Senate Energy, Utilities and Communications Committee
March 13, 2007 Hearing
Questions & Answers of the California Energy Commission

1. What are the forecasted electric energy needs for the state over the next 10 years?

- The Energy Commission's most recent forecast projects energy demand to grow about 1.2 percent annually, with energy demand of 326,000 gigawatt hours (GWhs) in 2016. We project peak demand to grow slightly faster, at 1.3 percent annually, with total peak demand of 67,484 megawatts (MW) in 2016.

Table 1: Statewide Forecast of Electricity Demand, 2005-2016[1]

Annual Energy Requirements (GWh)	2005	2006	2007	2010	2016	Average Annual Growth Rate 2005-2016
CAISO Control Area	230,560	233,820	236,829	245,831	262,982	1.2%
SMUD Control Area	19,530	19,982	20,362	21,526	24,024	1.9%
LADWP Control Area	29,743	29,903	29,998	30,302	30,606	0.3%
Other Control Areas	7,402	7,521	7,630	7,928	8,531	1.3%
Statewide	287,235	291,226	294,819	305,587	326,143	1.2%
Annual Peak Demand (MW)	2005	2006	2007	2010	2016	
CAISO Coincident Peak	46,843	47,613	48,289	50,292	54,215	1.3%
SMUD Control Area	4,168	4,267	4,352	4,635	5,295	2.2%
LADWP Control Area	6,339	6,371	6,387	6,441	6,495	0.2%
Other Control Areas	1,564	1,589	1,612	1,674	1,805	1.3%
Statewide Coincident Peak Demand	58,624	59,547	60,344	62,737	67,484	1.3%

2. How reliable is this forecast? What are the major variables? Please compare prior forecasts to actual results.

- The major drivers of long run trends in electricity demand are population and economic growth. Long run economic and demographic forecasts typically cannot predict the timing or magnitude of changes in the business cycle, so while the predicted trend may be accurate over the forecast horizon, the forecast for any given year may be significantly off.

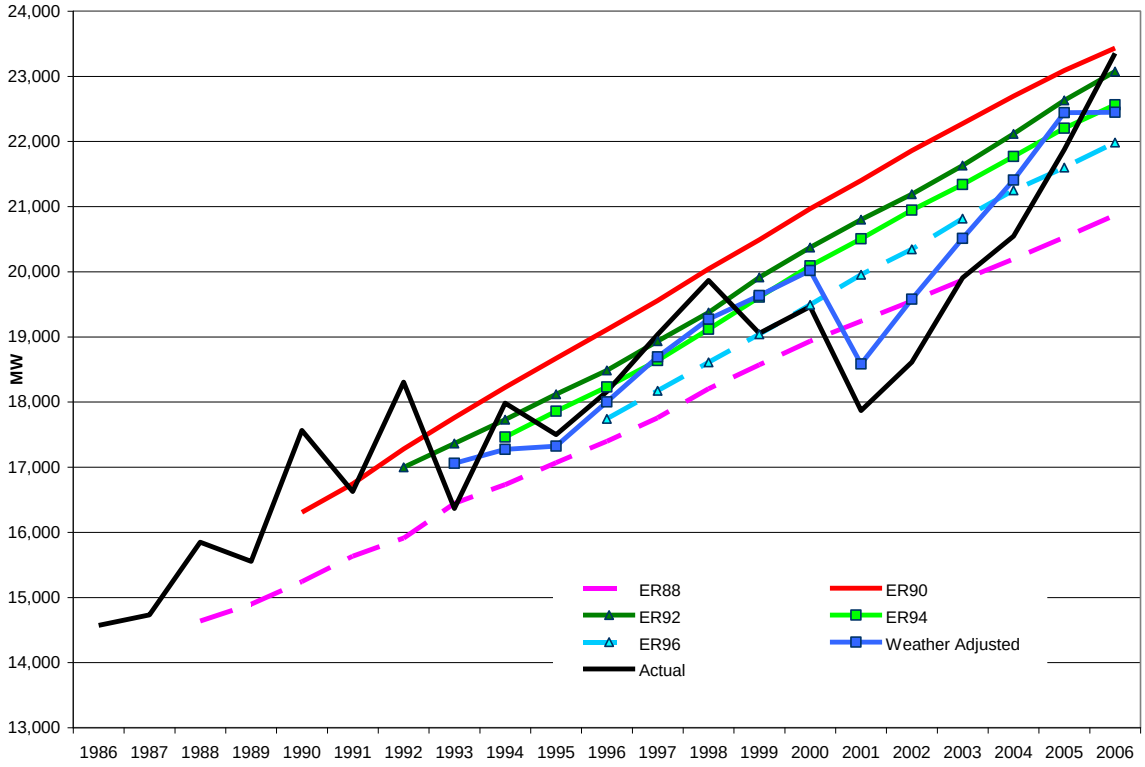
- For example, the Energy Commission's forecast of Southern California Edison's peak demand for the 1994 Electricity Report has had an average error of 2.9% over its forecast horizon — including the energy crisis years of 2001 (for which the forecast error was 10%) and 2002 — which

[1] Source: Energy Commission, *2005 Integrated Energy Policy Report* Demand Forecast Updated in June 2006.

motivated a large amount of voluntary demand curtailment. But in 2003, the ER 94 forecast was 4 percent too high, most likely reflecting the lingering effects of the recession associated with the bursting of the dot-com bubble. In 2005, the forecast error declined to 1%.

- For five forecasts of demand in the SCE planning area adopted by the Energy Commission from 1988 to 1996, the average annual absolute error over the 5-12 year forecast horizon was 4%. This is the error when compared to weather-adjusted demand (what we estimate demand would have been under average temperature conditions), and includes 2001 and 2002.

Figure 1: Forecasted versus Actual Peak Demand in the SCE Planning Area



3. What new resources are required to meet forecasted energy needs? For example, how many power plants must be added? How much of an increase in efficiency is required?

- The Energy Commission currently estimates that capacity (peak demand + 15% reserves) and net energy for load (customer demand for energy + 8.16% transmission and distribution losses) will increase by 9,146 MW and 34,802 GWh respectively during 2007–2017. These estimates do not include the California Solar Initiative and uncommitted energy efficiency (i.e., increases will be lower by the contribution of these programs).

Figure 2: Statewide Capacity Range of Procurement Need

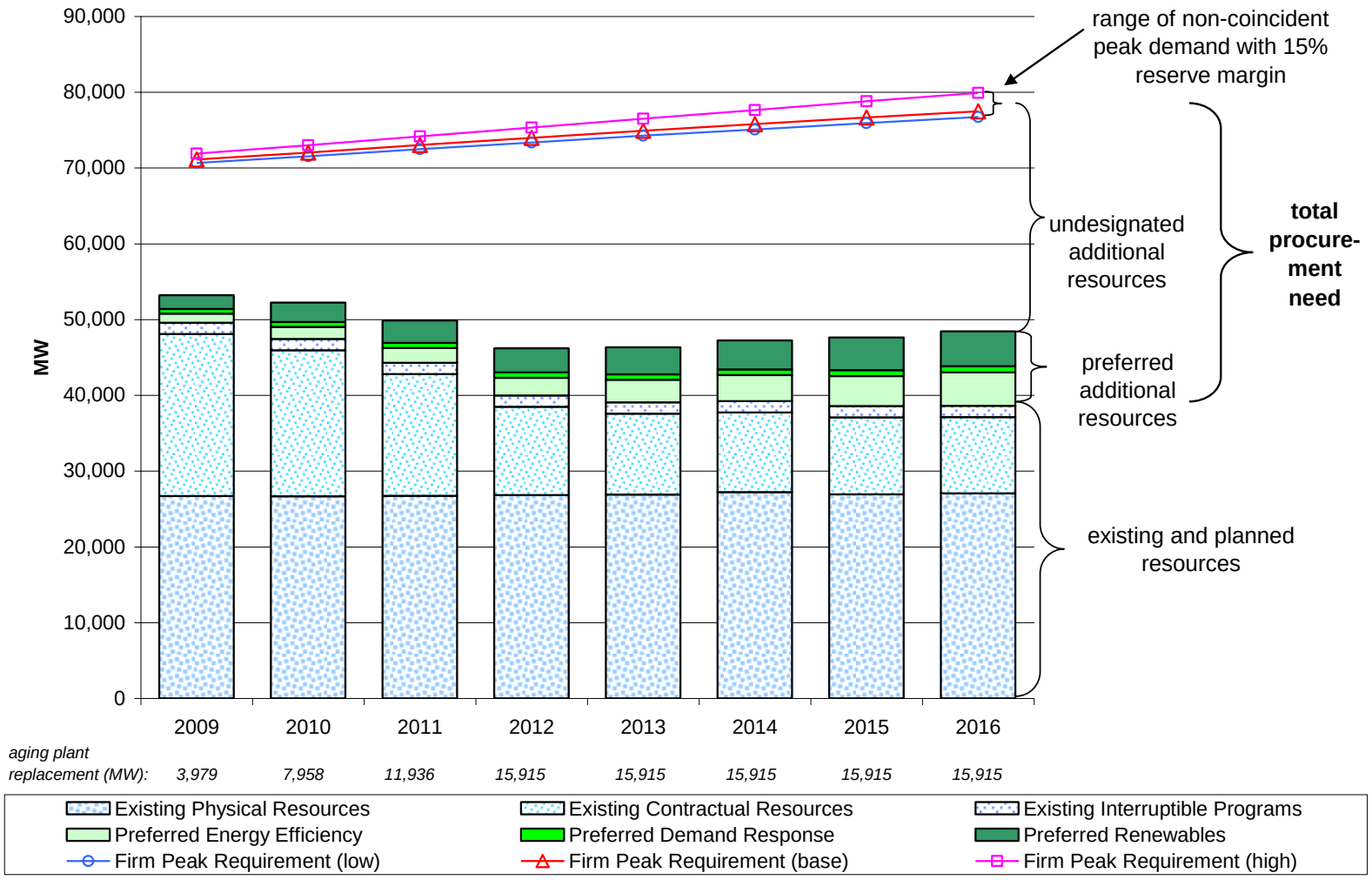
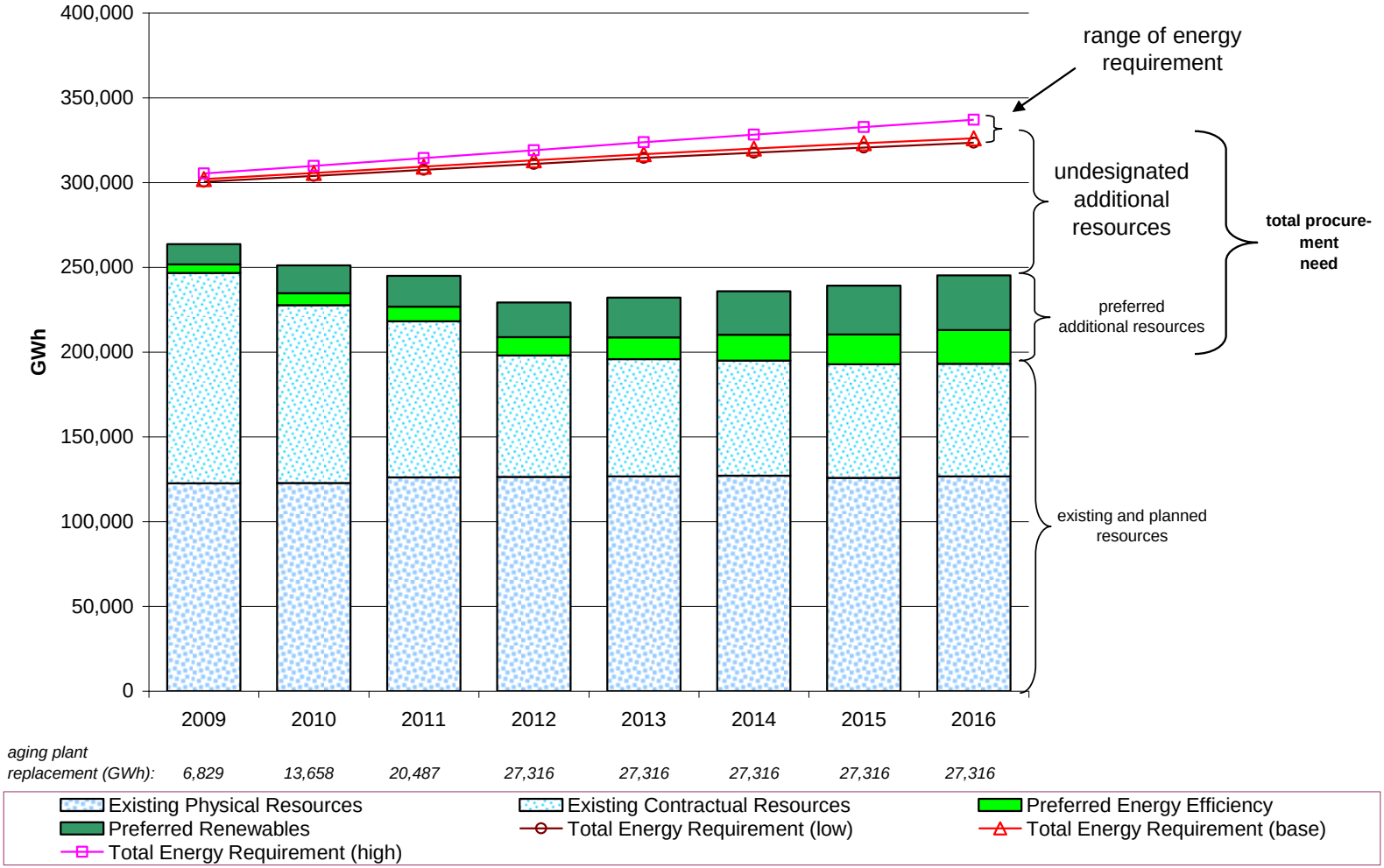


Figure 3: Statewide Annual Energy Range of Procurement Need



Question 3 (cont'd)

- A 33% renewables target by 2020 (i.e., renewable generation equal to 33% of customer sales) will require a total 103,830 GWh of renewable generation. Renewable generation needed to reach 26.1% in 2016 (a point on the path to 33%) is 78,696 GWh. Current (2005) renewable generation is 30,916 GWh, requiring an additional 47,780 GWh of renewable generation in 2016. The resulting incremental non-renewable generation need is (16,456) GWh.

- The capacity associated with 47,780 GWh of renewable generation, assuming a 50% capacity factor in aggregate for renewable generation, is 10,909 MW.

- The IEPR identifies 13,837 MW of aging units that should be retired by 2012; the resulting need for new capacity through 2016, when meeting both the 33% by 2020 renewable target and necessary retirements are taken into account is 11,139 MW.

- The Energy Action Plan requires energy needs to be met according to the "loading order" which calls for optimizing energy efficiency before developing other renewable or non-renewable sources. Energy efficiency comes principally from the state mandated programs (building and appliance standards) and investor-owned utilities (IOUs) and, to a lesser extent, publicly owned or municipal utilities (POUs). To optimize efficiency for the IOUs, the CPUC has set electricity savings goals in GWh and MW for these resources based on maximum achievable potential.

- The goals for IOU efficiency programs increase from roughly 2,625 GWhs in 2007 to 25,600 GWhs in 2016. Savings from the state's building and appliance standards would increase from 35,000 GWhs in 2007 to approximately 61,000 GWhs in 2016 to meet a statewide forecast of 326,000 GWhs.

- POUs currently have programs that save approximately 170 GWhs annually, and could therefore add between 1,700 GWhs and 3,300 GWhs over the next 10 years.

4. What amounts of renewable resource additions are needed to meet 20% and 33% of forecasted energy sales in 2020?

- In 2005, California had 30,916 gigawatt hours of renewable retail sales, representing 10.7% of statewide retail sales.[2]

[2] California Energy Commission, *Net System Power: A Small Share of California's Power Mix in 2005*, available at http://www.energy.ca.gov/2006publications/CEC-300-2006-009/CEC-300-2006-009-F.PDF

- 20% renewable by 2010 represents approximately 56,353 gigawatt hours (based on the staff forecast of 281,763 GWh of electricity retail sales in 2010). The additional renewable capacity needed to meet this depends on the mix of technologies used. Assuming an overall capacity factor of 50% (representing a mix of wind, geothermal, solar, and other technologies), the state will require an additional 5,810 MW of renewable capacity to meet the 20% target.[3]

- 33% renewable by 2020 represents approximately 103,830 gigawatt hours (based on the staff forecast of 314,625 GWhs of electricity retail sales in 2020)[4], or an additional 16,646 MW of capacity.[5]

- According to the Energy Commission's database on renewable contracts signed by investor owned utilities as of January 10, 2007,[6] the IOUs have signed contracts for between 7,492 and 12,538 GWh per year of new renewable energy since the RPS program began in 2002. The smaller quantity represents the minimum amount in all contracts, while the larger quantity assumes that all "build-out" options for additional generation come to fruition.

- Of the total renewable energy deliveries included in the signed IOU contracts, only 785 GWh per year is from facilities currently online. The Energy Commission's *2006 Integrated Energy Policy Report Update* raised the issue of contract failure and the impact on meeting the RPS goals, given that research indicates that a 30% contract failure rate may be typical for renewable projects.[7]

5. What amounts of carbon-free resource additions or efficiency are needed to reduce utility greenhouse gas emissions 25% by 2020?

- The Climate Action Team estimates that total statewide greenhouse gas emissions in 2020 will be 600 million metric tons. In 2004, total statewide emissions were 500 million metric tons, 61 million metric tons (12%) of which were attributable to the electricity generation sector. If the electricity

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[3] California Energy Commission, *California Energy Demand 2006-2016: Staff Energy Demand Forecast, Revised September 2005*, Form 1.c, Statewide Retail Sales by Utility (GWh).
[4] The forecast of retail sales is lower than the forecast of total electric needs because it does not include electricity not sold in the retail market (e.g., used on-site).
[5] October staff update of *Staff Energy Demand Forecast,* op. cit. The updated demand forecast extends through 2017. The 2020 estimate is a linear extrapolation using growth rates for distinct utilities or groups.
[6] California Energy Commission database on RPS contracts signed to date, available at http://www.energy.ca.gov/portfolio/contracts_database.html.
[7] *Building a Margin of Safety Into Renewable Energy Procurements: A Review of Experience with Contract Failure*, available on the Energy Commission's website at http://www.energy.ca.gov/2006publications/CEC-300-2006-004/CEC-300-2006-004.PDF

generation sector contributed the same percentage in 2020, emissions from utilities would represent 72 million metric tons. A 25% reduction in that amount would equal 18 million metric tons.

- It is important to emphasize that GHG reduction goals in AB 32 are a statewide, not industry-specific, goal. The goals do not necessarily translate into an equal percentage reduction for all sectors of the economy. The current climate action steps involve, among other activities, developing appropriate cost of GHG-reduction curves for different sectors so that the lowest cost GHG reductions can be undertaken regardless of sector. This approach is intended to minimize impacts on the economy.

6. How does the state determine whether individual proposed resource additions are consistent with broader objectives including affordable costs, secure and reliable fuel supply, renewable energy development, and greenhouse gas emission reductions?

- The CPUC conducts oversight of investor-owned utility resource procurement under the overall guidelines of AB 57. Upfront procurement standards and criteria are developed within a variety of CPUC proceedings (e.g., energy efficiency, demand response, renewables portfolio standard, long-term procurement planning, PURPA qualifying facility, etc.). The CPUC approves both renewable portfolio standard procurement plans and general long-term procurement plans for each IOU.

- Decision-making in the CPUC procurement proceeding tends to extend extraordinary deference to the utilities in applying and determining least cost, best fit criteria in the selection of which resource additions in the "business judgment" of utilities best meets their procurement needs.

- Regarding the POU's, the Governing Boards of these utilities are permitted to determine the consistency of their own individual resource additions with the state's "broader objectives." An exception is the SB 1368-directed determination by the Energy Commission of whether a new baseload resource of 5-year or longer term meets the GHG emissions standard.

7. How does the state evaluate and compare resource alternatives, such as conventional generation, renewable generation, distributed generation, efficiency and transmission, to ensure the best solutions are chosen?

- The Energy Commission, through its *Integrated Energy Policy Report* proceeding, conducts analysis to help determine the appropriate role that alternative resources, such as energy efficiency, demand response,

renewable resources, distributed generation, and transmission should play in meeting the state's future needs for electricity.

- In the *2005 Integrated Energy Policy Report,* the Energy Commission expressed concerns about whether least-cost, best-fit was indeed meeting statewide policy goals for the electricity system. In particular, the Energy Commission expressed concern that utility application of least-cost, best-fit appears to systematically ignore fuels cost pass-through for gas-fired generation, thereby ignoring significant price risks to ratepayers from over-reliance on natural gas for electricity generation.

- In addition, the Energy Commission raised concerns about whether utility procurement based on IOU least cost, best fit criteria adequately incorporates statutory priorities for distributed generation and whether it properly addresses the transmission needs of the state.

8. What are the agencies roles in developing and carrying out utility resource plans? How does the state ensure that preferred resource additions are carried out to completion?

- As described in the response to question 6 above, for the IOUs, the CPUC — in a variety of proceedings— establishes up-front procurement standards and criteria to guide IOU procurement activities and approves renewable and general long-term procurement plans. The IOUs then propose the results of their procurement activities to the CPUC for approval. The Energy Commission is a party in the procurement proceeding and has recently filed testimony addressing proposed procurement plans by IOUs and whether these plans are consistent with state energy policy.

- There is no analogous state process in developing and carrying out POU resource plans. The Governing Boards of the POUs are responsible for developing and carrying out their utility resource plans, including the extent to which resources preferred by the state are included. Two notable exceptions to this general condition is the Energy Commission's administration of the GHG emissions performance standard (SB 1368) and CPUC and Energy Commission's collaboration with the California Air Resources Board's development and enforcement of GHG emission reduction obligations for all utilities.