

CPUC Self-Generation Incentive Program (SGIP) Seventh-Year Impact Evaluation Highlights

This report summarizes an evaluation of impacts resulting from distributed generation (DG) technologies under the seventh Program Year (PY07) of the SGIP.

Program Overview:

- SGIP established in 2001 as response to peak demand problems facing California
- DG technologies eligible under the SGIP have included solar PV; wind energy; and fossil and renewable-fueled internal combustion engines (ICE), fuel cells (FC), microturbines (MT) and small gas turbines (GT). As of 01/01/08, only wind and fuel cell technologies remained eligible.
- SGIP as of 12/31/07:
 - Over 1,200 on-line SGIP projects (1,111 Complete & 98 “On-Line” Active)
 - Over 300 MW of rebated generating capacity
 - \$488 million incentives paid to Complete projects, \$283 million reserved for Active projects
 - Matched by private and public funds at a ratio of over 1.6 to 1
 - Total eligible project funds almost \$1.3 billion, corresponding to Complete projects
- Rebated Capacity:
 - PV technologies: nearly 105 MW (close to 40% SGIP total capacity)
 - ICEs, GTs, and MTs powered by non-renewable fuels: over 145 MW (approx. 50% SGIP total capacity)
- Incentives Paid:
 - PV technologies: over \$370 million (approx. 75% SGIP total incentives paid)
 - ICEs (renewable and non-renewable fueled): close to \$75 million (approx. 15% SGIP total incentives paid)

Program Impacts:

- Energy: By the end of 2007, SGIP facilities were delivering over 720,000 MWh of electricity to California’s electricity system; enough electricity to power over 60,000 homes for one year
 - Cogeneration facilities supplied over 70% of that total
 - PV systems provided nearly 23%; up 6% from PY06
 - PG&E largest PA contributor, providing 42% of total delivered electricity

- **Peak Demand:** 1,147 SGIP projects on-line during CAISO 2007 peak, providing nearly 140 MW of generating capacity; representing an aggregated capacity factor of 0.49 MW of peak SGIP capacity per MW of rebated capacity
 - Fuel cells: highest peak capacity factor at 0.76 kWhr of peak capacity per kWhr of rebated capacity.
 - PV: aggregate CAISO peak capacity factor of 0.60 kWhr per kWhr.
 - PV: 47% of peak capacity from SGIP facilities during CAISO 2007 peak
- **Greenhouse Gas (GHG) Emissions:** SGIP provided net GHG emission reductions of over 120,000 tons of CO₂ equivalent in 2007; making a total cumulative GHG reductions from SGIP since 2005 of over 323,000 tons of CO₂ equivalent. For PY07:
 - PV provided approx 80% of total reduction; up from 56% in PY06
 - Biogas-fueled DG facilities reduced over 38,000 tons of CO₂ equivalent
 - % of total by PA: PG&E: approx 61%; SCE: approx 22%; CCSE: approx 11%; SCG: approx 6%
- **Efficiency and Waste Heat Utilization:** Cogeneration facilities made up close to 60% of the SGIP PY07 capacity and provide not only electricity to customers but also recover waste heat and harness it for on-site heating and cooling needs. These facilities are required to achieve efficiency and waste heat requirements set by Public Utility Code (PUC).
 - All SGIP cogeneration technologies achieved and exceeded PUC 216.6(a)
 - FCs and GTs able to meet and exceed PUC 216.6(b), but ICEs and MTs fell short of requirements, due in part to lower than anticipated electricity generation efficiencies and lack of a significant coincident thermal load
 - Good match of electrical and thermal loads can play significant role in contribution of DG cogeneration facilities to offset peak demand and reduce GHG emissions during peak

Additional Observations:

- The SGIP provides significant value as a unique test bed for examining the actual performance of a mix of DG technologies operating in a commercial setting within California's utility and regulatory framework.
 - Multiple year trend analyses have provided important information on the impact of aging and deterioration on DG performance.
 - Performance evaluations have also shown short-comings of DG facilities that must be addressed as California begins to embark on a plan to expand growth of DG technologies.