Overview of the CPUC’s California Solar Initiative and DG Programs:

James Loewen, Energy Division
California Public Utilities Commission

For NREL Incentive Program Webinar
September 27, 2012

www.cpuc.ca.gov/PUC/energy/DistGen/
# DG and Renewables Policies and Programs

<table>
<thead>
<tr>
<th>DG Type</th>
<th>Programs</th>
</tr>
</thead>
</table>
| **System-Side Generation or Utility-Side Procurement** | Renewable Portfolio Standard (RPS) Program  
- Feed-in Tariffs (Market Price Referent)  
- Renewable Auction Mechanism (RAM)  
- Utility Solar PV Programs  
- Competitive Solicitations and Bilateral Contracts |
| | Combined Heat and Power (CHP) Programs  
- Qualifying Facility (QF) Contracts |
| **Customer-Side Generation or Self-Generation** | Go Solar California: Solar Photovoltaic (PV) Rebates  
- California Solar Initiative (CSI) -- CPUC  
- New Solar Homes Program (NSHP) – CEC |
| | Other Customer-Side Self Generation Rebates  
- Self-Generation Incentive Program (SGIP) (for non PV) – CPUC  
- Emerging Renewables Program (ERP) – CEC |
California Leads the Nation in Installed Solar

- Solar in California: 1,322+ MW installed PV at 126,567+ locations
- California is over 2/3rds of nation’s solar market and nation’s largest rebate program
- California supports solar self-generation with four interrelated state policies:
  - Rebates
  - Net energy metering (NEM)
  - Interconnection policies and
  - Rate structures (e.g. tiered rates, time of use rates)
California Solar Initiative (CSI)

- **Key Aspects of CSI Program Design**
  - Launched in 2007, but built on related distributed generation rebate programs.
  - Focus on Performance: Rebates paid on expected OR actual performance.
  - Declining Incentives: **Rebates lower in 10 steps based on market demand**: Started at $2.50/watt in 2007 and at $0.20/watt in 2012. Higher rebates for non-commercial.

- **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 rebates 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
CPUC’s California Solar Initiative (CSI) Budget

Two Sources of Funds
- CSI is funded separately by electric and gas ratepayers

Program Focus
- 5 program subcomponents fund solar PV and solar thermal (including solar hot water) technologies

<table>
<thead>
<tr>
<th>Budget ($ Millions)</th>
<th>Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSI Electric Budget (2007-2016)</td>
<td>$2,367</td>
</tr>
<tr>
<td>General Market Solar Program (includes PV and electric displacing CSI-Thermal program)</td>
<td>$2,097</td>
</tr>
<tr>
<td>Single-family Affordable Solar Homes (SASH)</td>
<td>$108</td>
</tr>
<tr>
<td>Multifamily Affordable Solar Housing (MASH)</td>
<td>$108</td>
</tr>
<tr>
<td>Research, Development, Demonstration, and Deployment (RD&amp;D)</td>
<td>$50</td>
</tr>
<tr>
<td>Solar Water Heating Pilot Program (SWHPP)</td>
<td>$2.6</td>
</tr>
<tr>
<td>CSI Gas Budget (2010-2017)</td>
<td>$250</td>
</tr>
<tr>
<td>Total CSI Budget</td>
<td>$2,617</td>
</tr>
</tbody>
</table>
Program Issues: Administrative Efficiency

- Take the paper out of paperwork: Automate administrative processes.
  - CSI has increased use of online interfaces and use of PDFs vs. paper submissions.

- Accountability and documentation vs. streamlining:
  - Over time, CSI has reduced the number of forms required
Program Issues: Handling Confidential Data

- CSI provides data at California Solar Statistics website – graphs, tables, and database
- We also share some data with researchers – only government-affiliated, often with NDAs
- CSI strives to show as much information as possible, but must maintain customer confidentiality – i.e. name and address.
Program Issues: Third Party Owners (TPOs)

- Issues with TPOs were unforeseen when we designed the program in 2006
- These applications require different kinds of documentation
- Identifying the “system cost” for TPO systems is challenging
Program Issues: Book Keeping and Databases

- CSI faced complications/challenges:
  - Transition from the SGIP program to CSI in 2006 → 2007
  - Operating in tandem two databases, because of program’s organic history. Trigger Tracker (for MW) and PowerClerk (for $).
Program Issues: Adequate Admin Budget

- The Commission order (Decision 06-12-033) establishing the CSI budget capped the administration budget at 10% of the total program cost.
- Admin includes evaluation and marketing.
- Program Administrators have been squeezed for resources.
- Allow flexibility, and some buffer, in administrative budgeting.
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 *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.)
Go Solar California Campaign

Goals of Go Solar California

- Senate Bill 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

- $3,551 million budget (2007-2016) from electric ratepayers (sub-portion of budget = $2,367 million overseen by CPUC)
- $250 million budget (2010-2017) from gas ratepayers

<table>
<thead>
<tr>
<th>Program</th>
<th>California Public Utilities Commission</th>
<th>California Energy Commission</th>
<th>Publicly Owned Utilities (POU)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Solar Goals (MW)</strong></td>
<td>California Solar Initiative (CSI) Programs</td>
<td>New Solar Homes Partnership (NSHP)</td>
<td>Various</td>
<td>Go Solar California</td>
</tr>
<tr>
<td><strong>Budget</strong></td>
<td>$2,367 million – electric</td>
<td>$400 million</td>
<td>$784 million</td>
<td>$3,551 million – electric</td>
</tr>
<tr>
<td></td>
<td>$250 million - gas</td>
<td></td>
<td></td>
<td>$250 million – gas</td>
</tr>
<tr>
<td><strong>Solar Goals (MW)</strong></td>
<td>1,940 MW – electric</td>
<td>360 MW</td>
<td>700 MW</td>
<td>3,000 MW</td>
</tr>
<tr>
<td></td>
<td>585 million therms (gas)</td>
<td></td>
<td></td>
<td>585 million therms</td>
</tr>
<tr>
<td><strong>Scope</strong></td>
<td>All solar in IOU areas except PV in new homes</td>
<td>Solar on new homes in IOU territories</td>
<td>All solar in POU areas</td>
<td>All of California</td>
</tr>
</tbody>
</table>

Note: The electric budgets are for 2007-2016, and the gas budgets are for 2010-2017.
CSI General Market Program (2007-2012)

- Program is 73% of the way towards its goal of 1,750 MW
- Pending projects have 12-18 months to come online or their funding is made newly available to other projects.
- Incentives have declined up to 10 times in five and half years
  - Started at $2.50/watt (or ~25% of installed cost)
  - Now at $0.20/watt in most territories (or ~3% of installed cost)
  - Due to declining incentive levels, the CSI budget supports the installation of more MWs as incentives decline.

<table>
<thead>
<tr>
<th>Capacity (MW)</th>
<th>Installed</th>
<th>Pending</th>
<th>Remaining</th>
<th>Total Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goal (% of Total)</td>
<td>839 MW</td>
<td>348 MW</td>
<td>563 MW</td>
<td>1,750 MW</td>
</tr>
<tr>
<td>Projects (Number)</td>
<td>48%</td>
<td>20%</td>
<td>32%</td>
<td>100%</td>
</tr>
<tr>
<td>Incentives ($ Million)</td>
<td>73,586</td>
<td>14,180</td>
<td>~</td>
<td>~</td>
</tr>
<tr>
<td>Incentives ($ Million)</td>
<td>$1,355M</td>
<td>$262M</td>
<td>$331M</td>
<td>$1,948 M</td>
</tr>
</tbody>
</table>

Data includes only CSI General Market Program.
Data through June 4, 2012.
CSI Program Totals, Installed by Year

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of CSI MW Installed (MW)</th>
<th>Number of CSI Solar Projects Installed</th>
<th>CSI Incentives Awarded ($) Million</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>28 MW</td>
<td>3,376</td>
<td>$72 M</td>
</tr>
<tr>
<td>2008</td>
<td>121 MW</td>
<td>8,330</td>
<td>$315 M</td>
</tr>
<tr>
<td>2009</td>
<td>136 MW</td>
<td>13,063</td>
<td>$284 M</td>
</tr>
<tr>
<td>2010</td>
<td>152 MW</td>
<td>16,809</td>
<td>$238 M</td>
</tr>
<tr>
<td>2011</td>
<td>261 MW</td>
<td>21,406</td>
<td>$308 M</td>
</tr>
<tr>
<td>Total</td>
<td>698 MW</td>
<td>62,984</td>
<td>$1,217 M</td>
</tr>
</tbody>
</table>

CSI program installs more MWs each year with less incentive funding.

Data includes only CSI Genera Market Program.
Data through June 2012
Track Our Solar Market Progress

- Go Solar California Portal: Online Consumer Information
  www.gosolarcalifornia.ca.gov

- Annually: Reports to CA legislature

- 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
Net Surplus Compensation

- **Net Surplus Generators**
  - Net energy metering customers who produce electricity in excess of their on-site load are eligible for compensation at the end of a 12-month true-up period (AB 920, 2006)
  - The net surplus compensation rate is a rolling 12-month average of each utility’s avoided cost derived from an hourly day-ahead electricity market price between the hours of 7am to 5pm, when most surplus generators produce electricity (D.11-06-016)

- **Renewable Energy Credits (RECs)**
  - AB 920 stipulates that utilities will receive the renewable energy credits (RECs) associated with those excess kilowatt hours for which they have provided compensation to customers
CSI Project Costs Declining

- CSI System costs have declined in five years on a CPI Adjusted basis

<table>
<thead>
<tr>
<th>Quarter/Year</th>
<th>Systems Less than 10 kW</th>
<th>Systems Greater than 10 kW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q4 2007</td>
<td>$10.23/watt</td>
<td>$9.90/watt</td>
</tr>
<tr>
<td>Q4 2008</td>
<td>$10.40/watt</td>
<td>$9.65/watt</td>
</tr>
<tr>
<td>Q4 2009</td>
<td>$9.37/watt</td>
<td>$7.79/watt</td>
</tr>
<tr>
<td>Q4 2010</td>
<td>$8.41/watt</td>
<td>$7.32/watt</td>
</tr>
<tr>
<td>Q4 2011</td>
<td>$7.39/watt</td>
<td>$6.47/watt</td>
</tr>
</tbody>
</table>

Date: June 3, 2012