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Renewable & Alternative Power
Southern California Edison
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Agenda

- SCE’s Renewable Energy Portfolio
- How SCE Procures Renewable Energy
- Costs of Renewable Energy
- RPS Principles
- Challenges
SCE Delivers More Renewable Energy Than Any Company In The U.S.

2009 Renewable Resources
13.6 Billion kWh
~17% of SCE’s portfolio

- Small Hydro 4%
- Solar 6%
- Biomass 7%
- Wind 26%
- Geothermal 57%

Renewable Resources 2009-2010 (Billion kWh)

<table>
<thead>
<tr>
<th></th>
<th>2009</th>
<th>2010</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>15.0</td>
</tr>
<tr>
<td>2009</td>
<td>13.6</td>
<td></td>
</tr>
<tr>
<td>Increase</td>
<td>10%</td>
<td>89%</td>
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</tbody>
</table>

Goal
2020
33% Goal

SCE’s Role in U.S. Renewables Market
In 2009, SCE purchased roughly:
- 80% of all U.S. solar generation
- 50% of renewable energy generated in California
- 60% of total wind energy in California
- 60% of total geothermal energy in California

Sources: Energy Information Administration, SCE
### SCE’s Recent Renewable Energy News

#### 2010 Accomplishments

- Signed 58 contracts for 852 MW of renewable energy
- Began deliveries from 300 MW of Alta Wind facilities via new Tehachapi transmission line
- Contracted 50 MW through its Solar Photovoltaic Program
- Had 50 contracts totaling 2,163 MW approved by the CPUC

#### Early Progress in 2011

- Executed two contracts for 386 MW of solar generation in California
- Submitted 20 contracts totaling 239 MW executed under SCE’s Renewable Standard Contract program to the CPUC for approval

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In 2010, SCE expects over 19% of energy deliveries to come from renewable resources and is on track in procuring towards 33%
The Majority of SCE’s Renewables Procurement Is From In-State Generators

Notes
• Out-of-state energy consists of forecasts from projects located outside California and not directly connected to CAISO
SCE’s Procurement Is Primarily From New Renewable Energy Facilities

Notes
- Projects signed during the 2002 to 2010 time period. Based on maximum potential energy.
SCE Procures Most of Its Renewable Energy Through Long-Term Contracts

Notes
• Projects signed during the 2002 to 2010 time period. Based on maximum potential energy.
How SCE Procures Renewable Energy

**Feed-In Tariffs**
- (~ 490 MWs)

**Bilaterals**
- (~ 960 MWs)

**RPS Solicitations**
- (~ 7,860 MWs)

*** PURPA (Historically)**
- (~ 2,300 MWs)

**Solar Photovoltaic Program (SPVP)**

**Renewable Standard Contracts (RSC)**

**California Renewable Energy Small Tariff (CREST)**

SCE has over 11,000 MWs of renewable resources in its portfolio.

SCE has signed 110 RPS contracts totaling over 9,000 MW since 2002.

While many options exist for renewables developers SCE prefers competitive solicitations for both small distributed generation as well as large utility-scale projects.

*PURPA - Public Utility Regulatory Policies Act*
### Various Feed-in Tariff Programs Accommodate Smaller Projects

<table>
<thead>
<tr>
<th>Solar PhotoVoltaic Program (SPVP)</th>
<th>Renewable Standard Contracts (RSC)</th>
<th>California Renewable Energy Small Tariff (CREST)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solar technology</td>
<td>All renewable technologies</td>
<td>All renewable technologies</td>
</tr>
<tr>
<td>Total program cap of 250 MW auctioned over 5 years</td>
<td>Contracts up to 5 MW or up to 20 MW</td>
<td>Total program cap of 248 MW</td>
</tr>
<tr>
<td>Most installations on rooftops</td>
<td>Voluntary, SCE designed</td>
<td>Feed-in Tariff up to 1.5 MW</td>
</tr>
<tr>
<td>1-2 MW contracts</td>
<td></td>
<td>Legislative/regulatory mandate</td>
</tr>
<tr>
<td>CPUC mandated</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- 29 Contracts
- 51 MW DC

- 37 Contracts
- 445 MW

- 1 Contract
- 1.1 MW
Costs of Renewable Energy

• The costs of renewable energy significantly exceed those of conventional resources

Levelized Cost of Energy by Technology, Q4 2009

- Solar PV - High
- Solar PV - Low
- Solar Thermal
- Biomass - High
- Biomass - Low
- Wind
- Landfill Gas
- Municipal Solid Waste
- Geothermal - High
- Geothermal - Low
- Gas CCGT
- Coal

$/MWh

• SCE exhausted its Above MPR Funds for the RPS on September 24, 2009, but continues to voluntarily procure renewables

Competitive processes help SCE contain the cost of renewables

Sources: Bloomberg New Energy Finance
## SCE’s Principles for RPS Reform

<table>
<thead>
<tr>
<th>Principle</th>
<th>Description</th>
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<tbody>
<tr>
<td>Broad Markets</td>
<td>A robust product pool makes more renewable resources available, thus lowering overall program costs for customers</td>
</tr>
<tr>
<td>Flexible Compliance</td>
<td>Banking and other mechanisms allow quick adjustments to market conditions, encouraging overprocurement in times of abundance and protecting against high prices in times of scarcity</td>
</tr>
<tr>
<td>Cost Containment</td>
<td>Meaningful cost containment provisions are necessary to shield customers from potentially unreasonable resource prices</td>
</tr>
<tr>
<td>Equal Rules</td>
<td>All electricity providers must meet the same rules and standards to ensure that all Californians contribute to RPS goals</td>
</tr>
</tbody>
</table>
The Package of RPS Rules Matters

- **Details Matter**
  - Lower Costs
  - Goals More Likely To Be Met

- **Higher Costs**
  - Goals Less Likely To Be Met

<table>
<thead>
<tr>
<th>Flexible</th>
<th>Constrained</th>
<th>Broad</th>
</tr>
</thead>
<tbody>
<tr>
<td>Details Matter</td>
<td>Lower Costs Goals More Likely To Be Met</td>
<td></td>
</tr>
<tr>
<td>Inflexible</td>
<td></td>
<td>Details Matter</td>
</tr>
</tbody>
</table>

- Renewable Products
Challenges to the RPS Program

- Product Restrictions (e.g., Renewable Energy Credit limits)
- Permitting and siting
- Transmission delays
- Project failure (e.g., lack of financing, decertification of previously eligible resources)
- Changing policy initiatives
- Overly prescriptive program
- Integrating intermittent renewable resources onto the grid
- Rate impact to retail customers (e.g., purchase costs, integration costs)
Appendix
SCE’s Procurement Objectives

**System Reliability**
- Resource adequacy
- Local area reliability
- Adequate transmission

**Price Stability**
- Cost minimization
- Financial risk management
- Optimization of commitments

**Environmental Considerations**
- Resources with lower greenhouse emission
- More efficient resources
- More energy efficiency

Balance objectives through CPUC/CEC’s* loading order:

1. Energy efficiency
2. Demand response
3. Renewable resources
4. Distributed generation
5. Clean and efficient fossil-fired generation.

*California Public Utilities Commission
*California Energy Commission
# Spectrum of Renewable Transactions

<table>
<thead>
<tr>
<th></th>
<th>CREST</th>
<th>SPVP</th>
<th>RSC 2009</th>
<th>RSC 2010</th>
<th>RPS Solicitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size / Complexity / Level of Negotiation</td>
<td>≤1.5 MWs</td>
<td>≤5 MW or ≤10 MWs</td>
<td>≤20 MWs</td>
<td>≥ 5 MWs</td>
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</tr>
</tbody>
</table>

- Small, Simple, Standard Contracts
- Large, Complex, Structured Contracts
# SCE’s Experience with Feed-in Tariffs (FITs)

<table>
<thead>
<tr>
<th>Price</th>
<th>Competition</th>
<th>Interconnection Matters</th>
<th>Terms &amp; Conditions</th>
</tr>
</thead>
</table>
| • SCE has offered FITs under both… | • Feed-in-Tariffs can undermine competitive pricing  
  1) Competitive offers (reverse auction)  
  2) Fixed price set annually by SCE | • Interconnection can happen via…  
  1) Fast-Track screening, or  
  2) Normal study / interconnection process | • Parties are willing to sign up to the SCE Pro Forma PPA Terms  
  • Feedback from entire market on PPA terms helps improve the success |

Feed-in Tariffs can be administratively simpler for both buyers and sellers and a good complement toward reaching goals but FIT design is critical (e.g., fixed-price vs. auction)
Renewables Max Capacity

Renewable Capacity
Under Contract (MW, %) with IOUs

Total Maximum Capacity Under Contract - 18,974 MW

- California: 14,020 MW (73%)
- New Mexico: 32 MW (<1%)
- Idaho: 130 MW (1%)
- Arizona: 260 MW (2%)
- Montana: 510 MW (3%)
- Nevada: 578 MW (3%)
- None - Canada: 516 MW (3%)
- Various: 591 MW (3%)
- Washington: 864 MW (5%)
- Oregon: 1,441 MW (7%)

Source:
CEC Website Database of IOU Contracts for Renewable Generation, April 2010
http://www.energy.ca.gov/portfolio/contracts_database.html