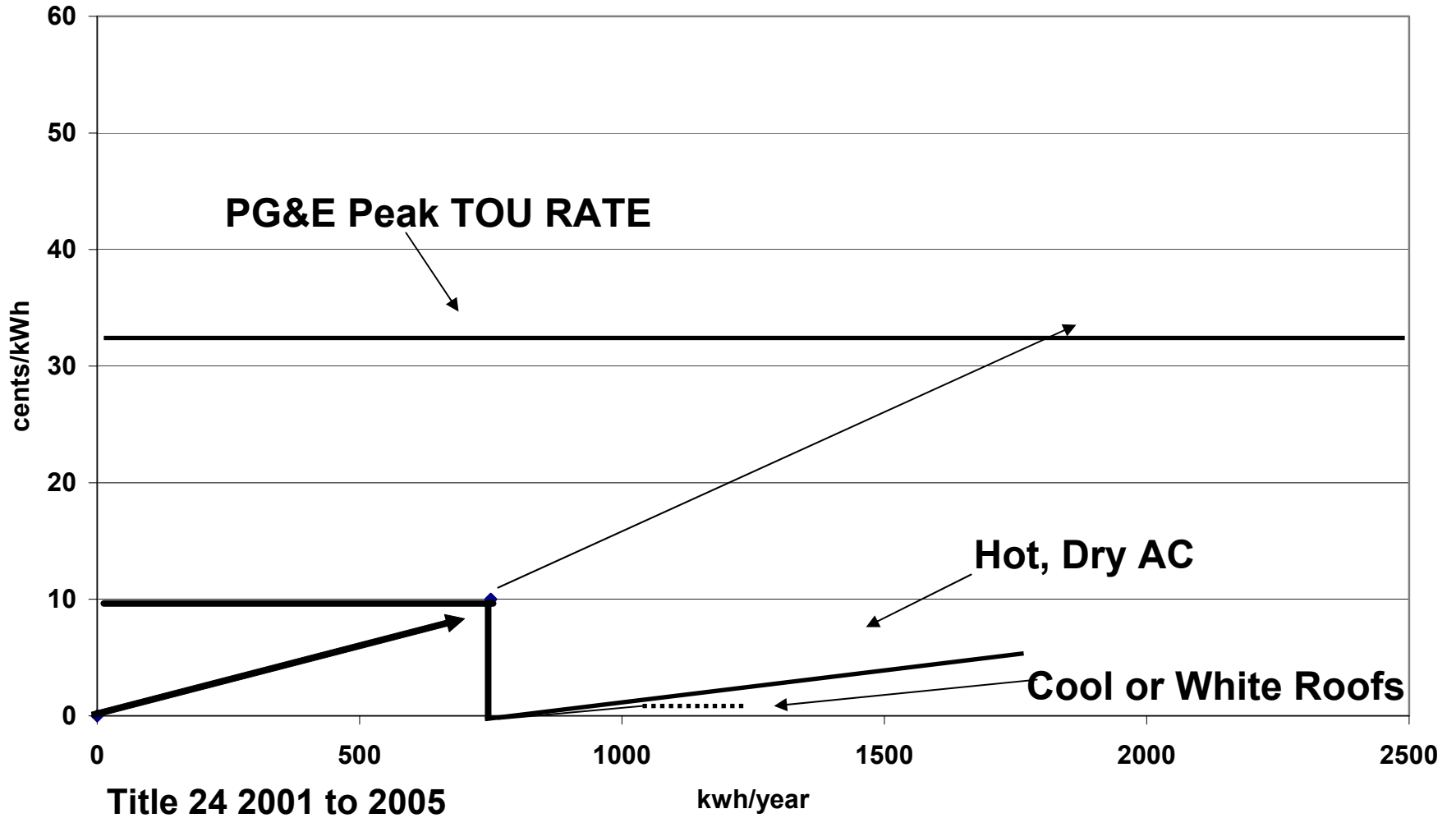


Climate VISION Roundtable for Energy Efficient Homes
August 5, 2004

**Arthur H. Rosenfeld, Commissioner
California Energy Commission
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<http://www.energy.ca.gov/commission/commissioners/rosenfeld.html>

**Cost of Conserved Energy in Cents per kWh
for A New Home in California
Average Total Use ~7,700 kWh per year**

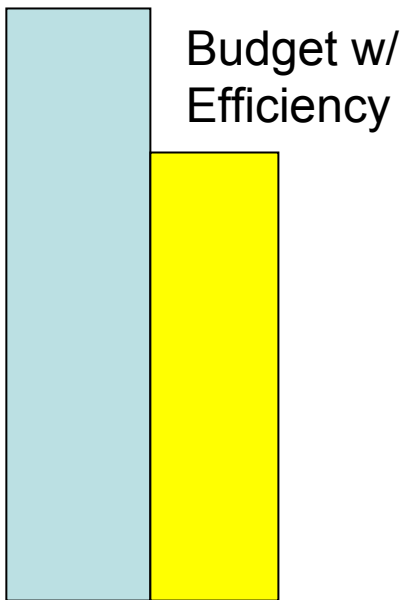


Goal 1: Reduce Energy Use by 25%

**Goal 2: Reduce Annual Electricity Bills by 70%,
Limit Incremental cost to \$5,000**

**Goal 3: Reduce Peak Load Impact to 1 kW
Regardless of House Size**

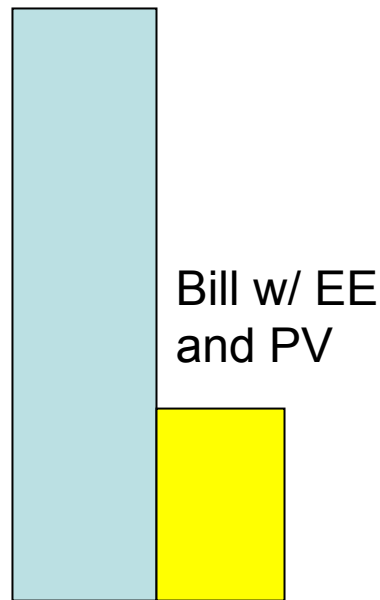
Title-24, 2005
energy budget



No PV

TDV Method

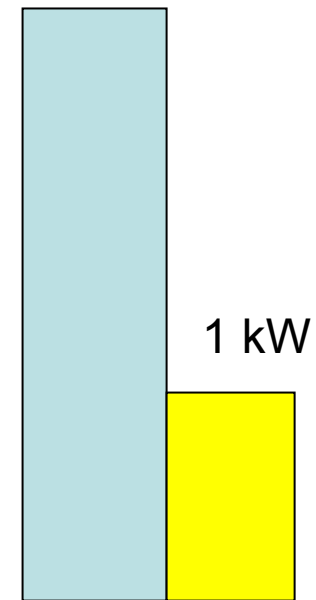
Expected Bill



TOU Tariff

Net Metering

Pre-ZENH



**House Load
minus PV
output**

Goal 1: Reduce Energy Use by 25%

- The aim is to reduce energy “budget”, that is, use measured with time dependent valuation (TDV) by 25%
 - Scales with house size
 - Measured against Title 24 Standards of 2005
 - However, no computer program yet certified
 - And, some things you do to meet this goal may have to be estimated

Goal 2: Reduce Electricity Bills by 70%, Limit Incremental Cost to \$5,000, after Rebate

- Electricity Costs are the bills that a customer pays for electricity
- On an annual basis our goal is a reduction of 70% of electricity bill
 - Based on projected electricity bill, but supported by historical data for utility/climate zone and representative house size
- We anticipate Time of Use Rates and Net Metering to be employed
 - However, will consider innovative strategies intended for implementation by utilities
- Incremental cost of EE/BIPV features not to exceed \$5,000
 - Post rebate (i.e., use of rebates allowed to get to \$5,000 limit)

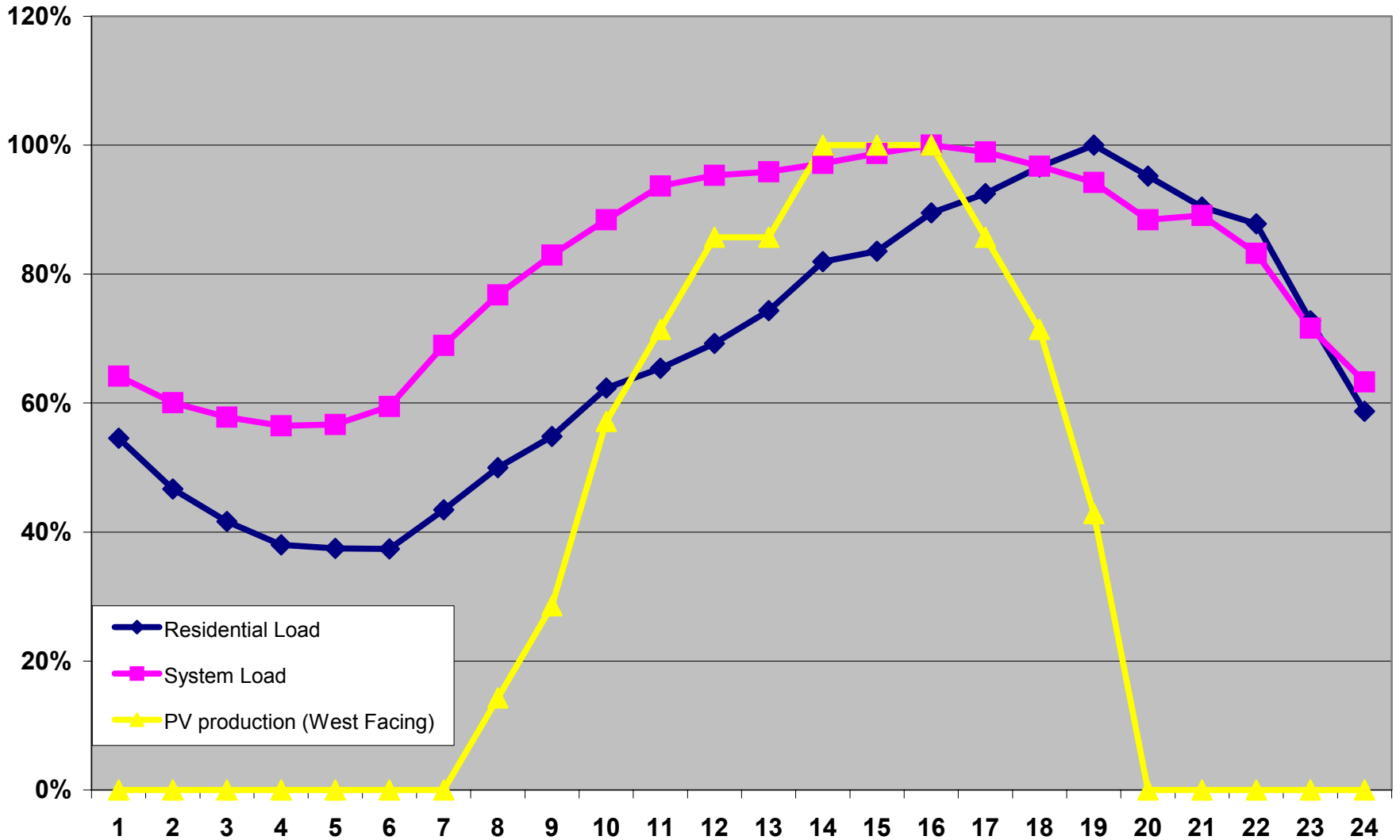
Goal 3: Reduce Peak Load Impact to 1 kW

- 1 kW limit does not scale with house size
- Typical new homes draws ~ 4+ kW of load during hot summer afternoons
- By combining improved energy efficiency with limited photovoltaics, we hope to reduce peak system impacts to 1 kW. This is the entire house load served by the utility during the peak
- Although, still under discussion this could be the average impact over the peak period as defined by the local utility or more detailed hourly or 15-minute data

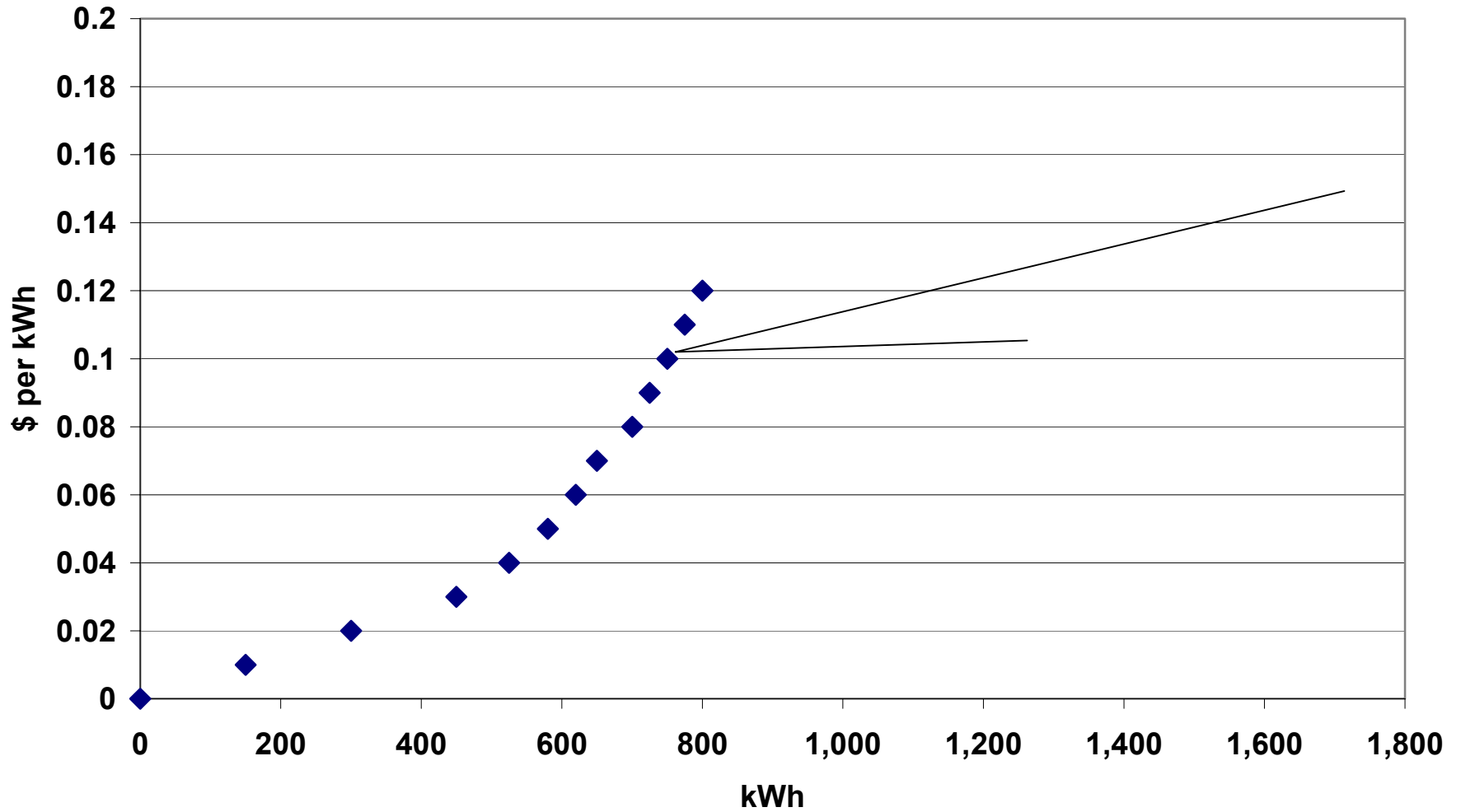
Other Considerations

- Utility must agree to install 15 – minute interval meters
 - For monitoring performance
- Tariffs should be at least time-of-use
- Gas bills will be monitored for informational purposes

Normalized System and Residential Loads and PV Production
A Very Hot Day in PG&E



Cost of Conserved Energy -- \$ per kWh for an Average New Home in California



Efficiency Measures of Interest

- Hot, Dry Air Conditioning
- High Efficiency Pool Pumps
- White or Reflective Material Roofs
- Solar Hot Water

AC for Hot and Dry Climates

- Research underway at Oak Ridge and Lawrence Berkeley Labs
- Compared to a baseline design of 12 SEER (or 8 EER at 115 F)
- A new design with nearly 3x the evaporator area, 20% more flow and more efficient fan motors
- Results show a reduction in household electricity use of 20% in Phoenix and 15% in Fresno
- And residential electricity bill reduction of 21% in Phoenix and 17% in Fresno
 - Based in DOE 2 runs with estimated simple payback of 3 year
- Source: Economic Evaluation of Residential Air Conditioner Designs for Hot and Dry Climates, Gregory Rosenquist (LBNL)

High Efficiency Pool Pump and Motor

- Levelized Cost per kWh saved of 3 cents
- Combining Existing and New Residential Construction the potential in California in 2011 is ~ 1,700 gWh and 300 MW
- See California's Secret Energy Surplus, Rufo and Coito, at www.ef.org or www.hewlett.org

White or COOL Roofs

- Now available in an attractive range of colors
- Significant reduction in attic temperatures and AC demand
- Estimated savings reduction for a 2,000 sq. ft house in Fresno of 500 kWh per year for very little incremental roofing cost
 - Results in ~ \$ 90 per year electricity savings
- See www.roofcalc.com