

Distributed Generation/ California Solar Initiative

Program Overview
Sachu Constantine
April 23, 2008



CALIFORNIA SOLAR INITIATIVE

Agenda

- CSI Goals and Budget
- CSI Incentive Structure
- Progress Report
- Lessons Learned
- Other CPUC DG Programs
- Conclusion

CALIFORNIA SOLAR INITIATIVE

CSI Program Goals

- Statewide goals
 - 3,000 MW of new distributed solar generation by 2016
 - Create a self-sustaining solar industry free from ratepayer subsidies after 2016
- CPUC portion of the statewide goal
 - 1,940 MW in investor-owned utility territories



Photo: Brian Peterson, Sierra Nevada Brewing Company, Chico, CA
California Solar Initiative Funded System, 1,258 kW, September 2007
Installer: Chico Electric

CALIFORNIA SOLAR INITIATIVE

California Solar Initiative by Program Component, 2007-2016

Program Authority	California Public Utilities Commission	California Energy Commission	Publicly Owned Utilities (POU)
Budget	\$2,167 million	\$400 million	\$784 million
Solar Goals (MW)	1,940 MW	360 MW	700 MW
Scope	All systems in IOU areas except new homes	New homes, IOU territories	All systems in POU areas
Audience	Various	Builders, home buyers	Various
Start Date	January 2007	January 2007	January 2008

CALIFORNIA SOLAR INITIATIVE

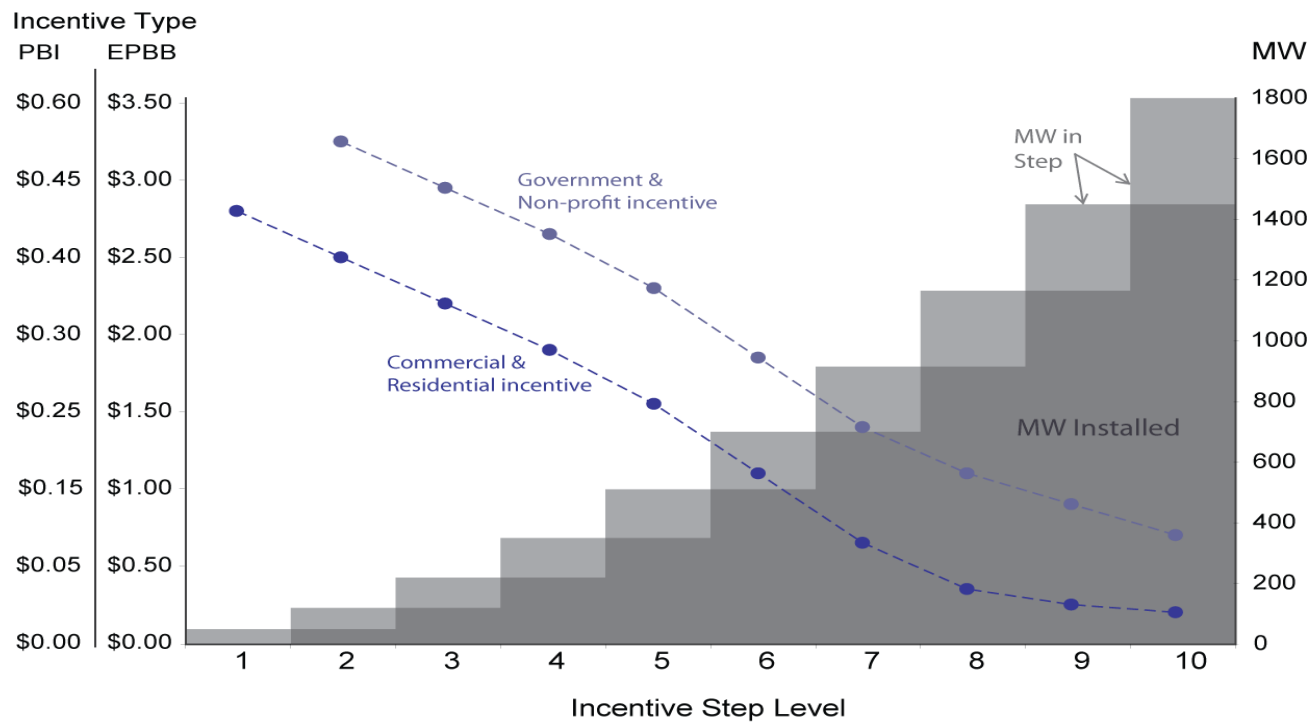
CPUC CSI Budget 2007-2016

Program Category	Budget (\$ Million)
General Market Program Subtotal	\$1,897
<i>Direct Incentives to Consumers</i>	<i>\$1,707</i>
<i>Program Administration, Marketing & Outreach, Evaluation (10%)</i>	<i>\$190</i>
Low-Income Program (10%)	\$217
Research, Development, Deployment and Demonstration (RD&D)	\$50
San Diego Regional Energy Office Solar Hot Water Pilot	\$2.6
Total CPUC CSI Budget	\$2,167

- **3 CPUC Program Administrators**
 - Pacific Gas & Electric
 - Southern California Edison
 - California Center for Sustainable Energy (CCSE) [In SDG&E territory]
- **CPUC 1,940 MW Goal**
 - 1,750 MW from general market program
 - 190 MW from low-income program

CALIFORNIA SOLAR INITIATIVE

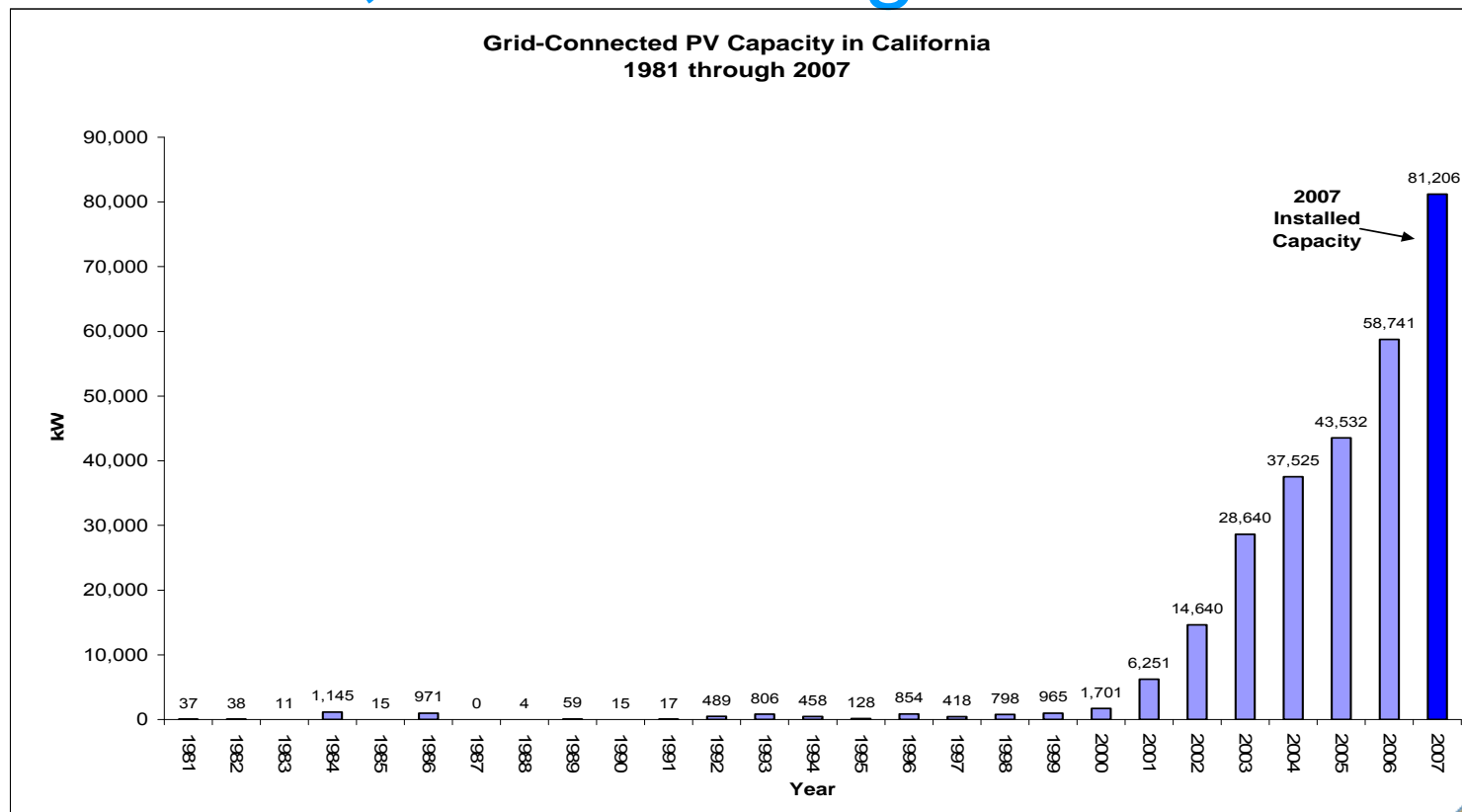
Incentives Decline as MWs Grow



PBI: Performance Based Incentive, paid over 5 years, in \$ / kWh
 EPBB: Expected Performance Based Buydown, paid upfront, in \$ / W

CALIFORNIA SOLAR INITIATIVE

Grid-Connected PV Capacity in California, 1981 through 2007



Source: 1981-2007 data from California Energy Commission's *Grid Connected PV Capacity Installed in California*, April 1, 2008. Available at: http://energy.ca.gov/renewables/emerging_renewables/GRID_CONNECTED_PV_12-31-07.XLS.

CALIFORNIA SOLAR INITIATIVE

Program Demand Statistics

All data from Jan 1 – Dec 31, 2007



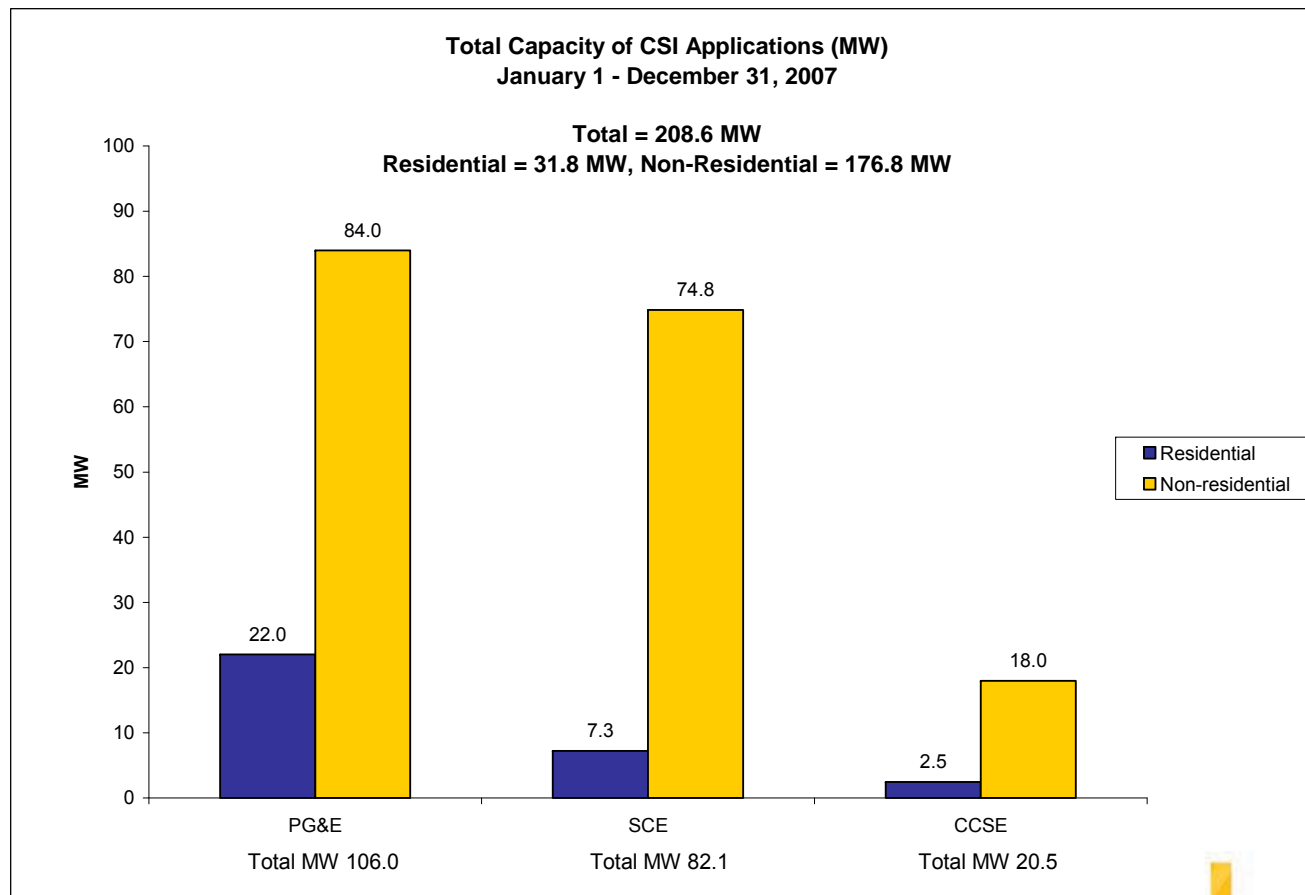
Photo: Travis Richardson, Hansen Trout Farm; Fillmore, CA.
105 kW California Solar Initiative Funded System, June 2007,
Installer: GW Richardson Heating & Air Conditioning, Inc.
Engineer/Designer: Kris Sutton, Travis Richardson

- Capacity of CSI Applications
 - 31.8 MW Residential
 - 176.8 MW Non-Residential
 - 208.6 MW Total
 - = \$558 million in incentives
- Number of Applications
 - 6,712 Residential
 - 829 Non-Residential
 - 7,541 Total
- Installed Projects
 - 17.9 MW
 - 2,719 Completed Projects



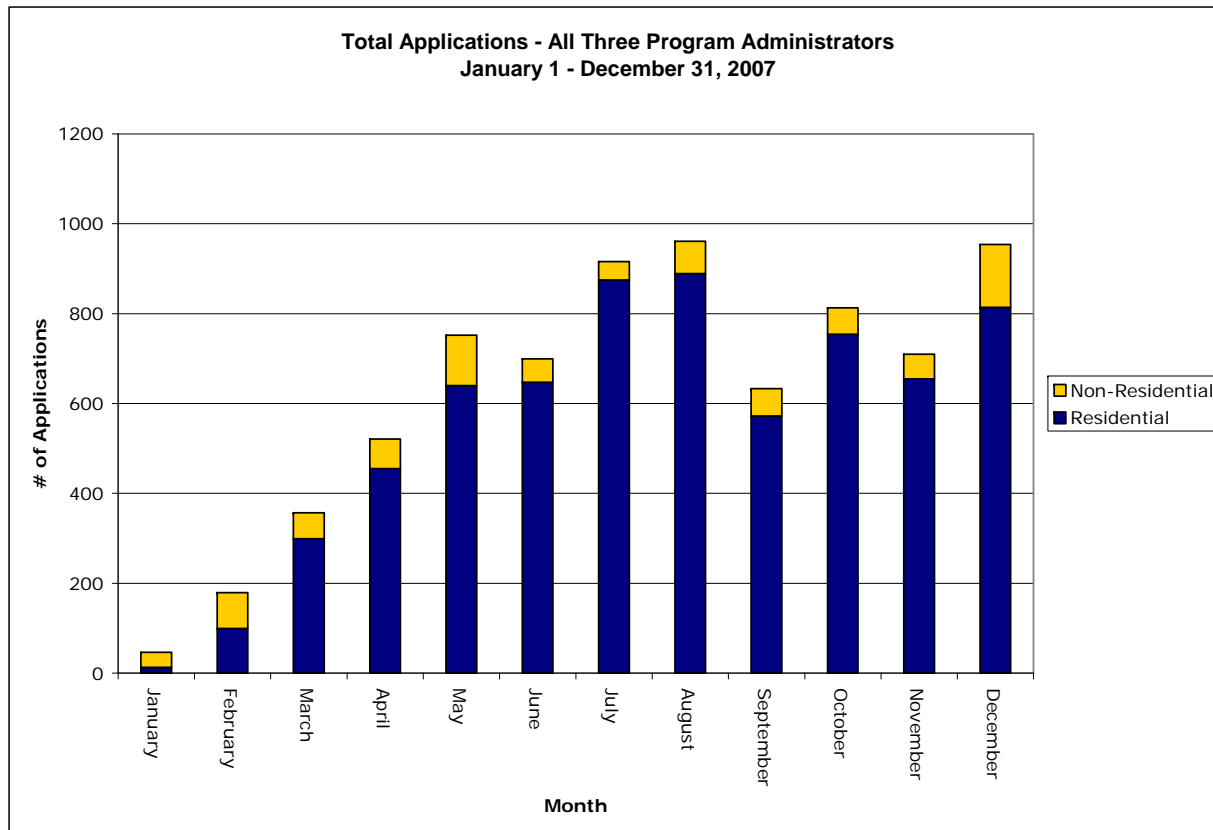
CALIFORNIA SOLAR INITIATIVE

CSI Demand (MW) by Territory



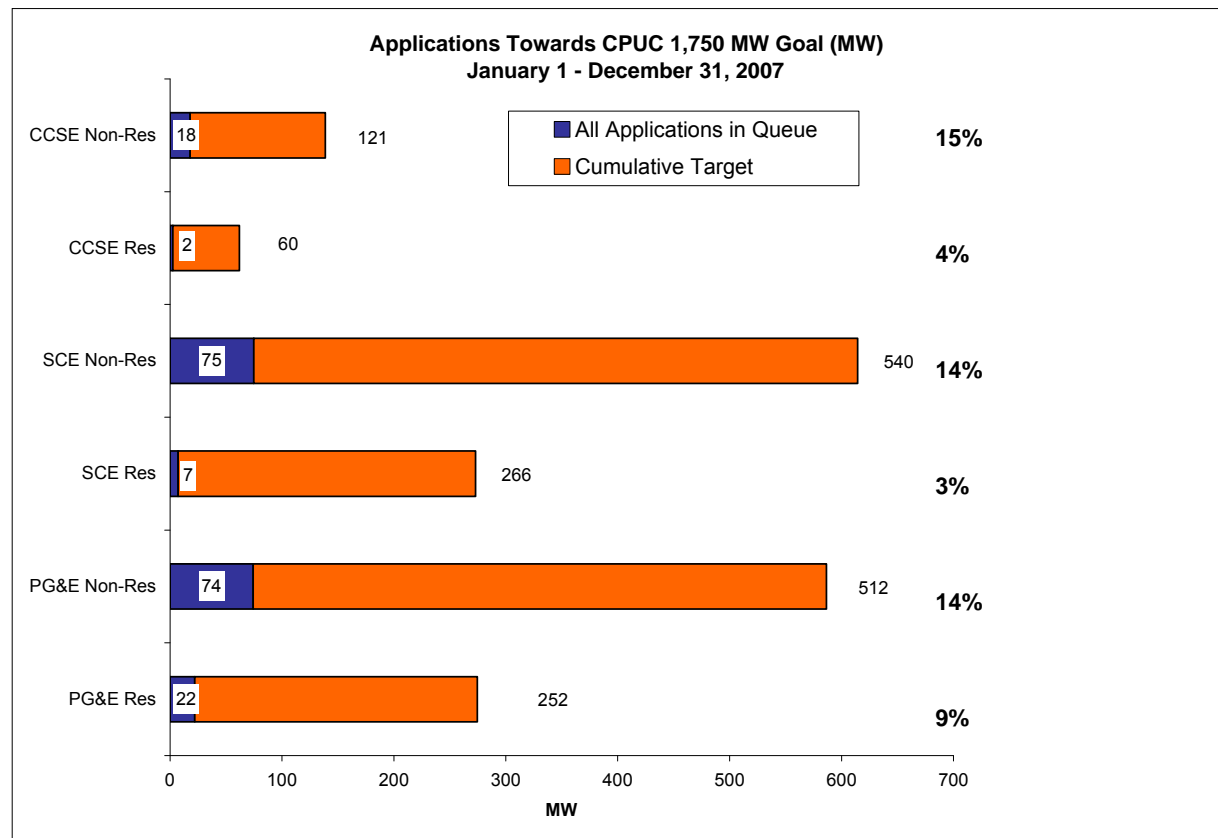
CALIFORNIA SOLAR INITIATIVE

CSI Applications by Month



CALIFORNIA SOLAR INITIATIVE

Progress Towards 1,750 MW Goal



CALIFORNIA SOLAR INITIATIVE

Other CSI Program Components

- Research Development, Deployment and Demonstration (RD&D)
 - CPUC Adopted in September 2007
 - Energy Division working to get a Program Manager selected
- Low-income incentive programs
 - Single Family Program Adopted in November 2007
 - Energy Division working to get a Program Manager selected for Single Family Program
 - Multifamily Low-Income Program Under Development
- Solar Hot Water Pilot Program
 - Program Launched in July 2007



Photo: Pritesh Sampat, La Habra Heights
Installer & Seller: AMECO, Long Beach, CA
California Solar Initiative Funded System 2007,
8.2 kW

CALIFORNIA SOLAR INITIATIVE

Additional Resources:

April Staff Progress Report:

<http://www.cpuc.ca.gov/PUC/energy/solar/>

Statewide consumer website:

www.GoSolarCalifornia.ca.gov

Program Handbook:

www.GoSolarCalifornia.ca.gov/documents/index.html

EPBB - Upfront Incentive Calculator:

www.csi-epbb.com

Online Application and Reporting Tool:

csi.powerclerk.com

Incentive Trigger Tracker (step level):

www.csi-trigger.com

CPUC Solar Initiative:

<http://www.cpuc.ca.gov/PUC/energy/solar>

California Solar Initiative

California Public Utilities Commission

Staff Progress Report

April 2008



GO solar CALIFORNIA



GO solar CALIFORNIA



Other CPUC DG Programs

- Self Generation Incentive Program
- Net energy metering (NEM)
- Feed-in-Tariffs

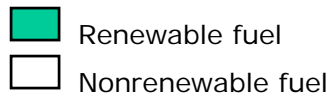
Self Generation Incentive Program (SGIP)

- ❑ **SGIP was the largest DG incentive program in the country (prior to CSI)**
 - Represents over \$1 billion in total project costs
 - As of March 31, 2008, approximately 1200 operating facilities (~300 MW of capacity installed)
- ❑ **Program was initiated by AB 970 (Ducheny, 2000)**
 - Started in response to California peak demand problems
 - Developed to pursue load control and distributed generation
- ❑ **Annual Budget**
 - \$83 million/year

CALIFORNIA SOLAR INITIATIVE

SGIP Technologies & Incentives

- Eligible technologies have included both renewable and fossil fuel powered systems



- Incentives have been capped at 1MW
- Maximum system capacity = 5MW

*Solar PV technologies were removed from SGIP effective 1/1/2007

**AB 2778 limits SGIP to wind and fuel cells effective 1/1/2008

Eligible Technology	Incentive Level \$/watt	
	2007	2008**
Solar PV*		
Wind turbines	\$1.50	\$1.50
Biogas fuel cell	\$4.50	\$4.50
Natural gas fuel cell	\$2.50	\$2.50
Biogas microturbines (MT)	\$1.30	
Biogas internal-combustion engines (ICE)	\$1.00	
Large biogas turbines	\$1.00	
Natural gas microturbines	\$0.80	
Natural gas internal-combustion engines	\$0.60	
Small natural gas turbines	\$0.80	
Large natural gas turbines	\$0.60	



Net Energy Metering (NEM)

Net Energy Metering:

- Customers may offset utility charges with credits from onsite power production.
- Systems up to 1 MW are eligible.
- NEM customers are exempt from standby charges and interconnection fees.

NEM Eligible Technologies:

- *Solar photovoltaics* and *wind turbines* receive credit based on the full retail rate.
- *Biogas-fired generators* and *fuel cells* receive credits at generation portion of the rate.

Feed-in-Tariffs (FiT)

❑ What is a feed-in-tariff?

- Standard offer contract for the sale of energy from a qualifying DG facility to the utility grid
- CA experience with FiT - Qualifying Facilities (QFs)
 - Public Utilities Regulatory Policy Act (PURPA) of 1978 established QFs and outlined their payment according to the avoided cost of power
 - QF is defined as non-utility generator with less than 80 MW capacity that utilizes cogeneration and/or renewable fuels (for bioenergy, \geq 50% biomass)

❑ New CA feed-in-tariffs

- AB 1969 (Yee) – Renewable FiT
- AB 1613 (Blakeslee) – CHP FiT

CALIFORNIA SOLAR INITIATIVE

AB 1969 (Yee)

Renewable Feed-in-Tariff

- ❑ Tariffs for the purchase of eligible renewable generation up 1.5 MW
- ❑ Statewide cap of 478.4 MW
- ❑ Fixed price is determined by the Commission, adjusted for time of delivery and season
- ❑ Contract periods of 10, 15 and 20 years
- ❑ Tariffs transfer Renewable Energy Certificates (RECs) from generator to utility
- ❑ Two options under tariff (depending on customer's choice):
 - Full sale of production
 - Excess sales (after onsite usage)

CALIFORNIA SOLAR INITIATIVE

AB 1613 (Blakeslee) CHP Feed-in-Tariff

- ❑ Feed-in-tariff for Combined Heat and Power DG
- ❑ Fixed or variable price to be determined by the CPUC
- ❑ Eligibility:
 - CHP up to 20MW
 - CHP systems must be sized to meet customer's thermal load. There is no requirement that CHP systems be sized to the customer's electric load. Thus, oversized systems (from an electric perspective) are permitted.
 - Only new CHP systems (installed after January 1, 2008) are eligible.
 - NOX emissions limit of 0.07 pounds per MWh