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

This report summarizes an evaluation of impacts resulting from distributed generation (DG) technologies under the eighth Program Year (PY08) 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 (IC Engine), fuel cells (FC), microturbines (MT), and small gas turbines (GT). As of 01/01/08, only wind and fuel cell technologies remained eligible. Additionally, advanced energy storage (AES) technologies are eligible for incentives if they accompany an eligible SGIP project.
- SGIP as of 12/31/08:
  - Over 1,270 on-line SGIP projects (1,268 Complete & 7 "on-line" Active)
  - Over 337 MW of rebated generating capacity
  - $601 million incentives paid to Complete projects, $90 million reserved for Active projects
  - Matched by private and public funds at a ratio of over 1.8 to 1
  - Total eligible project funds more than $1.7 billion, corresponding to Complete projects
- Rebated Capacity:
  - PV technologies: nearly 133 MW (close to 40% of SGIP total capacity)
  - FCs, IC Engines, GTs, and MTs powered by non-renewable fuels: over 177 MW (approx. 54% of SGIP total capacity)
- Incentives Paid:
  - PV technologies: nearly $454 million (approx. 76% SGIP total incentives paid)
  - IC Engines (renewable- and non-renewable fueled): over $86 million (approx. 14% SGIP total incentives paid)

Program Impacts:

- Energy: By the end of 2008, SGIP facilities were delivering over 718,000 MWh of electricity to California's electricity system; enough electricity to power nearly 109,000 homes for one year
  - Cogeneration facilities supplied over 63% of that total
  - PV systems provided nearly 27%; up 5% from PY07

  - PG&E largest PA contributor, providing 40% of total delivered electricity

- Peak Demand: 1,242 SGIP projects on-line during CAISO 2008 peak, providing over 320 MW of generating capacity and representing an aggregated capacity factor of 0.44 MW of peak SGIP capacity per MW of rebated capacity
  - GTs: highest peak capacity factor at 0.84 kWh of peak capacity per kWh of rebated capacity.
  - PV: aggregate CAISO peak capacity factor of 0.59 kWh per kWh.
  - PV: 54% of peak capacity from SGIP facilities during CAISO 2008 peak
- Greenhouse Gas (GHG) Emissions: SGIP provided net GHG emission reductions of over 175,000 tons of CO_2 equivalent in 2008; making a total cumulative GHG reductions from SGIP since 2005 of over 498,000 tons of CO_2 equivalent. For PY08:
  - PV provided approx 65% of total reduction; slightly less than PY07
  - Biogas-fueled DG facilities reduced over 60,000 tons of CO_2 equivalent
  - PA % of total: PG&E: approx. 59%; SCE: approx. 21%; CCSE: approx. 10%; SCG: approx. 10%
- Efficiency and Waste Heat Utilization: Cogeneration facilities made up close to 55% of the SGIP PY08 capacity, providing electricity and recovering and using waste heat 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) efficiency and waste heat requirements
  - FCs and GTs able to meet and exceed PUC 216.6(b), but IC Engines and MTs fell short
  - Good match of electrical and thermal loads can play significant role in offsetting peak demand and reducing GHG emissions

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.
- Information gleaned from the annual evaluations of the SGIP can provide value for other energy programs in California, such as the California Solar Initiative. The SGIP data may also help the California Energy Commission in development of guidelines to reduce GHG emissions from CHP facilities, as required under Assembly Bill 1613.