



## California Energy Commission

### IEPR Committee Workshop

# CALIFORNIA ENERGY DEMAND 2011-2022 PRELIMINARY STAFF FORECAST

August 30, 2011 — 10:00 am

## Statewide Forecast Results for Electricity and Natural Gas

Demand Analysis Office  
Electricity Supply Analysis Division



# CED 2011 Preliminary Forecast

- Agenda
  - Statewide results for electricity and natural gas including discussion of methodology
  - Conservation/Efficiency, Self-generation
  - Results and forecast comparisons for 5 major planning areas



## Demand Forecast: Key Outputs

- Electricity and natural gas consumption
- Electricity sales and net energy for load
- Peak demand
- Energy savings by source
- Private supply (self-generation)



# Planning Areas for Electricity

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



# Planning Areas for Natural Gas

- Pacific Gas and Electric (PG&E)
- Southern California Gas (SCG)
- San Diego Gas and Electric (SDG&E)



## Demand Forecast: Key Inputs

- Survey data (UECs, saturations)
- Econ-demo assumptions
- Energy prices
- QFER sales data
- Program data (efficiency, self-gen)



# Demand Forecast Methodology

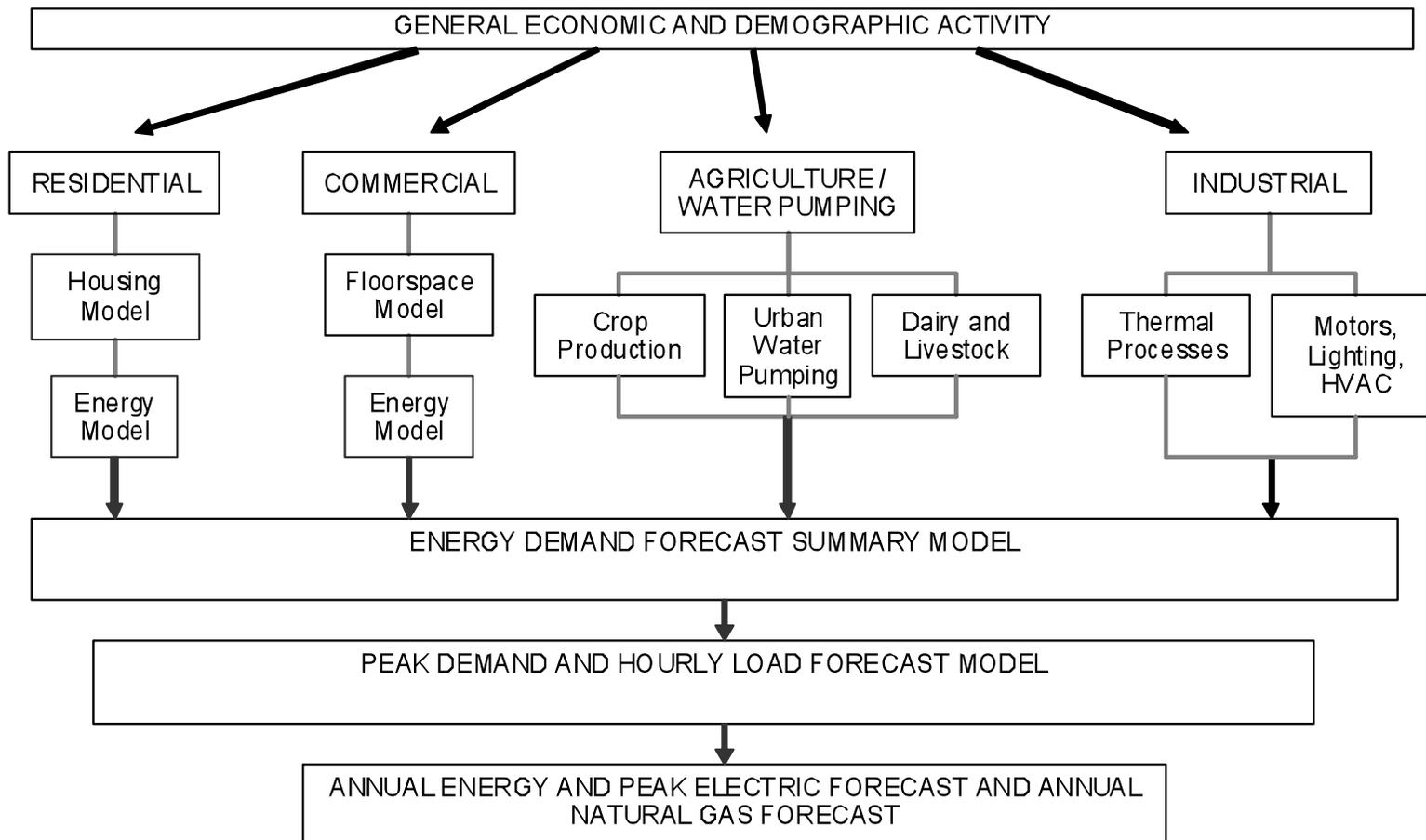
Individual sector models for:

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

Summary and peak models



# Demand Forecast Structure





# Demand Forecast Methodology

- New econometric models integrated into forecasting process (residential, commercial, industrial, peak)
- New predictive model for residential photovoltaics and solar water heating (trend analysis for other self-gen)
- Forecast incorporates climate change through temperature scenarios from Scripps



## Demand Forecast Methodology

- Incorporates AB 1109 and 2010 Title 24 revisions as “committed” efficiency savings
- A “managed” forecast is also provided: *CED 2011 Preliminary* forecast adjusted for incremental uncommitted efficiency
- Electric vehicle forecast from Fuels Office



## Integration of Econometric Models

- Electricity price elasticities for residential and industrial models made consistent with elasticities estimated in corresponding econometric models
- Weather adjustment commercial end use electricity consumption results made consistent with coefficient for cooling degree days estimated in commercial econometric model



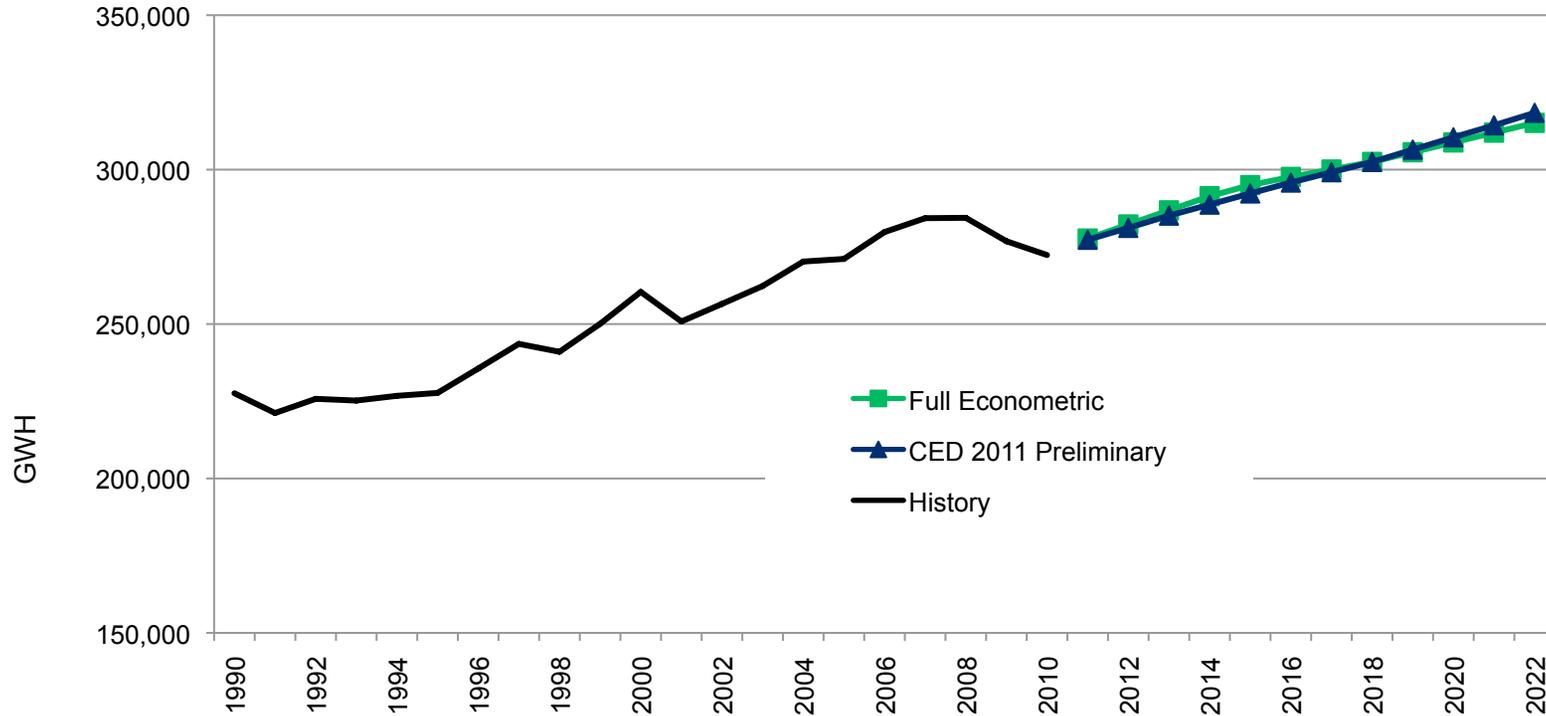
# Integration of Econometric Models

- Industrial electricity forecast for the manufacturing sector adjusted downward to reflect impact from increasing labor productivity estimated in manufacturing econometric model
- Peak results from the HELM adjusted to incorporate climate change scenarios using results from the peak econometric model
- Mining/construction econometric results used instead of INFORM model output



# *CED 2011 Preliminary vs. Full Econometric Forecast (consumption)*

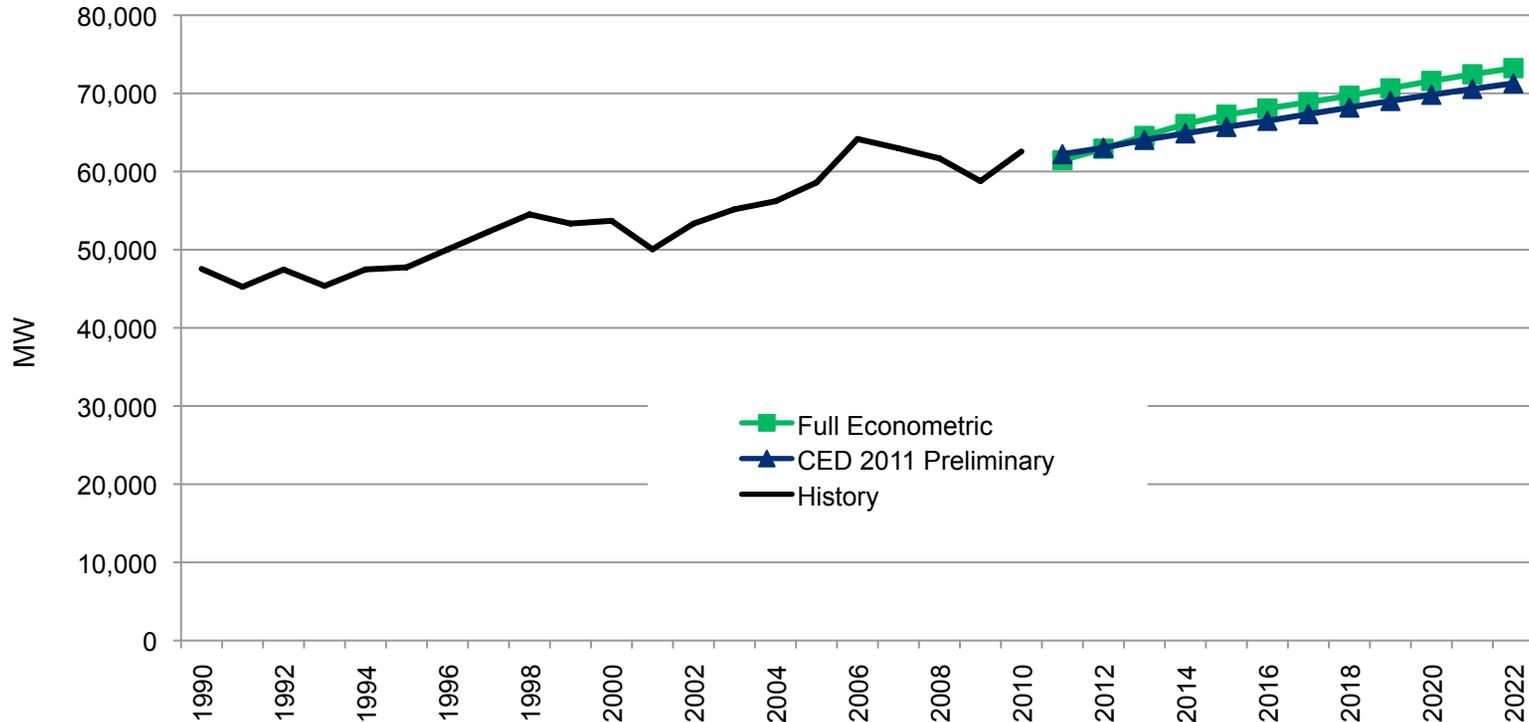
•End-use residential higher than econometric





# ***CED 2011 Preliminary vs. Full Econometric Forecast (peak)***

•LADWP and PG&E have higher econometric peaks





# Climate Change Adjustment

- Econometric peak model used for adjustment
- Scripps provided 8 temperature scenarios; staff chose a “mid” and a “high” temperature increase for mid and high cases
- Low demand case included no climate change adjustment
- Staff used long-term trend (1990-2020) from scenarios to calculate annual maximum *max631*
- 2022 peak increase of 425 MW (0.5%) and 650 MW (1%) in the mid and high demand cases, respectively



# Three Demand Scenarios

- Scenarios are based on April 2011 economic projections
- High case: High econ-demo growth (Global Insight “Optimistic”), lower electricity rates, low (committed) efficiency program and self-generation impacts
- Mid case: Mid economic growth (Economy.Com “Base”), mid electricity rates, mid efficiency program and self-gen impacts
- Low case: Low econ-demo growth (Economy.Com “Protracted Slump”), high electricity rates, high efficiency program and self-gen impacts



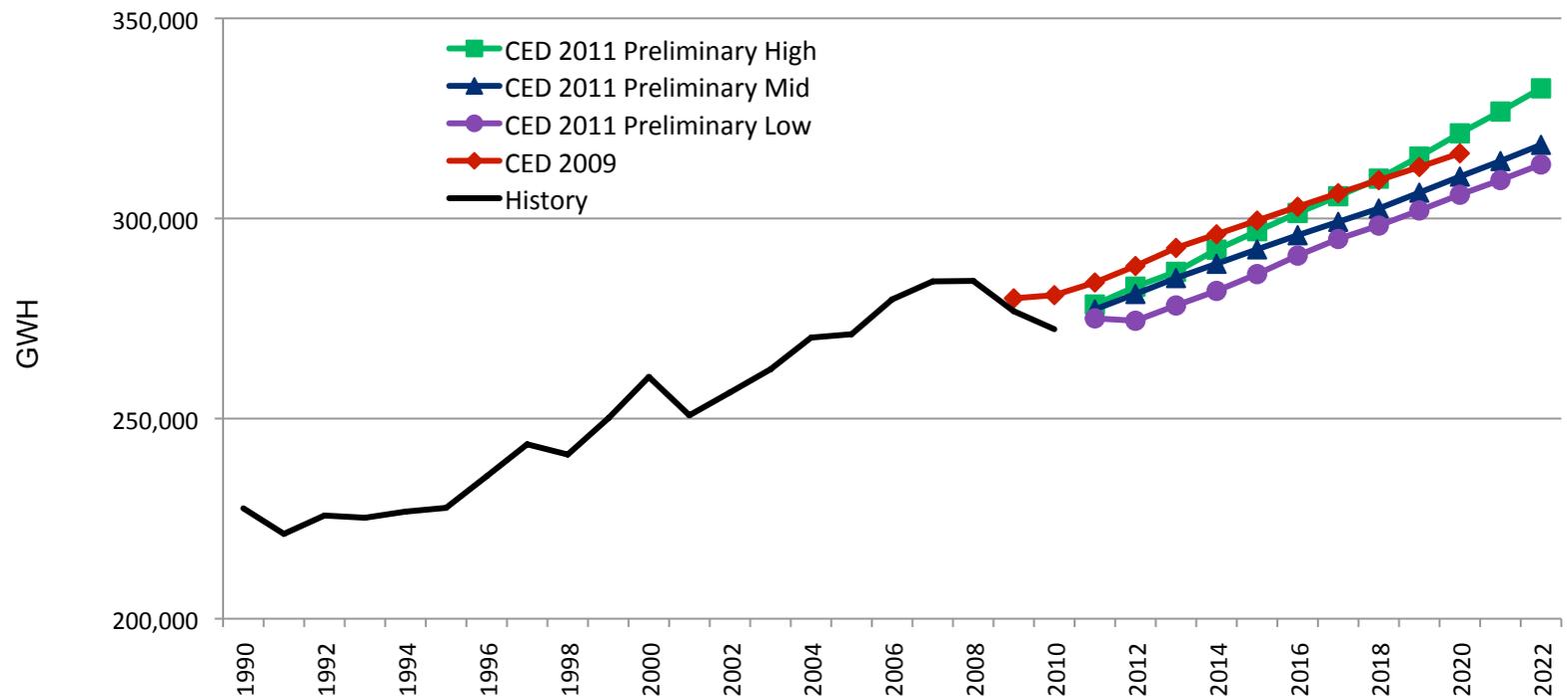
## Summary of Results

- 2010 statewide electricity consumption was 3% lower than *CED 2009* projection
- *CED 2011* reaches *CED 2009 2020* levels by 2018 in the high demand scenario and by 2022 in mid demand case.
- Statewide peak demand is projected to reach the *CED 2009 2020* level by 2017 in the high demand scenario and by 2022 in mid demand case.



# Statewide Electricity Consumption

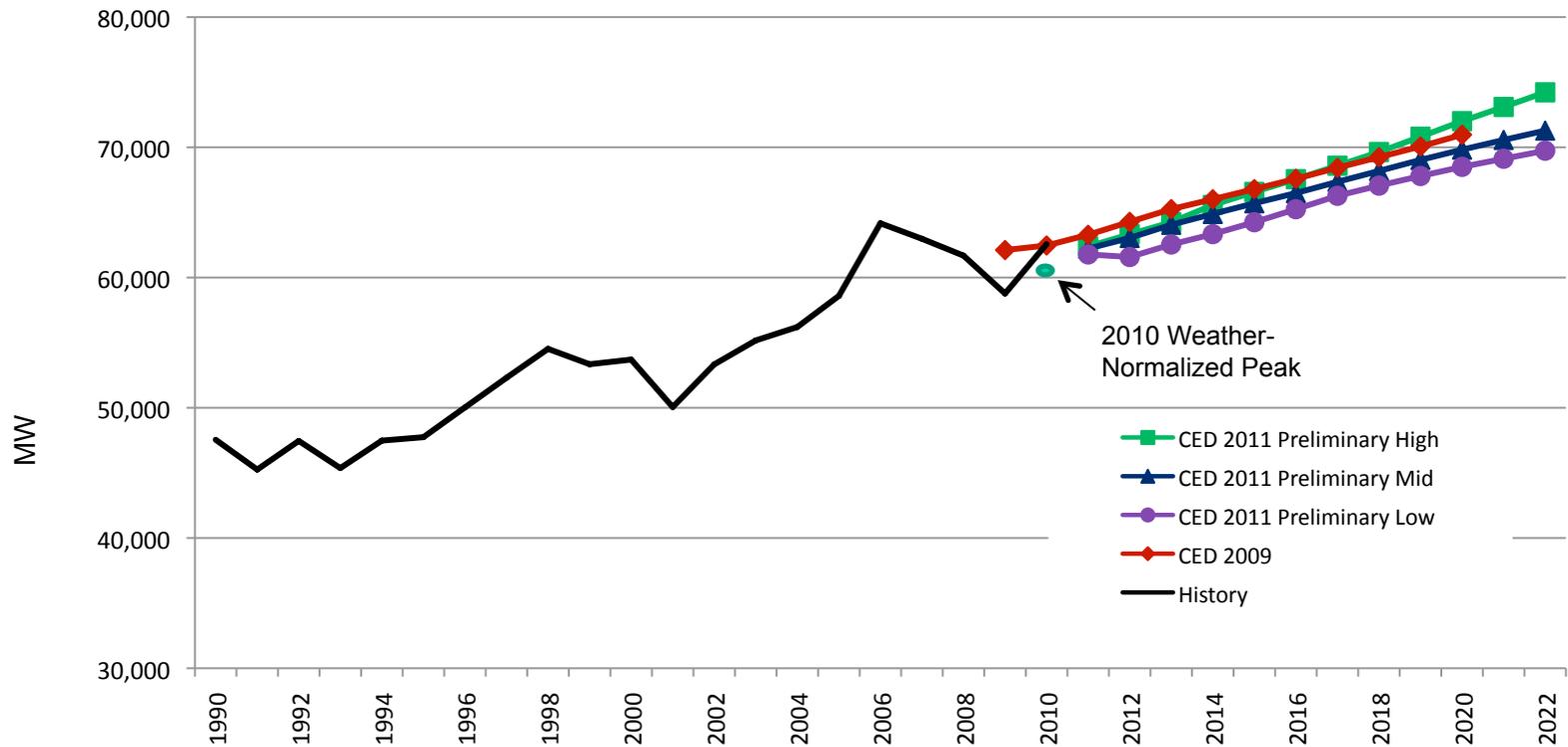
•Faster Growth for 2010-2020 in mid and high cases vs. *CED 2009*





# Statewide Electricity Peak

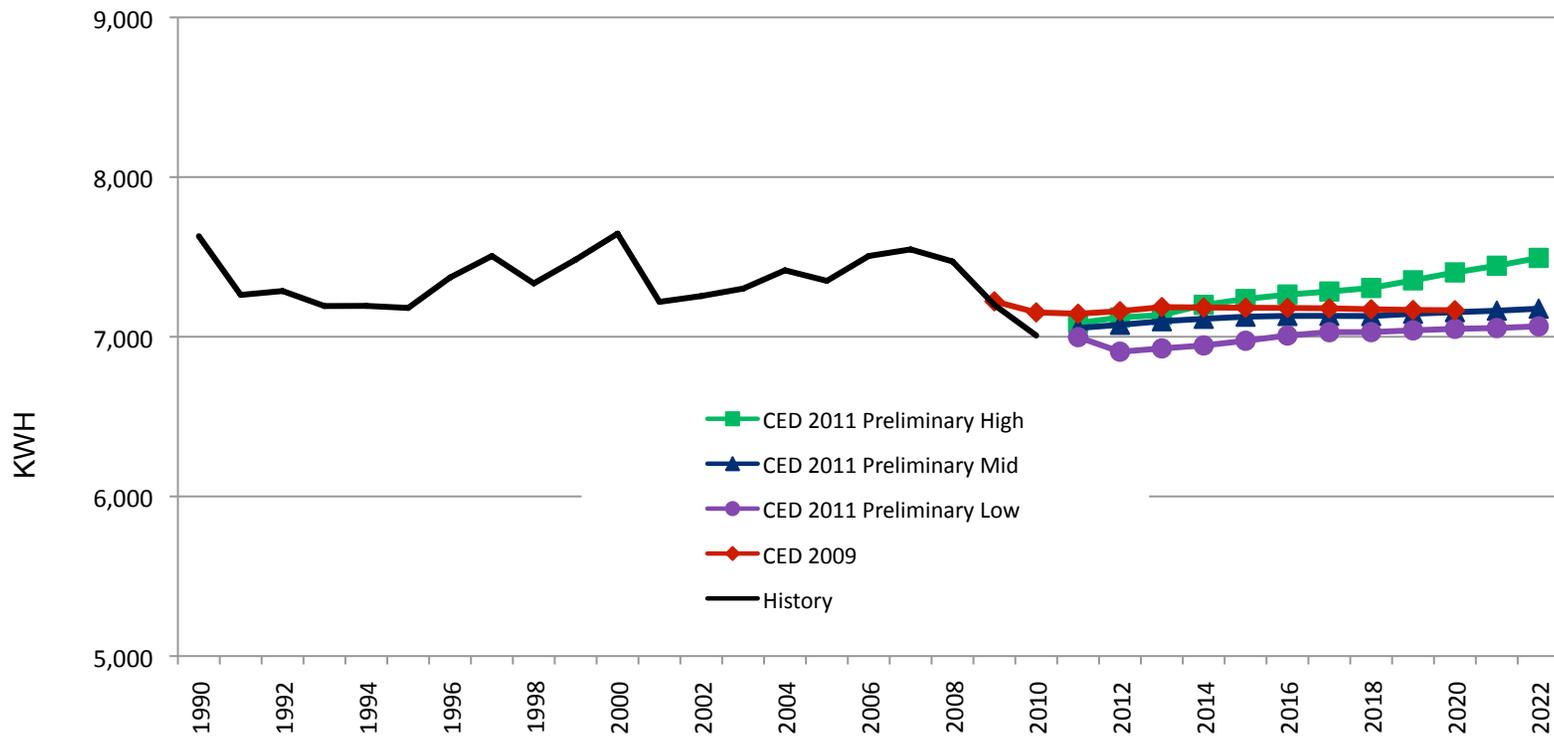
• Mid demand scenario 2 percent lower than *CED 2009* in 2020





# Electricity Consumption per Capita

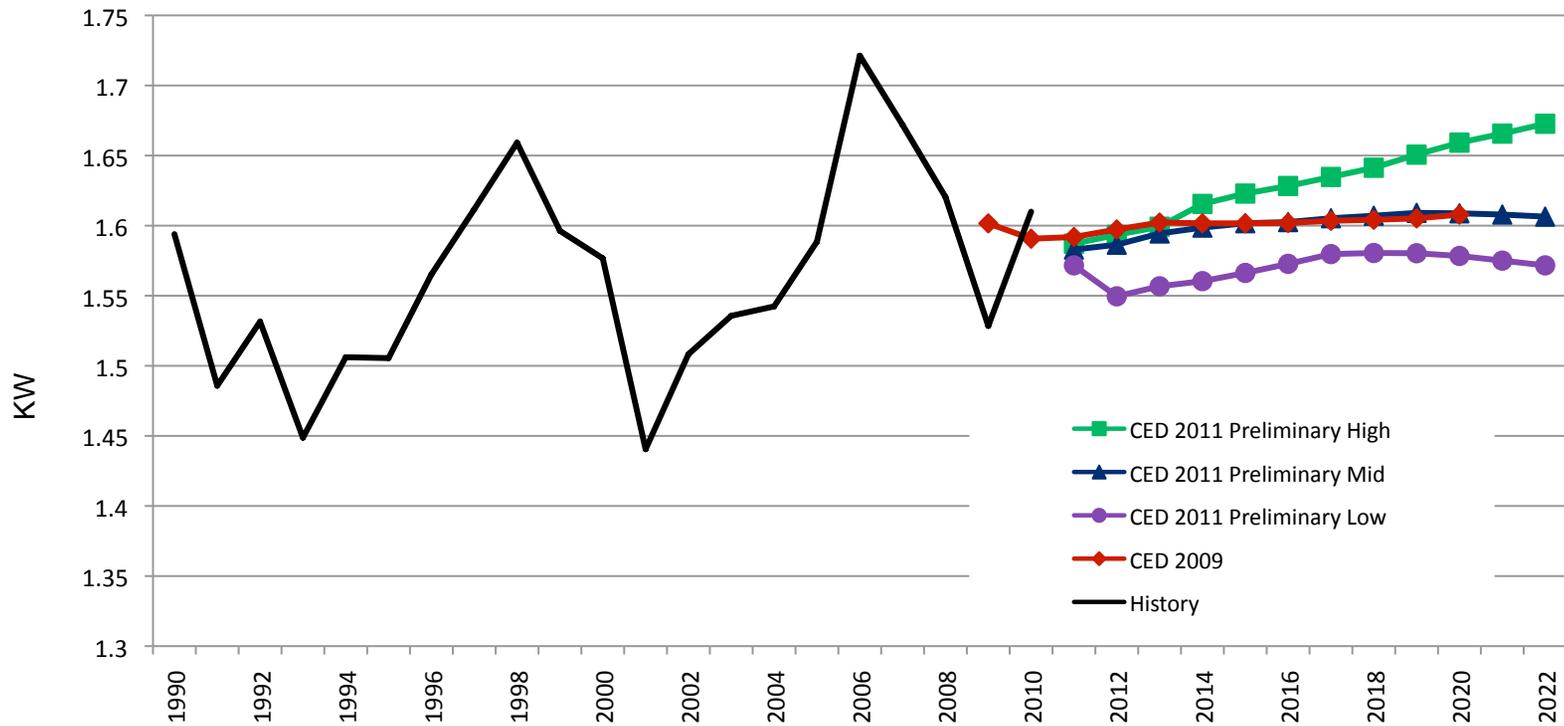
- Manufacturing and income increases lead to rising per capita consumption in high demand case





# Peak Electricity per Capita

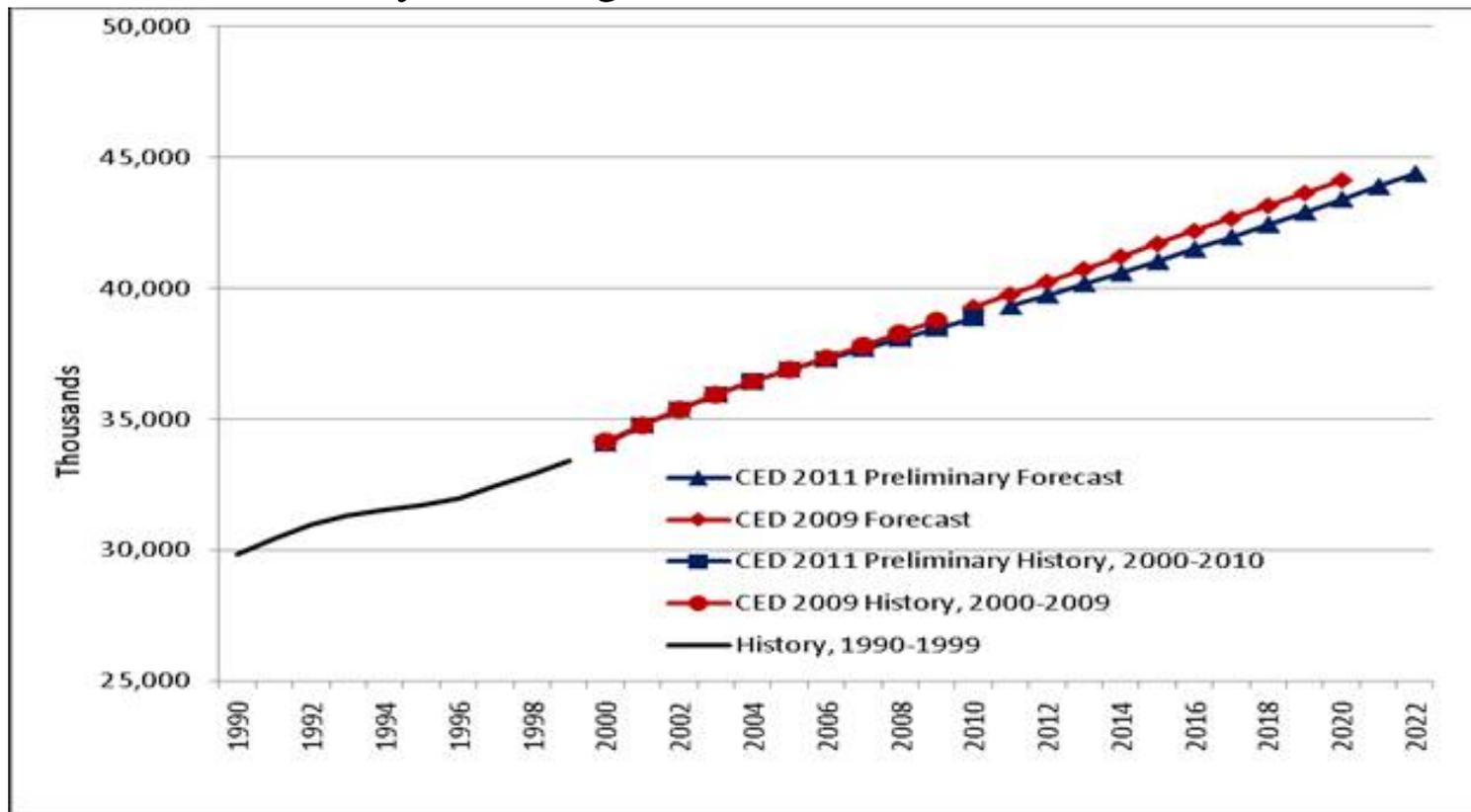
• Increase as economy recovers then eventual decrease in mid and low demand scenarios





# Econ-Demo: Statewide Population

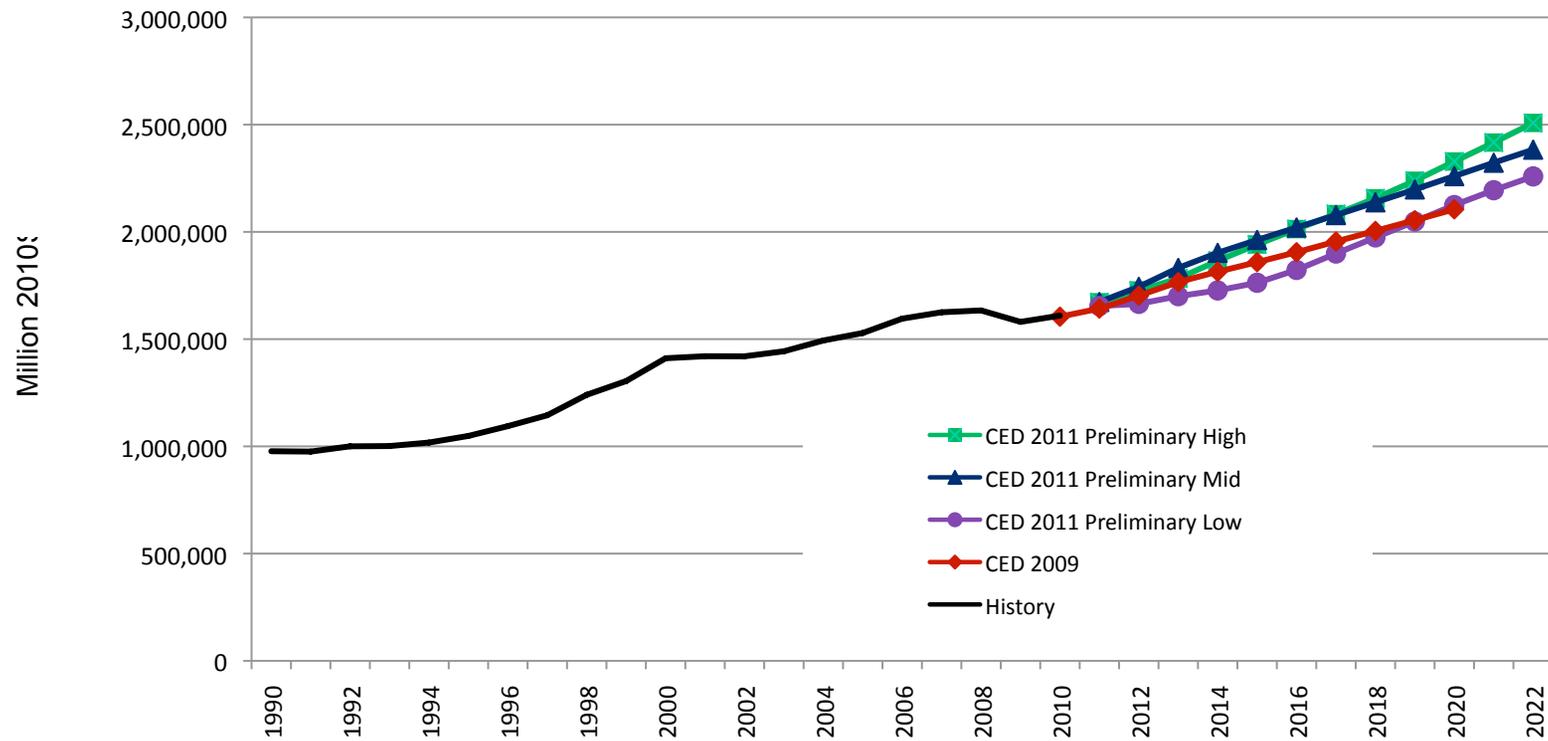
- One scenario only, slower growth 2010-2020





# Econ-Demo: Household Income

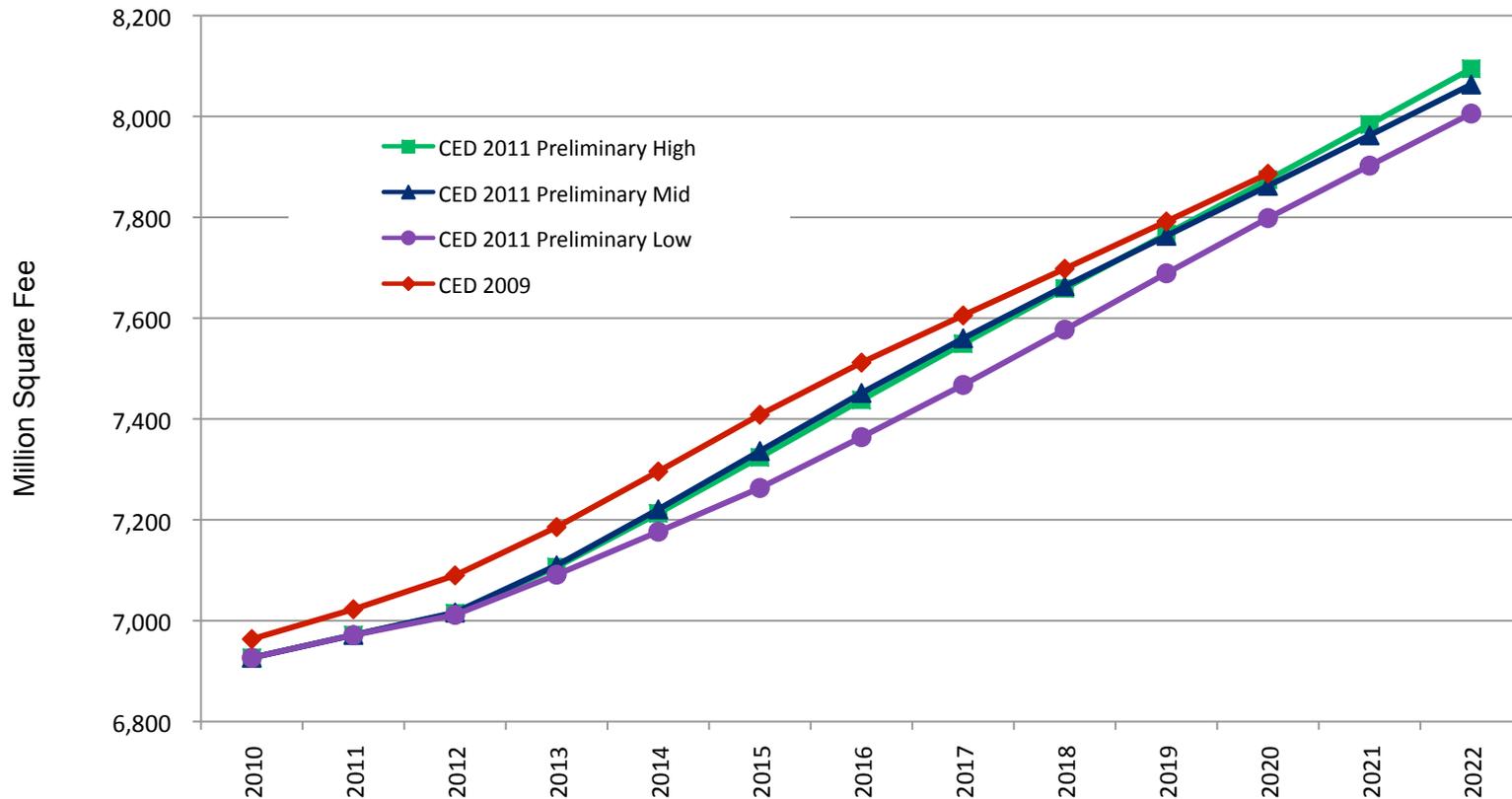
•Faster growth in all three scenarios vs. *CED 2009*





# Commercial Floor Space

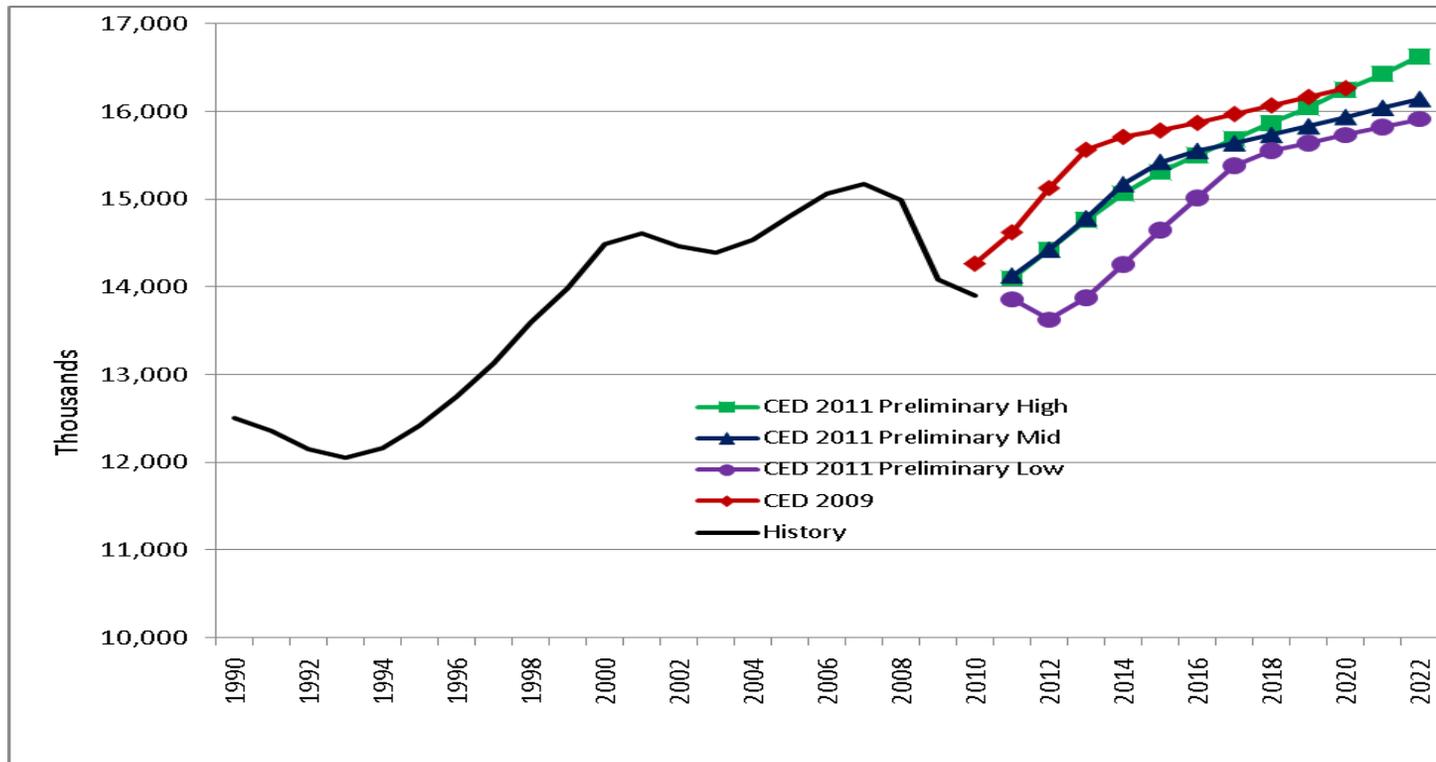
•Faster growth in mid and high cases vs. *CED 2009*





## California Energy Commission

### Statewide Employment Projections (April 2011)



Sources: Moody's and Global Insight, 2009 and 2011



# Statewide Electricity Forecast: Sectors

- Lower 2010 consumption starting point vs. *CED 2009* for the 3 main economic sectors (residential, commercial, and industrial) because of economy and weather
- Faster growth (2010-2020) for residential and commercial consumption in all three scenarios vs. *CED 2009*
- Lower consumption growth (2011-2020) in residential sector in mid and low cases vs. *CED 2009* because of AB 1109 impacts



## Statewide Electricity Forecast: Sectors

- Faster consumption growth (2011-2020) in commercial sector in mid and high cases vs. CED 2009; faster floor space growth offsets AB 1109 and Title 24 revisions
- Industrial consumption growth (2011-2020) lower in the mid and low scenarios vs. CED 2009 because of productivity adjustment
- General pattern of sectoral growth in weather-normalized peak follows that of consumption 2011-2022



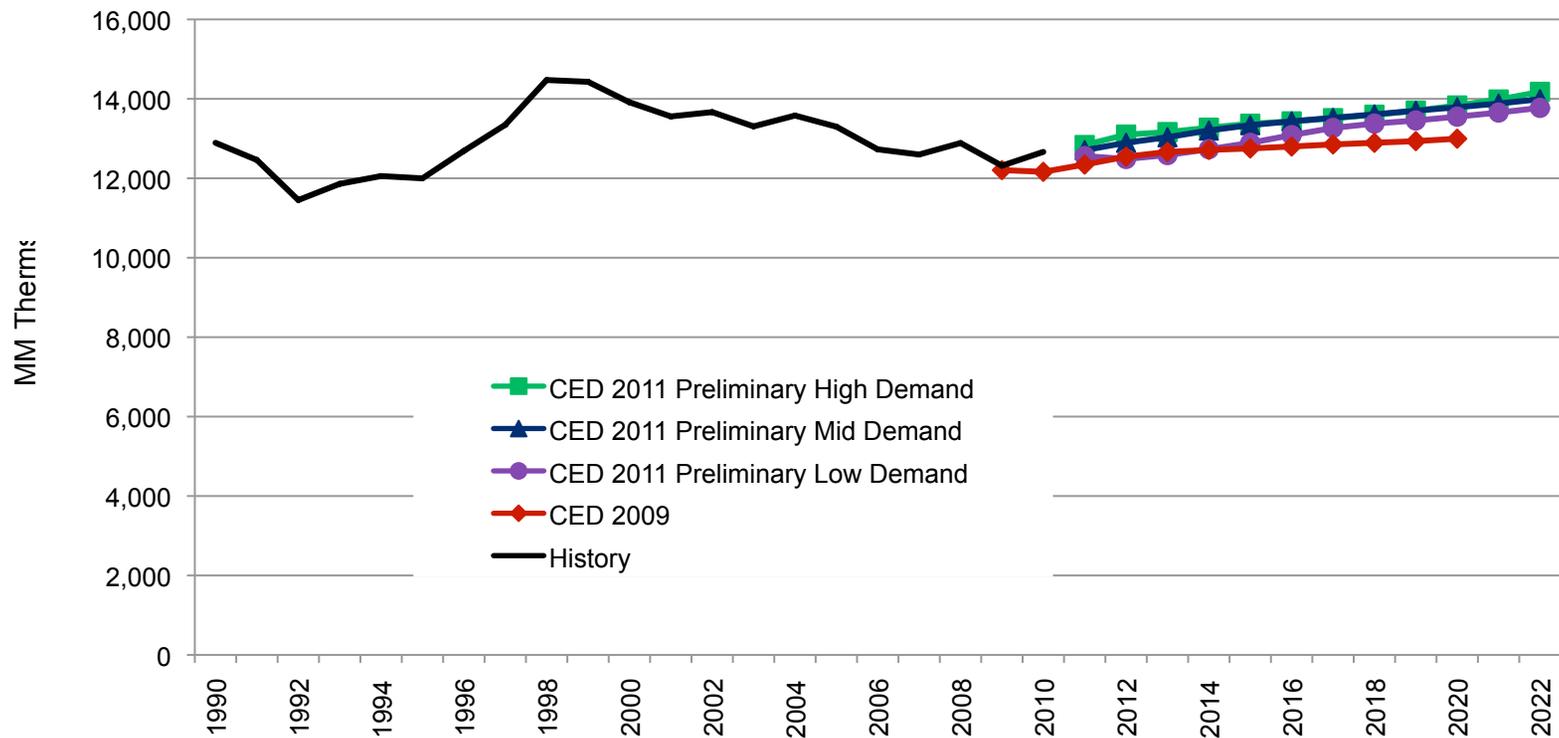
## End-User Natural Gas Forecast

- By planning area: PG&E, SCG, SDG&E, and other
- Does not include natural gas used by utilities or others for electric generation
- Forecast produced with same models as electricity
- Updated natural gas efficiency program impacts



# End-User Natural Gas Forecast

• Lower starting point, higher growth rate vs. *CED 2009* in all 3 scenarios





# PG&E Natural Gas Forecast

Consumption (MM Therms)				
	<i>CED 2009 (Dec. 2009)</i>	<i>CED 2011 Preliminary High Energy Demand (August 2011)</i>	<i>CED 2011 Preliminary Mid Energy Demand (August 2011)</i>	<i>CED 2011 Preliminary Low Energy Demand (August 2011)</i>
1990	5,275	5,275	5,275	5,275
2000	5,291	5,310	5,310	5,310
2010	4,186	4,530	4,530	4,530
2015	4,315	4,910	4,831	4,650
2020	4,388	5,197	5,033	4,883
2022	--	5,338	5,116	4,967
Average Annual Growth Rates				
1990-2000	0.03%	0.07%	0.07%	0.07%
2000-2010	-2.31%	-1.58%	-1.58%	-1.58%
2010-2015	0.61%	1.63%	1.30%	0.52%
2010-2020	0.47%	1.39%	1.06%	0.76%
2010-2022	--	1.38%	1.02%	0.77%

Historical values are shaded



# SCG Natural Gas Forecast

Consumption (MM Therms)				
	<i>CED 2009 (Dec. 2009)</i>	<i>CED 2011 Preliminary High Energy Demand (August 2011)</i>	<i>CED 2011 Preliminary Mid Energy Demand (August 2011)</i>	<i>CED 2011 Preliminary Low Energy Demand (August 2011)</i>
1990	6,806	6,806	6,806	6,806
2000	7,938	7,920	7,920	7,920
2010	7,290	7,435	7,435	7,435
2015	7,698	7,693	7,745	7,504
2020	7,829	7,789	7,931	7,863
2022	--	7,955	8,022	7,971
Average Annual Growth Rates				
1990-2000	1.55%	1.53%	1.53%	1.53%
2000-2010	-0.85%	-0.63%	-0.63%	-0.63%
2010-2015	1.10%	0.68%	0.82%	0.19%
2010-2020	0.72%	0.47%	0.65%	0.56%
2010-2022	--	0.57%	0.64%	0.58%

Historical values are shaded



# SDG&E Natural Gas Forecast

Consumption (MM Therms)				
	<i>CED 2009 (Dec. 2009)</i>	<i>CED 2011 Preliminary High Energy Demand (August 2011)</i>	<i>CED 2011 Preliminary Mid Energy Demand (August 2011)</i>	<i>CED 2011 Preliminary Low Energy Demand (August 2011)</i>
1990	717	717	717	717
2000	565	563	563	563
2010	531	555	555	555
2015	574	612	607	586
2020	611	677	660	644
2022	--	708	683	669
Average Annual Growth Rates				
1990-2000	-2.35%	-2.40%	-2.40%	-2.40%
2000-2010	-0.64%	-0.14%	-0.14%	-0.14%
2010-2015	1.60%	1.98%	1.79%	1.09%
2010-2020	1.43%	2.00%	1.75%	1.49%
2010-2022	--	2.04%	1.75%	1.56%

Historical values are shaded