California Solar Initiative

RD&D: Research, Development, Demonstration and Deployment Program

Making Solar Smarter, Stronger and Sustainable

The goal of the California Solar Initiative (CSI) Research, Development, Demonstration, and Deployment (RD&D) Program is to foster a sustainable and self-supporting customer-sited solar market. To achieve this, the California Legislature authorized the California Public Utilities Commission (CPUC) to allocate **$50 million** of the CSI budget to an RD&D program. Strategically, the RD&D program seeks to leverage cost-sharing funds from other state, federal and private research entities, and to target funding across four key stages of RD&D

- **Research: 20%** - Fundamental research to improve performance of solar energy technologies. The research component of the CSI RD&D program ($10 million) is dedicated to the Lawrence Berkeley National Laboratory Solar Energy Research Center
- **Development: 10-15%** - Activities that convert research into working prototypes of improved technologies.
- **Demonstration: 45-55%** - Activities that bring promising technologies closer to market by demonstrating their real-world feasibility to manufacturers.
- **Deployment: 5-10%** - Aiding new technologies in gaining wide-scale adoption or to reach a "tipping point" into widespread commercialization.

Target activities across these four stages:

- Grid integration, storage, and metering: 50-65%
- Production technologies: 10-25%
- Business development and deployment: 10-20%

Target milestones for results:

- Results in 1-3 year horizon: 60%
- Results in 4-7 year horizon: 20%
- Results in 8+ year horizon: 20%

There have been three program solicitations to-date that have awarded over **$28.5 million** in funding for projects, leveraging over **$23 million** in match funding. The funded projects cover three target areas plus a fourth cross cutting focus area.

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SEVEN KEY PRINCIPLES OF THE CSI RD&D PROGRAM

1. **Improve the economics of solar technologies** by reducing technology costs and increasing system performance
2. **Focus on issues that directly benefit California**, and that may not be funded by others
3. **Fill knowledge gaps** to enable successful, wide-scale deployment of solar distributed generation technologies
4. **Overcome significant barriers** to technology adoption
5. **Take advantage of California's wealth of data** from past, current, and future installations to fulfill the above
6. **Provide bridge funding** to help promising solar technologies transition from a pre-commercial state to full commercial viability
7. **Support efforts to address the integration of distributed solar power into the grid** in order to maximize its value to California ratepayers

C S I R D & D P r o g r a m

Focus Areas of Research

1. Grid Integration: High Penetration of PV

Project	Grantee
Development and Analysis of a Progressively Smarter Distribution System	UC Irvine (APEP)
Planning and Modeling for High-Penetration PV	SunPower Corporation
Advanced Modeling and Verification for High Penetration PV	Clean Power Research
Improving Economics of Solar Power Through Resource Analysis, Forecasting and Dynamic System Modeling	UC San Diego
Analysis of High-Penetration Levels of PV into the Distribution Grid in CA	Southern California Edison / NREL
High Penetration PV Initiative	Sacramento Municipal Utility District
Tools Development for Grid Integration of High PV Penetration	BEW Engineering
Quantification of Risk of Unintended Islanding and Re-Assessment of Interconnection	General Electric International, Inc.,
High-Fidelity Solar Forecasting Demonstration for Grid Integration	University of California, San Diego
Screening Distribution Feeders: Alternatives to the 15% Rule	Electric Power Research Institute, Inc.
Integrating PV into Utility Planning and Operation Tools	Clean Power Research

2. Improved Solar Technologies

Project	Grantee
PV and Advanced Energy Storage for Demand Reduction	SunPower Corporation
Improved manufacturing and innovative business models to accelerate commercialization in California of hybrid concentrating photovoltaic/thermal tri-generation (CPV/T-3G) technology	Cogenra
Proving Performance of the Lowest Cost PV System	Solaria Corporation
Improved Cost, Reliability, and Grid Integration of High Concentration Photovoltaic Systems	Amonix, Inc.

3. Innovative Business Models

Project	Grantee
Innovative Business Models, Rates and Incentives that Promote Integration of High Penetration PV with Real-Time Management of Customer Sited Distributed Energy Resources	Viridity Energy
Advanced Grid-Interactive Distributed PV and Storage	Solar City
Reducing California PV Balance of System Costs by Automating Array Design, Engineering and	SunLink
Solar Energy & Economic Development Fund (SEED Fund)	Strategic Energy Innovations, Inc.

4. Cross-cutting: Integration of energy efficiency, demand response and storage with PV

Project	Grantee
BEopt-CA (EX): A Tool for Optimal Integration of EE/DR/ES+PV for California Homes	Davis Energy Group / NREL
Specify, Test and Document an Integrated Energy Project Model	kW Engineering
Low-Cost, Smart-Grid Ready Solar Re-Roof Product Enables Residential Solar Energy Efficiency Results	BIRAenergy (formerly ConSol)
West Village Energy Initiative	University of California Davis

LEARN MORE:

One stop for all solar in California: *GoSolarCalifornia.ca.gov*

CSI RD&D website: *calsolarresearch.ca.gov*

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Feb 2013