



The Utility's Role in Implementing Clean Technology

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March 17, 2009

This presentation is not complete without the accompanying oral statements made on March 17, 2009. A replay is available at www.pgecorp.com. For more information about PG&E Corporation and its subsidiary, Pacific Gas and Electric Company, and a discussion of risks and uncertainties facing the companies, see the reports filed or furnished by the companies to the Securities and Exchange Commission, including the Annual Report on Form 10-K for the year ended December 31, 2008. These reports are available at www.pgecorp.com and www.pge.com.



Agenda

- **California's Clean Energy History**
- **The Importance of Demand-Side Emerging Technologies**
- **Renewable Energy Requirements**
- **Benefits and Challenges of Utility-scale vs. Distributed Solar**
- **PG&E's Portfolio Approach**
- **Comparison of PV vs. Concentrating Solar Thermal**
- **PG&E's Proposed New Photovoltaic Program**
- **Integration of Intermittent Renewables**
- **Enabling Technologies**
 - ✓ **Energy Storage**
 - ✓ **SmartGrid**



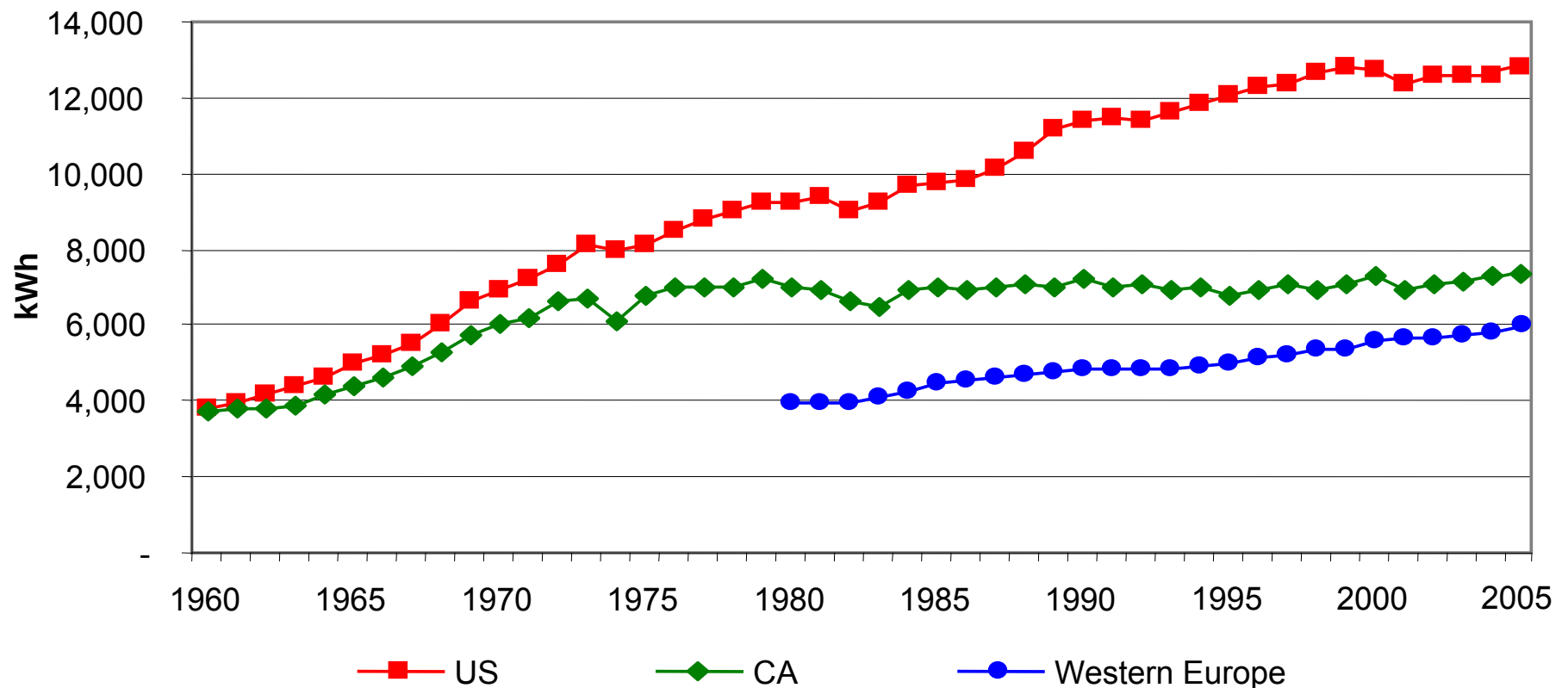
What Makes California Different?

- Long-standing State policies lower carbon footprint.
- 30+ years of energy efficiency programs facilitated by “decoupling” of rates.
- California Energy Action Plan preferred loading order:
 - Customer Energy Efficiency
 - Demand Response/Dynamic Pricing
 - Renewables
 - Distributed Generation
 - Clean gas-fired plants



History of Energy Efficiency Key to California Success

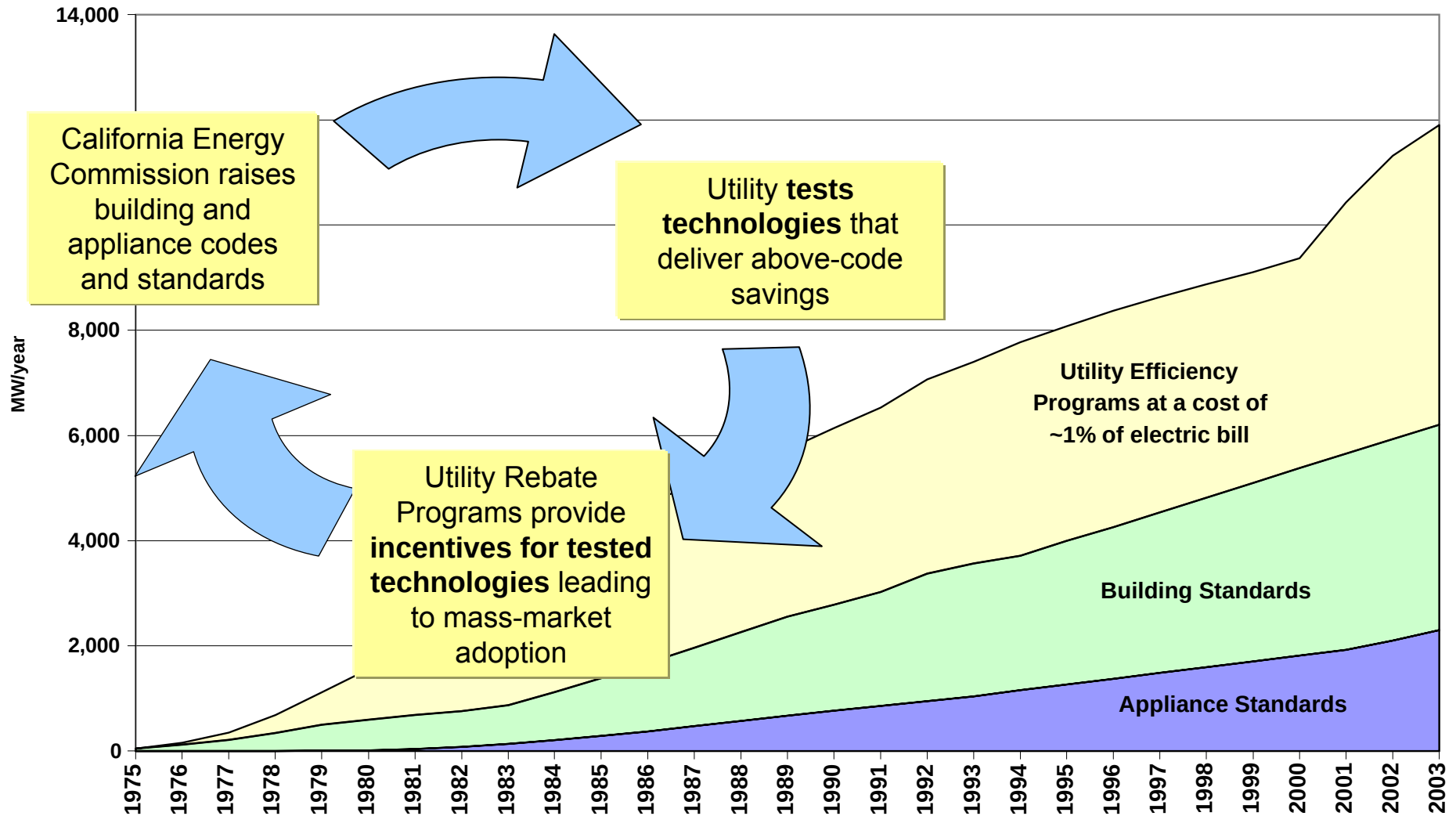
Over the past 30 years, California per capita electricity use has remained relatively flat compared to the 50% increase in U.S. per capita electricity use.



Source: California Energy Commission

Utility Programs and State Standards

Savings from Efficiency Programs and Standards



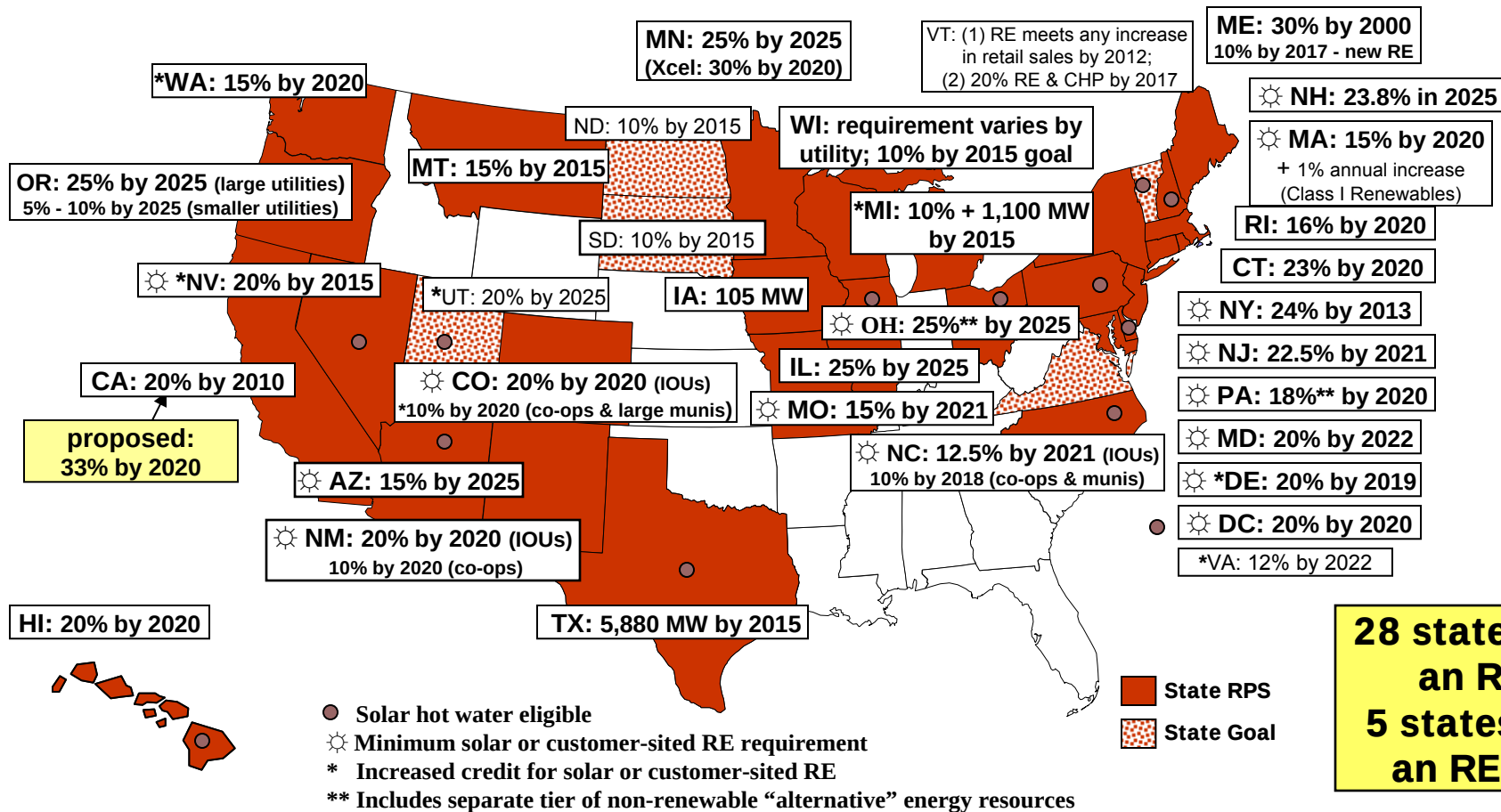
Source: California Energy Commission

Demand Response: SmartAC Example

- Remote activation of SmartAC switch lowers peak energy demand
- Goal: 305 MW by Summer 2011 (~400k devices)
- Pilot: 100 MW
- Offsets need for two average-sized peaker power plants
- 93% of customers surveyed didn't notice the system had been activated

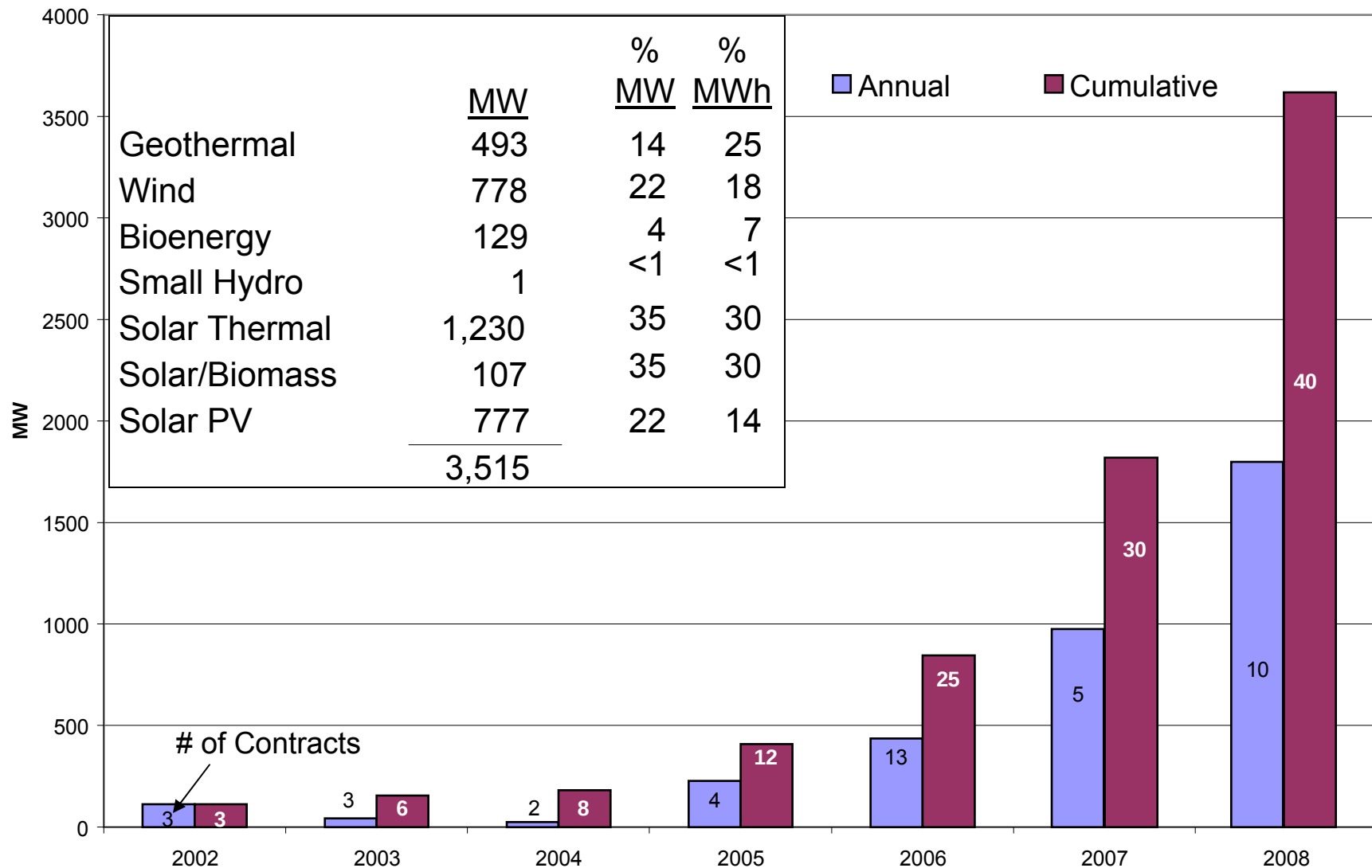


California Has the Most Aggressive Renewable Portfolio Standard





Aggressive Contracting for Diverse Renewable Resources





Advancing Renewable Energy Technologies

Traditional



Biomass



Small Hydro



Geothermal



Wind

Emerging



BioGas



**Concentrating
Solar Thermal**



**Concentrating
Photovoltaic**



Wave Power

Distributed vs. Utility Scale Solar

Distributed



Pros:

- Speed to market
- Not transmission dependent
- Not dependent on water

Cons:

- Higher deployment costs
- Slower scale penetration

Utility Scale



Pros:

- Economies of scale
- Efficiencies
- Compatible with emerging storage technologies

Cons:

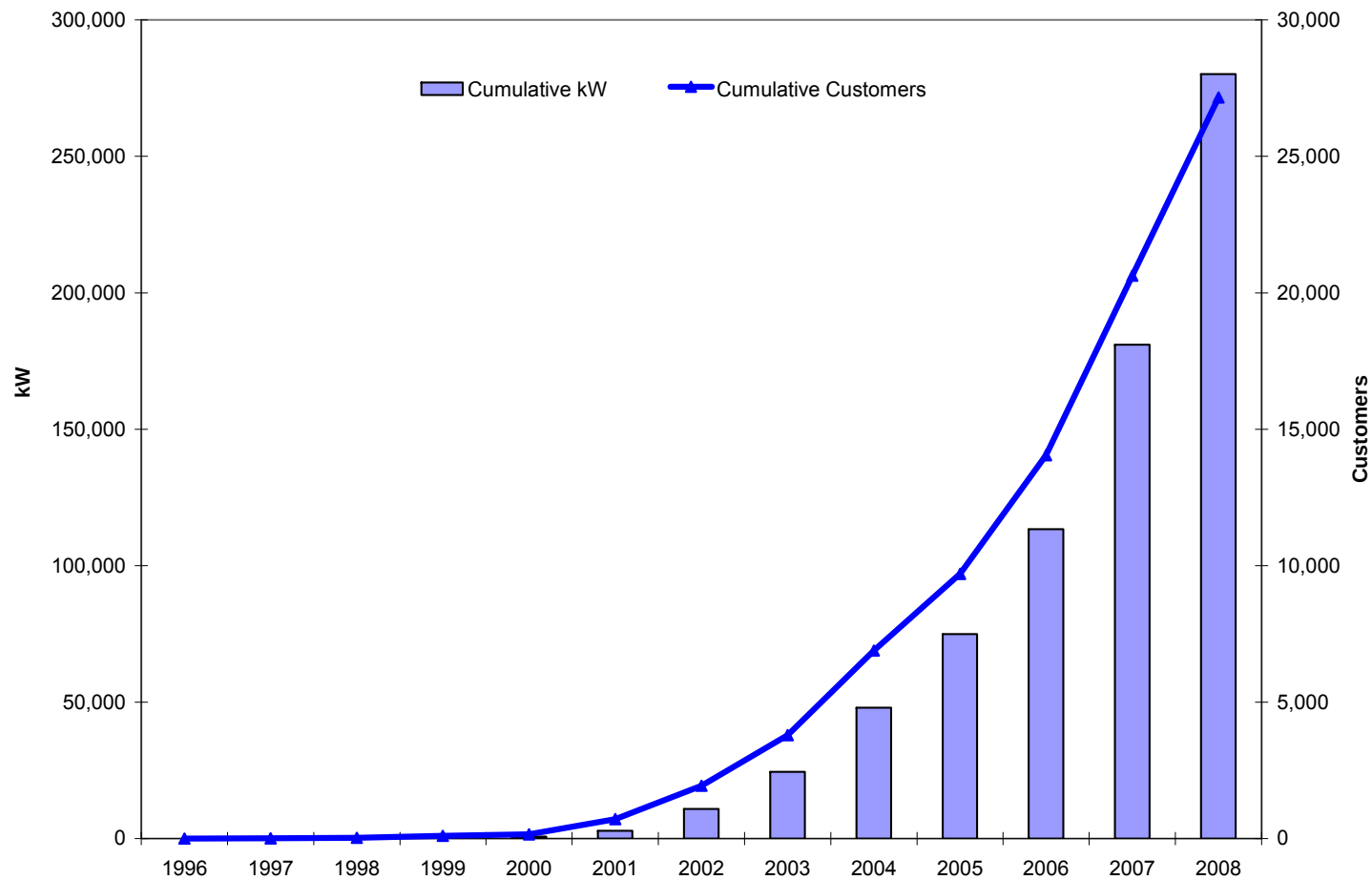
- Transmission dependent
- Land & water requirements
- Not for all locations

PG&E Takes a Diversified Portfolio Approach



Annual PG&E Solar Interconnections

28,500 PG&E customer solar installations (>290 MW)





A Portfolio of Diverse Central-Station and Dispersed Utility-Scale Solar Technologies



553-MW Parabolic Trough



500-MW Power Tower



550-MW Cd Te PV

Illustrative



**250-MW Dispersed PV
(1-20 MW ea) (PPA)**

Illustrative



**250-MW Dispersed PV
(1-20 MW ea) (owned)**



210-MW c-Si Tracking PV



Why Utility Ownership?

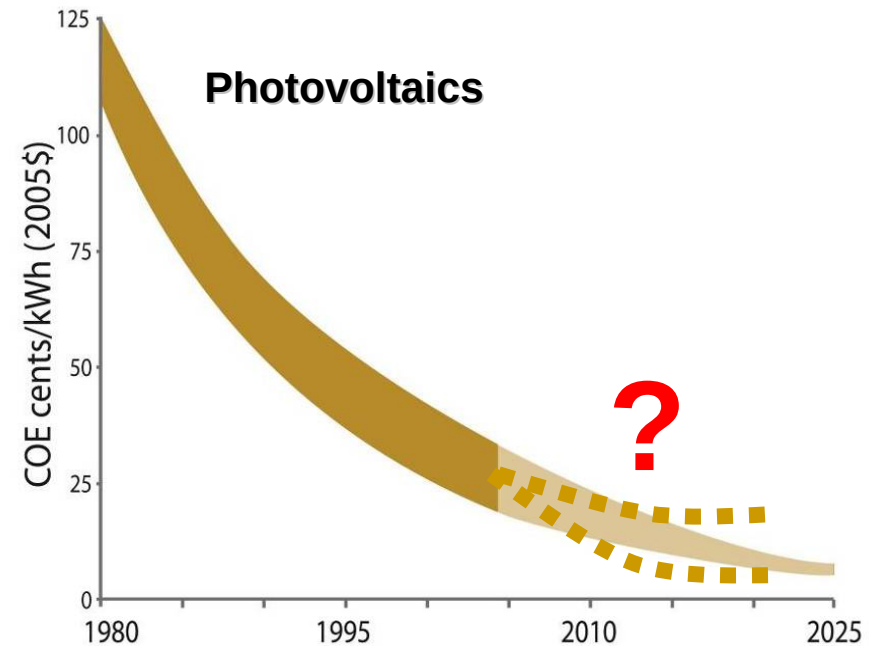
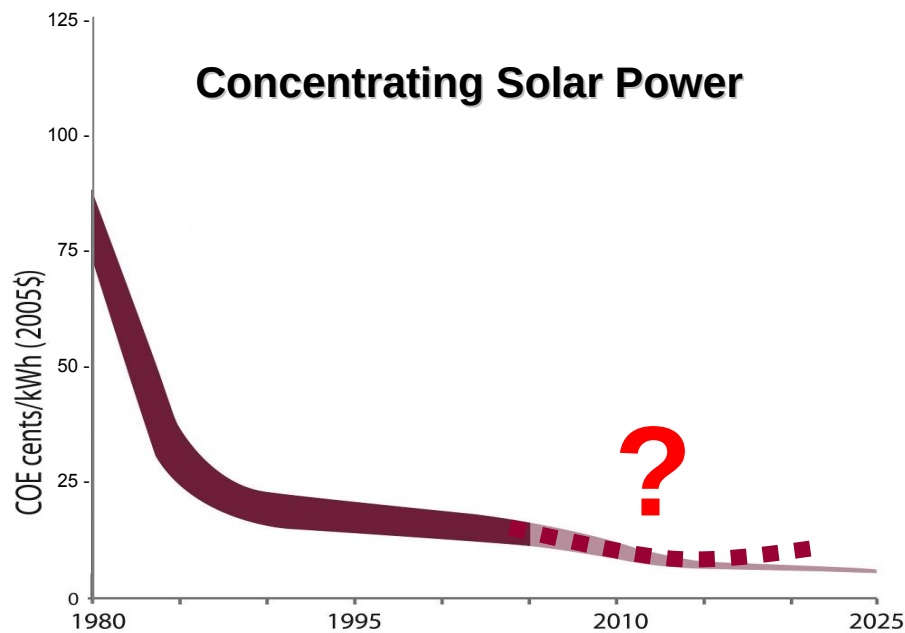
- **Credit-related cancellations or delays of independent contractors' projects**
- **Balance sheet strength produces lower cost of money**
- **Utilities can utilize the PTC and ITC**
- **Reduces development risk**



Why the Trend to Photovoltaics?

- **Proven, commercially ready technology**
- **Costs are decreasing**
- **Many Northern California locations suitable for PV deployment**
- **Modular / rapid deployment capabilities**
- **Project size facilitates expedited interconnection**
- **Project size avoids transmission upgrades**
- **Dispersed implementation reduces environmental impacts**
- **More peak coincident than other renewables**
- **Utilities now eligible for ITC**

Levelized Cost of Energy¹ Has Decreased



Source: NREL Energy Analysis Office (www.nrel.gov/analysis/docs/cost_curves_2005.ppt)

¹These graphs are reflections of historical cost trends NOT precise annual historical data.



PG&E's Proposed New “Hybrid” PV Program

- Requested California Public Utilities Commission (CPUC) approval in February 2009
- 5-Year Program targeted to begin in January 2010
- 500 MW_(AC): 1 to 20 MW installations composed of
 - 250 MW (305 MW_(DC)) utility-owned generation (UOG) at an estimated capital cost of \$1.45 billion (~\$4.25 per Watt_(DC))
 - 250 MW of PPAs
- PG&E-owned projects projected to be primarily ground-mounted
 - Targeting utility-owned land with grid connection capability



PG&E's Proposed New "Hybrid" PV Program

- **PG&E would seek to finance projects as any rate-base investment**
- **The terms and pricing of the PPAs would be subject to pre-approval by the CPUC**
- **Proposed 2 MW pilot UOG PV project targeted to start in 2009, to speed deployment of the larger PV Program if approved by the CPUC**

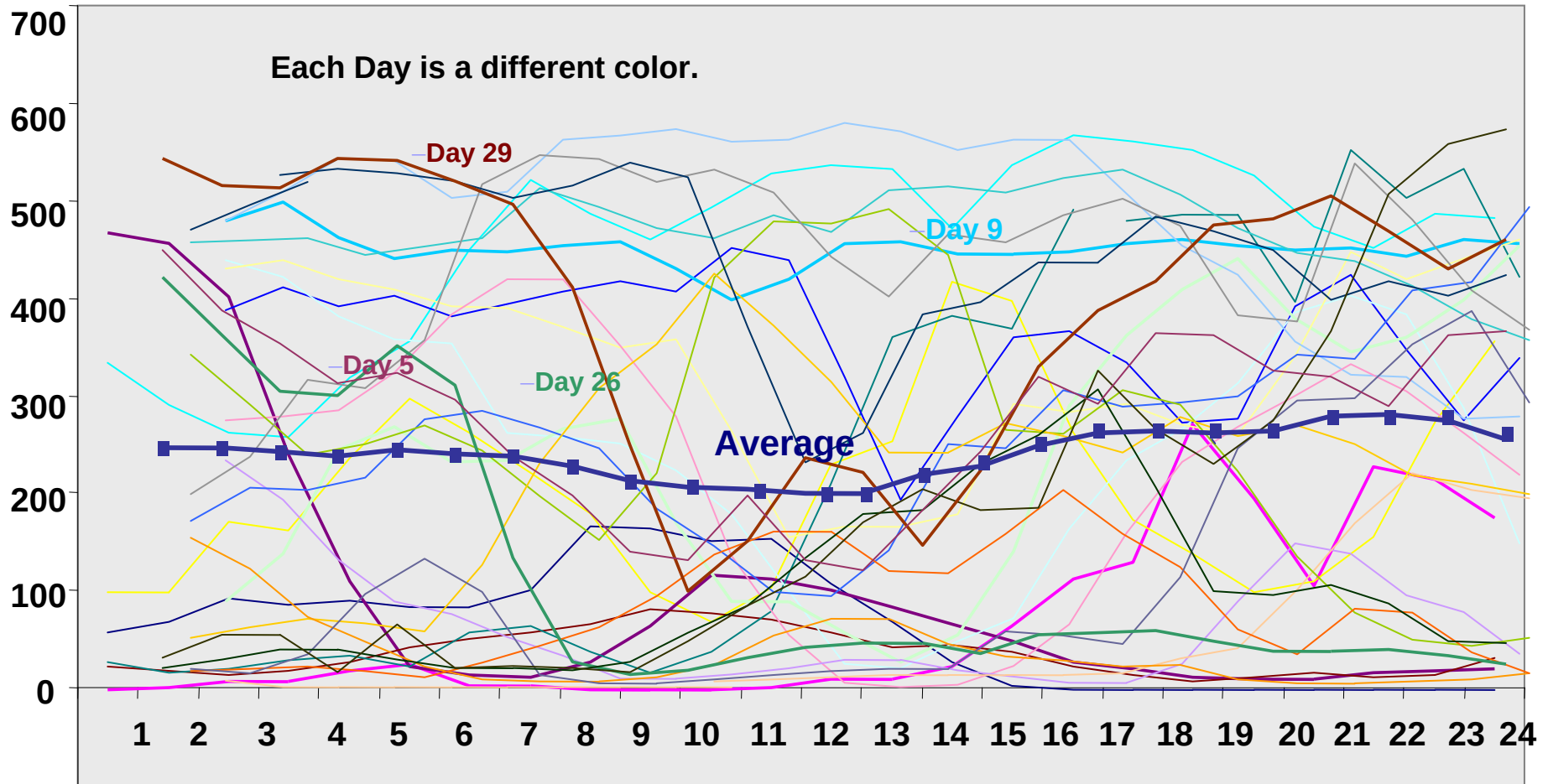
- **Solar and wind are both intermittent resources**
- **Very few renewable resources are dispatchable**
- **Today, integrating renewable resources requires more fast-response natural gas power plants**
- **New technologies will provide other options in the future**



Wind Generation Varies Widely

The average is smooth, but day-to-day variability is great

MW



Hour

Source: CAISO

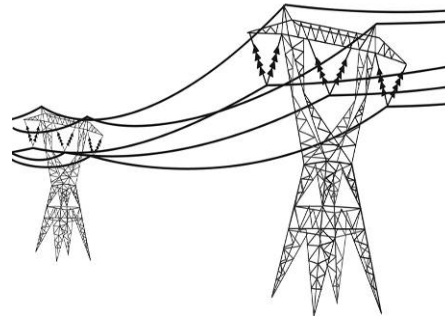
Renewable Resource Generation

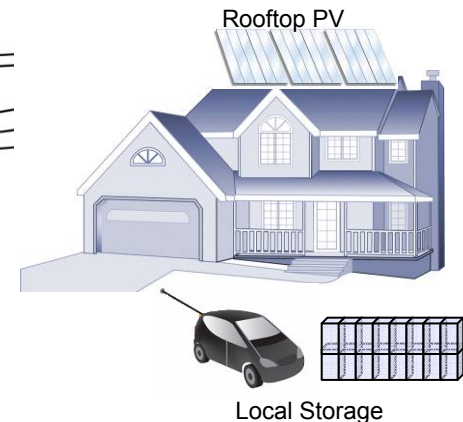
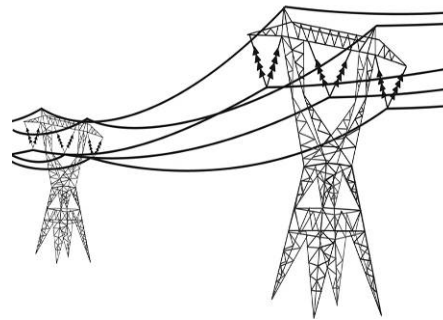
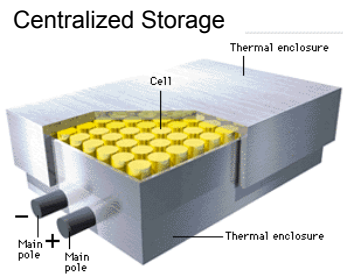


Today:

- Clean, flexible, natural gas-fueled resources are currently necessary to back up intermittent resources
- Significantly improved air emissions profile compared to retiring plants, but still fossil-fueled

CCGT Power Plant





Tomorrow:

- Utility scale distributed storage to back up intermittent resources and timeshift resource availability to be coincident with demand
- Distributed generation and distributed storage to apply similar principles at the customer premise
- Demand response programs used to integrate intermittent renewables



Source: California Energy Commission

- The commute to the average office building in CA uses 57% more energy than the building uses.
- Transportation will be the next big use of clean electricity.
- The SmartGrid will enable the electrification of transportation without requiring additional fossil-fueled generation.

Load Curve for a Typical Day

