

Policy Support for Fuel Cells In California

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Why DG Matters

- Can help defer or avoid transmission and distribution investments through peak demand reduction
- Renewable DG technologies as GHG mitigation strategy
- Reduce/avoid criteria pollutant emissions
- Consumer empowerment
- Renewable DG as hedge against viability risk of larger scale renewable projects



Self Generation Incentive Program (SGIP)

- **SGIP is the largest DG incentive program in the country**
 - Represents over \$1 billion in total project costs
 - As of March 31, 2010, approximately 1400 operating facilities (~355 MW of capacity)
- **Program was initiated by AB 970 (Ducheny, 2000)**
 - Started in response to California peak demand problems
 - Developed to pursue load control and distributed generation (DG)
 - DG facilities were to be located at the demand source (i.e., customer sites)
- **Program continues to evolve**
 - Solar PV moved to California Solar Initiative in 2007
 - AB2778 extends SGIP through December 31, 2011, limited technologies to only wind and fuel cells
 - CPUC increased incentive cap from 1 MW to 3 MW (April 2008)
 - CPUC authorized the use of “directed biogas” contracts as satisfying renewable fuel criteria.
 - More recently the passage of SB412 authorized the CPUC to expand technology eligibility provided technologies are GHG reducing.



SGIP Technologies

- Currently, only wind and fuel cells are eligible for SGIP, per statute
- Distributed solar was transferred to a separate program, the California Solar Initiative, in 2007.
- Staff is currently developing a proposal to modify what systems are eligible pursuant to SB 412.

SGIP Technology	Fuel Type	Eligibility Status
Fuel cell	Natural Gas/ Biogas	Currently Eligible
Wind turbines	Wind	Currently Eligible
Internal-combustion engines	Natural Gas/ Biogas	Removed from SGIP 1/1/2008
Microturbines	Natural Gas/ Biogas	Removed from SGIP 1/1/2008
Small gas turbines	Natural Gas/ Biogas	Removed from SGIP 1/1/2008
Solar	Sun	Moved from SGIP to CSI 1/1/2007



SGIP Incentives

- Maximum system capacity = 5MW
- Maximum incentive size = 3MW
 - Increased from 1MW by CPUC in April 2008
 - Pilot basis through 2009
 - Incentives decline over 1MW

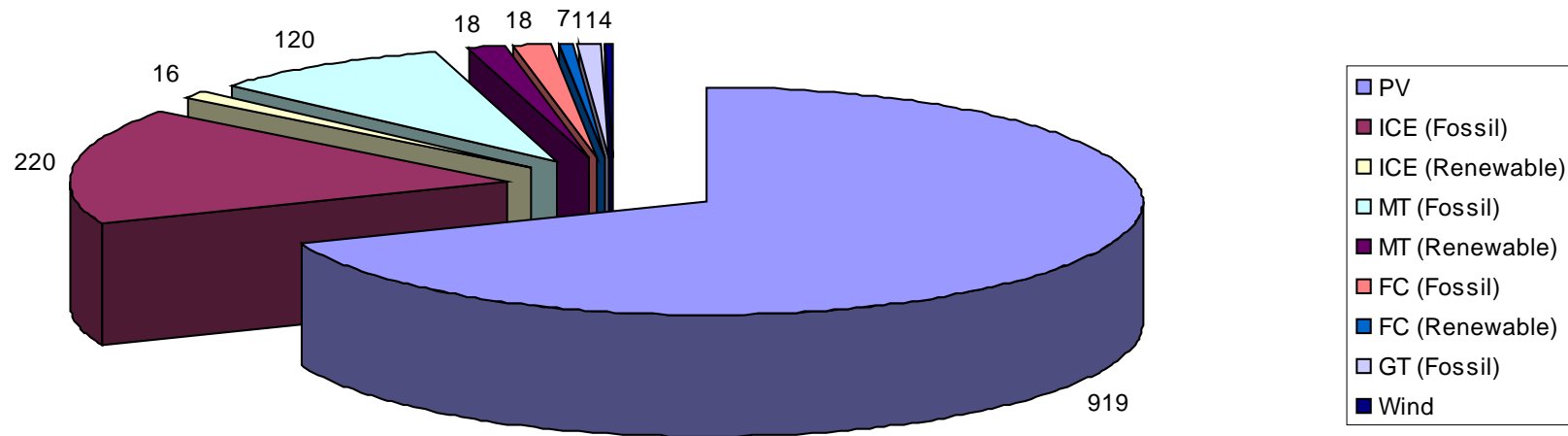
Incentive Levels	Eligible Technologies	Minimum System Size	Maximum System Size	Maximum Incentive Size	Incentive Offered (\$/watt)		
					0 - 1 MW	1 - 2 MW	2 -3 MW
Level 2 Renewable	Wind Turbines	30 kW	5 MW	3 MW	\$1.50	\$0.75	\$0.375
	Renewable Fuel Cells	30 kW			\$4.50	\$2.25	\$1.125
Level 3 Non-Renewable	Non-Renewable Fuel Cells	None	5 MW	3 MW	\$2.50	\$1.25	\$0.625



SGIP Installed Capacity (MW)

355 MW Total

Capacity of Completed SGIP Projects



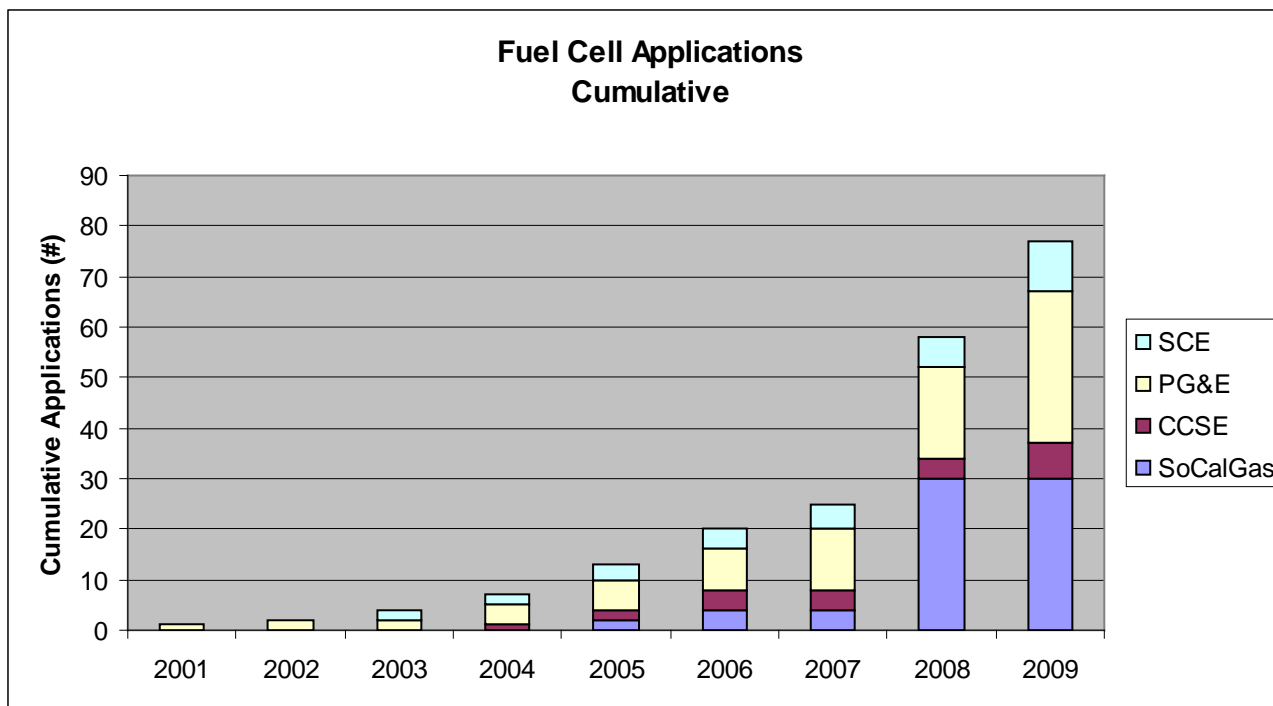
SGIP Project Applications

- SGIP applications through March 31, 2010:

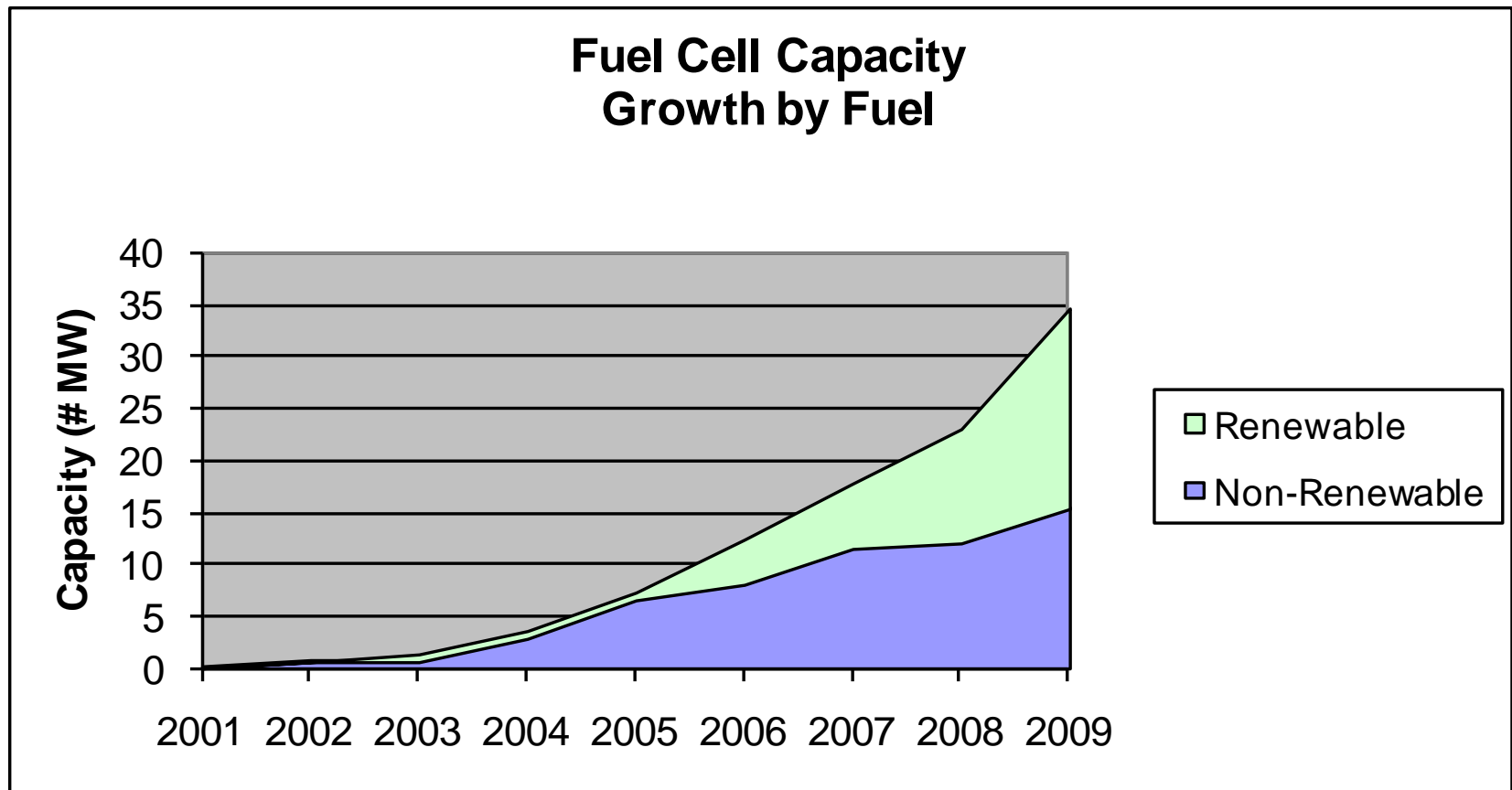
Technology	Project Count	MW Total
Photovoltaics	921	144.308
Fuel Cells - Ren	23	15.6
Fuel Cells - Non-Ren	72	22.185
Wind Turbine	12	14.579
IC Engines - Ren	23	12.394
IC Engines - Non-Ren	242	152.478
Microturbines - Ren	21	2.942
Microturbines - Non-Ren	124	17.594
Gas Turbines - Non-Ren	11	30.845
Total	1449	412.925



Fuel Cell Project Application Growth 2001-2009



Fuel Cell Capacity by Fuel



SGIP Program Impacts

- SGIP facilities delivered **718,000 MWh** in 2008
 - Engines/Turbines provided 65%
 - Fuel Cells provided 9%
 - Represents electricity that did not have to be generated by central station power plants or delivered by transmission and distribution systems
- Over 175,000 tons of CO₂ equivalent reduced in 2008
 - Biogas systems (including biogas fueled Fuel Cells) provided 34% of total CO₂ equivalent reductions
- Three ways SGIP-funded systems reduce GHG emissions:
 - *Displace grid electricity*
 - *Methane captured and used by biogas facilities*
 - *Waste heat recovery systems used at cogeneration facilities avoid need for emissions associated with generating heat other ways*



SGIP Climate Impacts

2008 GHG reductions (tons CO2 equivalent) from all installed SGIP systems

Technology	Tons of CO2 eq. Reduced	Annual Energy Impact (MWh)
Combustion Technologies - Renewable	58,298	168,867
Fuel Cells - Renewable	6,895	12,572
Solar	115,057	197,178
Wind	n/a	n/a
Fuel Cells - Nonrenewable	5,968	44,050
CHP Combustion Technologies – Nonrenewable	-9,974	455,925
Total	176,244	718,558



CPUC Recently Approved 6 Utility Owned Fuel Cell Projects

- In a decision in April 2010, the CPUC authorized PG&E and SCE to pursue 3 utility owned fuel cell projects in each of their respective service territories.
 - Projects, representing 6 MW in capacity are to be located at the following universities: CSU East Bay, SF State, CSU San Bernadino, CSU Long Beach, and UC Santa Barbara.
 - The technologies represented include solid oxide and molten carbonate fuel cells to be deployed in a combined heat and power and electric only configurations.
 - Overall costs of this program are \$40 million in capital costs.
- Program provides for additional funding to support fuel cells during time of economic downturn when availability of private monies is limited.
- Universities anticipate incorporating fuel cells into energy and science curricula.



AB 1969 (Yee, 2006)

Renewable Feed-in-Tariff

- Feed-In tariff for Public Water/Wastewater facilities
 - CPUC voluntary expansion required SCE and PG&E to offer the FiT to all renewable facilities
- Eligibility:
 - All *renewable* DG up to 1.5MW (*including biogas fueled Fuel Cells*)
- Statewide cap of 478.4 MW
- Fixed price is determined by Market-Price Referent (MPR), adjusted for time of delivery and season
- Contract periods of 10, 15 and 20 years
- Tariffs transfer Renewable Energy Certificates (RECs) from generator to utility and count as utility procurement towards Renewable Portfolio Standard (RPS)
- Two options under tariff (depending on customer's choice):
 - Full sale of production
 - Excess sales (after onsite usage)
- Program will be augmented to accomodate requirements of SB32
 - Increases eligible project size to 3 MW
 - Increases statewide capacity under the program to 750 MW



AB 1613 (Blakeslee, 2007)

CHP Feed-in-Tariff

- In December 2009, the CPUC adopted a decision which provides a fixed price contract for electricity generated by CHP systems.
 - Contract term is 10 years.
 - Price under the contract is based on a market referent; actual price will vary with price of natural gas.
 - A 10% adder is provided to projects located in transmission constrained areas.
- In order to be eligible, participating systems need to have an efficiency of 62% and sized no larger than 20 MW.
- The authority of a state Commission to establish a FIT price is legally contentious, owing to concerns regarding Federal Power Act preemption.
 - CPUC has filed a petition for declaratory order on this issue with FERC.



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Thank You!

For Additional Information:

www.cpuc.ca.gov

