ACEEE's 4th National Conference
Energy Efficiency as a Resource
September 30 - October 2, 2007
Berkeley

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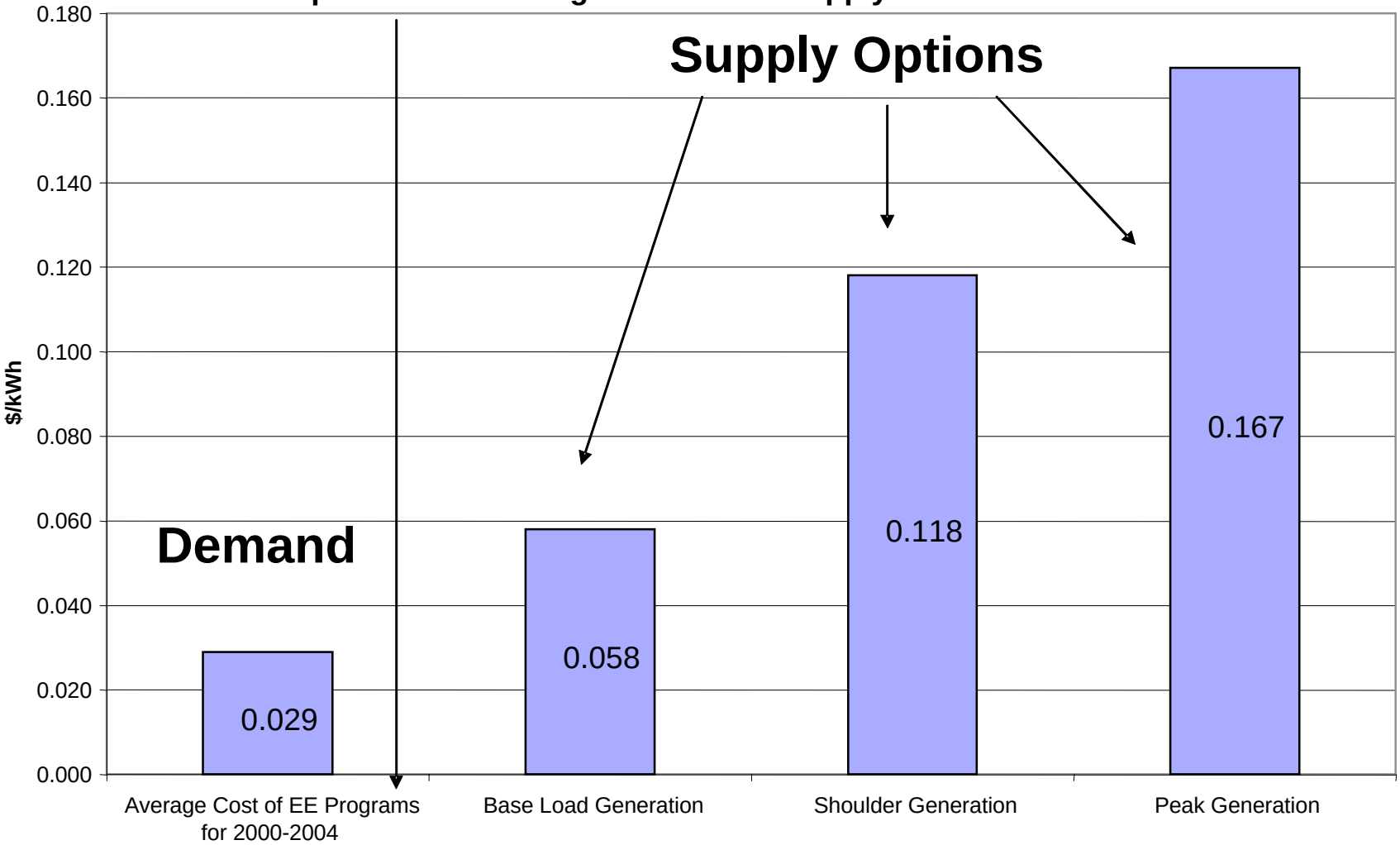
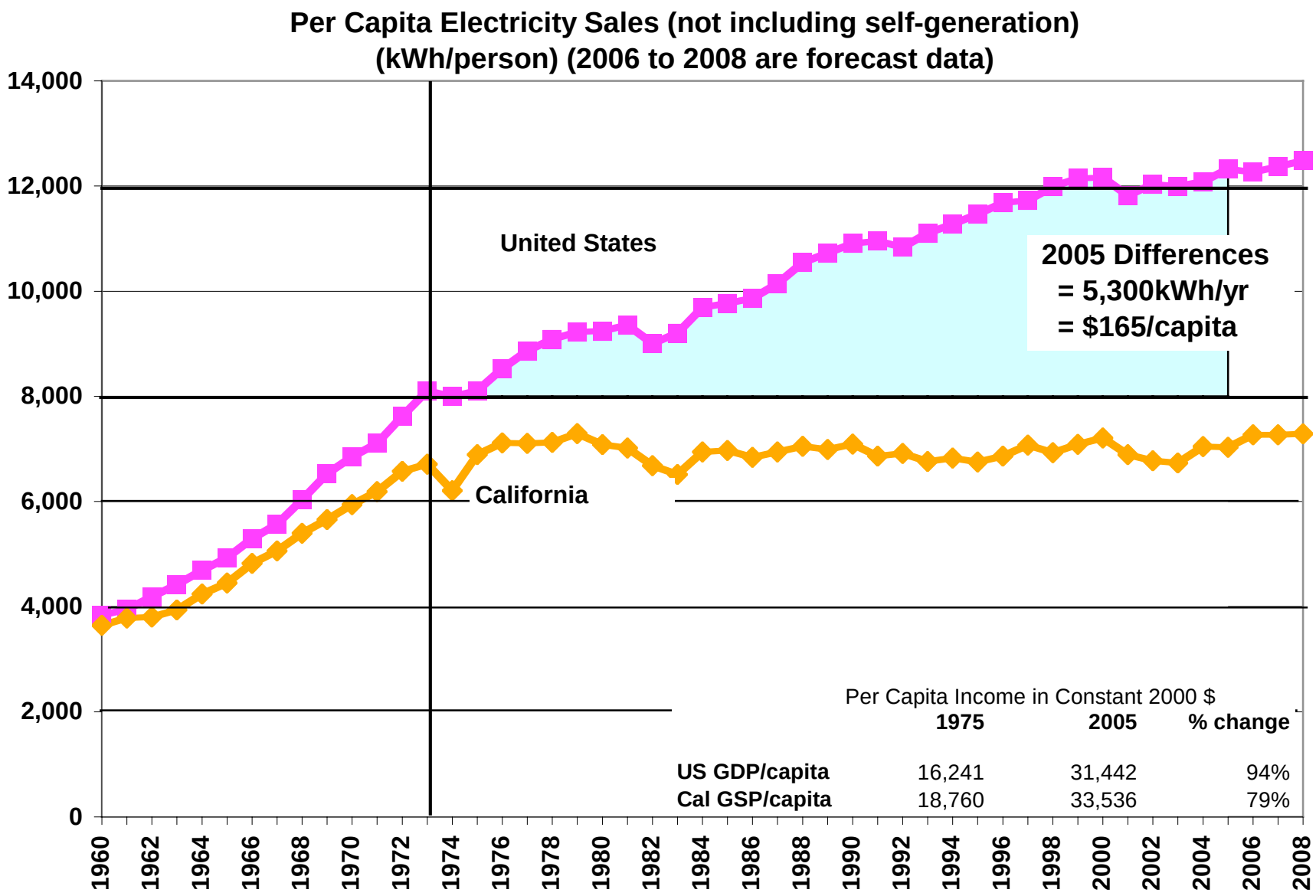
http://www.energy.ca.gov/commission/commissioners/rosenfeld.html

or just Google "Art Rosenfeld"

Figure 8
Comparison of EE Program Costs to Supply Generation Costs

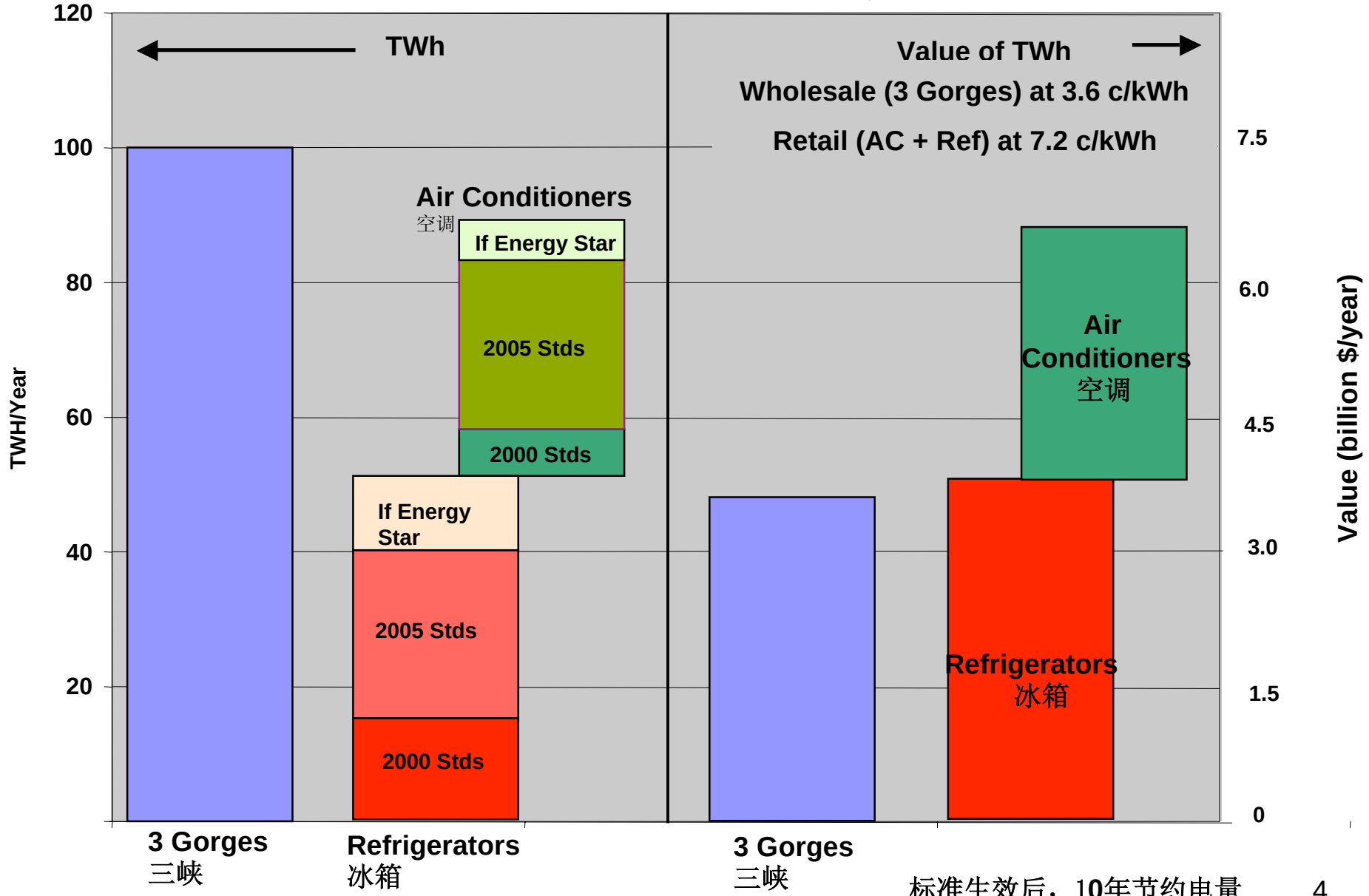


FUNDING AND ENERGY SAVINGS FROM INVESTOR OWNED UTILITY ENERGY EFFICIENCY PROGRAMS IN CALIFORNIA FOR PROGRAM YEARS 2000 THROUGH 2004, Rogers, et.al, CEC


Per Capita Electricity Sales (not including self-generation)
(kWh/person) (2006 to 2008 are forecast data)
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
United States
California
2005 Differences
= 5,300kWh/yr
= $165/capita
Per Capita Income in Constant 2000 $
1975
2005
% change
US GDP/capita 16,241 31,442 94%
Cal GSP/capita 18,760 33,536 79%
1960
1962
1964
1966
1968
1970
1972
1974
1976
1978
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008

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

Conservation Supply Curves Explained

- Start with conservation supply curves for electricity, natural gas, gasoline, etc
- Annual benefit = yearly saved bills – annualized cost of measure
- Then convert kWh or therms or gallons or … to CO2 avoided
- Note that shaded areas are dollars saved or spent (depending if below or above the x-axis)

See NAS “Policy Implications of Greenhouse Warming” 1992, App. B

- **Policy Implications of Greenhouse Warming**: Mitigation, Adaptation, and the Science Base (1992) Committee on Science, Engineering, and Public **Policy** (COSEPUP **...** books.nap.edu/books/0309043867/html

McKinsey Quarterly

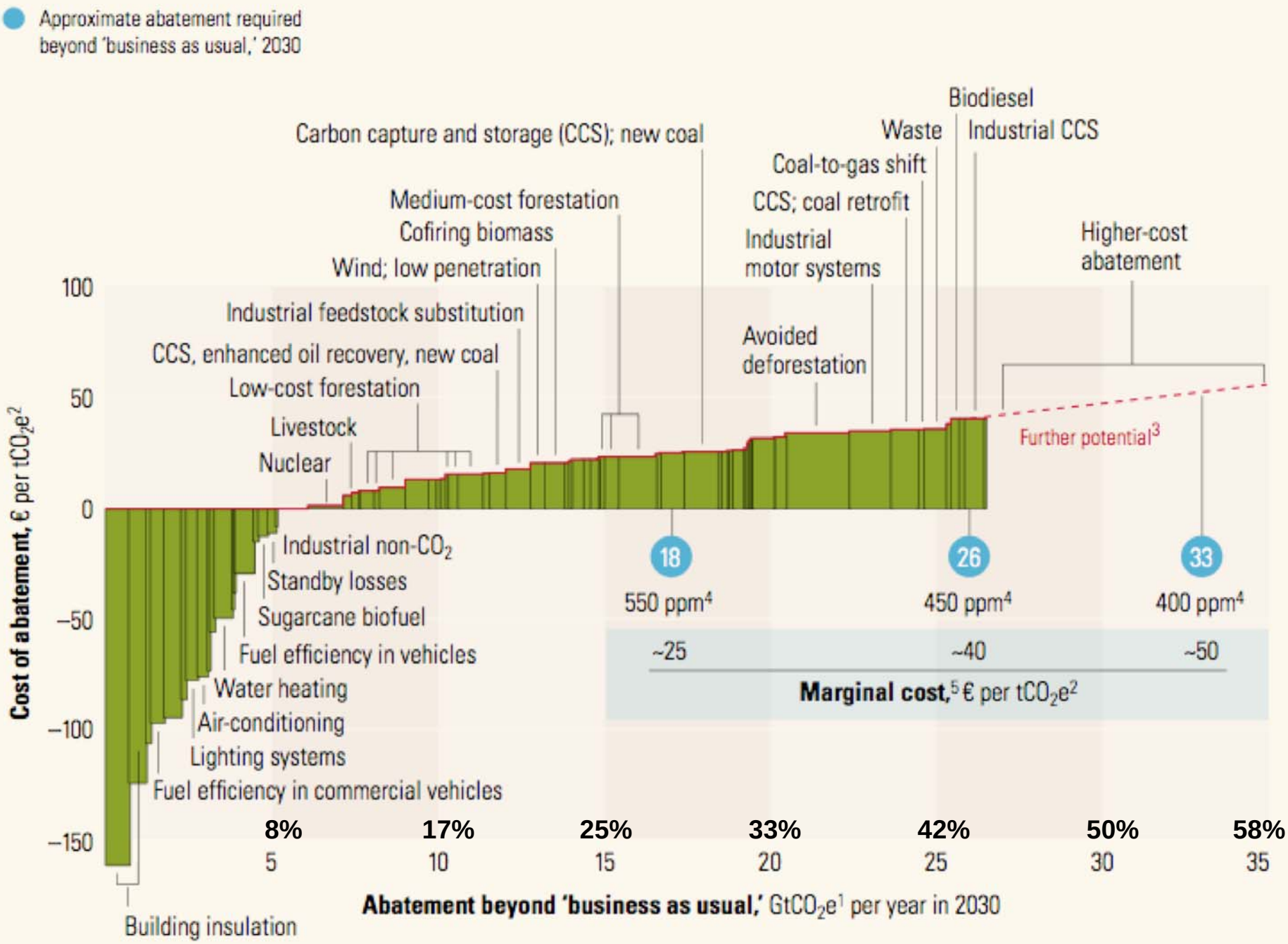
A **cost curve** for greenhouse gas reduction

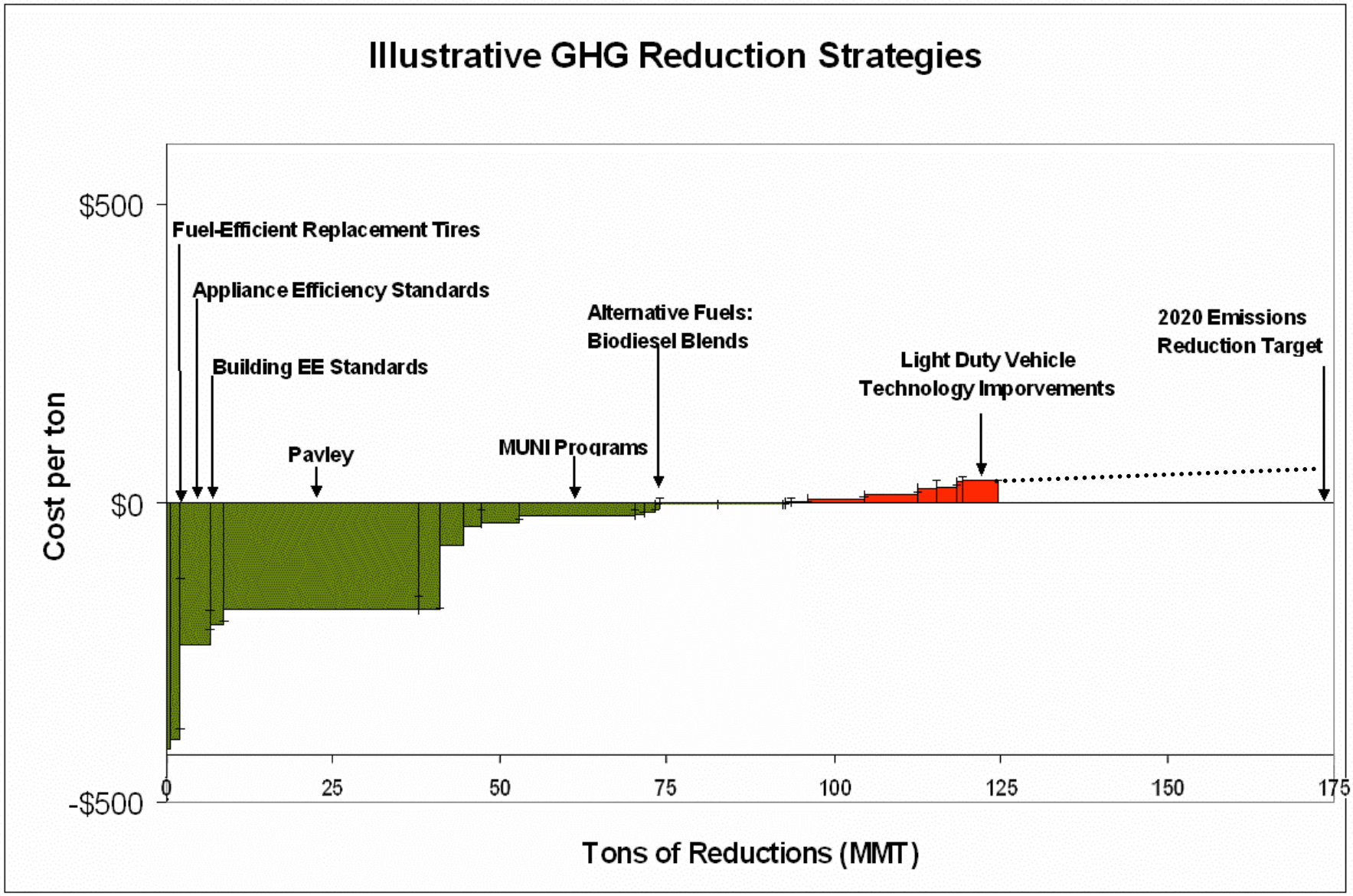
A global study of the size and cost of measures to reduce greenhouse gas emissions yields important insights for businesses and policy makers.

Per-Anders Enkvist, Tomas Nauclér, and Jerker Rosander

http://www.mckinseyquarterly.com/Energy_Resources_Materials/A_cost_curve_for_greenhouse_gas_reduction_abstract

Global cost curve for greenhouse gas abatement measures beyond 'business as usual'; greenhouse gases measured in $GtCO_2e$[1]





Based Upon Exhibit 11: Updated Estimates for 2020 for the Climate Strategies Included in the 2006 CAT Report UPDATED MACROECONOMIC ANALYSIS OF CLIMATE STRATEGIES …

Introducing Dian Grueneich

- Grueneich = Gruen Eich = Green Oak in German. BA Stanford
- 1977. Georgetown Law, then att'y for CEC, then private practise
- 1986. Founded Grueneich Resource Assoc. (GRA)
- 1986. Attorney to start CIEE, w/ Blumstein, Grether, Harris, Levine
  More in my autobiography, Google "Art Rosenfeld" PDF p. 30

Then EE was to save money and protect the environment. She served on board of ACEEE, CLCV, …

1989 SCR7 (Senate Concurrent Res.7). Might be good strategy today

Now, with climate change, EE merges saving $, environment, and the planet, so we're both even more passionate in spreading the California success story.

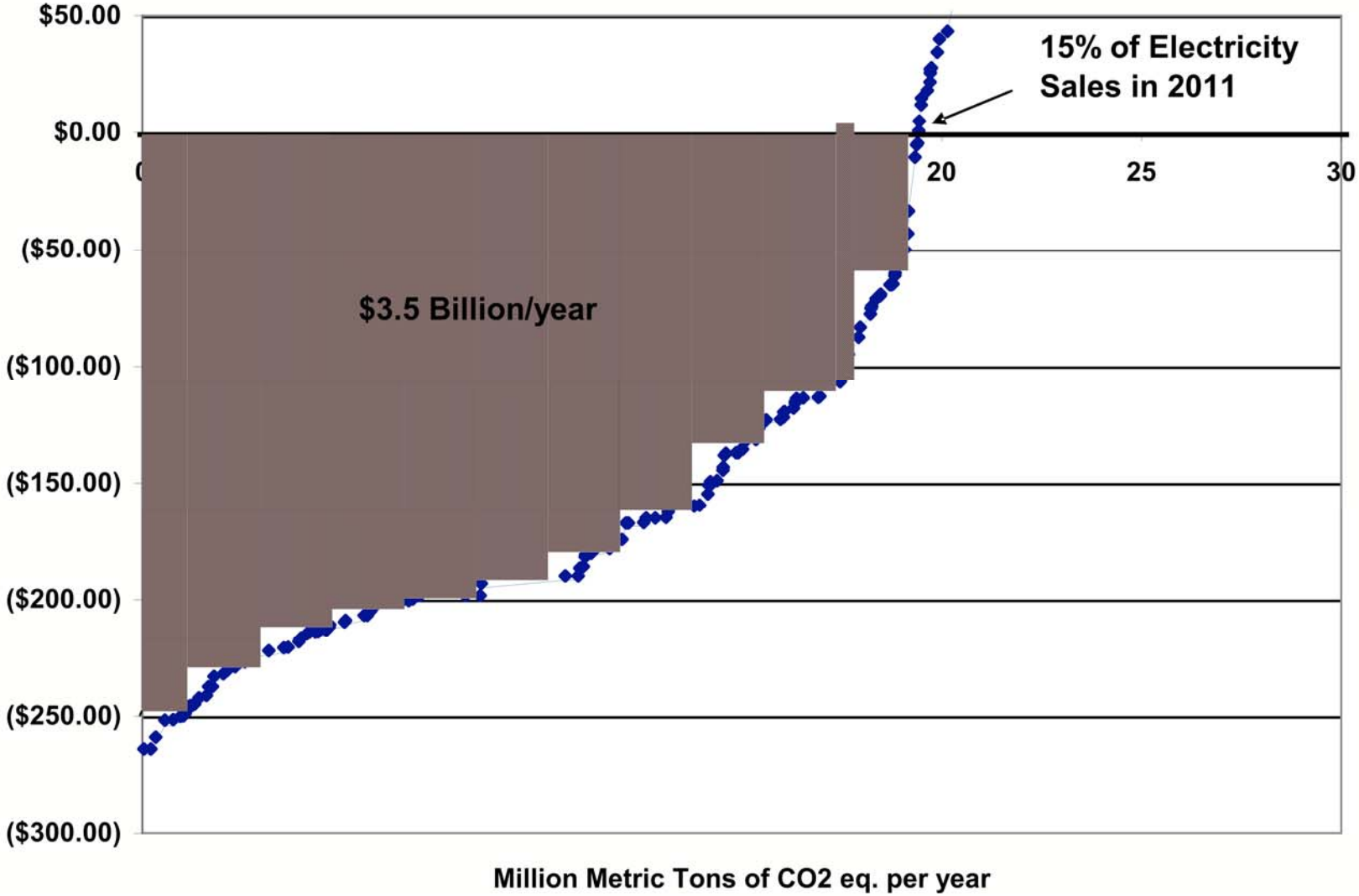
Appointed to CPUC in 05. Assigned Commissioner for EE, low income

Updated EAP –-EE and DR come first, then Renewable, then Supply

Nationally: NAP EE, NARUC ERE, Int'l: China and India (PGC, Decoupling, Bldg. and Appliance Standards)

Last Week CPUC adopted 5:0 her EE Incentives Decision. I call it "Decoupling Plus"

Supply Curve for CO2, Conserved thru Energy Efficiency in Electricity Sector in California - Potential in 2011 at 1 kwh = 0.454 kg of CO2



- California spends $700 million per year pursuing this curve
- And will save $3.5 Billion per year, net

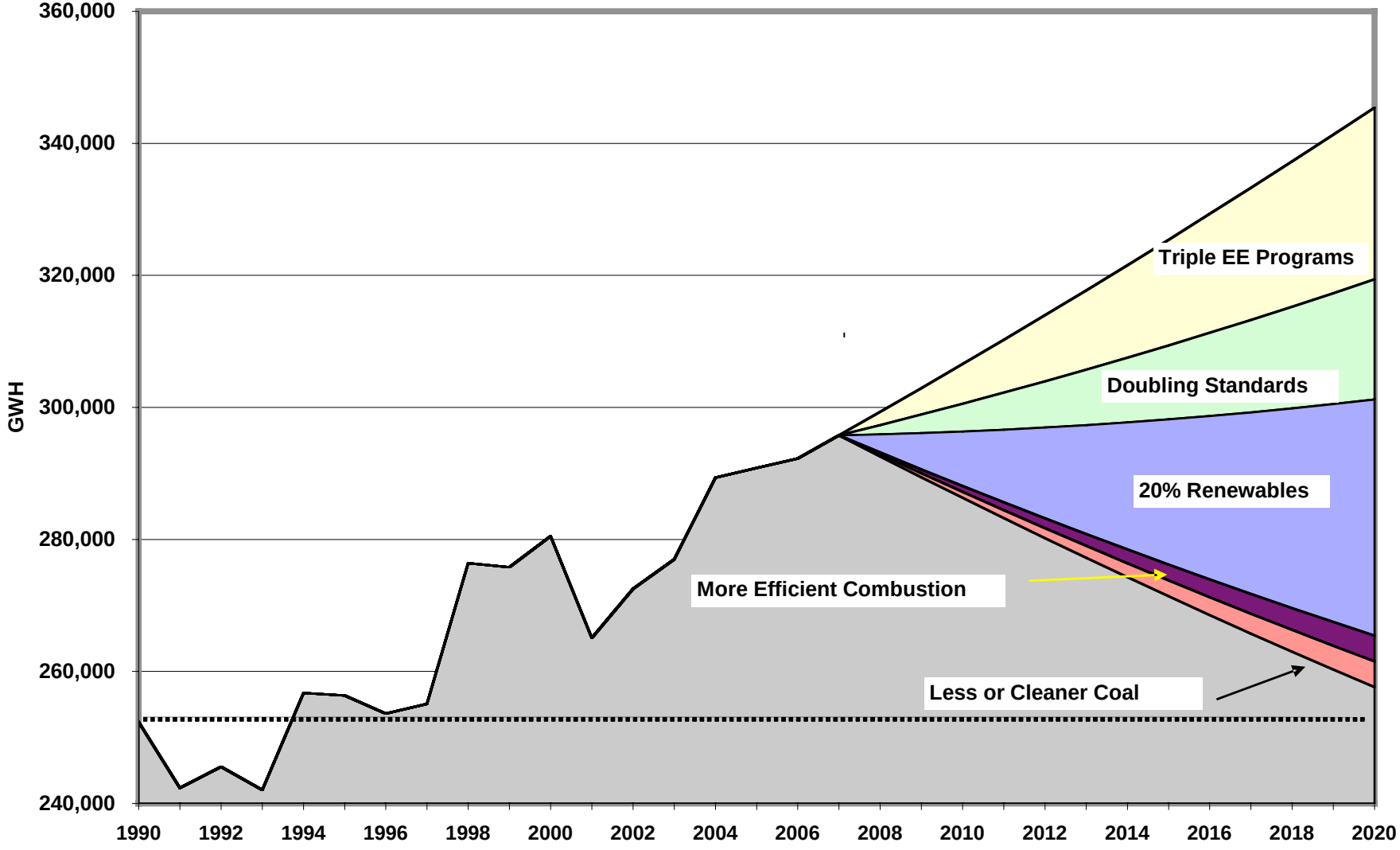
Turning to California

- AB 32 CO2 Goals:
  - 1990 levels by 2020
  - 80% below 1990 levels by 2050
- Where are we headed?

	1990	**2000**	**2010**	**2020**	**2030**	**2040**	**2050**
CALIFORNIA Population (million)	30	34	39	44	49	54	60
growth rate (historic and projected)		1.3%	1.4%	1.2%	1.1%	1.0%	0.9%
CO2 Business as Usual (MtCO2 eq.)	436	480	530	585	647	714	789
CO2 to Meet AB 32 Goals	436	480	486	436	320	204	87
growth rate to Meet AB 32		1%	0.1%	-1%	-5.3%	-5.3%	-5.3%

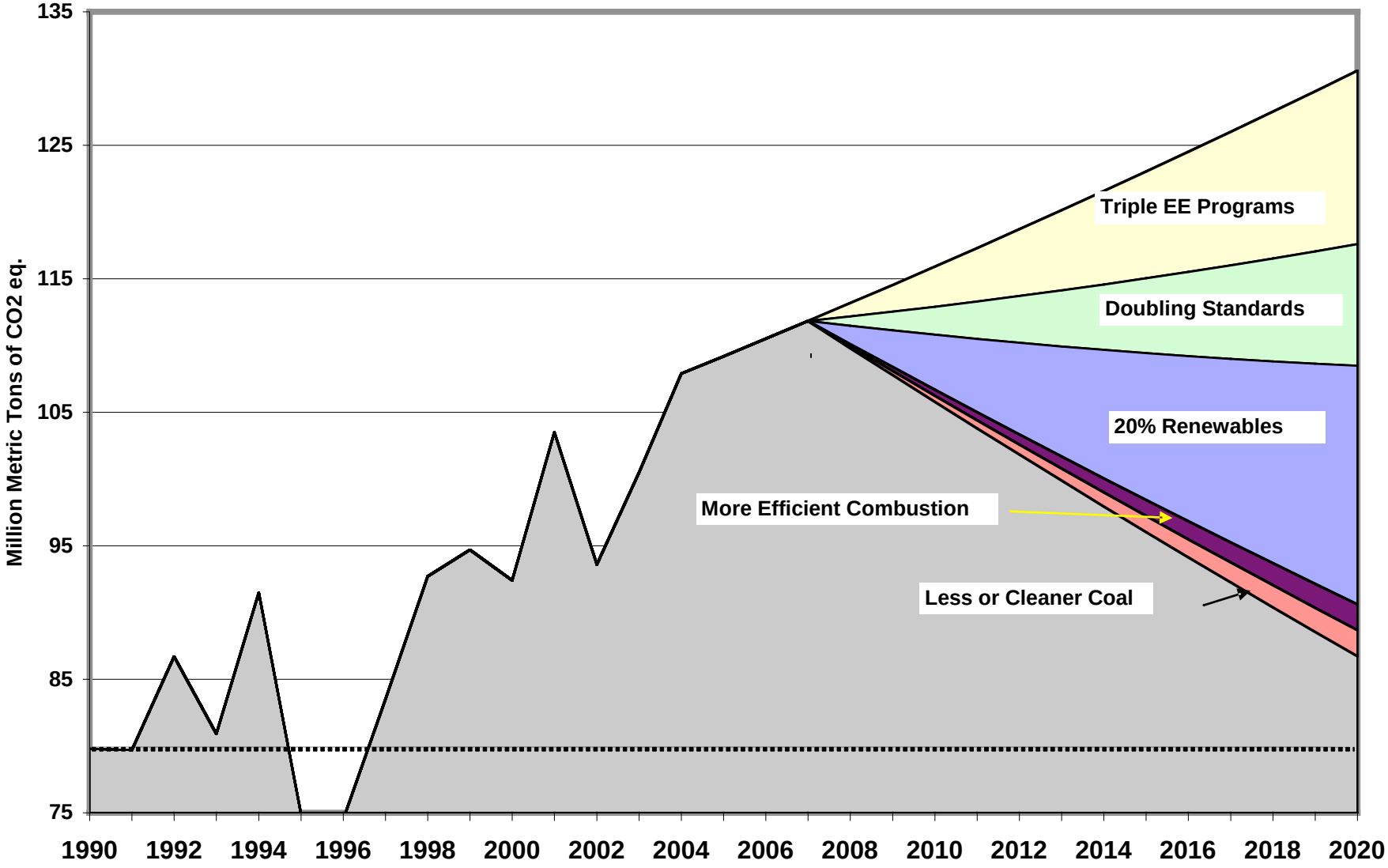
Note: CO2 historic and projected data continue to change, consider these as estimates

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



Source: Pat McAuliffe, pmcaulif@energy.state.ca.us

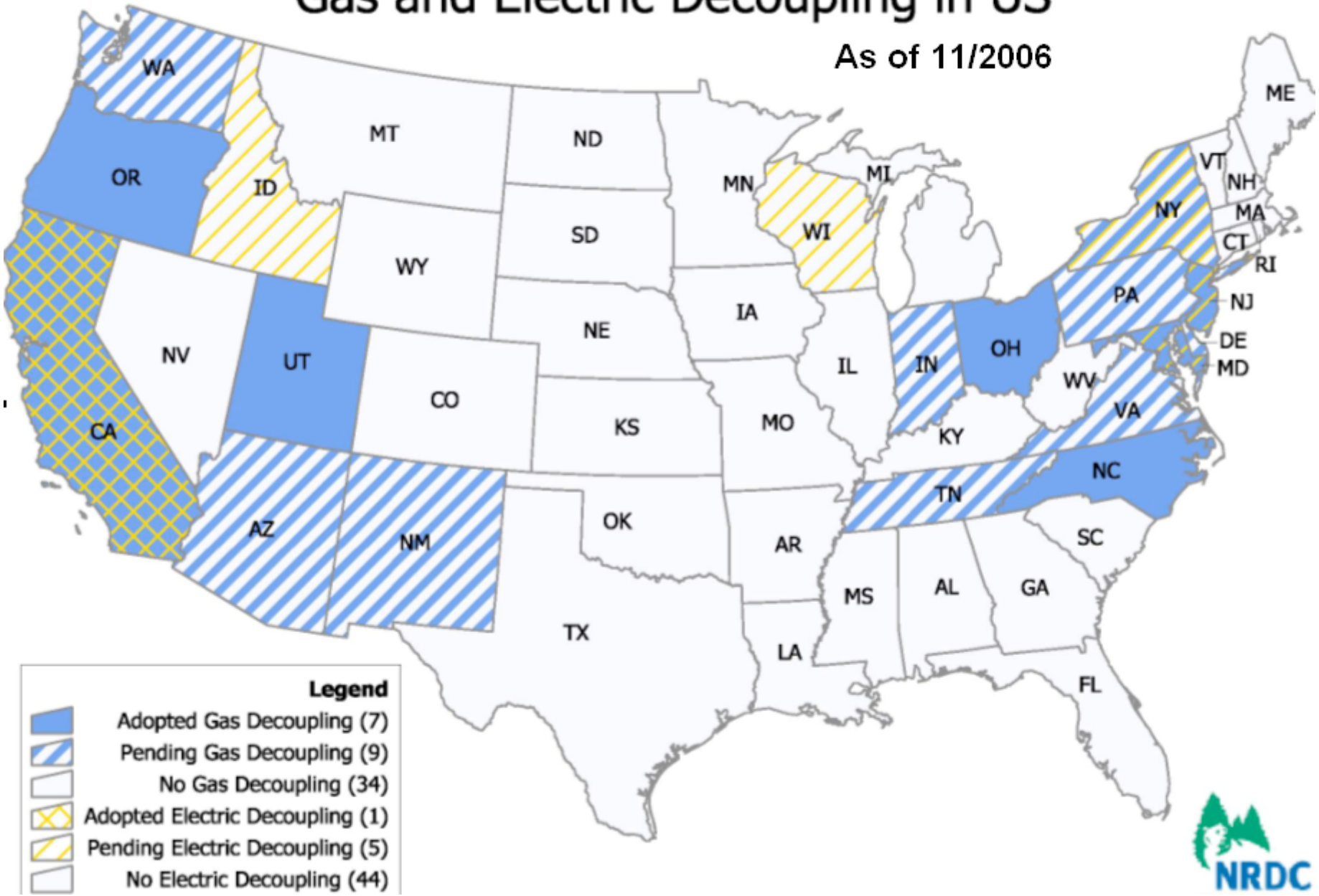
Possible Strategies to Reduce Electricity Sector Carbon Emissions in California, ignoring ramp up times and other implementation issues -- The CARBON Perspective



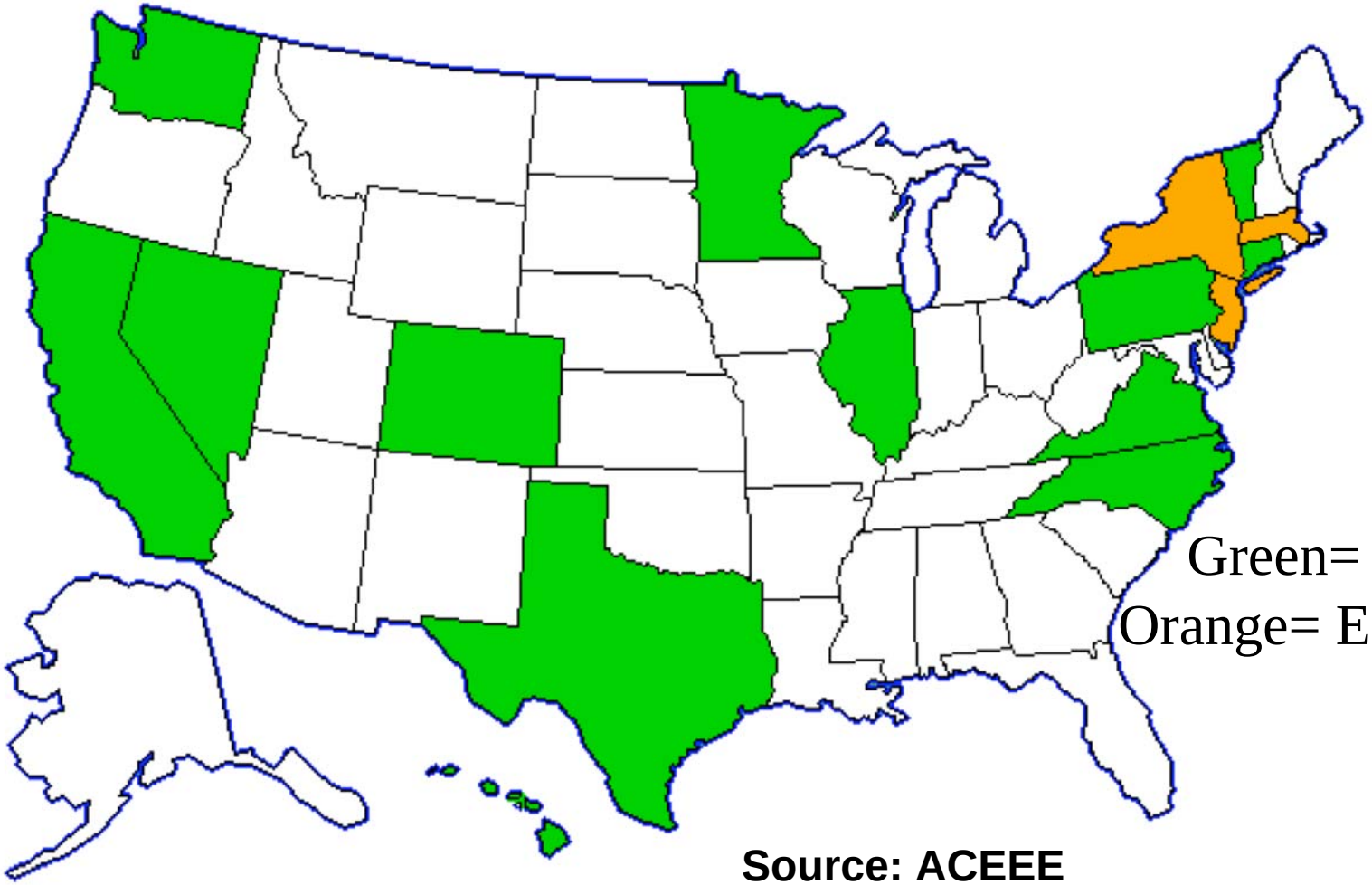
Source: Pat McAuliffe, pmcaulif@energy.state.ca.us

Gas and Electric Decoupling in US

As of 11/2006



States with EERS-Like Policies



Green= has EERS
Orange= EERS pending

Source: ACEEE