

# ***Energy Efficiency in California***

***Climate Group Breakfast  
Preceding Gov. Schwarzenegger's  
Climate Summit  
Nov. 18, 2008***

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**<http://www.energy.ca.gov/commissioners/rosenfeld.html>  
or just Google “Art Rosenfeld”**

*Does Anyone See A Problem With This Picture?*





**The Guardian** for America.

**guardian.co.uk** | **TheObserver**

## Time runs out for islanders on global warming's front line

Rising sea levels threaten to flood many of the islands in the fertile Ganges delta, leading to an environmental disaster and a refugee crisis for India and Bangladesh

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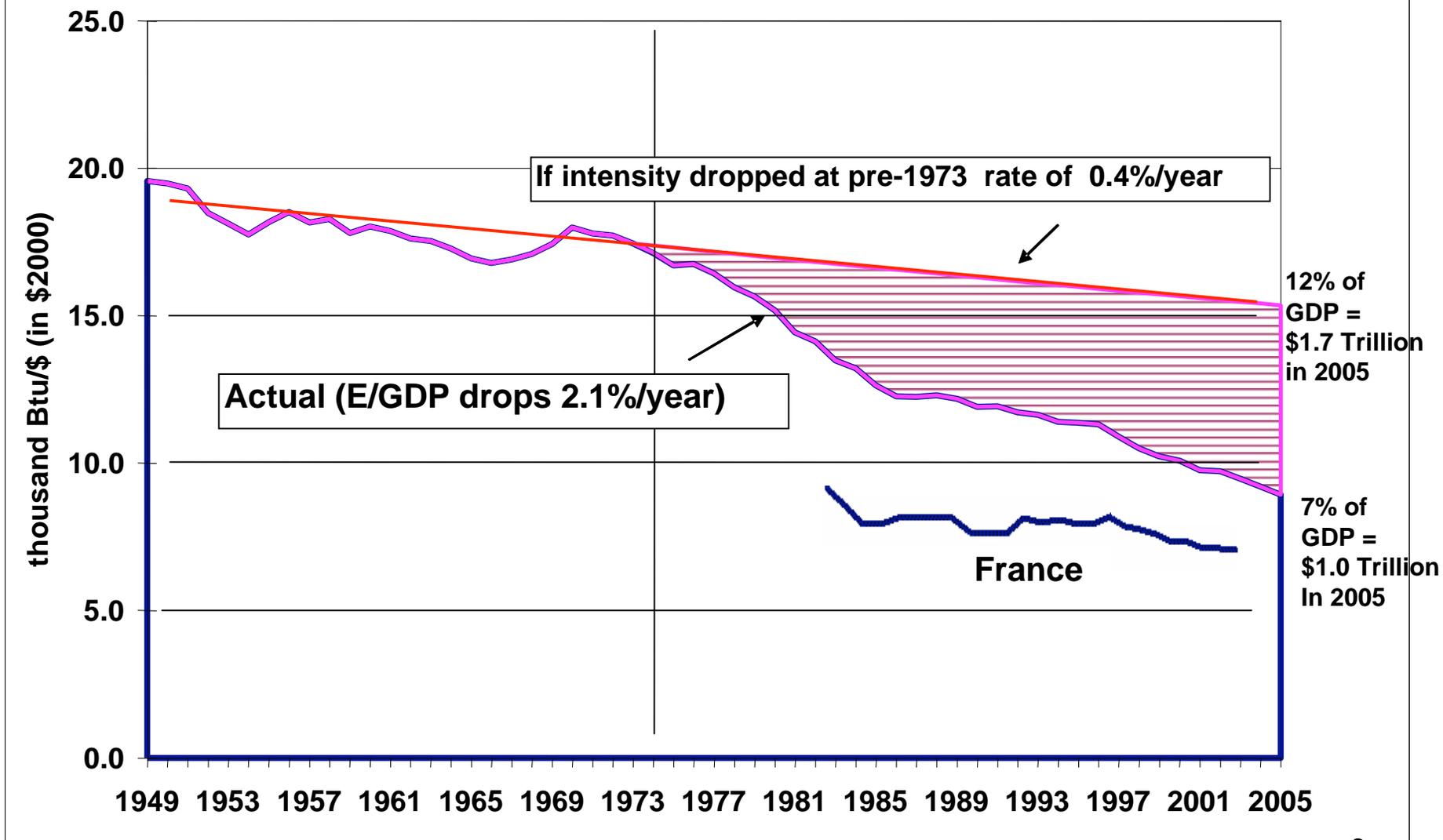
Dan McDougall in the Sundarbans  
The Observer, Sunday March 30 2008

**To find this story, Google "Sundarbans Refugee  
Camp"**

# Two Energy Agencies in California

- The California Public Utilities Commission (CPUC) was formed in 1890 to regulate natural monopolies, like railroads, and later electric and gas utilities.
- The California Energy Commission (CEC) was formed in 1974 to regulate the environmental side of energy production and use.
- Now the two agencies work very closely, particularly to delay climate change.
- The Investor-Owned Utilities, under the guidance of the CPUC, spend “Public Goods Charge” money (rate-payer money) to do everything they can that is cost effective to beat existing standards.
- The Publicly Owned utilities (20% of the power), under loose supervision by the CEC, do the same.

### Energy Intensity (E/GDP) in the United States (1949 - 2005) and France (1980 - 2003)



# How Much of The Savings Come from Efficiency

- Some examples of estimated savings in 2006 based on 1974 efficiencies minus 2006 efficiencies

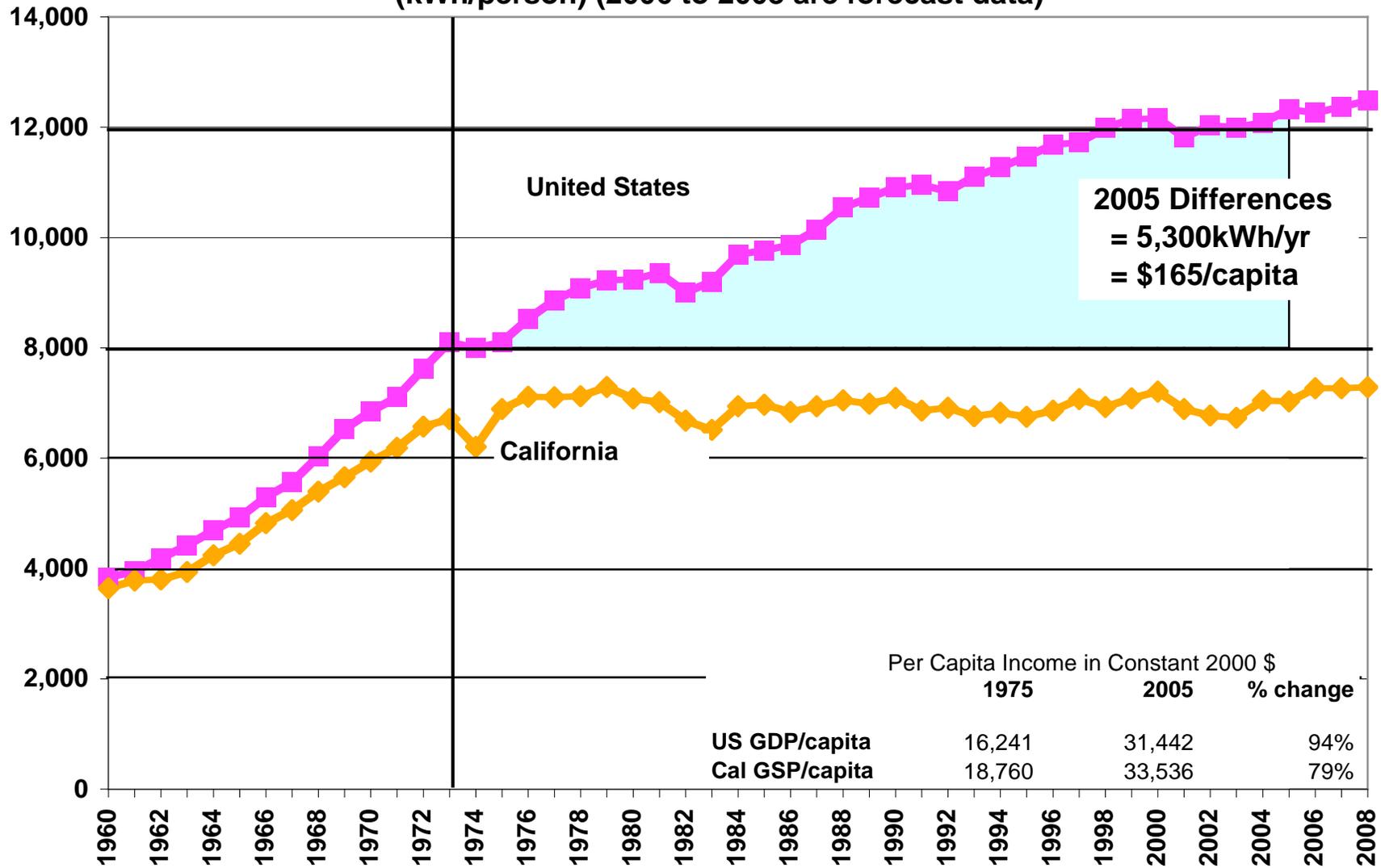
	Billion \$
Space Heating	40
Air Conditioning	30
Refrigerators	15
Fluorescent Tube Lamps	5
Compact Fluorescent Lamps	5
<b>Total</b>	<b>95</b>

- Beginning in 2007 in California, reduction of “vampire” or stand-by losses
  - This will save \$10 Billion when finally implemented, nationwide
- Out of a total **\$700 Billion**, a crude summary is that 1/3 is structural, 1/3 is from transportation, and 1/3 from buildings and industry.

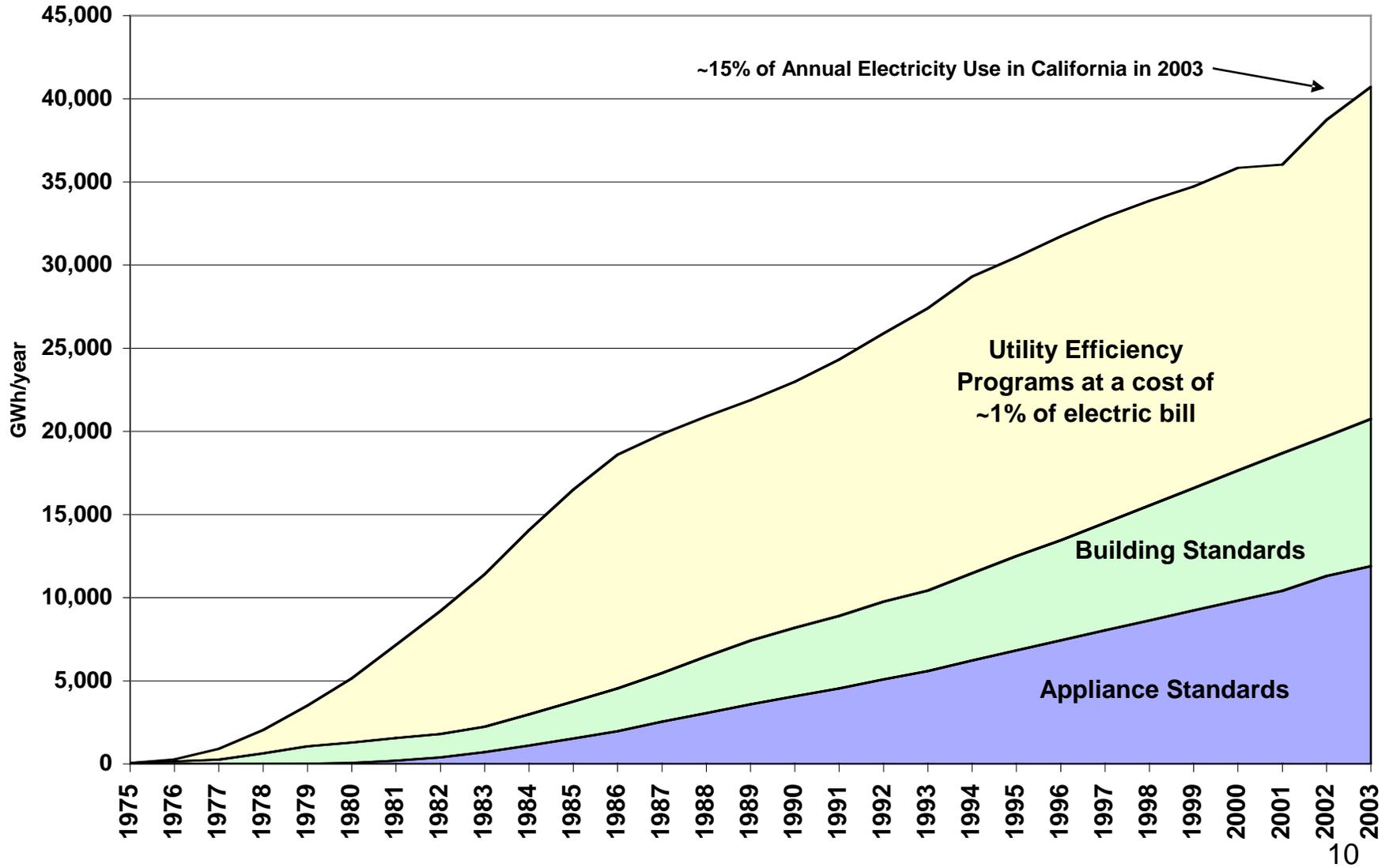
# California's Energy Action Plan

- California's Energy Agencies first adopted an Energy Action Plan in 2003. Central to this is the State's preferred "Loading Order" for resource expansion.
  - 1. Energy efficiency and Demand Response
  - 2. Renewable Generation
  - 3. Increased development of affordable & reliable conventional generation
  - 4. Transmission expansion to support all of California's energy goals.
- The Energy Action Plan has been updated since 2003 and provides overall policy direction to the various state agencies involved with the energy sectors

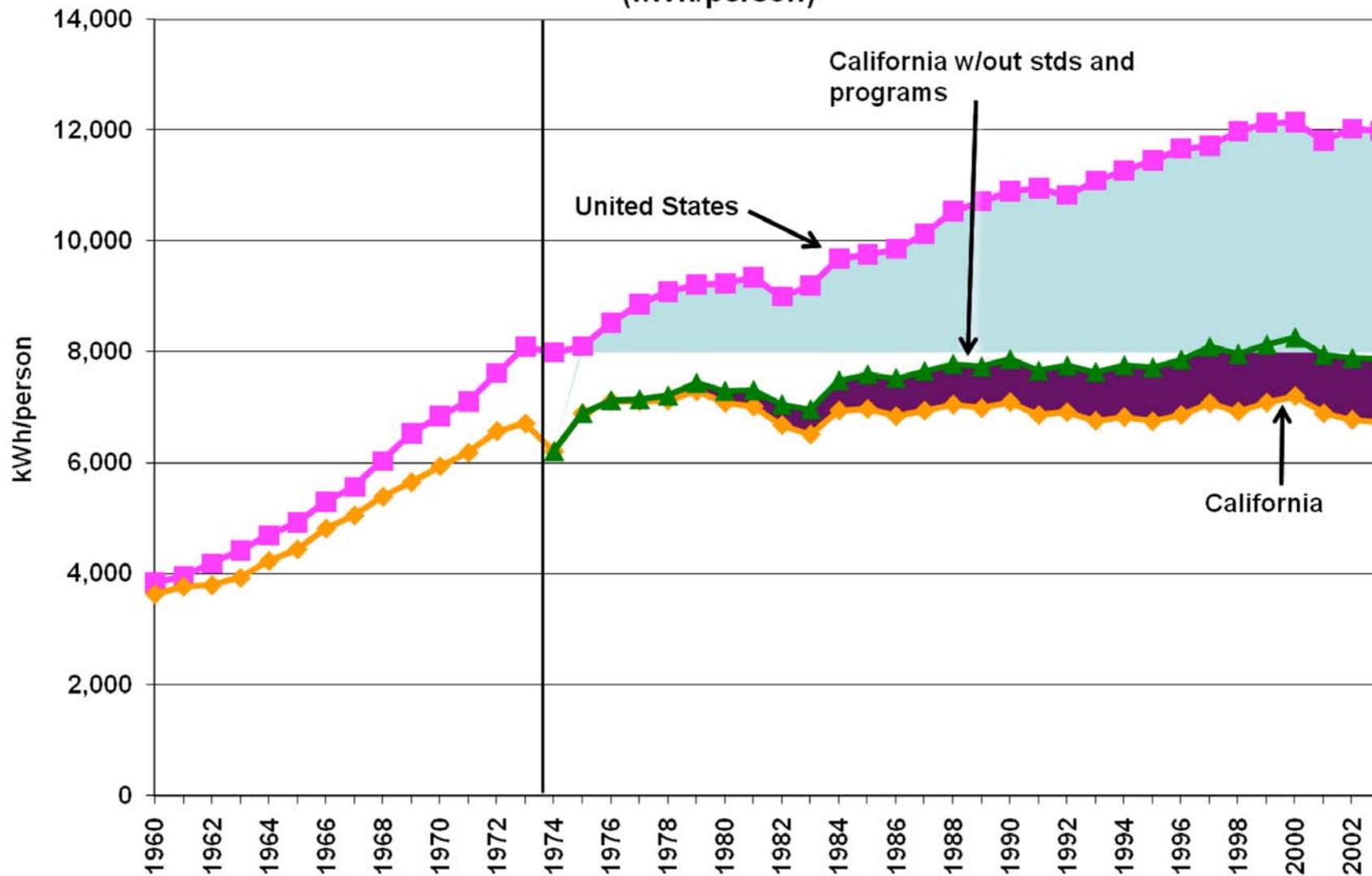
**Per Capita Electricity Sales (not including self-generation)  
(kWh/person) (2006 to 2008 are forecast data)**



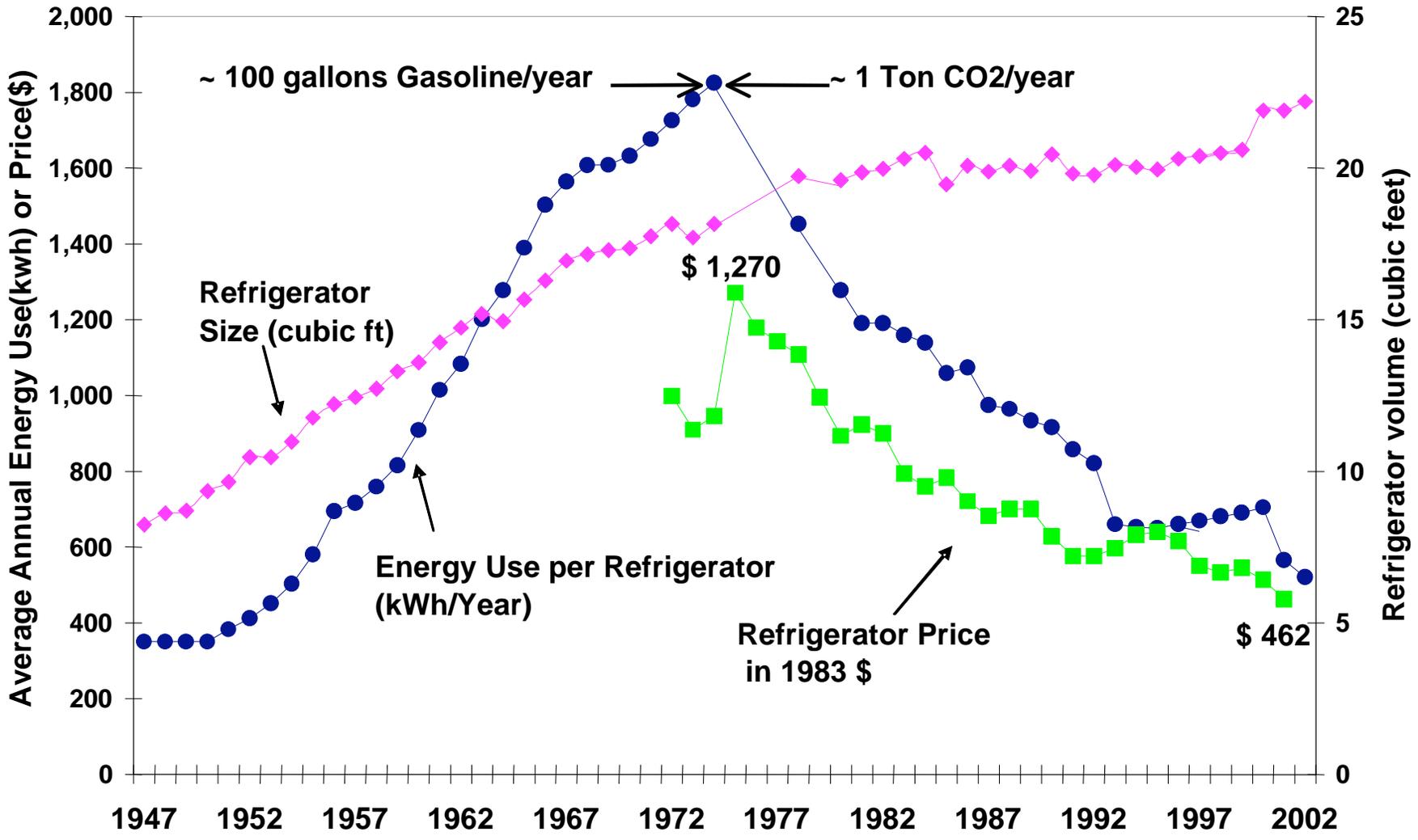
# Annual Energy Savings from Efficiency Programs and Standards



Per Capita Electricity Sales (not including self-generation)  
(kWh/person)

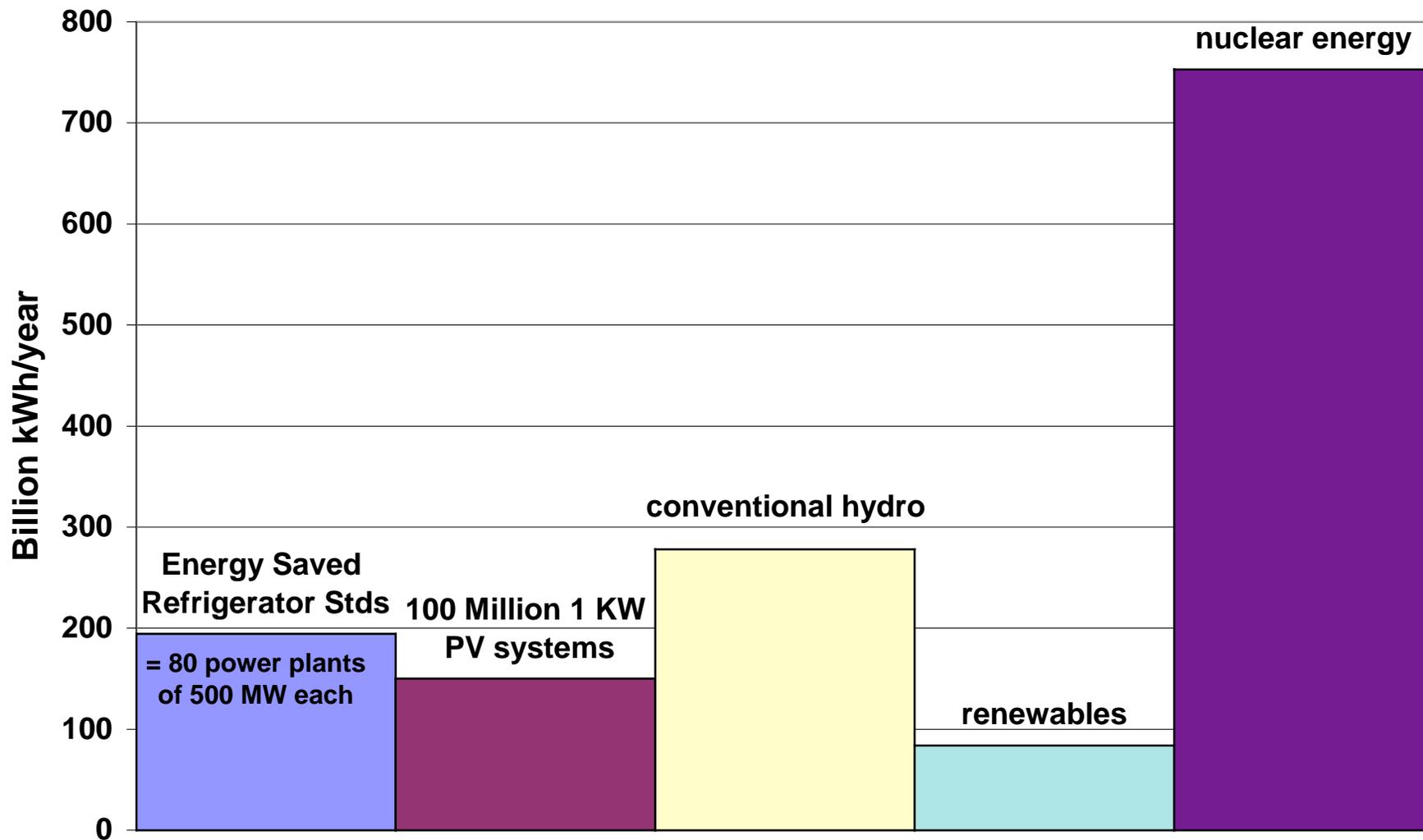


New United States Refrigerator Use v. Time  
and Retail Prices



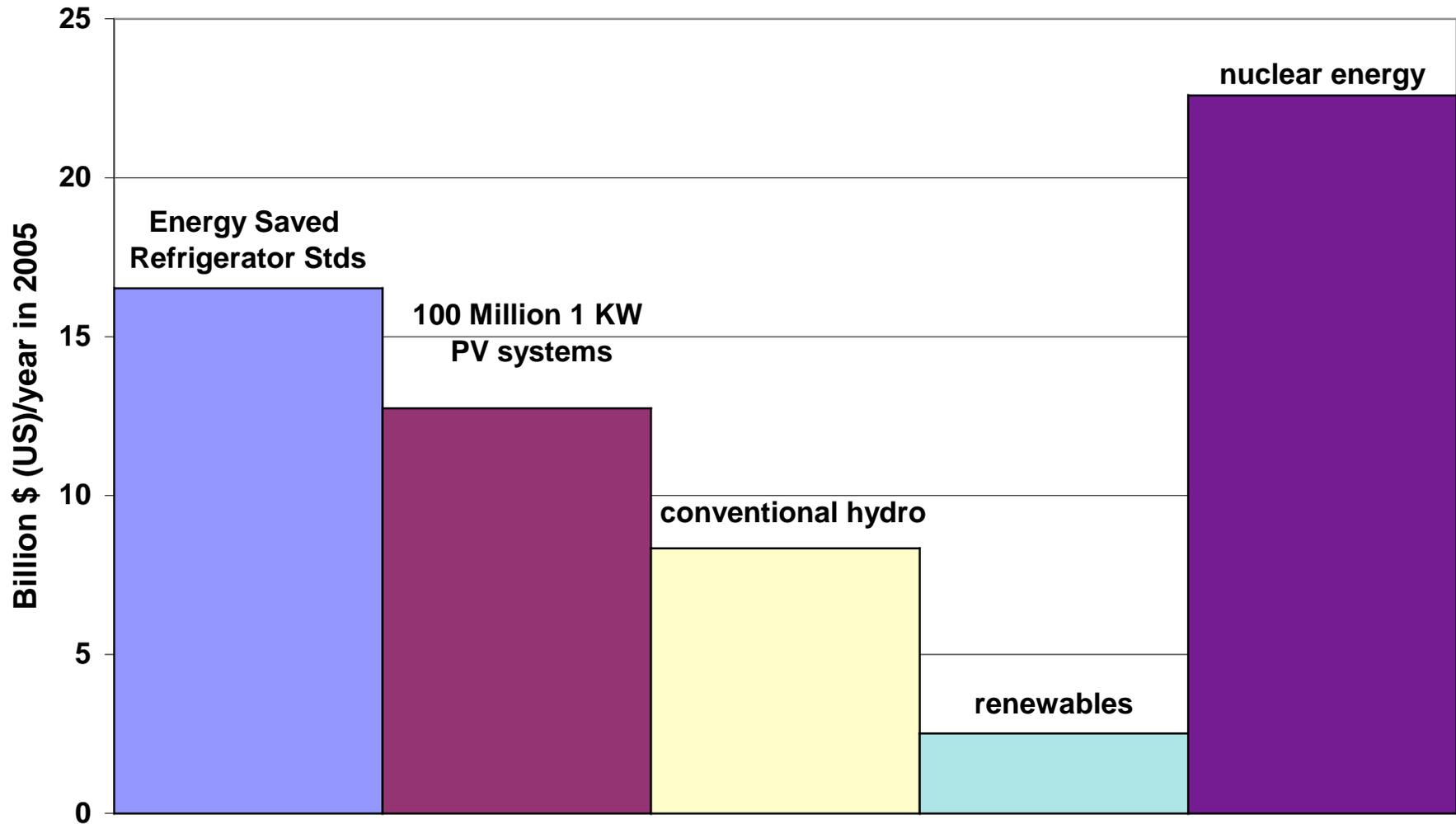
Source: David Goldstein

## Annual Energy Saved vs. Several Sources of Supply In the United States

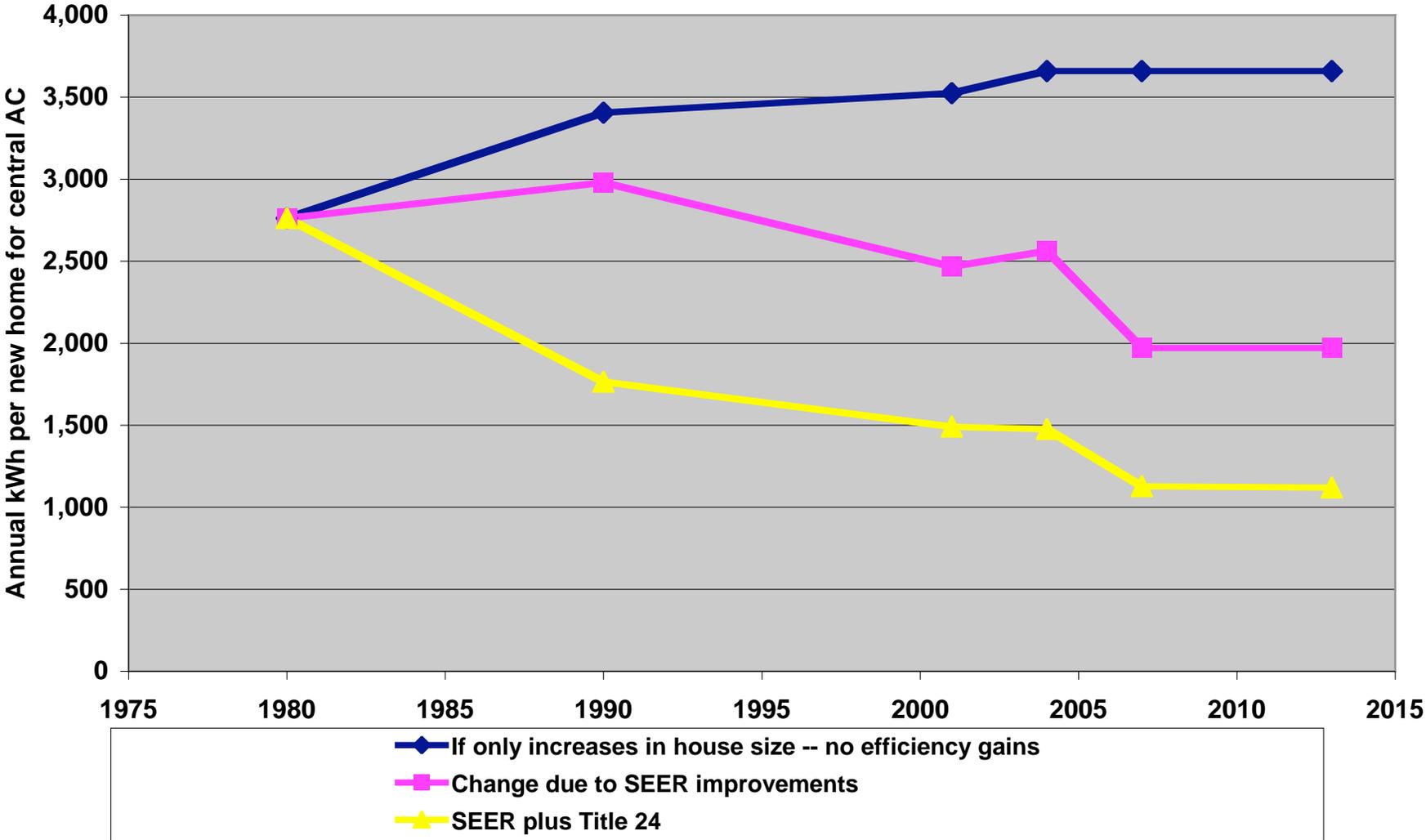


## In the United States

**Value of Energy to be Saved (at 8.5 cents/kWh, retail price) vs.  
Several Sources of Supply in 2005 (at 3 cents/kWh, wholesale price)**

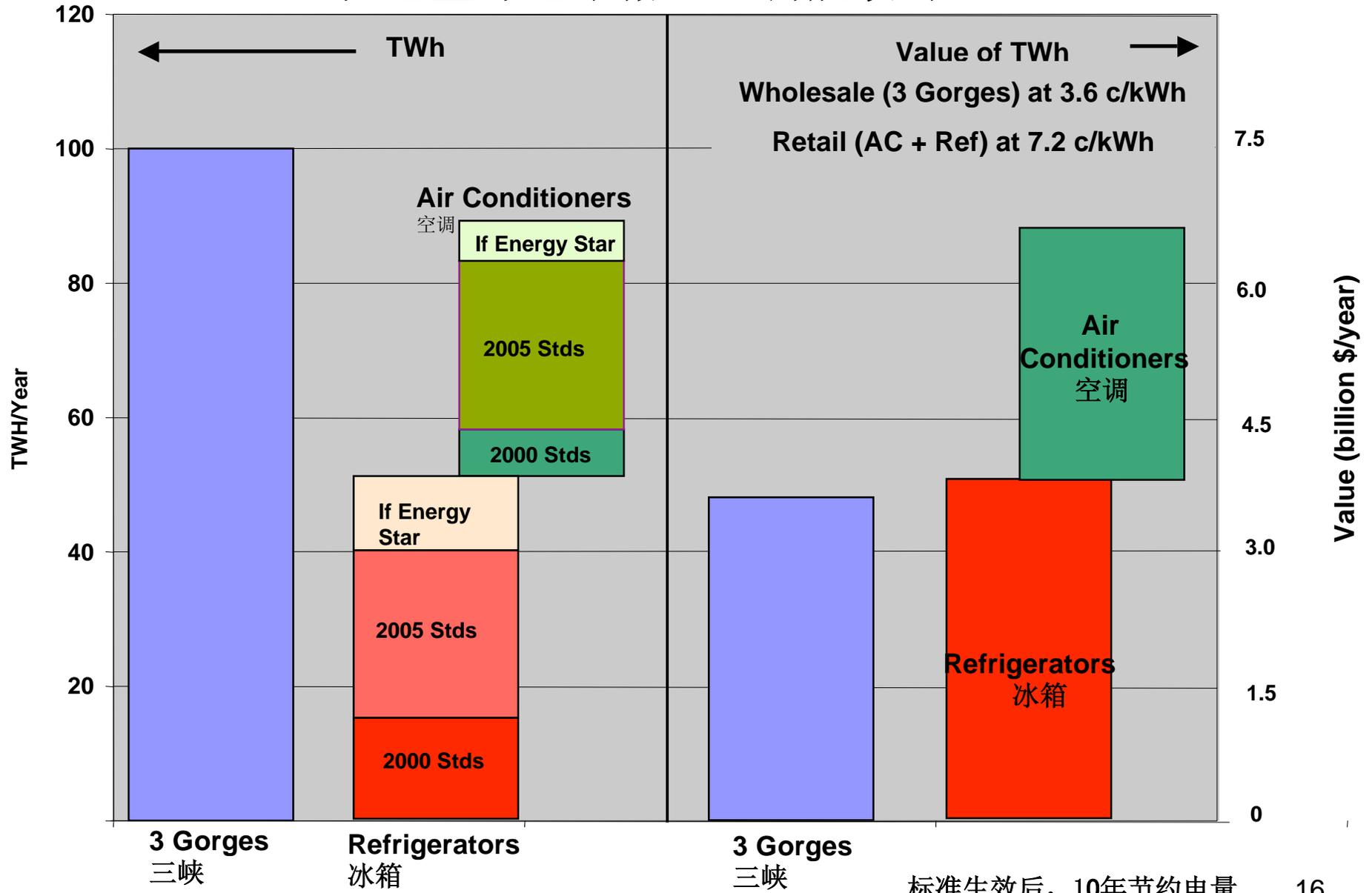


### Air Conditioning Energy Use in Single Family Homes in PG&E The effect of AC Standards (SEER) and Title 24 standards



# Comparison of 3 Gorges to Refrigerator and AC Efficiency Improvements

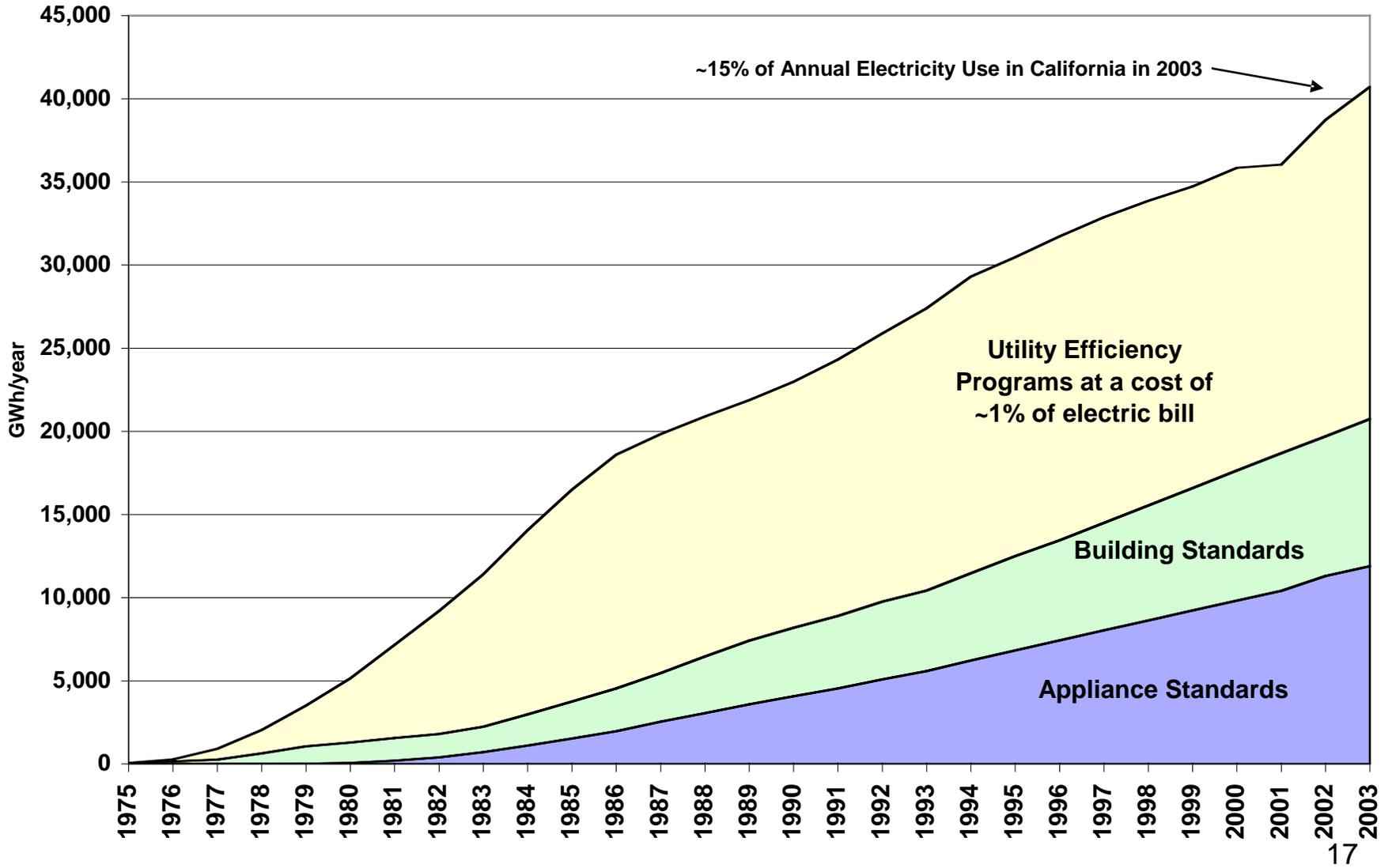
## 三峡电量与电冰箱、空调能效对比



Savings calculated 10 years after standard takes effect. Calculations provided by David Fridley, LBNL

标准生效后, 10年节约电量

# Annual Energy Savings from Efficiency Programs and Standards



# Energy Efficiency, Innovation, and Job Creation in California

David Roland-Holst

October 2008

Center for Energy, Resource, and  
Economic Sustainability (CERES)

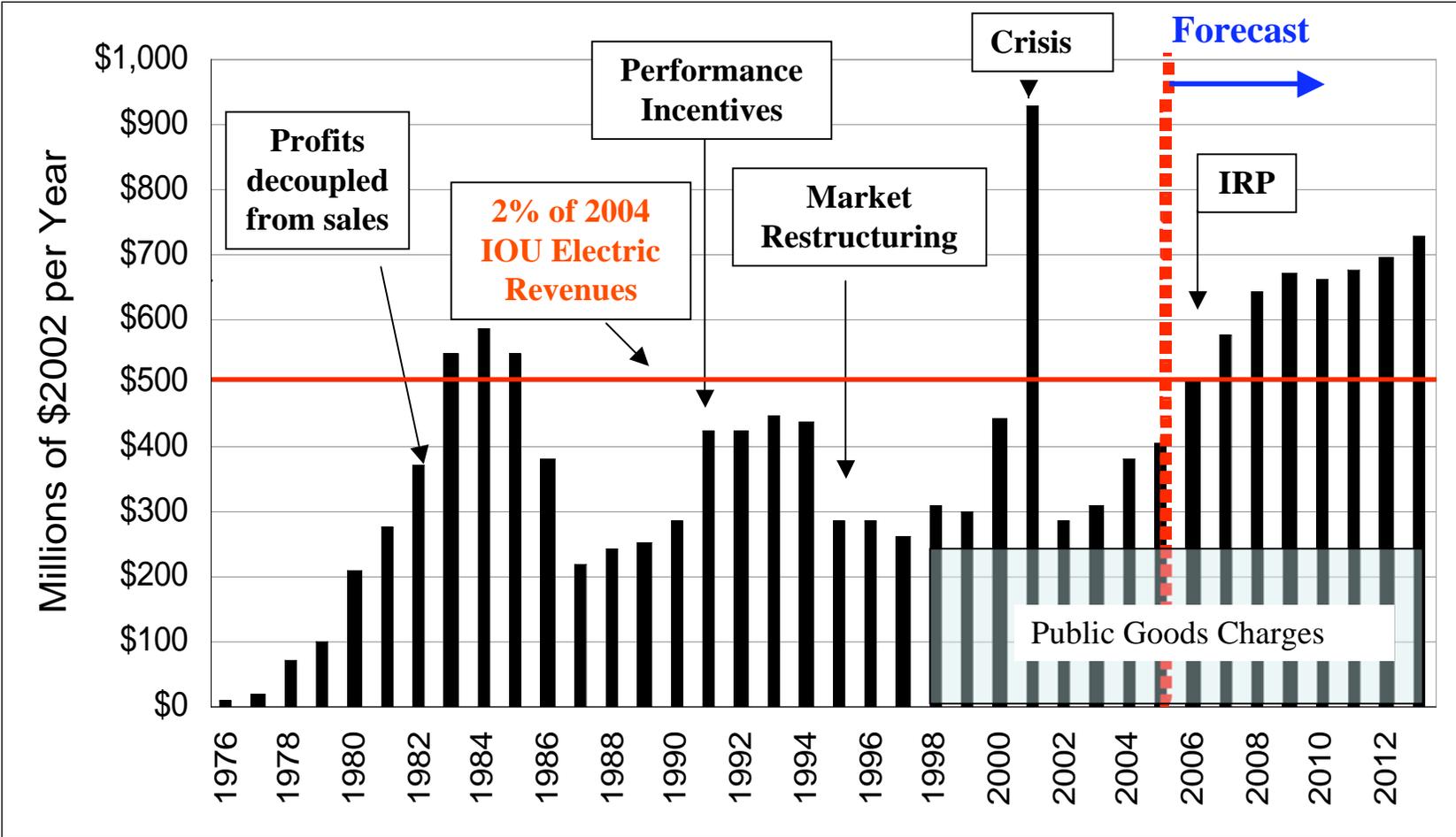
**Accessible on the Next 10 Web Site:**

**[http://www.nextten.org/research/research\\_eeijc.html](http://www.nextten.org/research/research_eeijc.html)**

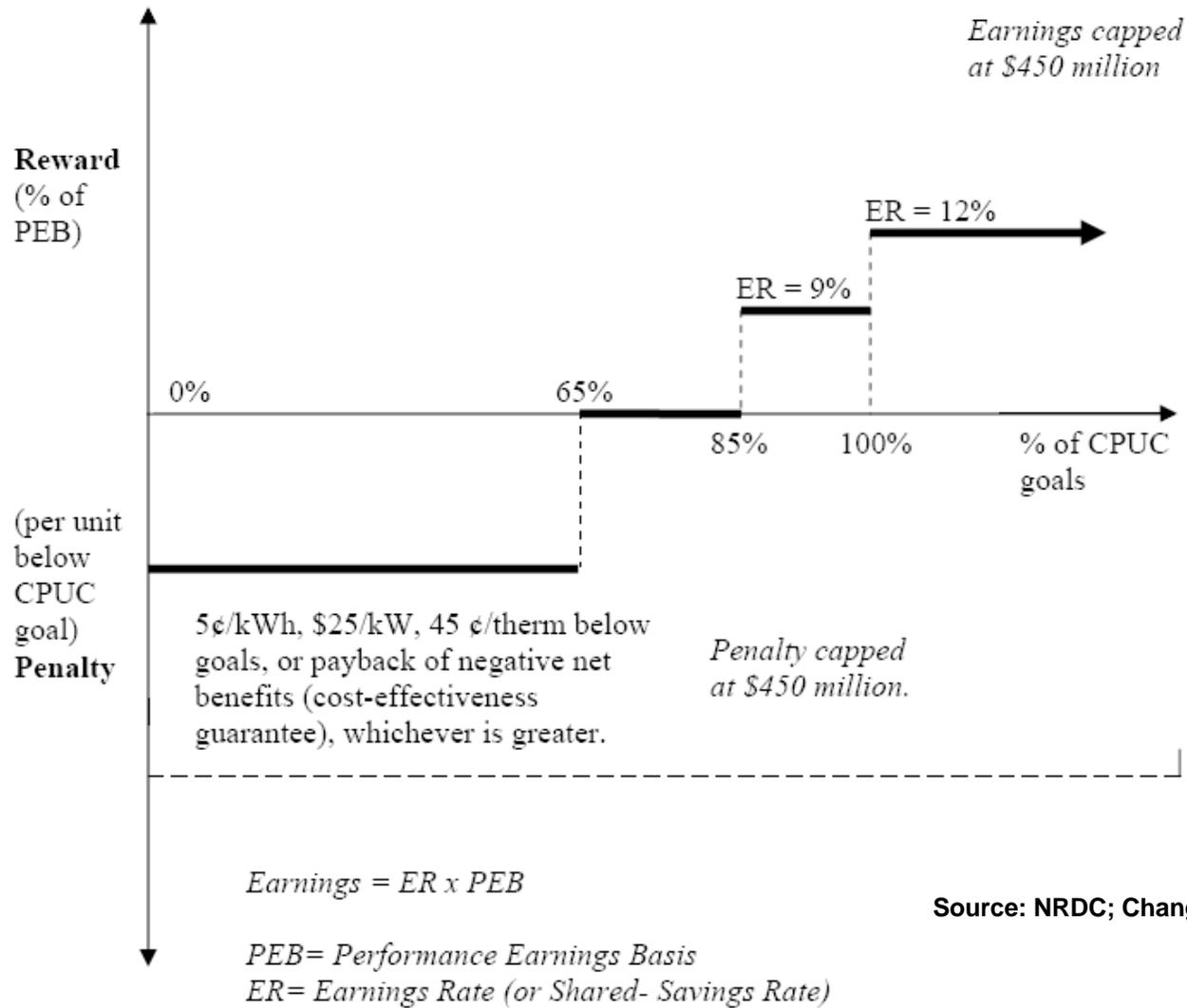
# Energy Efficiency Creates Jobs

- Using the BEAR econometric model
- Estimates of Job Creation since 1972:
- Energy Efficiency Measures have created **1.5 Million Jobs** out of 18 million total Jobs in CA

# California IOU's Investment in Energy Efficiency



**Energy Efficiency Incentive Mechanism Earnings/Penalty Curve**  
 (D.07-09-043, p. 8)



Source: NRDC; Chang and Wang, 9/26/2007

- *To be published in Climatic Change 2008.*
- **Global Cooling: Increasing World-wide Urban Albedos to Offset CO2**

July 28, 2008

**Hashem Akbari and Surabi Menon**  
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*Tel: 510-486-4287*

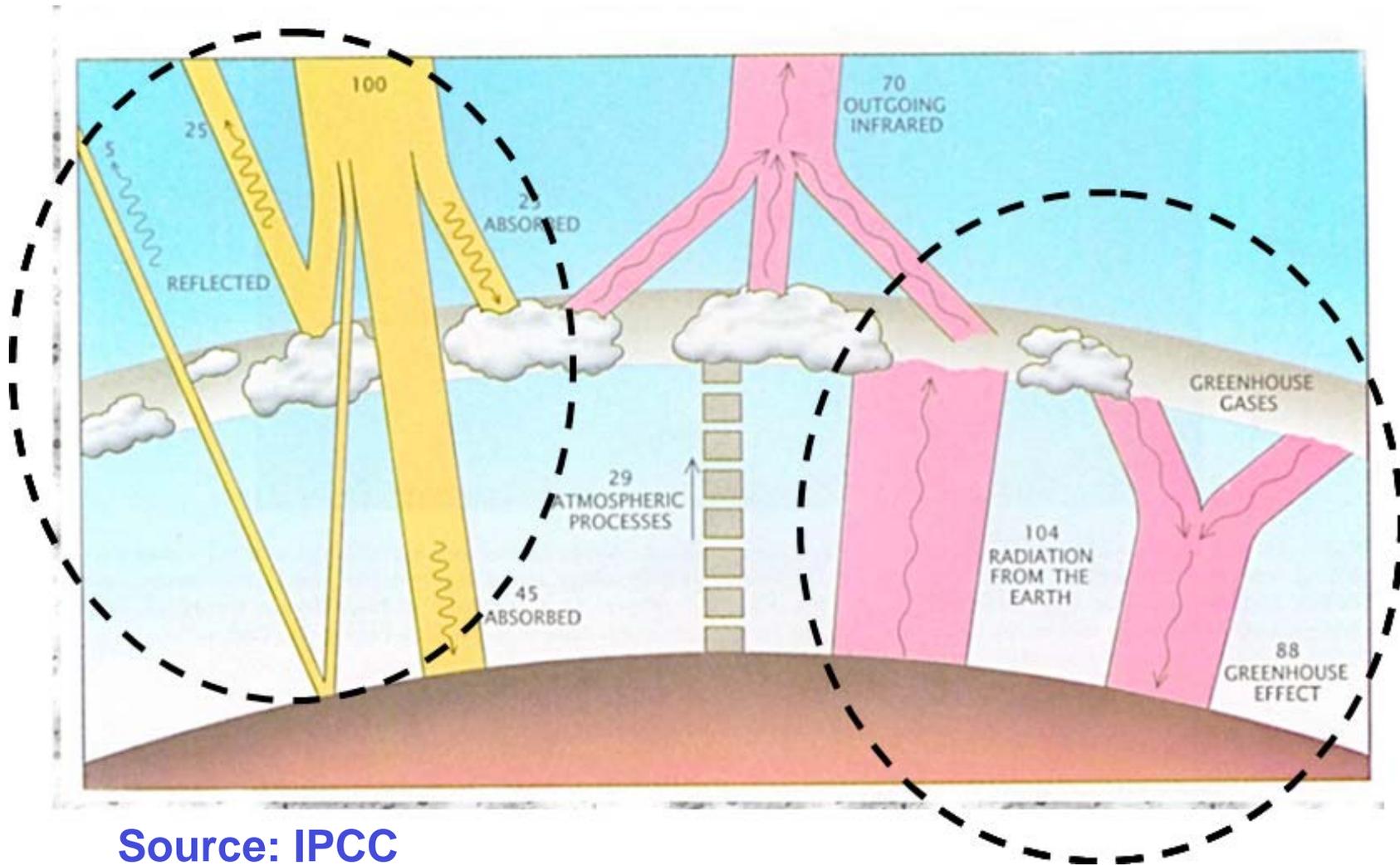
**Arthur Rosenfeld**  
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*Tel: 916-654 4930*

- **A First Step In Geo-Engineering Which Saves Money and Has Known Positive Environmental Impacts**

**100m<sup>2</sup>(~1000 ft<sup>2</sup>) of a white roof, replacing a dark roof, offset the emission of 10 tonnes of CO<sub>2</sub>**



# Solar Reflective Surfaces Also Cool the Globe



Source: IPCC

# **CO<sub>2</sub> Equivalency of Cool Roofs World-wide (Tropics+Temperate)**

- Cool Roofs alone offset 24 Gt CO<sub>2</sub>
- Worth > €600 Billion
- To Convert 24 Gt CO<sub>2</sub> one time into a rate
- Assume 20 Year Program, thus  
1.2 Gt CO<sub>2</sub>/year
- Average World Car Emits 4 tCO<sub>2</sub>/year,  
**equivalent to 300 Million Cars  
off the Road for 20 years.**

# Reducing U.S. Greenhouse Gas Emissions: *How Much at What Cost?*

**US Greenhouse Gas Abatement Mapping Initiative**

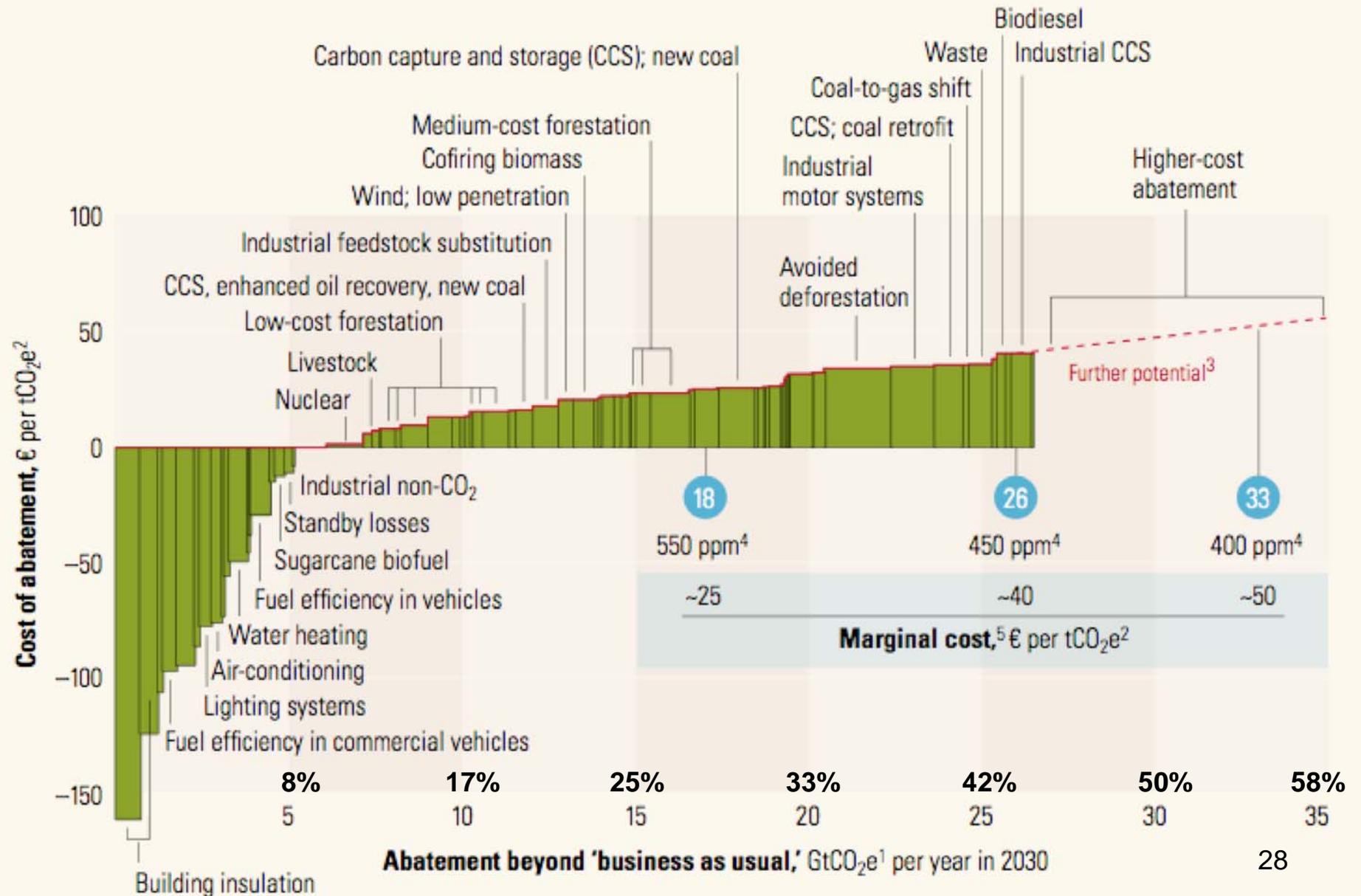
**December 12, 2007**

McKinsey&Company

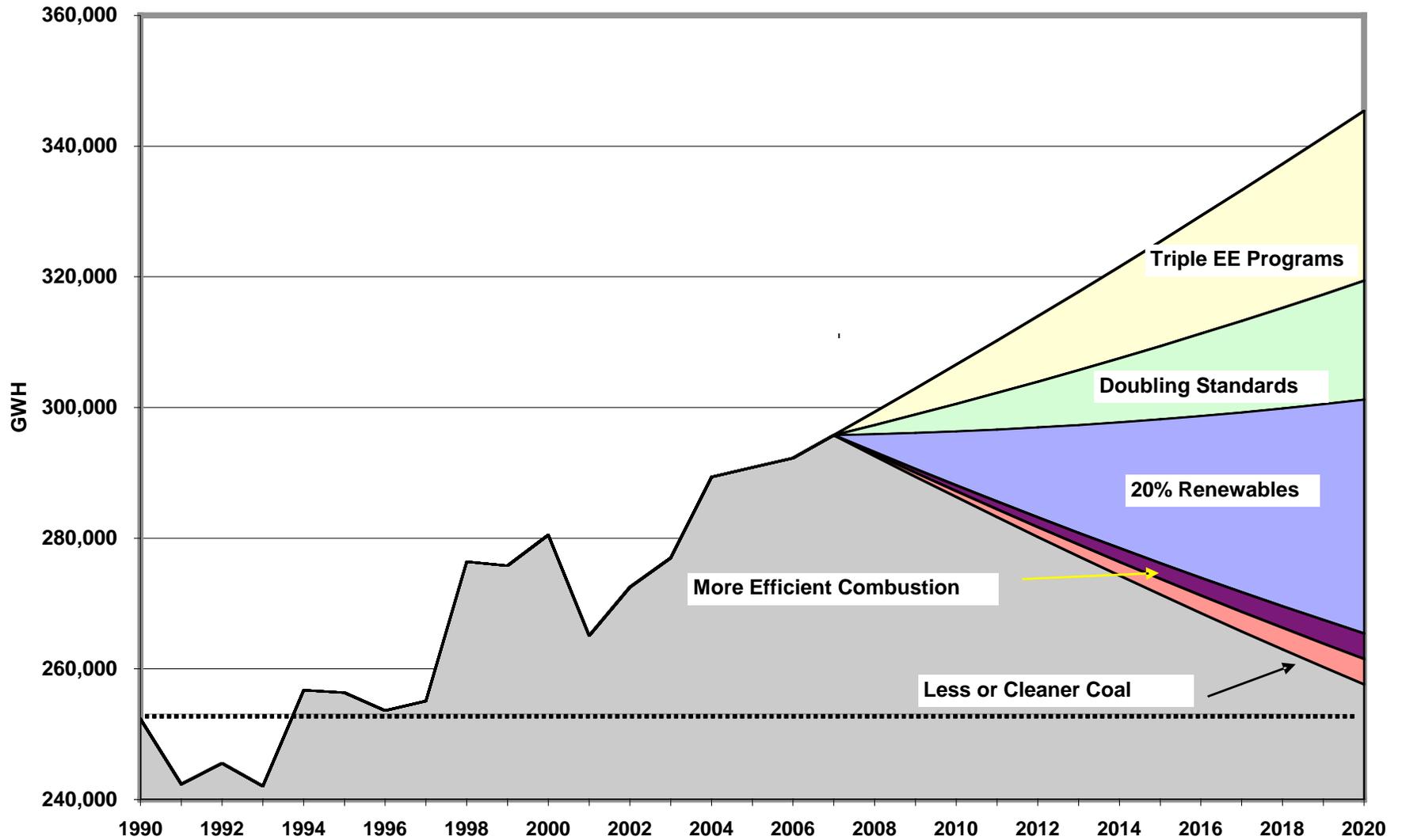


Global cost curve for greenhouse gas abatement measures beyond 'business as usual'; greenhouse gases measured in GtCO<sub>2</sub>e<sup>1</sup>

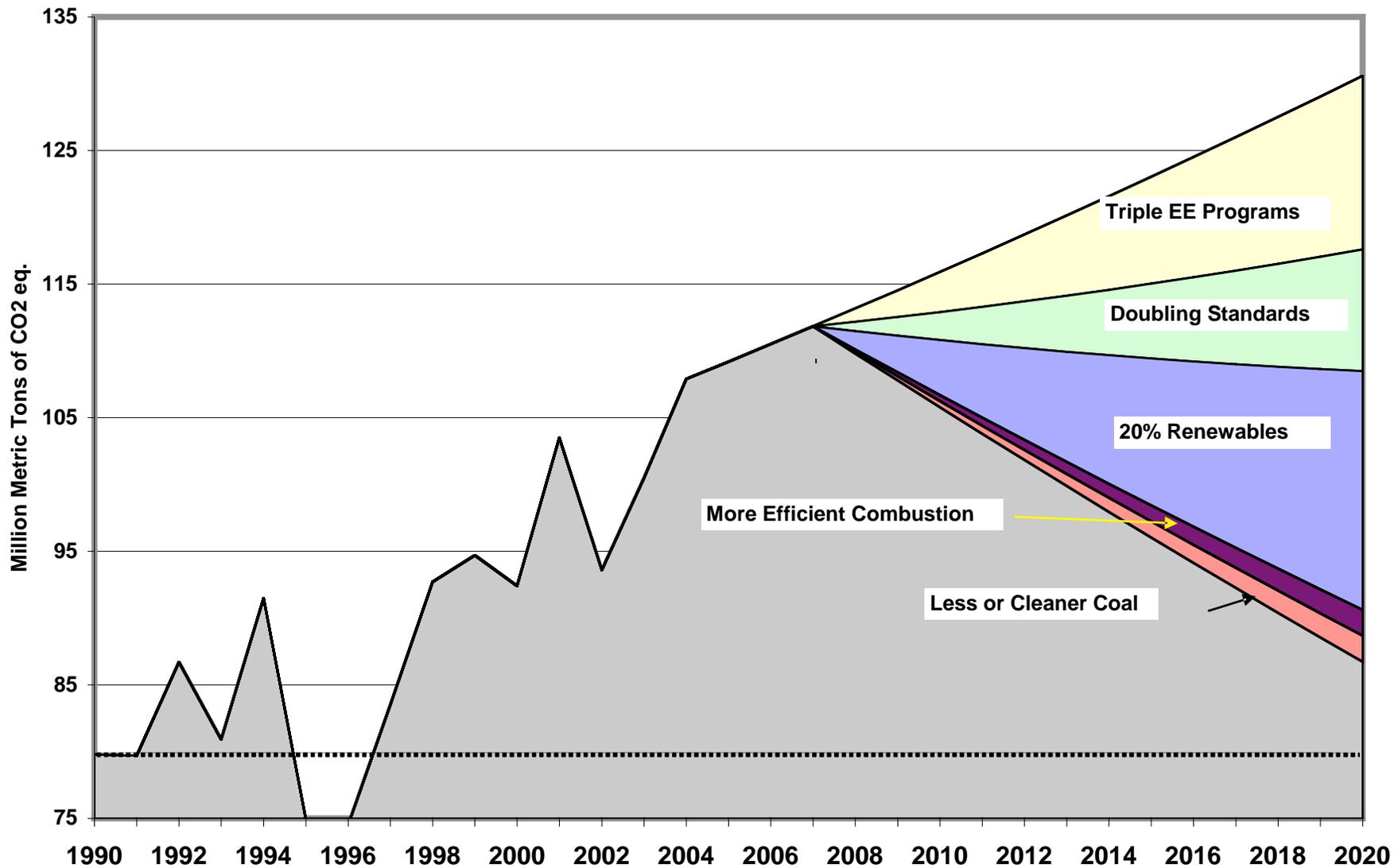
● Approximate abatement required beyond 'business as usual,' 2030



**Possible Strategies to Reduce Electricity Sector Carbon Emissions in California, ignoring ramp up times and other implementation issues -- The ELECTRICITY Perspective**



**Possible Strategies to Reduce Electricity Sector Carbon Emissions in California, ignoring ramp up times and other implementation issues -- The CARBON Perspective**



# The End

For More Information:

[http://www.energy.ca.gov/commissioners/rosenfeld\\_docs/index.html](http://www.energy.ca.gov/commissioners/rosenfeld_docs/index.html)

**or just Google “Art Rosenfeld”**