



The Utility's Role in Implementing Clean Technology

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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**



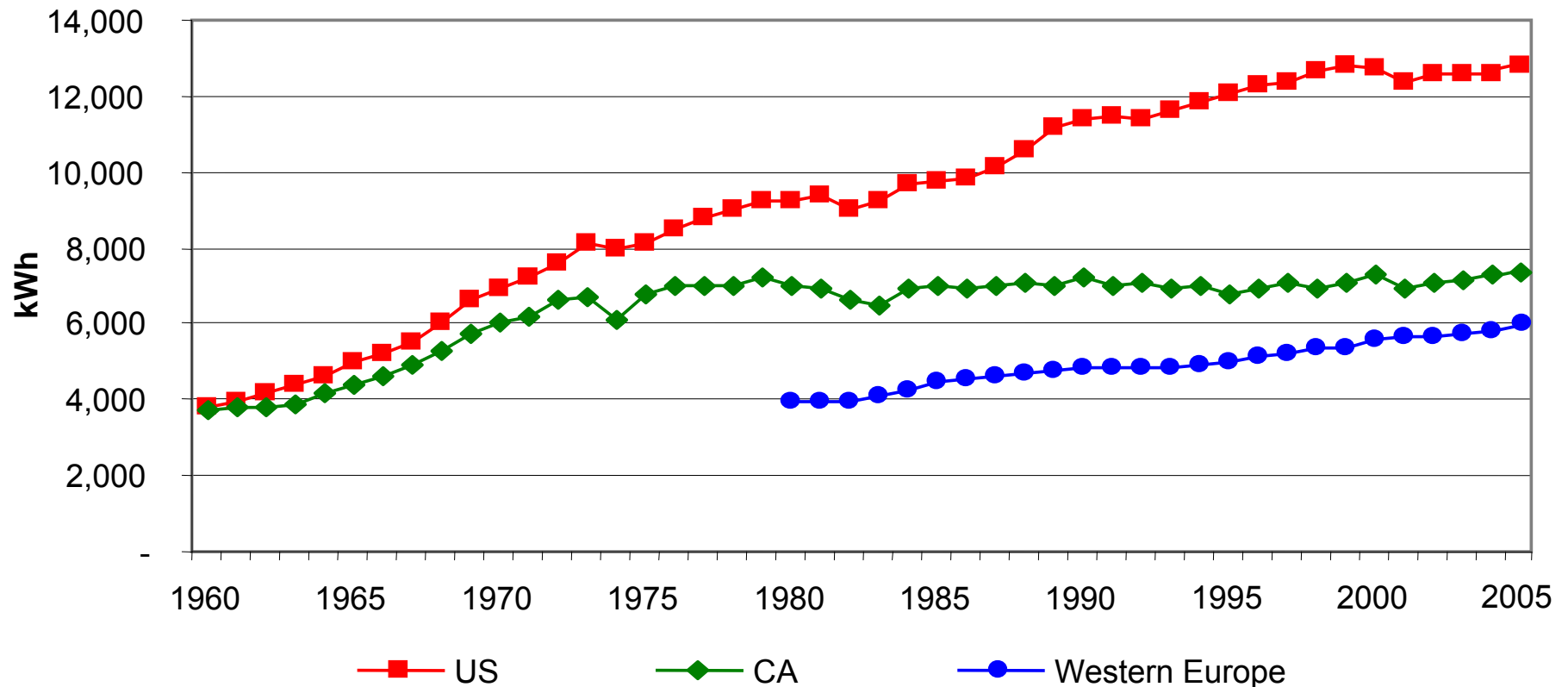
What Makes California Different?

- 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.

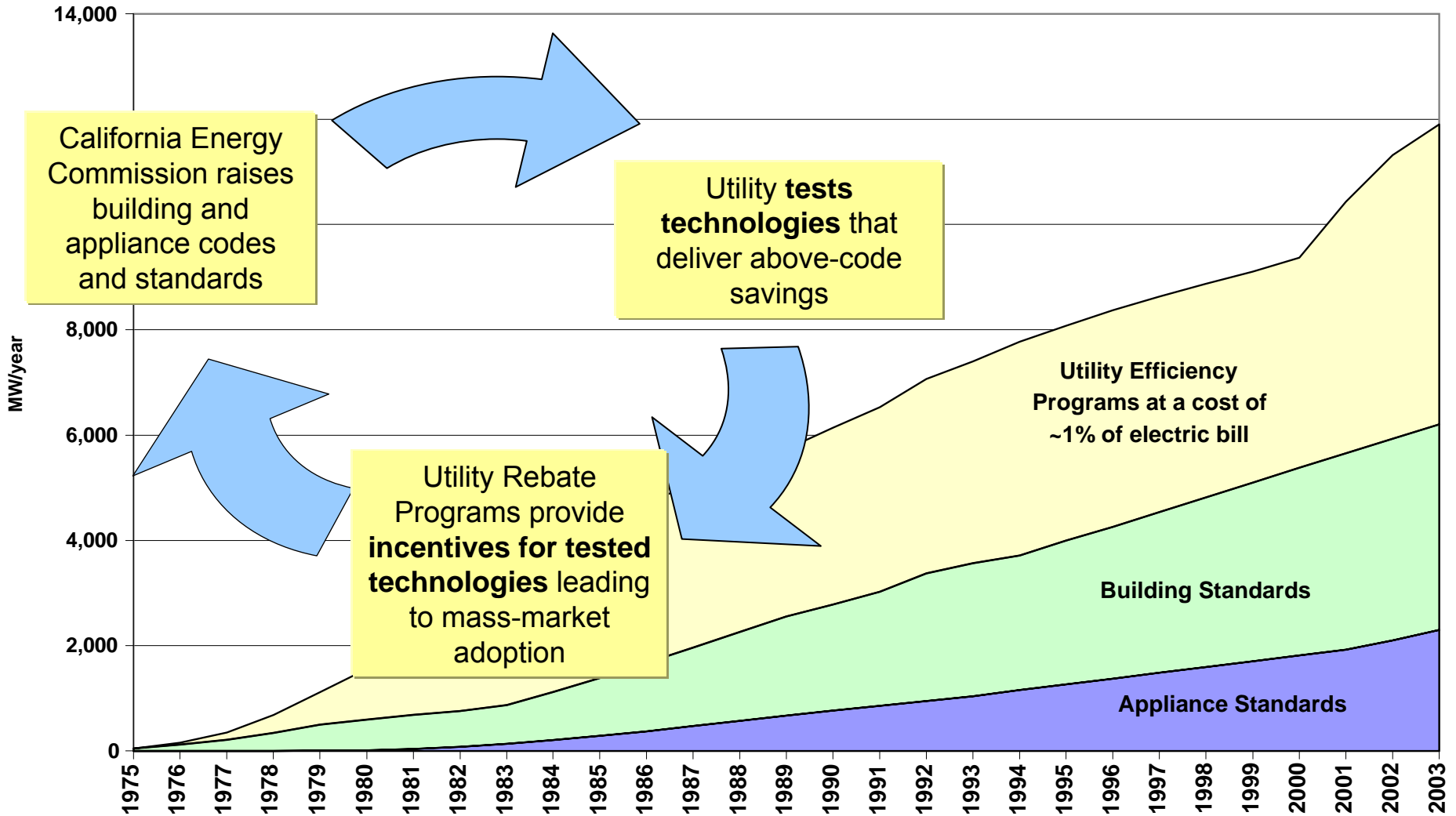


Source: California Energy Commission



Utility Programs and State Standards

Savings from Efficiency Programs and Standards



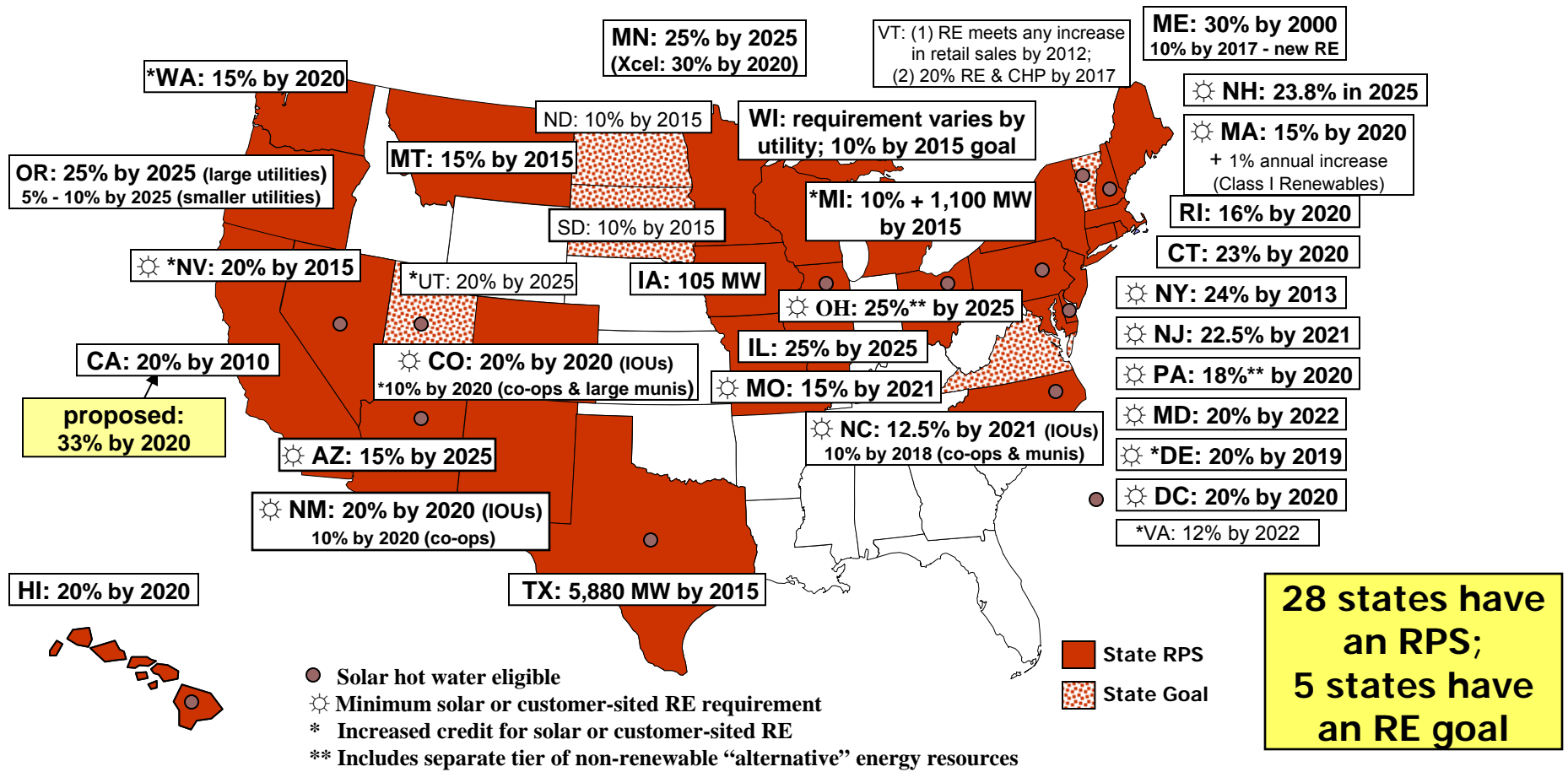
Source: California Energy Commission

- 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

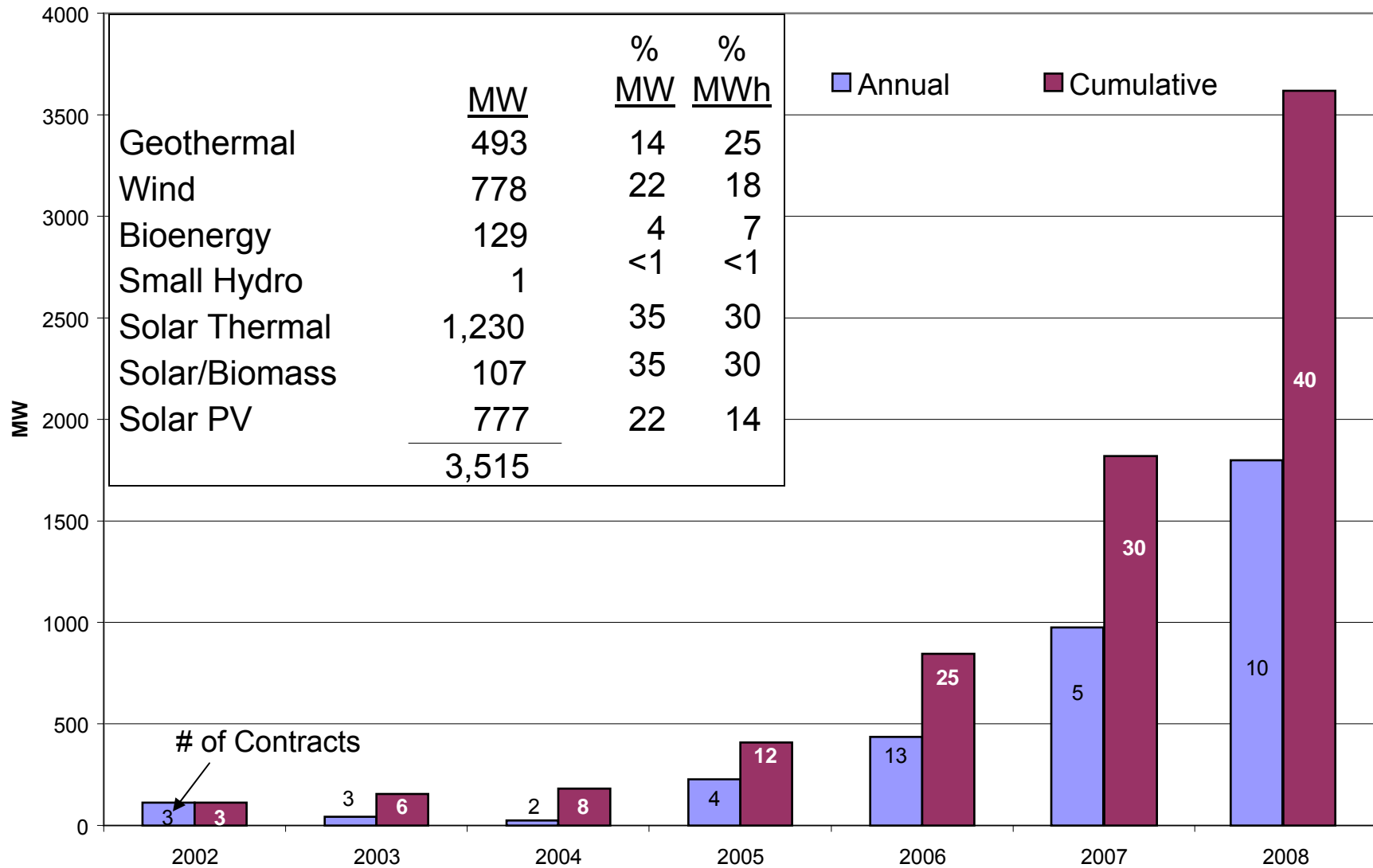


DSIRE: www.dsireusa.org

March 2009



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



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:

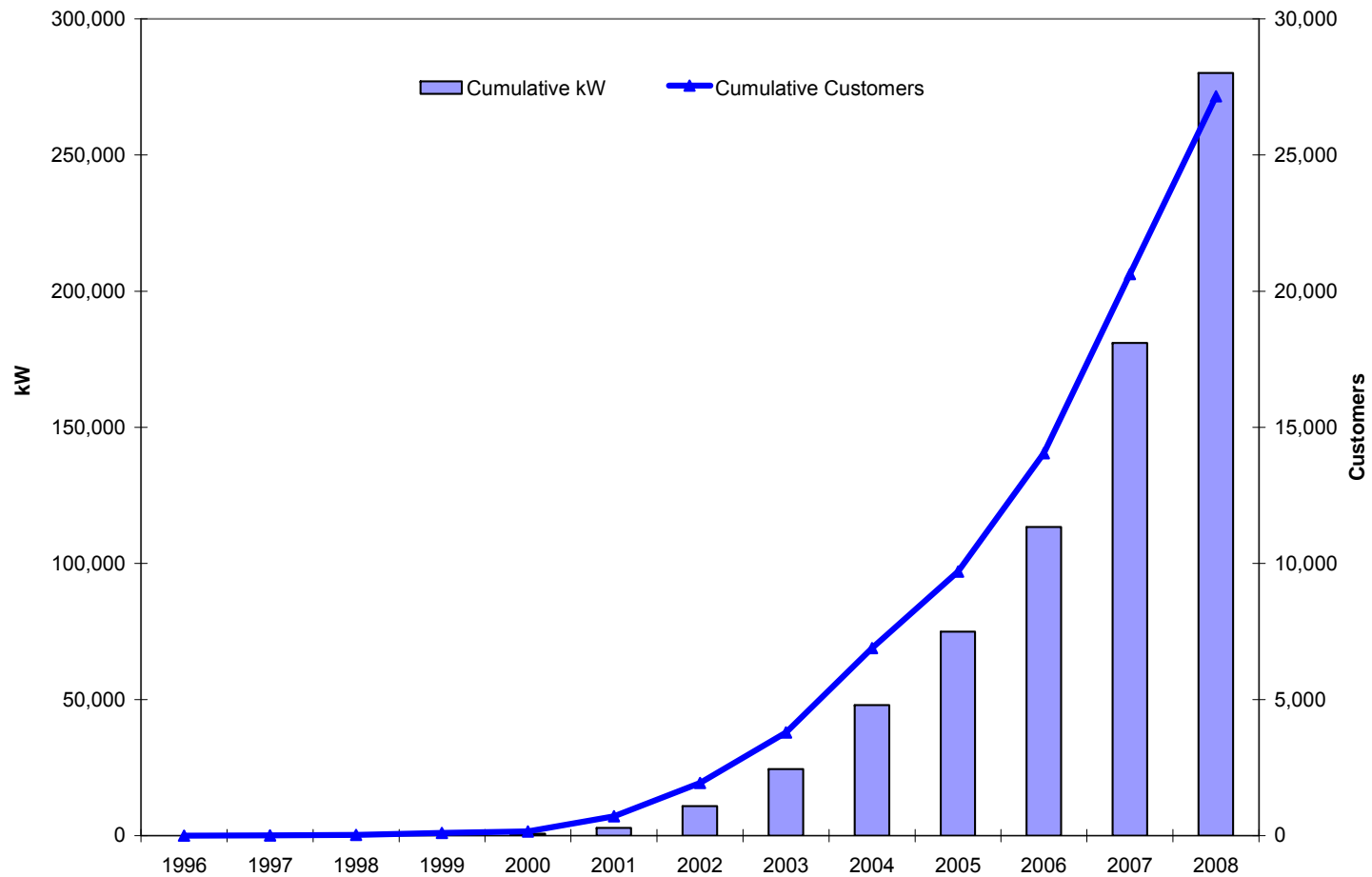
- Transmission dependent
- Land & water requirements
- Not for all locations

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



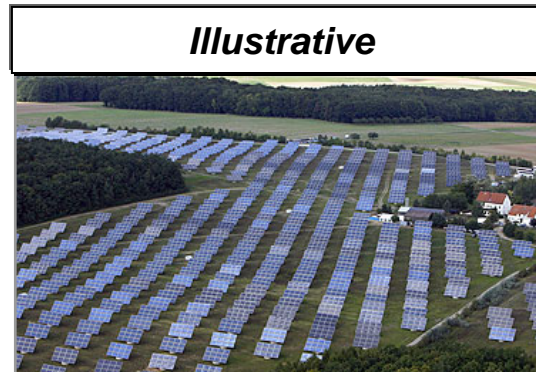
500-MW Power Tower



550-MW Cd Te PV



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



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



210-MW c-Si Tracking PV



Why Utility Ownership?

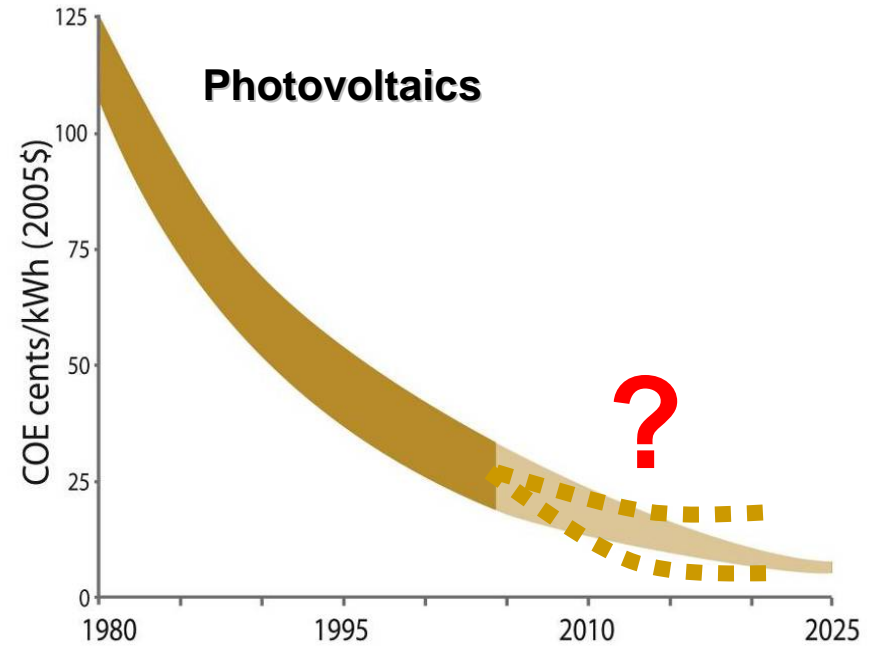
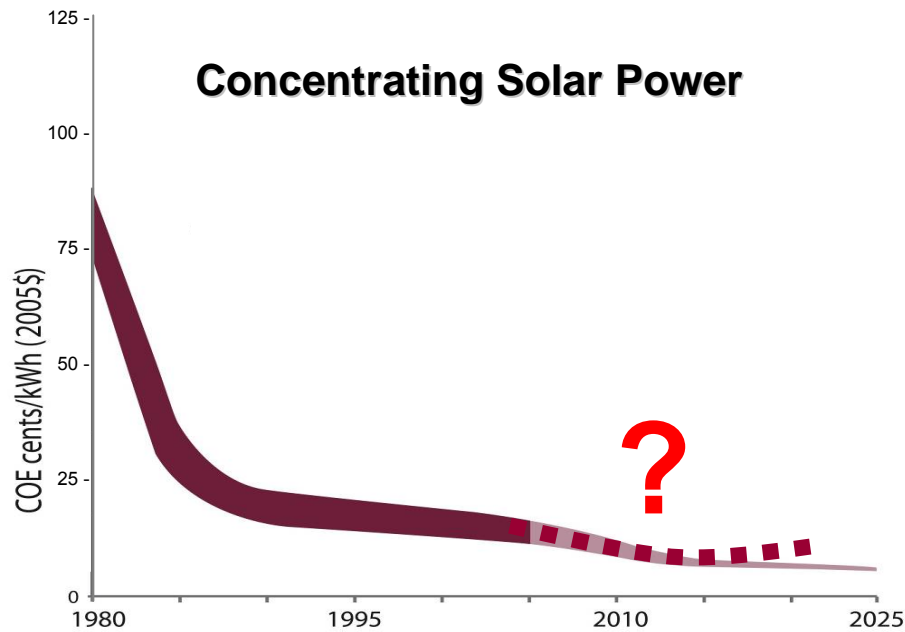
- **Credit-related cancellations or delays of independent contractors' projects**
- **Balance sheet strength produces lower cost of money**
- **Utilities can utilize the PTC and ITC**
- **Reduces development risk**



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**



Integrating Intermittent Renewables

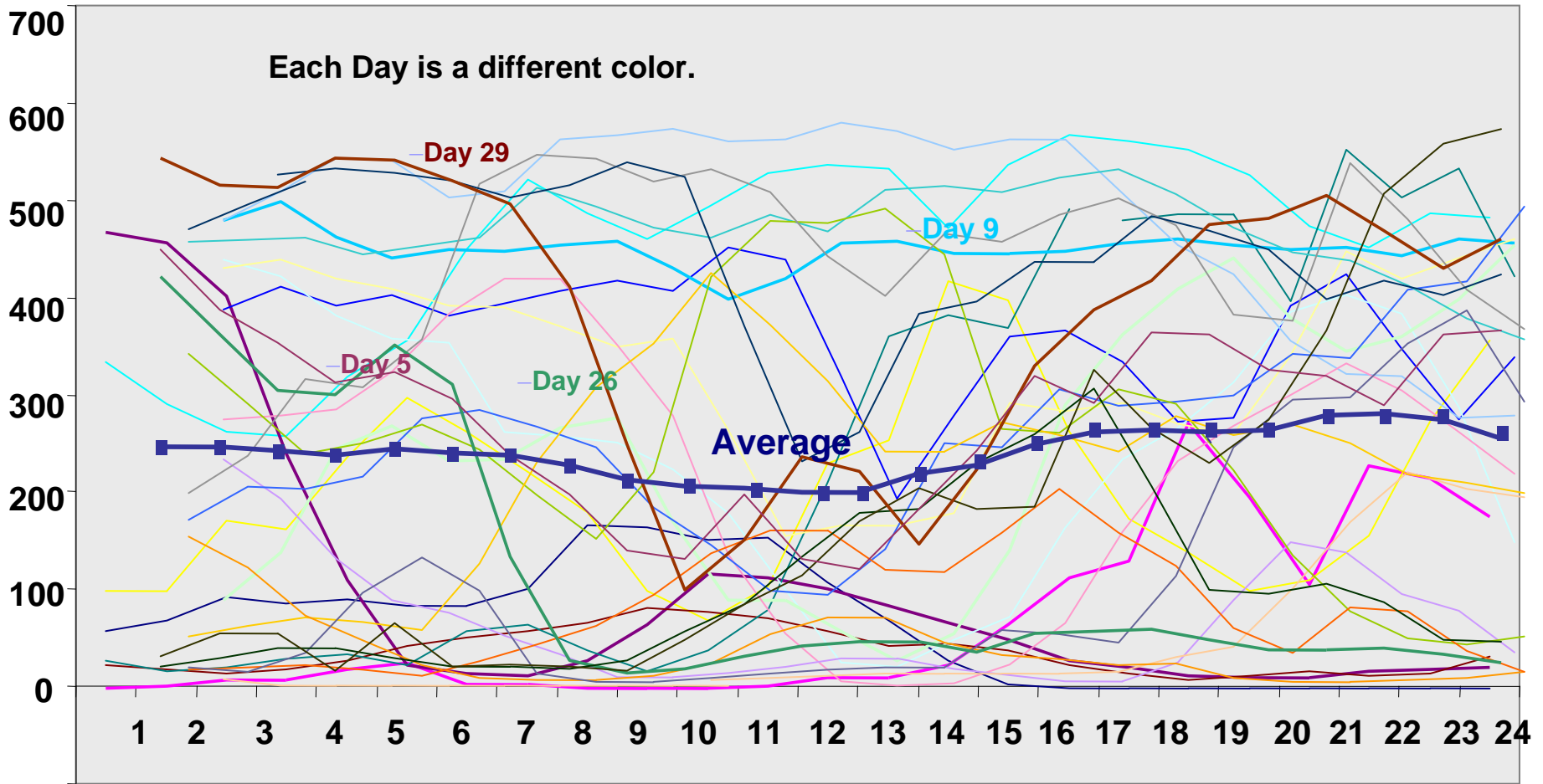
- **Solar and wind are both intermittent resources**
- **Very few renewable resources are dispatchable**
- **Today, integrating renewable resources requires more fast-response natural gas power plants**
- **New technologies will provide other options in the future**



Wind Generation Varies Widely

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

MW



Hour

Source: CAISO

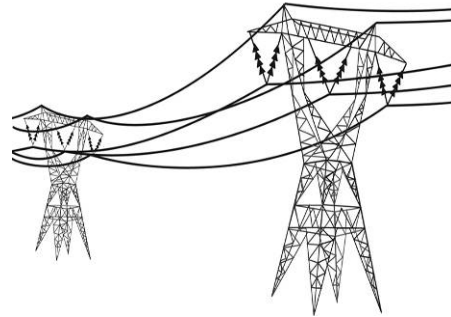
Renewable Resource Generation



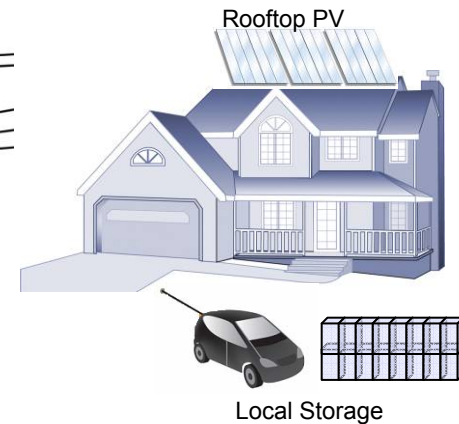
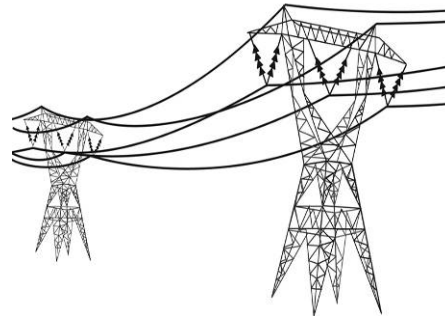
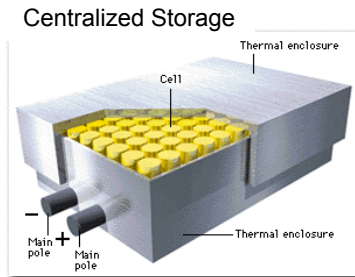
Today:

- 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



Renewable Resource Generation



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



- 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.

Source: California Energy Commission

Load Curve for a Typical Day

