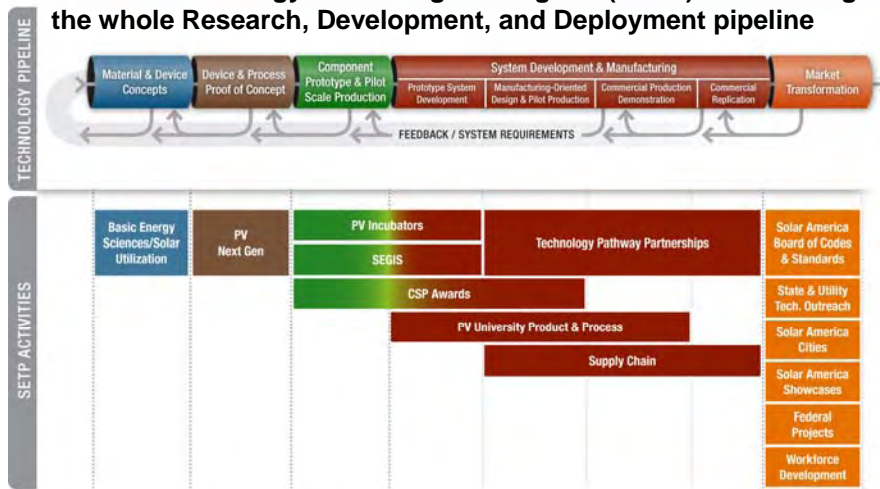
*President's request for FY09 was \$150M, current House mark is \$220M, current Senate mark is \$229M.



FY09 Projected Solar Budget



DOE's Solar Energy Technologies Program (SETP) works along the whole Research, Development, and Deployment pipeline





PV module research balances various materials through joint industry R&D and long-term research



Thin Films (aSi) 5%

Advancing amorphous and wafer replacement crystal silicon film solar cells on low-cost substrates



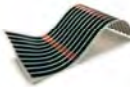
5% Thin Films (CdTe)

Simplifying deposition while retaining performance and transferring record device architecture to manufacturing processes



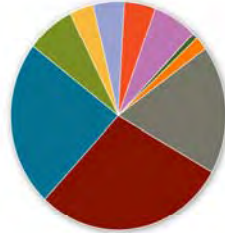
7% Thin Films (CIGS)

Supporting the manufacture of non-vacuum processes and transferring record efficiency device performance into large area commercial modules



Organic PV 4%

Customizing molecules, substrates, and deposition techniques to yield ultra low-cost modules



1% Dye-Sensitized Cells

Advancing the efficiency and stability of inexpensive dye-based solar cells with novel nanostructures



Next Generation 7%

Investigating advanced concepts aimed at delivering revolutionary performance improvements

2% Building Integrated PV

Creating module form factors aimed at dramatically reducing or eliminating solar installation costs



Crystalline Silicon 23%

Developing higher efficiency devices and lower cost processing methods for traditional silicon cells

28% Crosscut

Synergistic technologies, evaluation approaches, and process engineering approaches applicable across multiple absorber materials and processes

18% Concentrating PV

Combining new, lower cost multijunction cells and innovative optical packages



R&D is targeting technical obstacles in CSP systems to improve performance and reduce costs

Line Focus

- Optimize receiver and concentrator designs for higher temps, increase component suppliers, and create advanced evaluation capabilities.



Point Focus

- Improve engine reliability and system manufacturability, and develop next-generation dish system designs. Test new tower receiver panel.



Storage

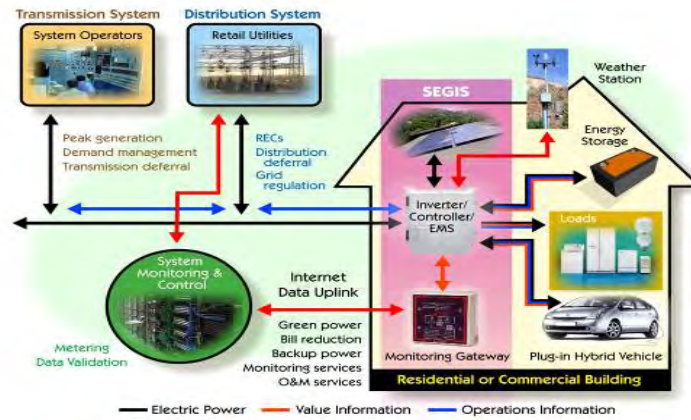
- Develop advanced heat transfer fluids for more efficient operation at high temperatures, and test innovative designs for low-cost storage using sensible and latent heat options.



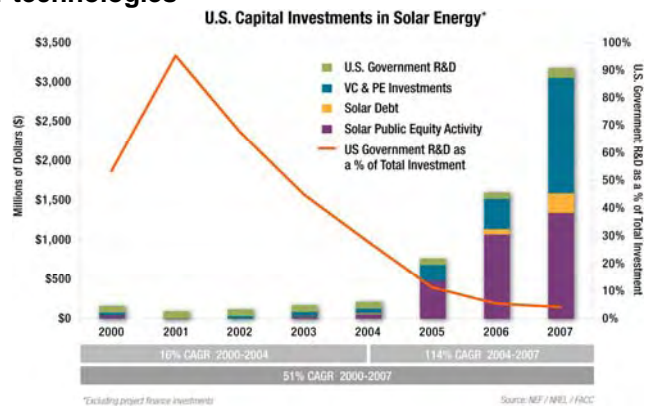


Distributed PV System Technology Solar Energy Grid Integration Systems (SEGIS)

- SEGIS is a "System" development program focused on new requirements for interconnecting PV to the electrical grid.
- SEGIS is the intelligent hardware that strengthens the ties of Smart Grids, Microgrids, PV, and other Distributed Generation.



The SETP is a critical part of the total funding available for solar technologies



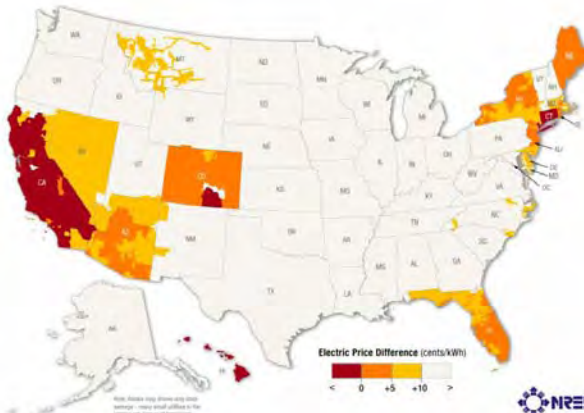
DOE Funding Advantages

1. Validating new technologies for private investment
2. Encouraging established companies to enter solar industry
3. Preferential access to National Lab expertise and facilities



Market penetration begins - 2007 residential PV and electricity price differences with existing incentives

- Currently PV is financially competitive where there is some combination of high electricity prices, excellent irradiance and/or state/local incentives.

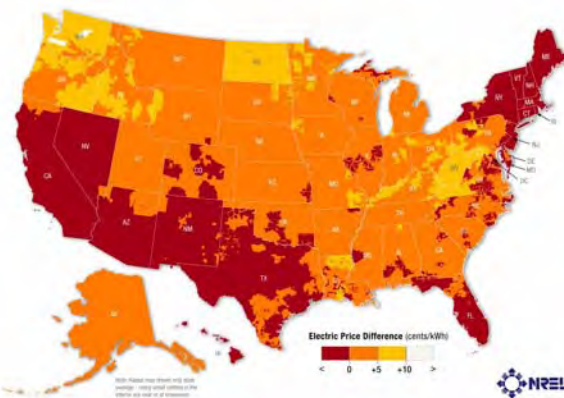


Assumptions: For the price of electricity, the average electricity price for the 1000 largest utilities in the U.S. based on EIA data for 2006 (except CA, where existing tiered rates structures were used). The installed system price is set at \$8.5/Wp in the current case and is assumed to be financed with a home equity loan (i.e., interest is tax deductible), with a 10% down payment, 6% interest rate, with the owner in the 28% tax bracket, and a 30 year loan/30 year evaluation period. Incentives included are the Federal ITC worth \$500/kW due to \$2000 cap and individual state incentives as of December 2007.



The conservative forecast - 2015 residential without incentives and moderate (1.5% PA) increase in real electricity prices

- PV is less expensive in 250 of 1,000 largest utilities, which provide ~37% of U.S. residential electricity sales
- 85% of sales (in nearly 870 utilities) are projected to have a price difference of less than 5¢/kWh between PV and grid electricity

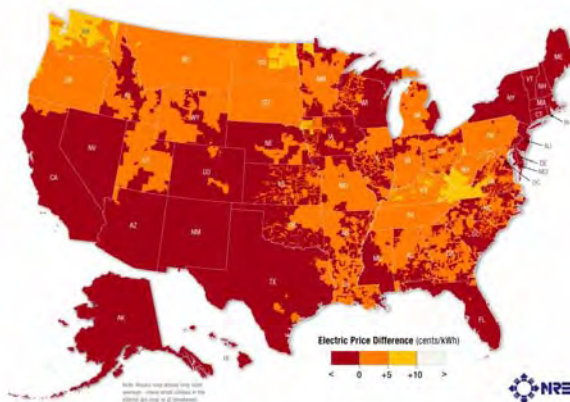


Notes: The installed system price is set at \$3.3/Wp.



The realistic forecast - 2015 residential installations without incentives and aggressive (2.5% PA) increases in real electricity prices

- PV is less expensive in 450 of the 1,000 largest utilities, which provide ~50% of U.S. residential electricity sales
- 91% of sales (in nearly 950 utilities) have a price difference of less than 5¢/kWh between PV and grid electricity



Notes: The installed system price is set at \$3.3/Wp.



Through Solar America Cities, DOE is partnering with cities committed to achieving a sustainable solar infrastructure



- Each of the 25 Solar America Cities receives \$200,000 plus \$250,000 in technical assistance from National Labs and other experts to:
 - 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)
 - Promote solar technology among residents and local businesses (e.g., outreach, curriculum development and/or implementation, incentive programs, etc.)

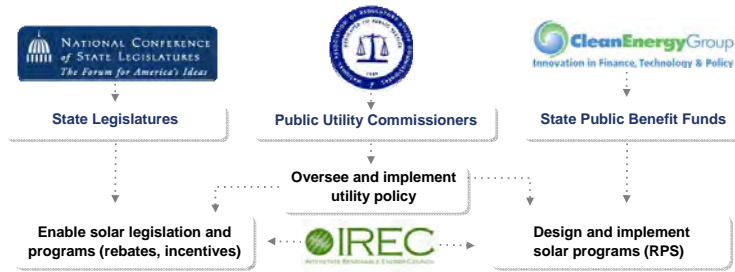
Activity Objective



State Technical Outreach

Activity Objectives:

- Build relationships with State decision-makers responsible for enacting policies, programs, and plans that are key drivers for solar technology market transformation.
- Provide state policymakers with best practice and current data about solar technology, so they can make informed solar policy decisions.



Utility Technical Outreach

Activity Objective:

- Deliver key technical and informational assistance to utilities to promote their acceptance and use of solar.



SEPA will assist their 175 member organizations and non-member utilities in the following ways:

Develop new business cases for solar

Provide current information on solar technologies

Disseminate innovative solar program design information to utilities



Activity Objective: Provide technical assistance to replicable, large-scale, high-visibility solar installation projects that showcase state-of-the-art solar technologies and applications.



Washington, DC Public Schools



Forest City Military Communities, HI



Orange County Convention Center, FL



City of San Jose, CA



NE Denver Housing Center, CO



Mystic Seaport, CT



Mesa Del Sol, NM



Major initiatives for the SETP in 2009

- Improve PV supply chain to meet 2015 grid parity targets
 - \$5M Funding Opportunity to close January 2009
- Continue to invest in new solar technologies
 - \$3M Pre-Incubator Funding Opportunity just opened – closes 3/10
 - Incubator Funding opportunity opening soon
- Accelerate industry access to Federal lands for solar projects
 - Co-lead PEIS with BLM; funding of PEIS through ANL
- Expand Solar industry work force training
 - \$2M Funding Opportunity in development
- Define requirements for energy storage and other grid integration
 - Will lay groundwork for expanded R&D for large scale energy storage



Additional Resources:

DOE Solar Program: <http://www.eere.energy.gov/solar/>

SNL PV Systems R&D: <http://www.sandia.gov/pv>

NREL Solar Research: <http://www.nrel.gov/solar>

Sign up for our Newsletter and Market Analysis: Send email to solar@ee.doe.gov

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