PG&E
Solar Efforts and Services

Chuck Hornbrook
Senior Manager, Solar and Customer Generation
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PG&E and our Business

What we do:

- Deliver safe, reliable, and environmentally responsible gas and electricity to approximately 15 million Californians

<table>
<thead>
<tr>
<th>Electric and gas distribution customers</th>
<th>5.1 MM electric, 4.2 MM gas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electric transmission circuits</td>
<td>18,610 miles</td>
</tr>
<tr>
<td>Gas transmission backbone</td>
<td>6,136 miles</td>
</tr>
<tr>
<td>Electric generation capacity</td>
<td>6,000 MW</td>
</tr>
</tbody>
</table>
PG&E as a Partner and Solutions Provider

PG&E Portfolio Solution

- Reduce Energy Use
- Partnership
- Education
- Outreach
- ClimateSmart
- Renewable Power Supply
Over the past 30 years, California per capita energy use has remained relatively flat compared to the 50% increase in U.S. per capita energy use.

Source: California Energy Commission
Greening our Headquarters

- Certified LEED™ Gold by U.S. Green Building Council

- Waste Minimization
  - Recycling
  - Composting
  - E-waste disposal
  - Landscape management
  - Buy recycled products
PG&E’s 2008 Electric Delivery Mix
--on average over 50% of the energy PG&E delivers comes from sources that emit almost no carbon dioxide
Greening our Energy Supply: Existing Renewable Resources

Biomass Energy

Wind Energy

Small Hydropower (<30MW)

Geothermal Energy
Solar Thermal Technologies Under Contract

Parabolic Trough

Compact Linear Fresnel Reflector

Power Tower

Dish Engine (SCE/SDG&E)

Power Tower (SCE)

Trough/Biomass Hybrid
Solar Photovoltaic (PV) Technologies Under Contract

- Fixed Thin Film (a-Si)
- Tracking Crystalline Silicon
- Fixed Thin Film (Cd Tel) (SCE)
- Unspecified CPV (illustrative)
- Concentrating PV
PG&E Solar Activities

• Management of the California Solar Initiative
• Management of the New Solar Homes Partnership
• Partnering with Habitat for Humanity to build solar communities
• Teaching children through our Solar Schools program
• Creating clean solar energy at our own facilities
• Helping create Major League Baseball’s first solar ballpark
• Connected more solar customers than any other utility in the county – roughly 50% of total solar installed
Other Support for Solar

- **Net Metering**
  - Exports to utility grid are valued at retail electricity rate
  - Capped at 2.5% of utility peak
- **No standby charges**
- **No interconnection study fees**
- **Exemption from Nonbypassable Charges**
- **Renewable Energy Credits**
Cumulative PG&E Solar Interconnections

- 28,000+ grid tied solar installations
- Roughly 50% of all grid tied in US
- More than 280 MW
### CPUC

- **Existing Residential**
- **Existing Commercial**
- **Commercial New Construction**

1. California Solar Initiative (CSI)

2. Multi-family

   - Program Administrators
   - PG&E

### CEC

- **Existing Low Income**

3. Single Family

   - Grid Alternatives

4. New Solar Homes Partnership (NSHP)

   - Program Administrators
   - PG&E

## SB 1 – 3000 MW Goal
California Solar Initiative - www.pge.com/csi

- PG&E began administering in 2007
- $950 million in PG&E solar incentives over the next decade
- Statewide goal is to install 3,000 MW by 2016
- Customers must perform energy efficiency audit to be eligible for incentives

PG&E has connected more than 28,000 solar-generating customers to the grid.
CSI Incentives: Performance Based Incentives (PBI) or Expected Performance Based-Buydown (EPBB)

Incentives decline over time based on MWs installed via Steps

<table>
<thead>
<tr>
<th>Step</th>
<th>Statewide MW in Step</th>
<th>EPBB Payments (per Watt)</th>
<th></th>
<th>PBI Payments (per kWh)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Residential</td>
<td>Commercial</td>
<td>Government/Non-Profit</td>
<td>Residential</td>
</tr>
<tr>
<td>1</td>
<td>50</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>2</td>
<td>70</td>
<td>$2.50</td>
<td>$2.50</td>
<td>$3.25</td>
<td>$0.39</td>
</tr>
<tr>
<td>3</td>
<td>100</td>
<td>$2.20</td>
<td>$2.20</td>
<td>$2.95</td>
<td>$0.34</td>
</tr>
<tr>
<td>4</td>
<td>130</td>
<td>$1.90</td>
<td>$1.90</td>
<td>$2.65</td>
<td>$0.26</td>
</tr>
<tr>
<td>5</td>
<td>160</td>
<td>$1.55</td>
<td>$1.55</td>
<td>$2.30</td>
<td>$0.22</td>
</tr>
<tr>
<td>6</td>
<td>190</td>
<td>$1.10</td>
<td>$1.10</td>
<td>$1.85</td>
<td>$0.15</td>
</tr>
<tr>
<td>7</td>
<td>215</td>
<td>$0.65</td>
<td>$0.65</td>
<td>$1.40</td>
<td>$0.09</td>
</tr>
<tr>
<td>8</td>
<td>250</td>
<td>$0.35</td>
<td>$0.35</td>
<td>$1.10</td>
<td>$0.05</td>
</tr>
<tr>
<td>9</td>
<td>285</td>
<td>$0.25</td>
<td>$0.25</td>
<td>$0.90</td>
<td>$0.03</td>
</tr>
<tr>
<td>10</td>
<td>350</td>
<td>$0.20</td>
<td>$0.20</td>
<td>$0.70</td>
<td>$0.03</td>
</tr>
</tbody>
</table>
CSI Applications
Non-Residential Trigger

Total Non-Res: 1,133

Non-Res Apps Received
CSI – Current Snapshot

- 12,570 applications;
- Paid out more than 7,700;
- Represents more than 185 MW;
- Committed to more than $420,000,000 in incentives
- Avoiding roughly 82,000 tons of CO2 emissions
Other Solar Electric Generating Technologies

• Overview

  – A definition: *All solar technologies other than flat-plate non-concentrating modules*
    • In other words: Anything other than conventional PV
  – As of October 1, 2008, other solar electric technologies could apply for CSI incentive
  – Reflects CPUC intent that all solar technologies (not just PV) should qualify for incentives
  – All “Other Solar Electric” incentives are PBI
  – As with PV, products must be certified for CSI eligibility
    • Only one product certified to-date (SolFocus)

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Model</th>
<th>Technology</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>SolFocus Inc.</td>
<td>Sf-1000P</td>
<td>228W Concentrator PV Module</td>
<td>Added 9/19/08</td>
</tr>
</tbody>
</table>
## Other Solar Electric Generating Technologies

<table>
<thead>
<tr>
<th>Category</th>
<th>Electric Generating</th>
<th>Electric Displacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technology Examples</td>
<td>• Dish stirling</td>
<td>• Solar water heating</td>
</tr>
<tr>
<td></td>
<td>• Solar trough</td>
<td>• Solar space &amp; process heating</td>
</tr>
<tr>
<td></td>
<td>• Dish and lens</td>
<td>• Solar driven cooling</td>
</tr>
<tr>
<td></td>
<td>• Concentrating solar (“CPV”)</td>
<td></td>
</tr>
<tr>
<td>Incentive Basis</td>
<td>Amount of electricity generated (like with PV)</td>
<td>Amount of electricity that <em>would have otherwise been consumed</em>, assuming minimum equipment efficiencies</td>
</tr>
<tr>
<td></td>
<td>minus ancillary loads</td>
<td></td>
</tr>
</tbody>
</table>
Other Solar Electric Generating Technologies

• Going forward
  – CSI calculator for Concentrating PV is available
    • Determines incentive based on user estimate of annual kWh (can be obtained from vendor calculations)
  – Calculator for other technologies to follow
  – Forms available on CSI website
    • Reservation request form
    • Reservation application guide
  – Have received first “Other Solar Electric” reservation request (Concentrating PV)

Questions?
Low Income Solar Programs: Single and Multifamily

- $216 million (10% of CSI Budget) set aside for Low Income, split between single family and multifamily
- PG&E, SCE, SDG&E ratepayer funded
- GOAL -
  Promote participation by low income households living in existing housing structures
- PURPOSE -
  Provide incentives for and education about installing eligible solar photovoltaic systems on existing low income homes
Multifamily Affordable Solar Housing (MASH) - Goals

- Stimulate the adoption of solar power in the affordable housing sector;
- Improve the energy utilization and overall quality of affordable housing through the application of solar and energy efficiency technologies;
- Decrease electricity use and cost without increasing monthly household expenses of low income tenants;
- Increase awareness of and appreciation for the benefits of solar among low income tenants and affordable housing developers.
MASH Overview

• Budget of $108 million
• PG&E; SCE and CCSE
• Higher incentives available to low income building owners –
  – $3.30/watt to offset common load (Track 1a)
  – $4.00/watt to offset tenant load (Track 1b)
  – Third incentive type that offers grants to building owners who can demonstrate significant tenant benefit
• Virtual Net Metering -- allows credits from one solar system to be applied to multi-tenant low income accounts
New Solar Homes Partnership (NSHP)

- Incentive program for installing eligible solar photovoltaic systems on new homes;
- 400 MW; Budget of $400 million
- Goal to create a self sustaining market for solar homes where builders incorporate high levels of energy efficiency and high performing solar systems
- Begun January 2007, ends December 2016
- PG&E; SCE; SDG&E and BVES Electric
**NSHP Incentives**

- One time, up-front, expected performance based incentive payment
- Levels decline over 10 years as MWs achieved
- Higher incentives available for affordable housing
  --Start at $3.50/watt for residential units and systems servicing common areas
- Market rate base incentive
  --2.50/watt; $2.60/watt – production housing with solar standard
Self Generation Incentive Program (SGIP)

• Program initiated in 2001

• Scheduled to continue accepting applications through 2012 – with modifications beginning in 2008

• Provides incentives for the installation of new, qualifying self-generation equipment installed to meet all or a portion of the electric energy needs of a facility (small wind and fuel cell)

• PG&E, SCE, SoCal Gas, California Center for Sustainable Energy (CCSE) for SDG&E
# 2008 SGIP Incentives

<table>
<thead>
<tr>
<th>Incentive Levels</th>
<th>Eligible Technologies</th>
<th>Incentive Offered ($/Watt)</th>
<th>Minimum System Size</th>
<th>Maximum System Size</th>
<th>Maximum Incentive Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 2</td>
<td>Wind turbines</td>
<td>$1.50/W</td>
<td>30 kW</td>
<td>5 MW</td>
<td>1 MW</td>
</tr>
<tr>
<td>Level 2</td>
<td>Renewable fuel cells</td>
<td>$4.50/W</td>
<td>30 kW</td>
<td>5 MW</td>
<td>1 MW</td>
</tr>
<tr>
<td>Level 3</td>
<td>Non-Renewable fuel cells</td>
<td>$2.50/W</td>
<td>None</td>
<td>5 MW</td>
<td>1 MW</td>
</tr>
</tbody>
</table>

For projects that are greater than 1 MW up to 3 MW, the incentives identified above declines according to the schedule below:

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Incentive Rate (Pct. of Base)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 – 1 MW</td>
<td>100%</td>
</tr>
<tr>
<td>&gt;1 MW – 2 MW</td>
<td>50%</td>
</tr>
<tr>
<td>&gt;2 MW – 3 MW</td>
<td>25%</td>
</tr>
</tbody>
</table>
Applied Technology Services: Modular Generation Test Facility

- ATS has unique capabilities for testing and evaluating distributed generation and storage equipment and their interactions with a utility grid.

- Our facility is designed for testing grid-connected and off-grid power generation and storage technologies.

- It complies with all PG&E interconnection requirements for an independent power producer (IPP) at its 500 kVA facility rating.

- Measurement systems are designed based on the needs of the system under test and can include temperature, pressure, flow, electrical properties, power quality, vibration, acoustics, and emissions.
Distributed Generation Testing Capabilities

- 500 kVA switchgear for independent power production
- 3-phase, 480 Volt wye service
- Multiple bus configurations for islanding capability
- Protection for utility under/over frequency, under/over voltage, and ground fault current
- 400 kW variable resistive load controllable in 5 kW increments
- 550 kVAR variable inductive load controllable in 3.75 kVAR increments
- 750 kVAR variable capacitive load
- Additional capacitance, resistance, and inductance can be added as required
- Natural gas supply
- 70-foot by 40-foot building designed for distributed resource testing.
For More Information
PG&E Products and Services

- E-mail: Roxanne Fong  RFC2@pge.com or valueadd@pge.com
- Phone: Roxanne Fong at 415-973-5825 or 1-800-687-5720
- Web: www.pge.com/b2b
Questions?