



## California Energy Commission

# 2009 IEPR Workshop California Energy Demand 2010-2020 Staff Draft Forecast

# Statewide Forecast Results for Electricity and Natural Gas

June 26, 2009

Chris Kavalec

Demand Analysis Office

Electricity Supply Analysis Division

[Chris.Kavalec@energy.state.ca.us](mailto:Chris.Kavalec@energy.state.ca.us)

916-654-5184

**DOCKET**  
**09-IEP-1C**

DATE	Jun 26 2009
RECD.	Jul 03 2009



# California Energy Demand (CED) Forecasts

- Draft
- Revised
  - Released August 3, 2009
  - Workshop August 17, 2009
- Uncommitted forecast: to be completed after the revised forecast



## Staff Draft CED Forecast

- [http://www.energy.ca.gov/2009\\_energypolicy/documents/index.html#062609](http://www.energy.ca.gov/2009_energypolicy/documents/index.html#062609)
- Agenda
  - Statewide results for electricity and natural gas
  - Conservation/Efficiency
  - Results and forecast comparisons for 5 major planning areas



## Summary of Results

- Significantly reduced electricity consumption vs. previous forecast (for 2007 IEPR)
  - Economy
  - Increased efficiency impacts
  - Lower starting point
- Drop in peak electricity demand not as dramatic



# Demand Forecast Methodology

## 8 Planning Areas for Electricity

- Burbank/Glendale
- Imperial Irrigation District
- LA Department of Water and Power (LADWP)
- Pacific Gas and Electric (PG&E)
- Pasadena
- Southern California Edison (SCE)
- San Diego Gas and Electric (SDG&E)
- Sacramento Municipal Utility District (SMUD)



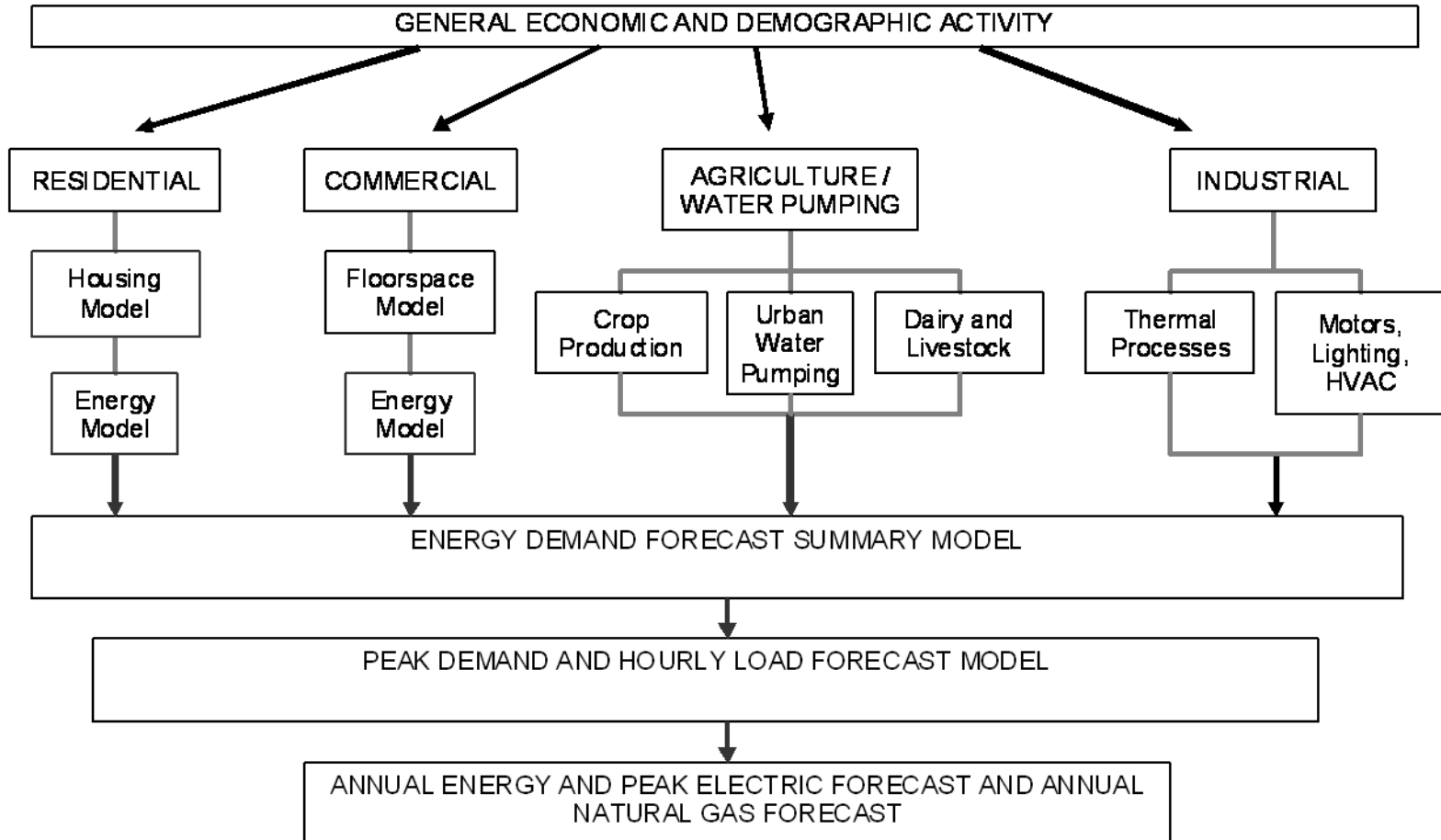
# Demand Forecast Methodology

Individual sector models for:

- Residential
- Commercial
- Industrial
- Agricultural
- Transportation, communications, and utilities (TCU) and street lighting



# Demand Forecast Structure





# Changes in Demand Forecast

- Residential lighting broken out as separate end use
- New commercial floor space projection methodology
- Higher compliance with 2005 Commercial Lighting Standards
- Increased effort to capture impacts of utility efficiency programs





# Reduced Economic Growth

- Projected real personal income down 5.7% statewide relative to previous forecast by 2018
- Projected total employment down 5.9% statewide relative to previous forecast by 2018
- Key economic indicators show short-term drop followed by slower long-term growth



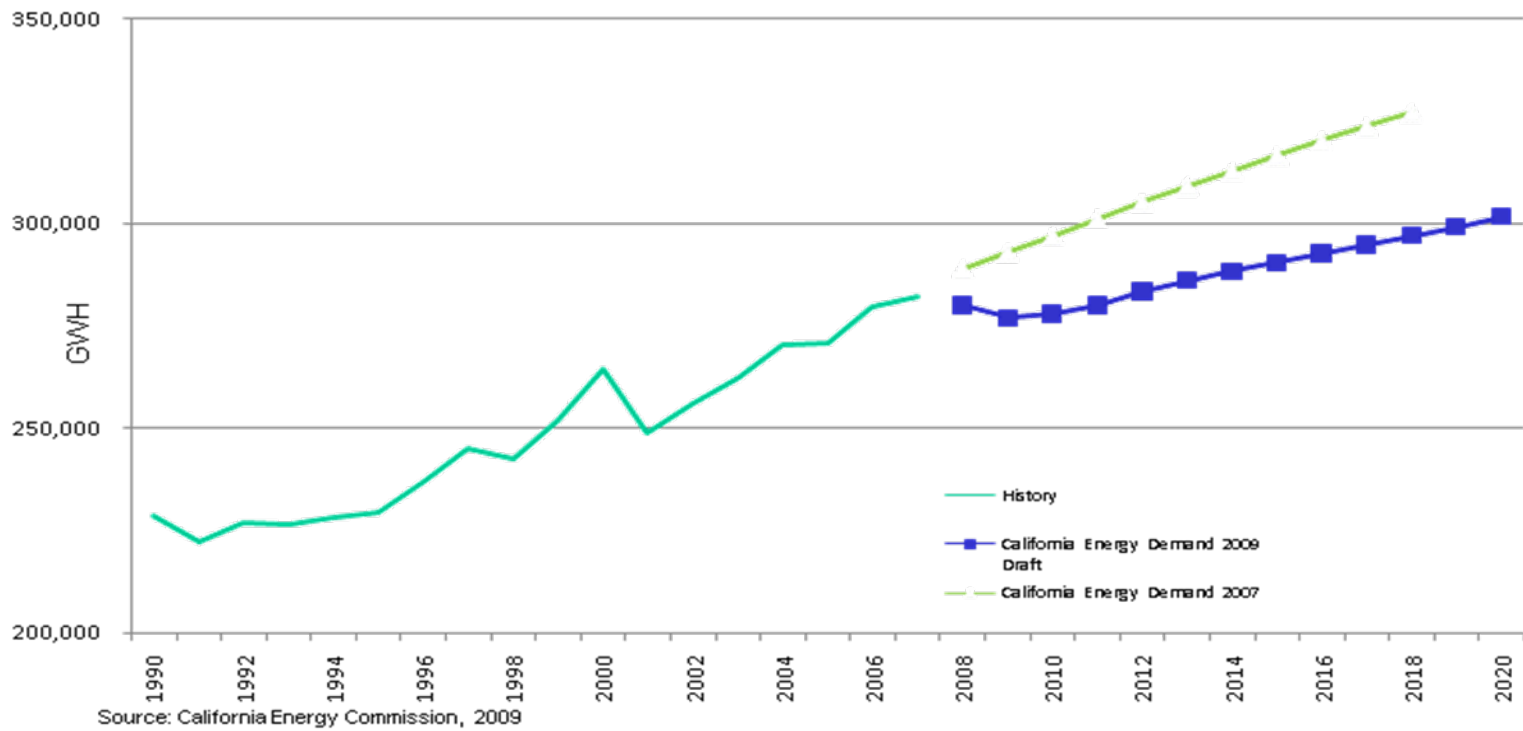
# Rate Scenarios

- 3 rate scenarios for electricity and natural gas
  - Low-rate case: constant rates
  - Mid-rate case: 15 % higher for electricity and 10% higher for natural gas by 2020 vs. 2010
  - High-rate case: 30% higher by 2020 vs. 2010
- Affects residential, commercial, and industrial sectors
- Using low-rate case for comparison to previous electricity forecast



# Statewide Electricity Consumption Low-Rate Case

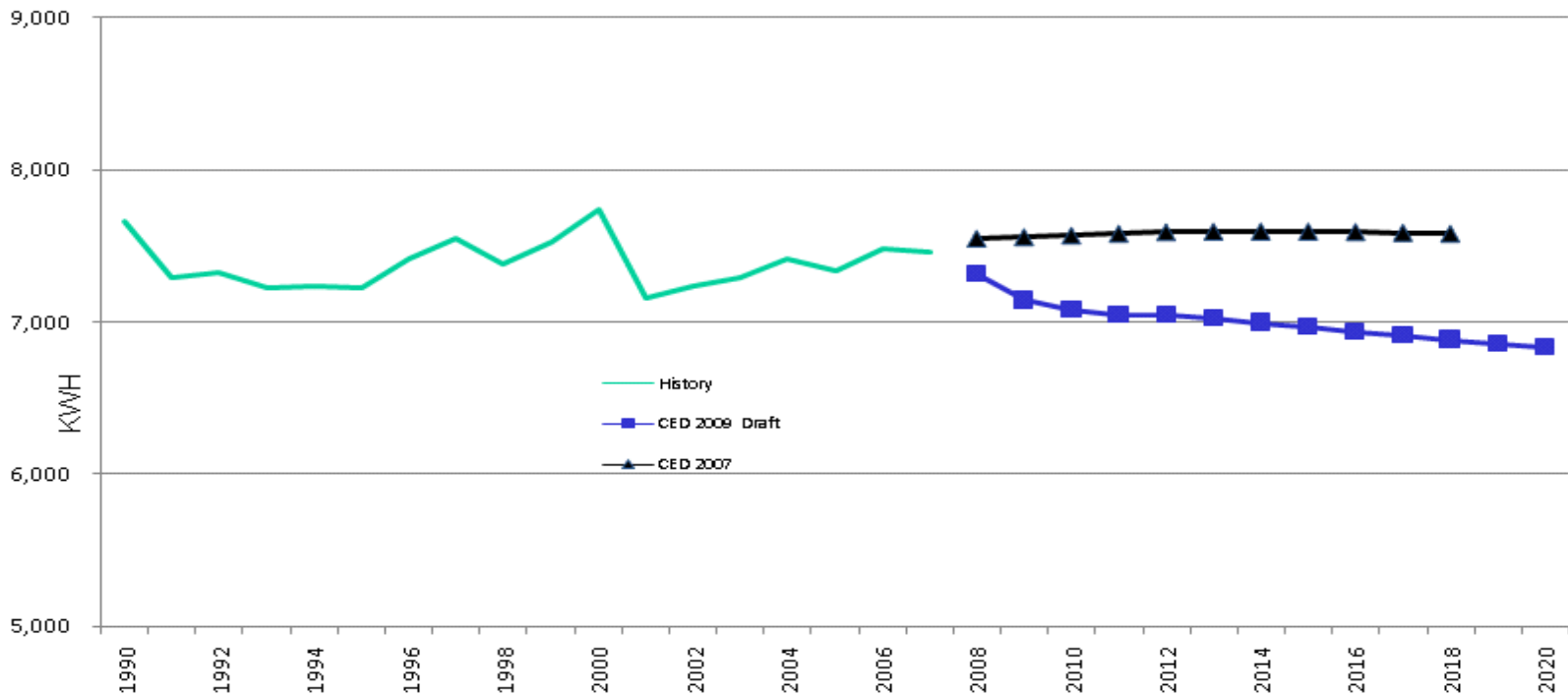
Short-term drop, lower long-term growth





# Electricity Consumption per Capita Low-Rate Case

Declining throughout the forecast period

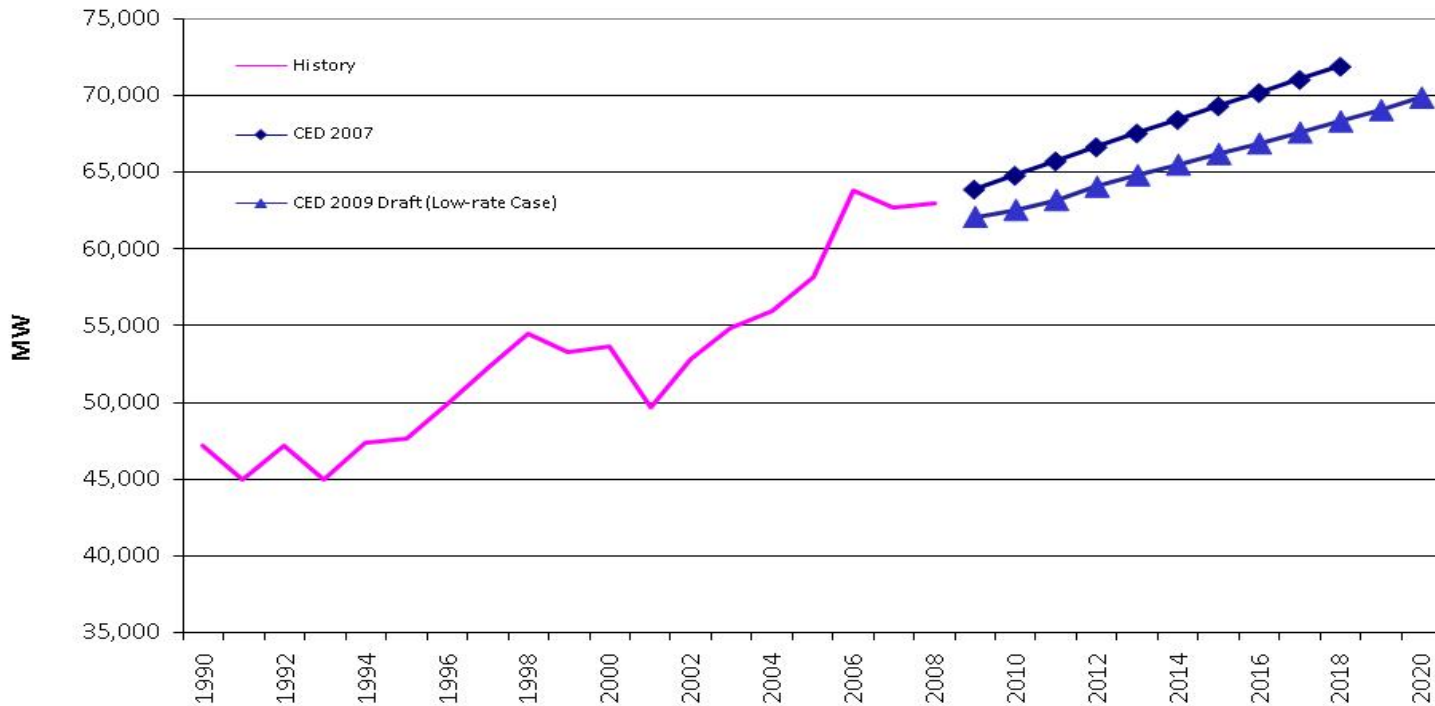


Source: California Energy Commission, 2009



# Statewide Electricity Peak Low-Rate Case

Rate of growth higher than consumption

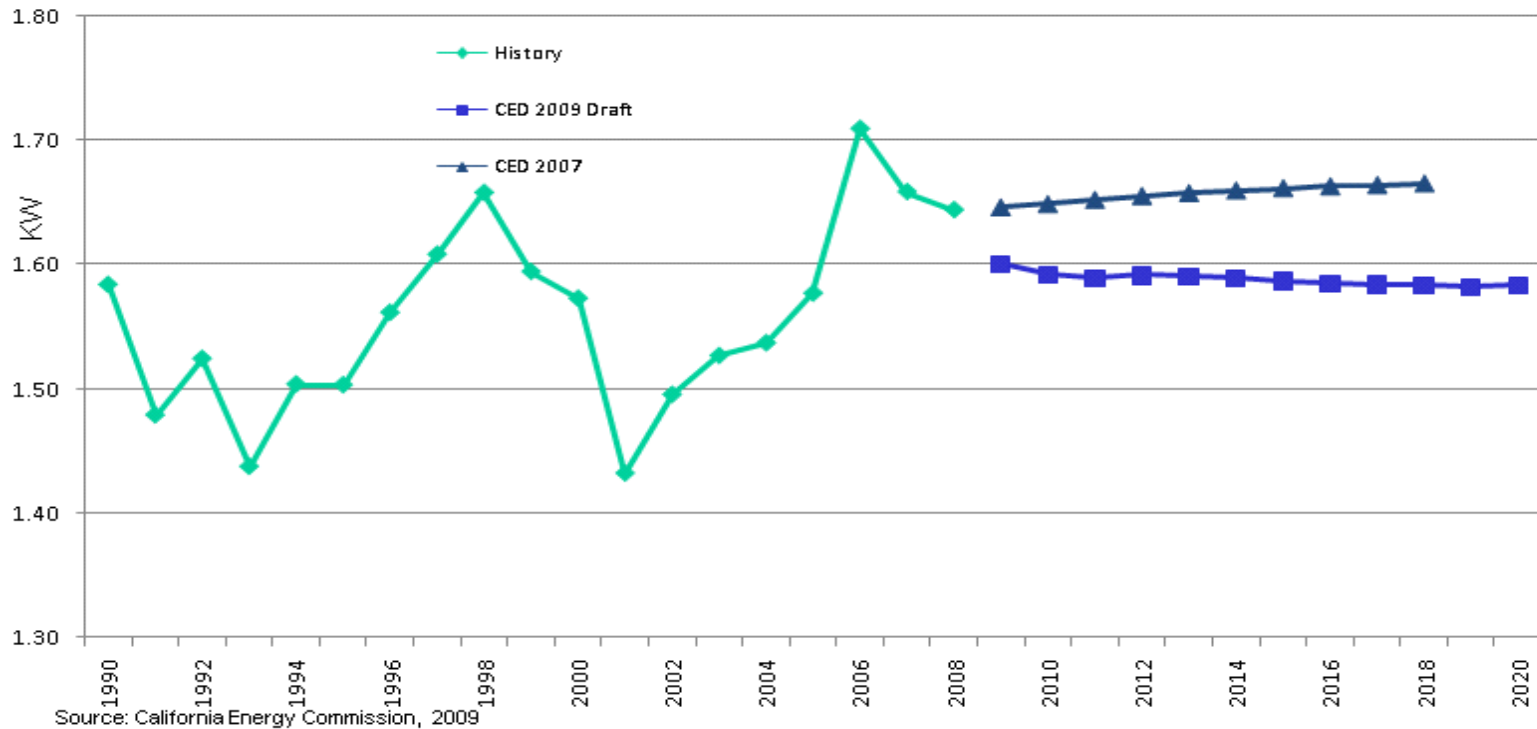


Source: California Energy Commission, 2009



## Peak Electricity per Capita Low-Rate Case

Less decline compared to consumption



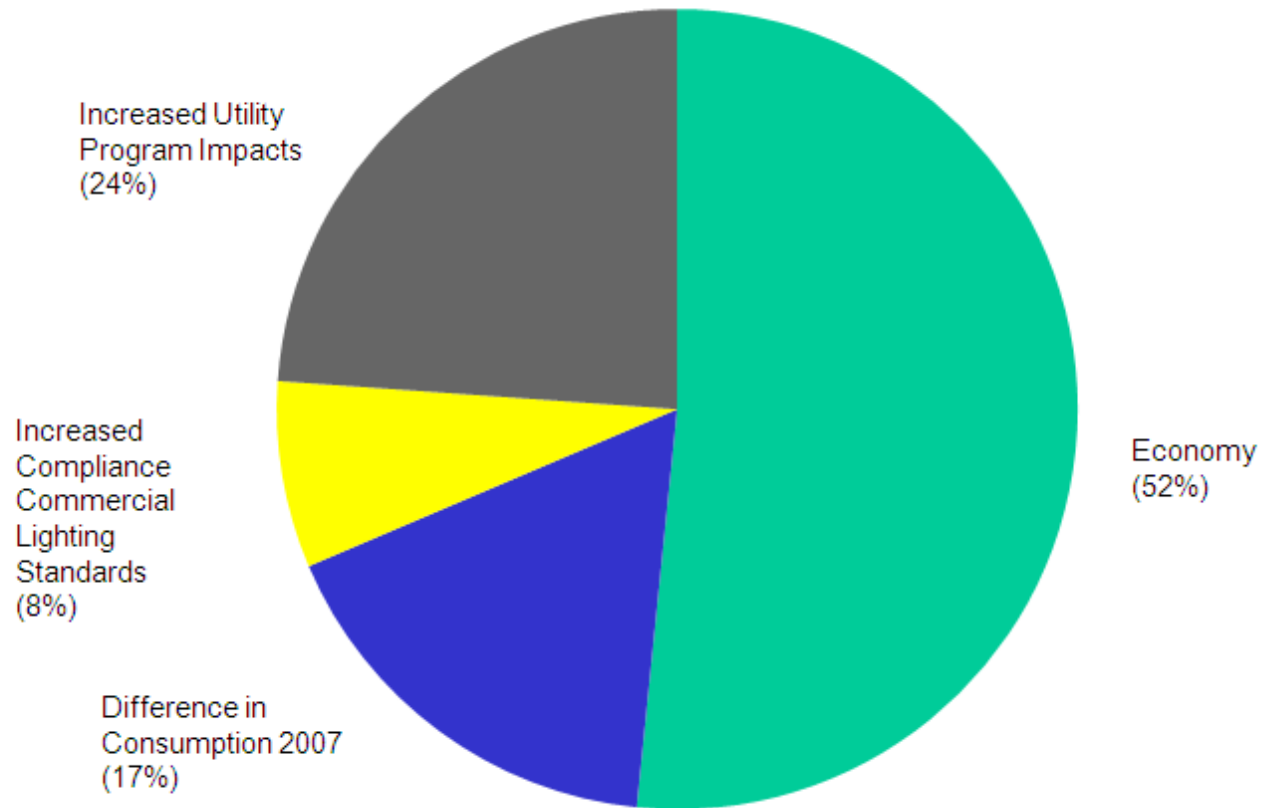


# Statewide Electricity Forecast

- Consumption down by 9.2% by 2018 vs. CED 2007
- Peak down by 5% in 2018
- Growth rates 2010-2018: consumption 0.8% vs. 1.2% for CED 2007; peak 1.1% vs. 1.3% for CED 2007
- Economy responsible for most of the difference



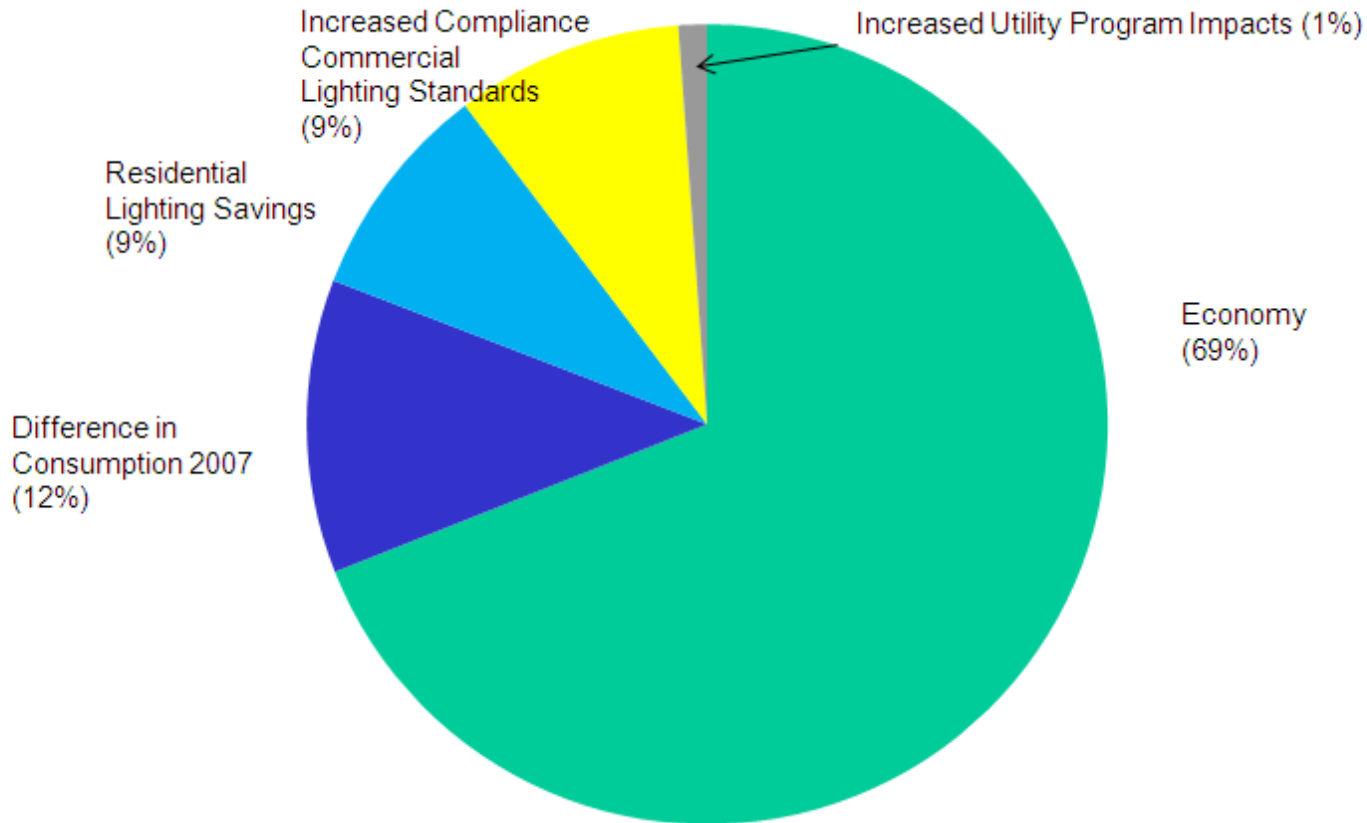
# Causes of Reduced Consumption in 2010: 2009 Draft vs. CED 2007





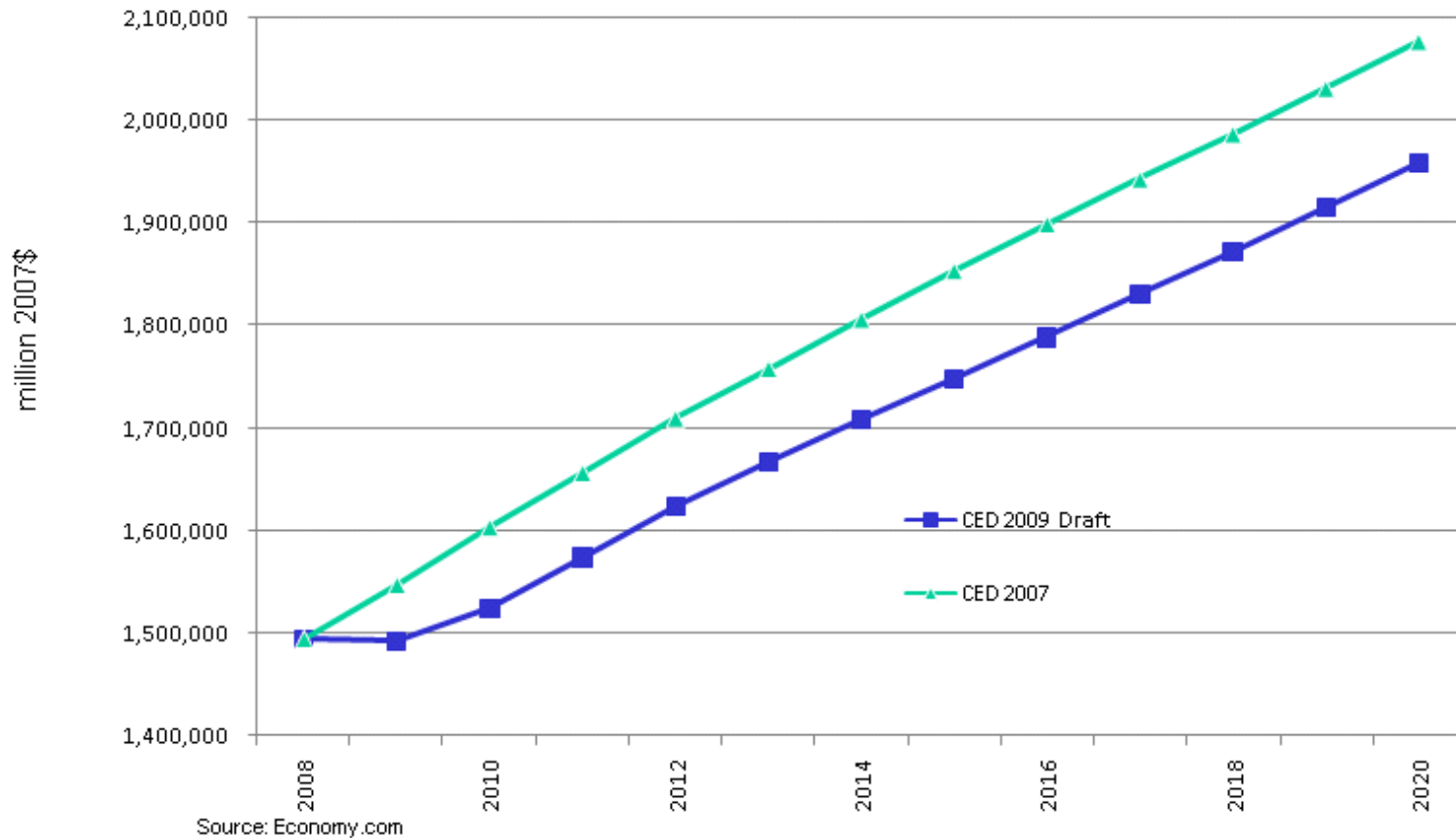


# Causes of Reduced Consumption in 2018: 2009 Draft vs. CED 2007



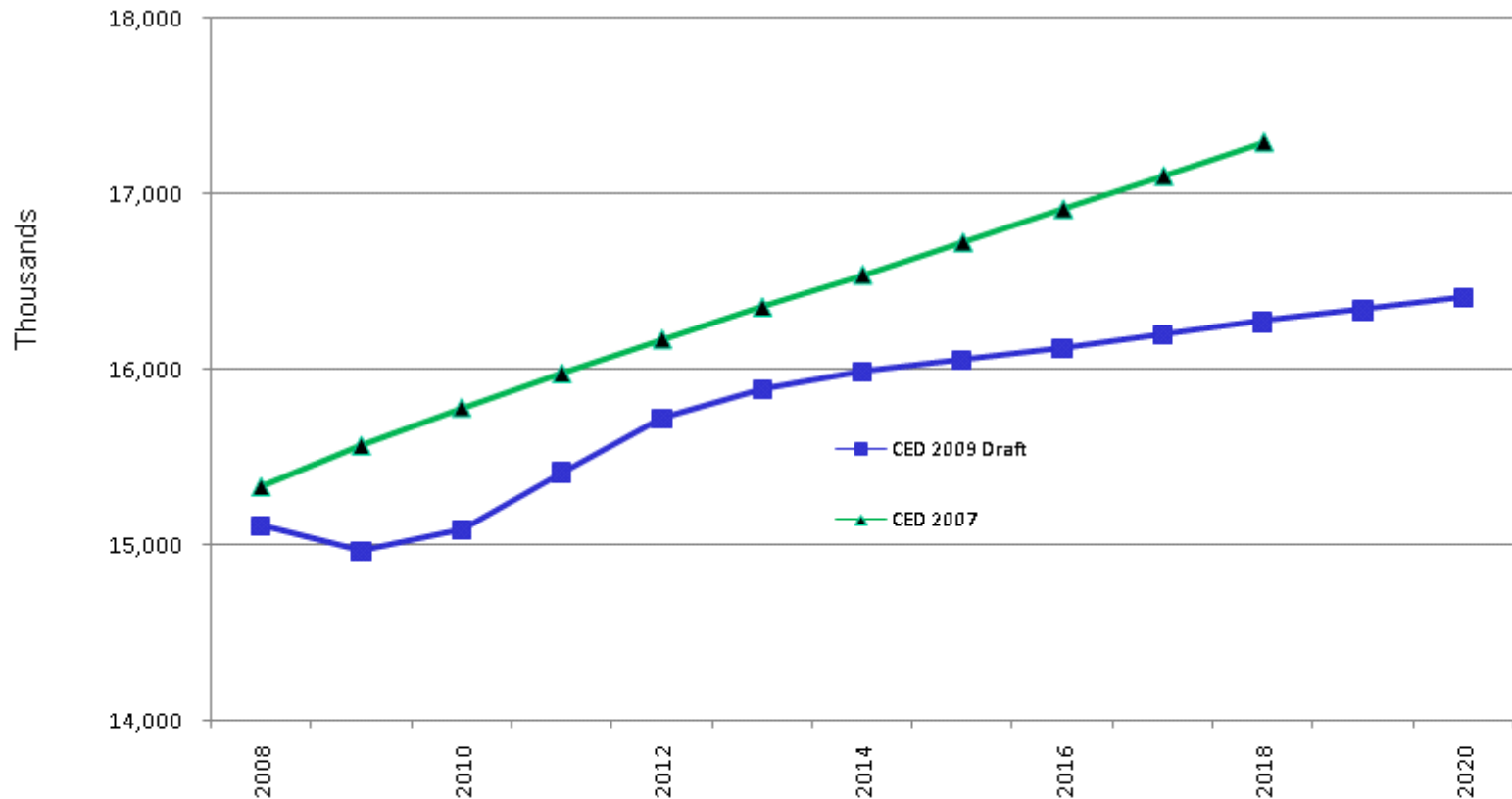


# Statewide Personal Income Mirrors Consumption





# Statewide Employment Mirrors Consumption

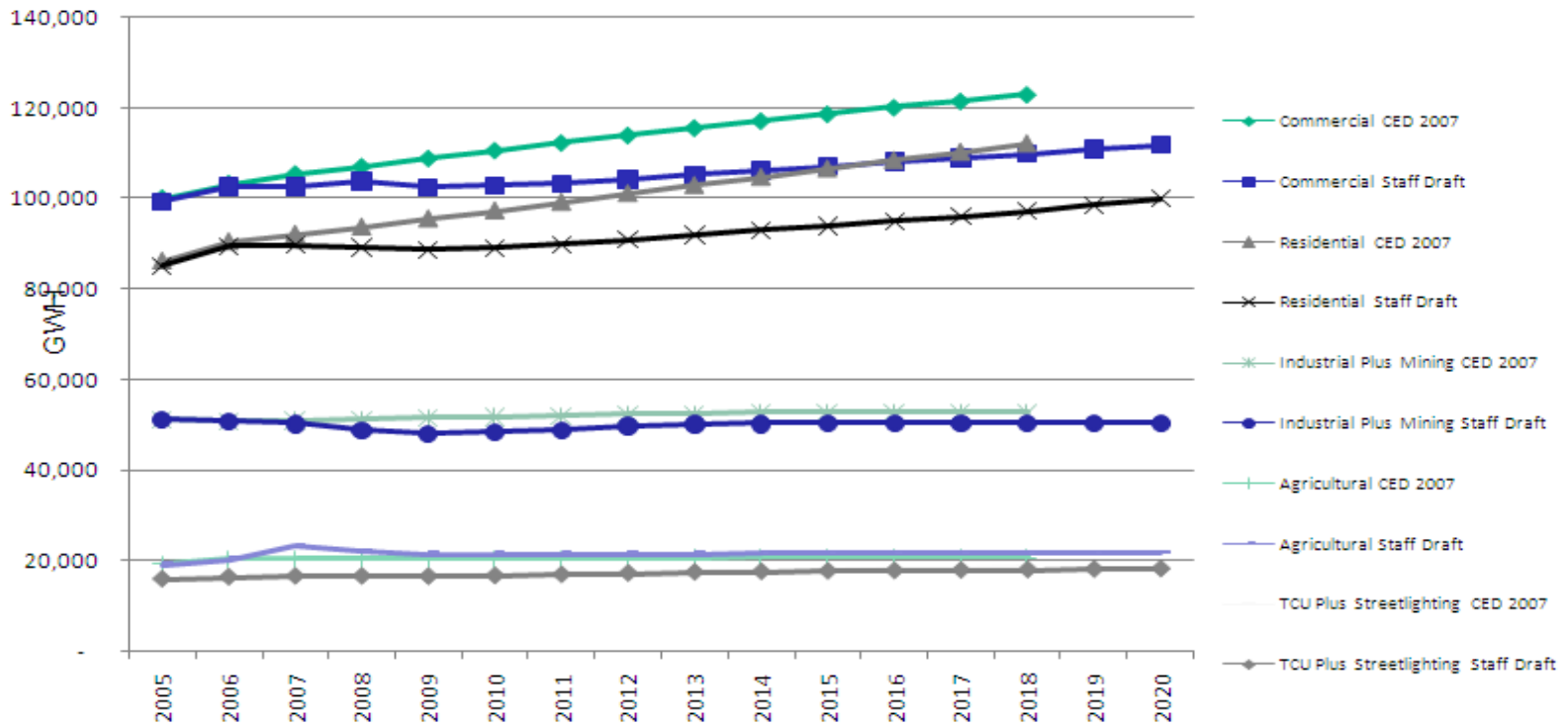


Source: Economy.com



## Statewide Electricity Consumption by Sector: Low-Rate Case

Most of the reduction is in residential and commercial

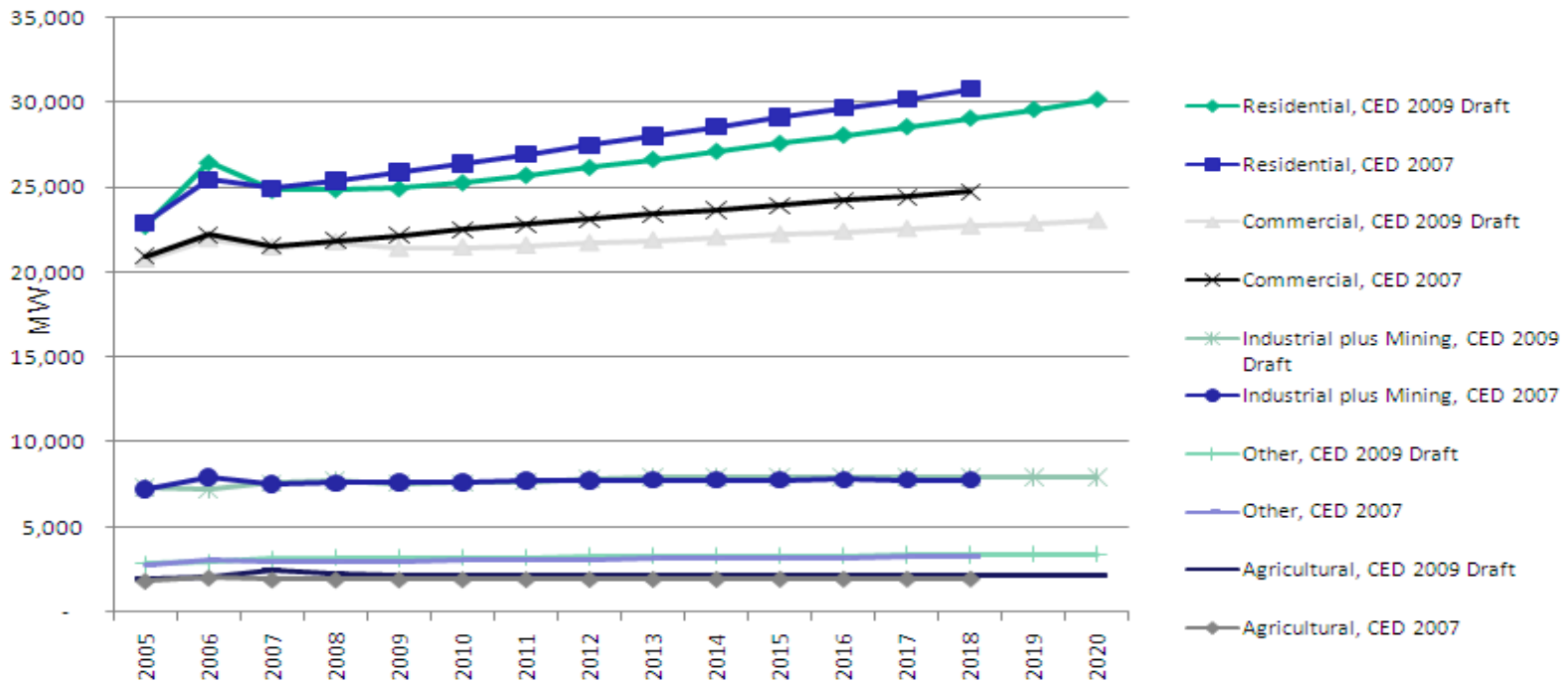


Source: California Energy Commission, 2009



# Statewide Electricity Peak by Sector Low-Rate Case

Most of the reduction is in residential and commercial



Source: California Energy Commission, 2009

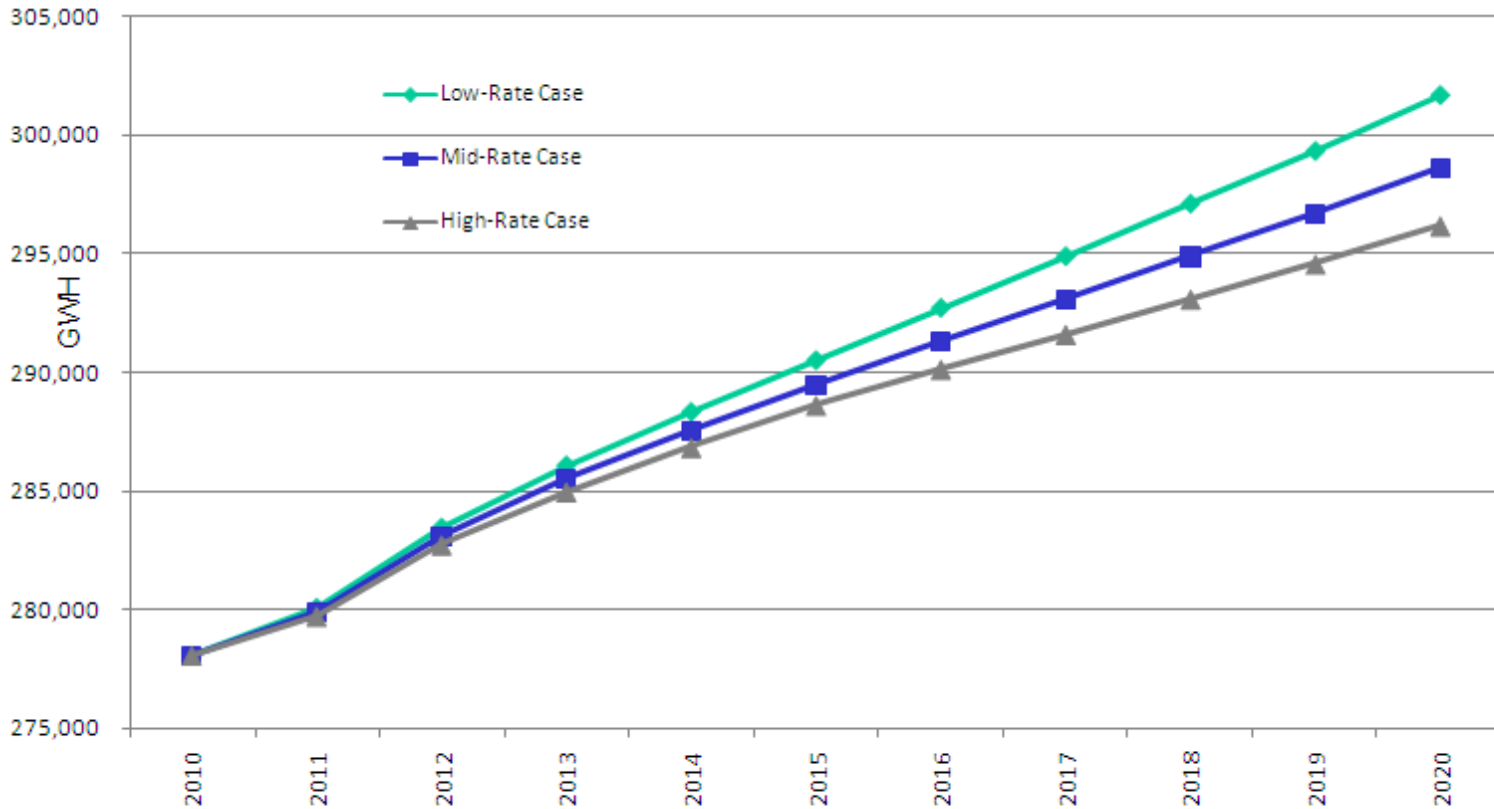


## Statewide Electricity by Sector

- Residential consumption down by 13.1% in 2018 vs. CED 2007
- Residential peak down 4.2% in 2018
- Commercial consumption down by 10.8% in 2018
- Commercial peak down by 8.0% in 2018



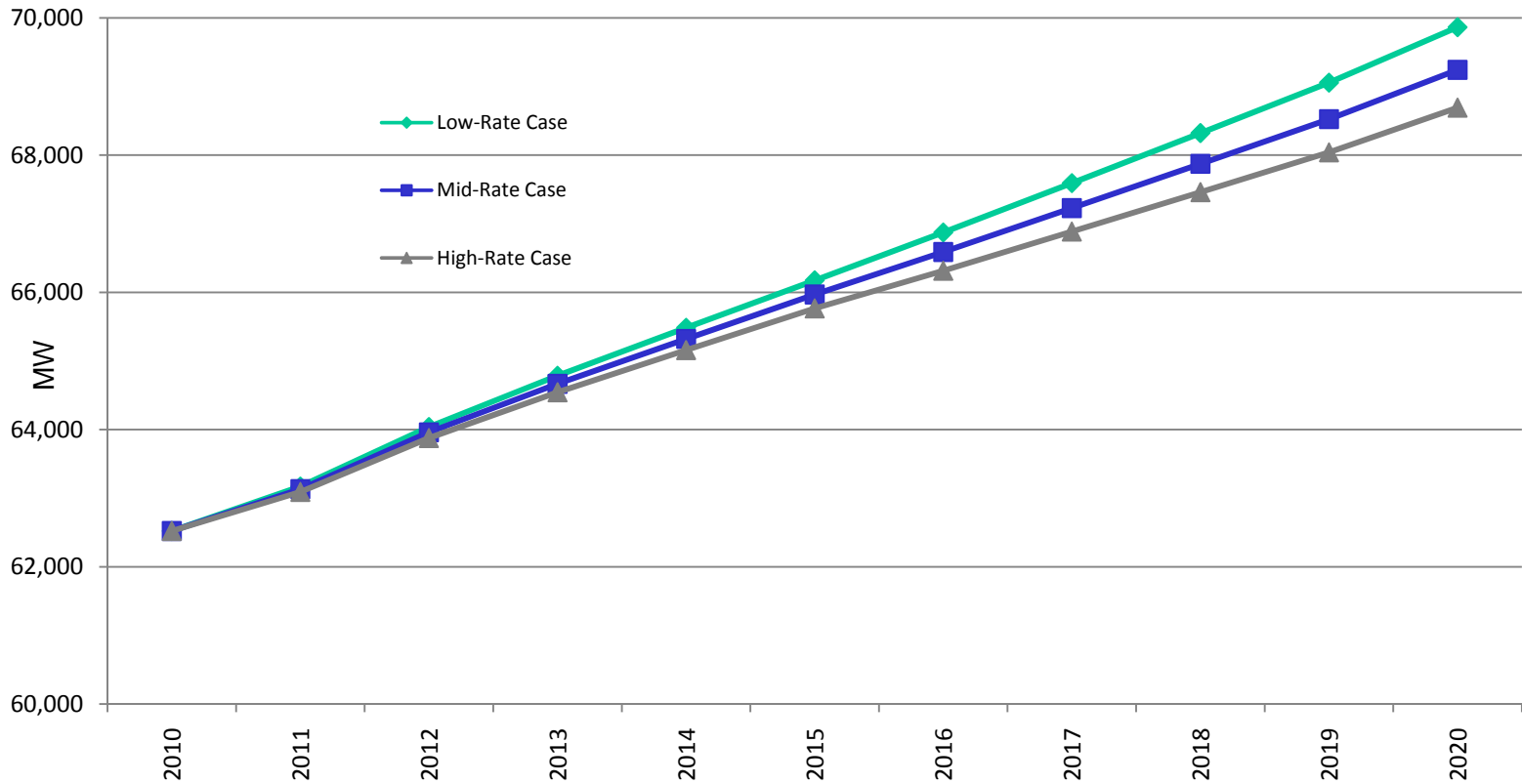
# Statewide Electricity Consumption by Price Scenario



Source: California Energy Commission, 2009



# Statewide Electricity Peak by Price Scenario



Source: California Energy Commission, 2009





## Electricity Price Response

- Consumption down 1.8% in high-rate case in 2020 vs. low-rate case, down 1% in mid-rate case
- Peak down 1.7% and 0.9% in 2020
- Corresponds to a price elasticity of 6-7% overall
- Commercial sector price elasticity = 15%
- Residential and industrial elasticity = 1-2%
- We propose using mid-rate case for revised forecast



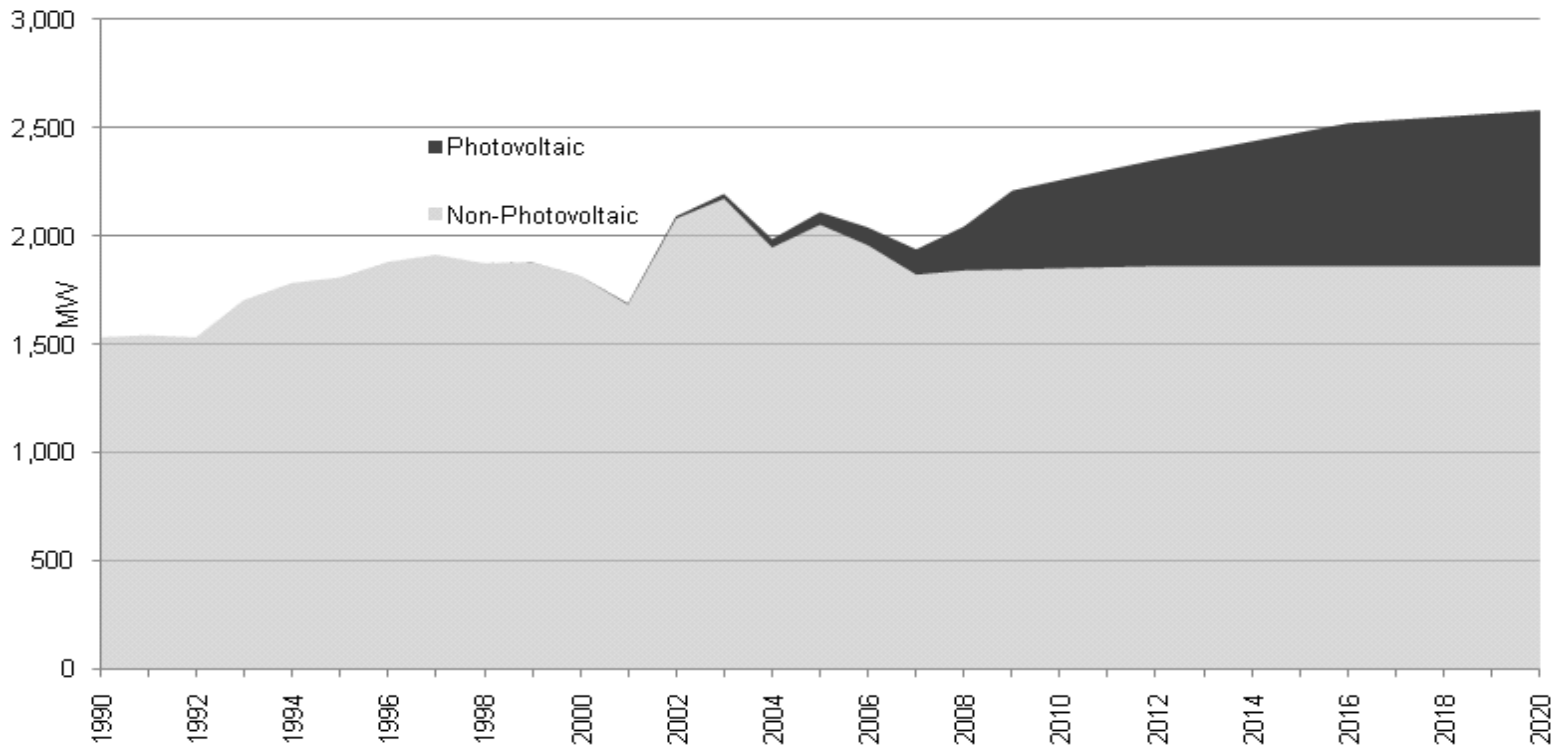
# Self-Generation Forecast

- Accounts for all of the major programs
  - Emerging Renewables Program (ERP)
  - California Solar Initiative (CSI)
  - Self-Generation Incentive Program (SGIP)
  - New Solar Homes Partnership (NSHP)
  - Other misc.
- Billing data reports self-generation by large industrial users



# Self-Generation Peak Impacts

PV systems reduce peak by over 700 MW in 2020





# Self-Generation Predictive Models

- Based on estimated payback periods and cost-effectiveness
- First model, still being tested by staff, predicts residential photovoltaic system adoption
- Plan is to apply these models for 2011 forecast



# Illustrative Residential PV System Simulation (MW installed)

Adoptions increase quickly as system prices drop

		Electricity Rate (2007 \$/kWh)							
		\$ 0.08	\$0.10	\$0.12	\$0.14	\$0.16	\$0.18	\$0.20	\$0.22
Photovoltaic System Price (2007 \$/kW)	\$1,000	277	356	406	575	587	587	959	1076
	\$3,000	20	63	104	124	139	176	206	260
	\$5,000	4	6	18	48	67	84	98	108
	\$7,000	3	3	5	6	18	42	58	72
	\$9,000	3	3	3	4	5	6	20	40

Source: California Energy Commission, 2009

\*Assumes a discount rate of 3 percent.



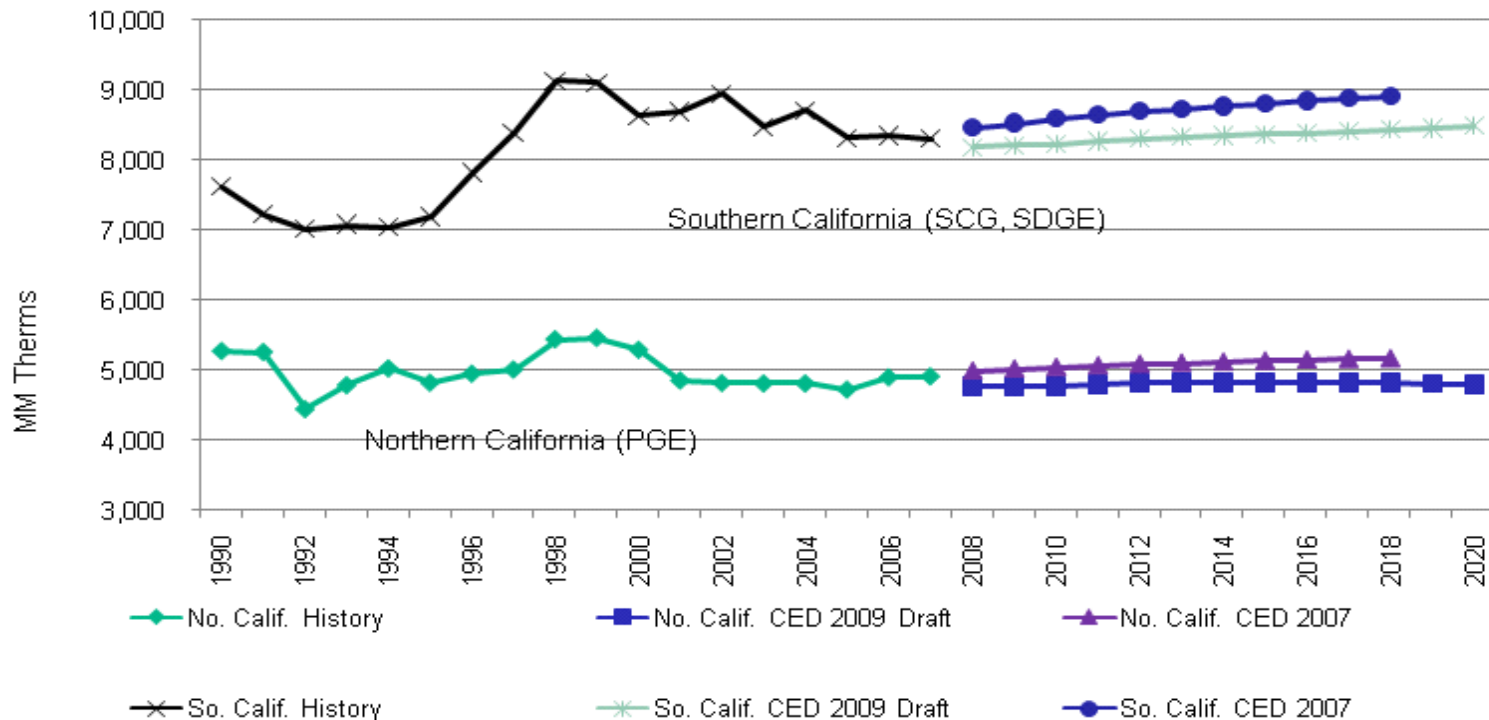
# End-User Natural Gas Forecast

- By planning area: PG&E, SCG, SDG&E, and other
- Does not include natural gas used by utilities or others for electric generation
- Mid and high cases from *Scenario Analyses of California's Electricity System: Preliminary Results for the 2007 Integrated Energy Policy Report*, CEC-200-2007-010-SD, June 2007



## Natural Gas Forecast-High Rate Case

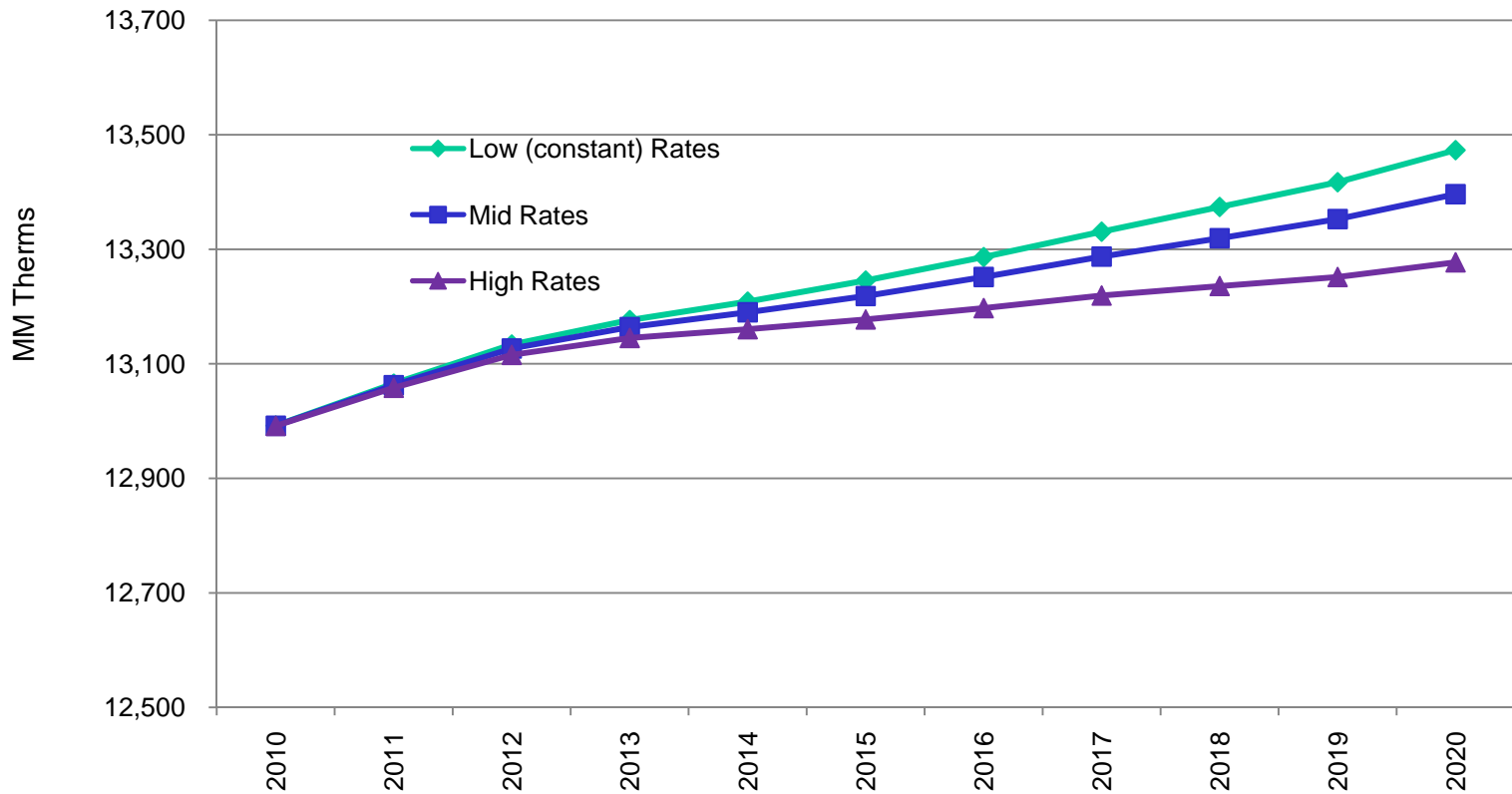
Same pattern as electricity consumption



Source: California Energy Commission, 2009



# Natural Gas Forecast by Price Scenario



Source: California Energy Commission, 2009