



Overview of DG in Self-Generation, Customer-Side Programs:

California Solar Initiative (CSI) and Self-Generation Incentive Program (SGIP)

March 2011

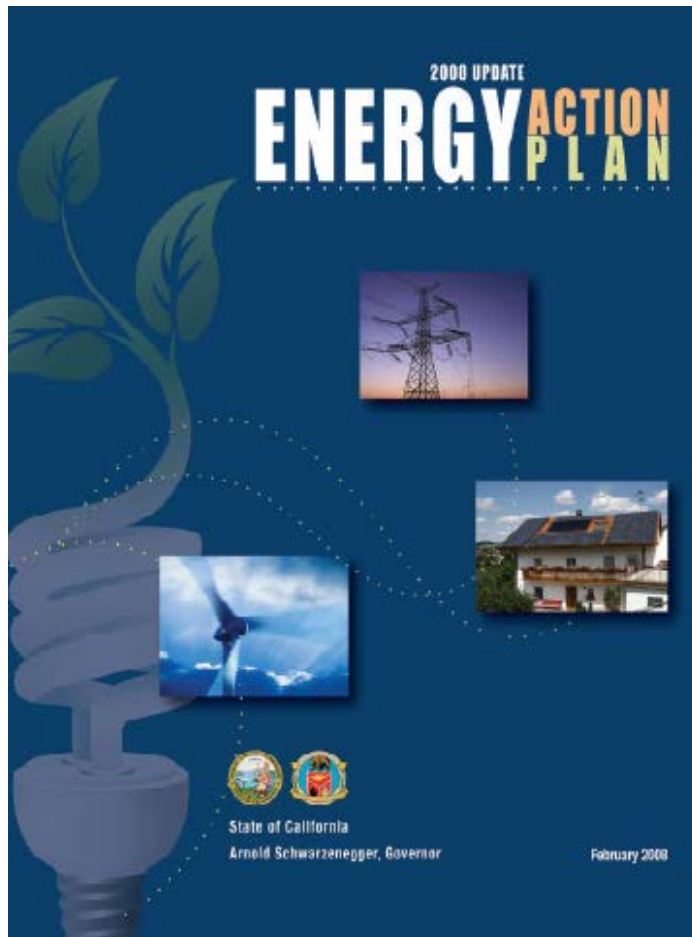
California Public Utilities Commission
Energy Division

www.cpuc.ca.gov/PUC/energy/solar/
www.cpuc.ca.gov/PUC/energy/DistGen/sgip/





Energy Action Plan: “Loading Order”



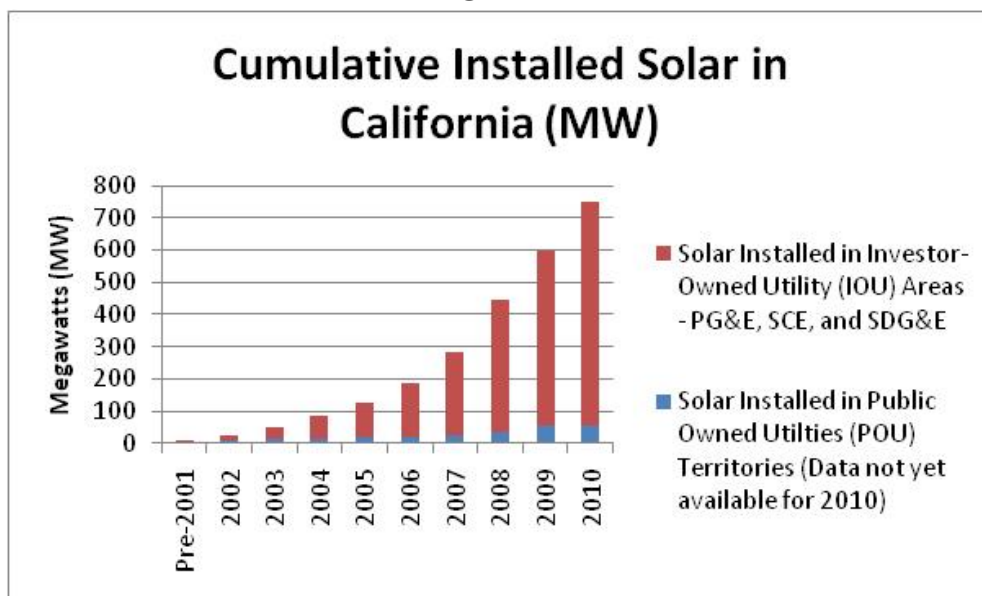
- Energy efficiency
- Demand response
- Distributed generation
- Renewable generation
- Cleanest available fossil resources





California Leads the Nation in Installed Solar

- California has 800+ MW installed PV at 78,000+ locations
- California is over 2/3rds of nation's solar market and nation's largest rebate program
- California supports solar self-generation with four inter-related state policies: rebates, net energy metering (NEM), interconnection policies, and rate structures (e.g. tiered rates, time of use rates)



Date: January 7, 2011. Data Shown ONLY includes customer-side of the meter self-generation solar. Does not include RPS or wholesale-side solar projects that serve utility load.

Sources: IOU data based on CPUC collected interconnection reports, except 2010 data which is based on CSI Program Data only. POU data based on California Energy Commission data, available through 2009 only.





Go Solar California campaign

Goals of Go Solar California

- SB 1 set goal of 3,000 MW of new customer-owned solar DG
- SB 1 set goal of a “self-sustaining” solar industry

Statewide Budget

- \$3,300 million budget (2007-2016) from electric ratepayers (sub-portion of budget = \$2,167 overseen by CPUC)
- \$250 million budget (2010-2017) from gas ratepayers

	California Public Utilities Commission	California Energy Commission	Publicly Owned Utilities (POU)	Total
Program	California Solar Initiative (CSI) Programs	New Solar Homes Partnership (NSHP)	Various	Go Solar California
Budget	\$2,167 million – electric \$250 million - gas	\$400 million	\$784 million	\$3,351 million – electric \$250 million – gas
Solar Goals (MW)	1,940 MW – electric 585 million therms displaced - gas	360 MW	700 MW	3,000 MW 585 million therms
Scope	All solar systems in IOU areas <u>except</u> PV in new homes	Solar systems on new homes in IOU territories	All solar systems in POU areas	All of California





Introduction to California Solar Initiative (CSI)

- ❑ Key Aspects of CSI Program Design
 - Launched in 2007, but built on related distributed generation rebate programs available under auspices of CPUC and CEC since earlier in decade.
 - Focus on Performance: Rebates paid on expected or actual performance, not just capacity. Rebates for large projects paid over five years.
 - Declining Incentives: Rebates lower in 10 steps based on market demand: Started at \$2.50/watt in 2007 and now at \$0.35/watt in 2011.
- ❑ CSI Program Includes 5 Sub-Components
 1. **General Market Program** : Provides incentives to all buildings except new homes, includes electric-displacing CSI-Thermal rebates
 2. **Single-family Affordable Solar Homes (SASH) Program**: Provides rebate to low-income customers in deed-restricted single-family homes
 3. **Multifamily Affordable Solar Housing (MASH) Program**: Provides rebates to multifamily affordable housing in deed restricted multi-family residences
 4. **RD&D Program**: Provides up to \$50 million in a program for projects related to CSI goals
 5. **CSI-Thermal Program**: Provides rebates for solar water heating and solar heating/cooling technologies





CSI General Market Program (2007-2010)

- Program is 51% of the way towards its goal of 1,750 MW in 4 years (26% installed)
- Pending projects have 12-18 months to come online or their funding is made newly available to other projects.
- Incentives have declined up to seven times in four years
 - Started at \$2.50/watt (or ~25% of installed cost)
 - Now at \$0.35/watt in most territories (or ~4% of installed cost)
 - Due to declining incentive levels, the CSI budget supports the installation of more MWs as incentives decline.

	Installed	Pending	Remaining	Total Goal
Capacity (MW)	456 MW	460 MW	834 MW	1,750 MW
Goal (% of Total)	26%	25%	49%	100%
Projects (Number)	43,185	11,730	~~	~~
Incentives (\$ Million)	\$903 M	\$578 M	\$267 M	\$1,748 M

Data includes only CSI General Market Program.
Data through January 26, 2011.





CSI Rebate as a % of System Costs

- ❑ Average systems cost btw. \$7.50-\$8.50/watt
- ❑ CSI Rebate now covers just 4-5% of system

Breakdown of System Costs by Means of Support (\$/watt)

Application Type	Solar System Cost Components			Estimated Net Energy Metering (NEM) Benefits over 20 Year Period
	CSI Rebate	Federal Investment Tax Credit (ITC)	Average System Cost	
Residential	\$0.35	\$2.39	\$7.96	\$1.00
<i>Percentage</i>	4%	30%	100%	
Non-Residential	\$0.35	\$2.26	\$7.42	\$1.00
<i>Percentage</i>	5%	30%	100%	
Non-Tax Entity	\$1.10	0	\$7.96	\$1.00
<i>Percentage</i>	15%	0	100%	





CSI Project Costs Declining

- ❑ CSI Systems have declined over 20% in four years on a CPI Adjusted basis

Size of System	Systems Less than 10 kW	Cumulative Decline in Price (Under 10 kW)	Systems Greater than 10 kW	Cumulative Decline in Price (Greater than 10kW)
Quarter/Year				
Q2 2007	\$10.09/watt		\$9.53/watt	
Q2 2008	\$9.53/watt		\$9.19/watt	
Q2 2009	\$9.52/watt		\$9.42/watt	
Q2 2010	\$7.96/watt	- 21%	\$7.42/watt	-22%

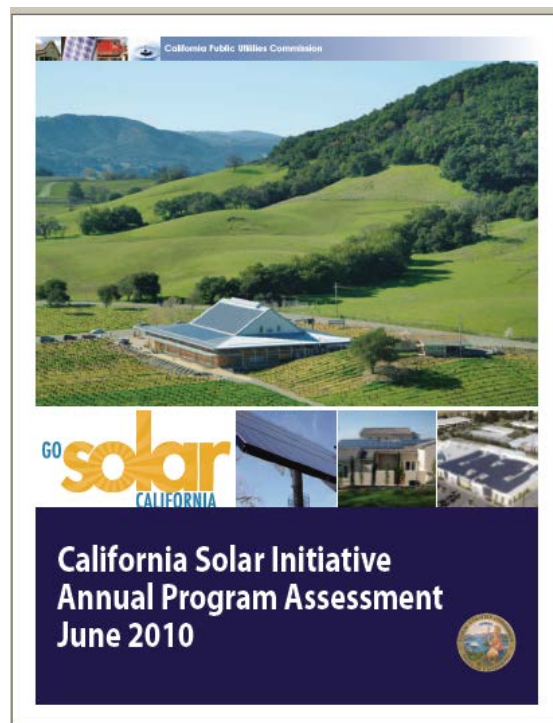
Date: January 6, 2011





Track Our Solar Market Progress

- ❑ Go Solar California Portal: Online Consumer Information
www.gosolarcalifornia.ca.gov
- ❑ Annually: Reports to CA legislature
<http://www.cpuc.ca.gov/PUC/energy/Solar/apa10.htm>
- ❑ Quarterly: Public "CSI Program Forums" – in person meetings
www.cpuc.ca.gov/PUC/energy/Solar/forum.htm
- ❑ Monthly: Go Solar California! Newsletter
www.gosolarcalifornia.ca.gov/news/
- ❑ Weekly: All program data available each Wednesday
www.CaliforniaSolarStatistics.ca.gov





Introduction to Self-Generation Incentive Program (SGIP)

SGIP provides incentives for DG technologies which have demonstrated a need for financial support in order to encourage customer adoption

Goals of SGIP

- Reduce peak load demand (historical goal from inception in 2001)
- Reduce greenhouse gas emissions (per SB 412 in 2009)

Budget

- \$83 Million program budget per year
 - \$75 Million for incentives, \$8 Million for program administration
 - Incentive budget split 50% for renewable and 50% for non-renewable
- Budget allocated across IOUs as % of natural gas sales
- No new budget collection authorized after 12/31/2011 per SB 412
- SGIP Program authorized through 2016





SGIP Program Incentive Structure

- SGIP offers upfront incentives to offset the cost of capital investment
- SGIP Program has completed 1,320 self-generation projects (for 355 MW)
 - Program has an additional 169 pending projects (for 82 MW).
- Incentives Offered
 - Wind = \$1.50/Watt
 - Fuel Cells = \$2.50/Watt (+ \$2.00/watt if using biogas)
 - Storage = \$2.00/Watt
 - + 20% incentive adder for California Suppliers (per AB 2667, 2008)
 - Fuel Cells using biogas with a California Supplier = \$5.00/watt
 - Per SB 412 the CPUC is considering offering incentives to other technologies internal combustion (IC) engines, microturbines, gas turbines, advanced energy storage)
- For comparison, California Solar Initiative (CSI) incentives are paid based on performance (incentive rates as of 2/2/2011)
 - PV incentives paid upfront to systems under 30 kW
 - PV incentives paid over 5 years to systems over 30 kW
 - PV for Non-Residential projects = \$0.35/watt (\$1.10 for gov't)
 - PV for Residential projects = \$0.35/watt (except SCE at \$1.55/watt)





Questions?





Additional Information on CPUC DG Programs





What is Distributed Generation (DG)?

A broad term that includes:

- Size: DG is generally considered 1 kW to 20 MW
- Definition: distributed power plants (generation) connected throughout the system at *distribution* voltage, but occasionally at the *transmission* voltage
- Benefits: voltage support, reduce transmission & distribution, local reliability, procurement portfolio diversity, demand reduction, flexible siting options, quick development timelines
- Ownership: DG can be customer-owned, utility-owned, or third-party owned
- Types of Technologies: solar PV, solar thermal, wind, CHP (including ICE, micro-turbines, gas turbines), fuel cells, distributed storage (if coupled with generation)
- Types of Fuel: all (sun, wind, natural gas, biogas, biomass, etc.)





DG Policies and Programs

DG Type	Programs
System-Side Generation or Utility-Side Procurement	Renewable Portfolio Standard (RPS) Program <ul style="list-style-type: none"> ▪ Feed-in Tariffs ▪ IOU Voluntary Programs ▪ Renewable Auction Mechanism (RAM) ▪ Utility Solar PV Programs ▪ Competitive Solicitations and Bilateral Contracts
	Combined Heat and Power (CHP) Programs <ul style="list-style-type: none"> ▪ Qualifying Facility (QF) Contracts ▪ Feed-in Tariff (FIT) under AB 1613 (Blakeslee, 2007)
Customer-Side Generation or Self-Generation	Go Solar California: Solar Photovoltaic (PV) Rebates <ul style="list-style-type: none"> ▪ California Solar Initiative (CSI) -- CPUC ▪ New Solar Homes Program (NSHP) – CEC
	Other Customer-Side Self Generation Rebates <ul style="list-style-type: none"> ▪ Self-Generation Incentive Program (SGIP) – CPUC (also storage, considering adding CHP) ▪ Emerging Renewables Program (ERP) – CEC





Net Energy Metering (NEM)

- Eligible Technologies: Solar, wind, biogas, and fuel cell generation facilities (up to 1 MW)
- Onsite Load: Facilities must serve onsite electricity needs
- Export/Import: NEM customer-generator export to the grid, and import (consume) from grid → Only pay for the net on a billing period basis.
- Credits: NEM customers can rollover excess bill credits for up to a year
 - New in 2010: NEM Customers will be paid “Net Surplus Compensation” for any net excess kWh sent to utility on an annual basis. CPUC setting rate in a ratesetting proceeding per AB 920 (Huffman, 2009).
- Two Variations on NEM
 - Bill Credit Transfer (BCT) - AB 2466 allows a local government (e.g. school district) to install renewable generation of up to 1 MW at one location within its geographic boundary. Credits can be used to offset charges at one or more other locations within the same geographic boundary.
 - Virtual Net Energy Metering (VNM) – CPUC established a pilot program to allow facilities to transfer NEM credits “virtually” across multiple accounts to support the affordable housing solar program. CPUC considering expanding VNM to other types of customers.

