

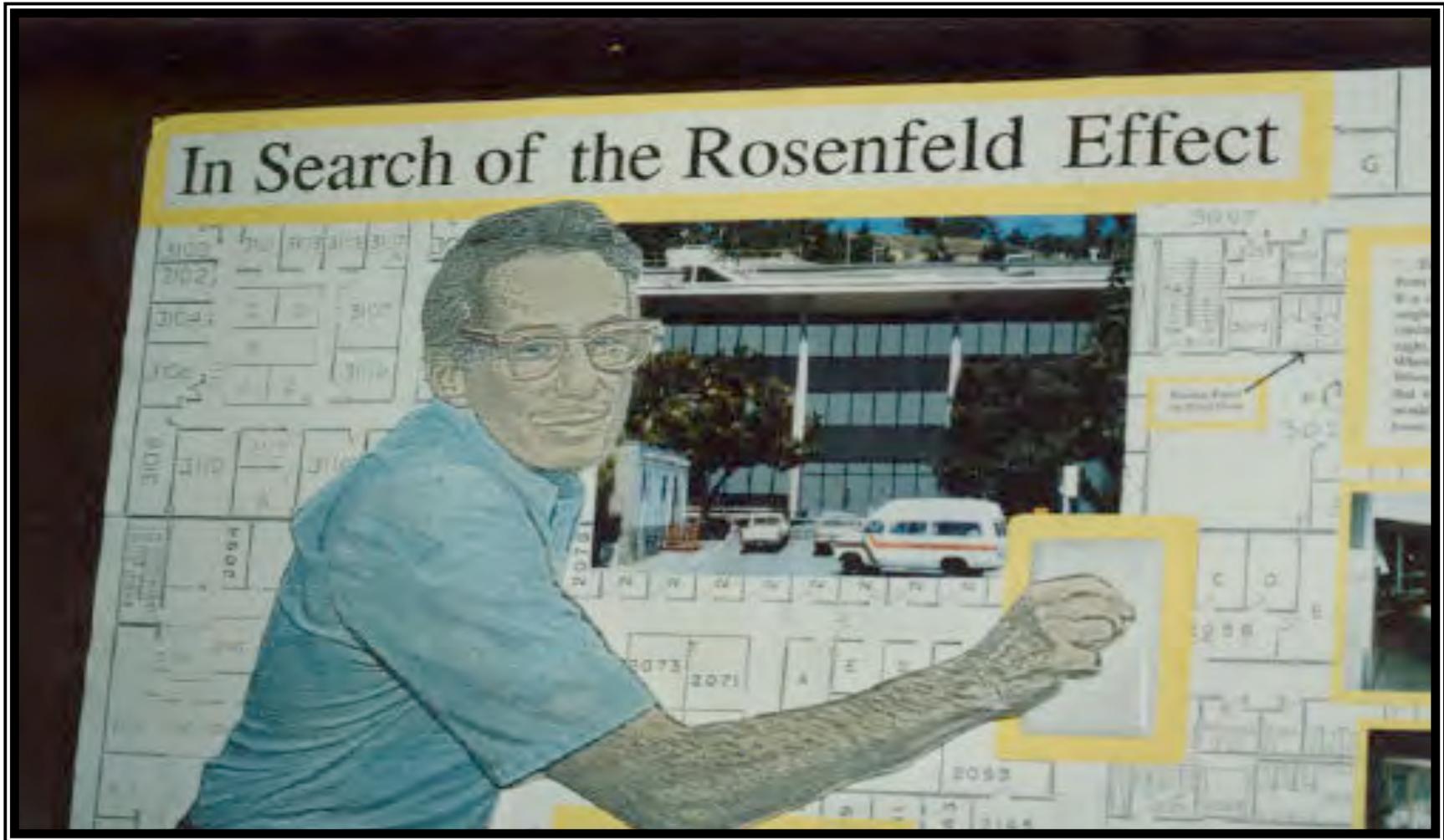
The Rosenfeld Effect in California: The *Art* of Energy Efficiency



Sheryl Carter, Devra Wang and Audrey Chang

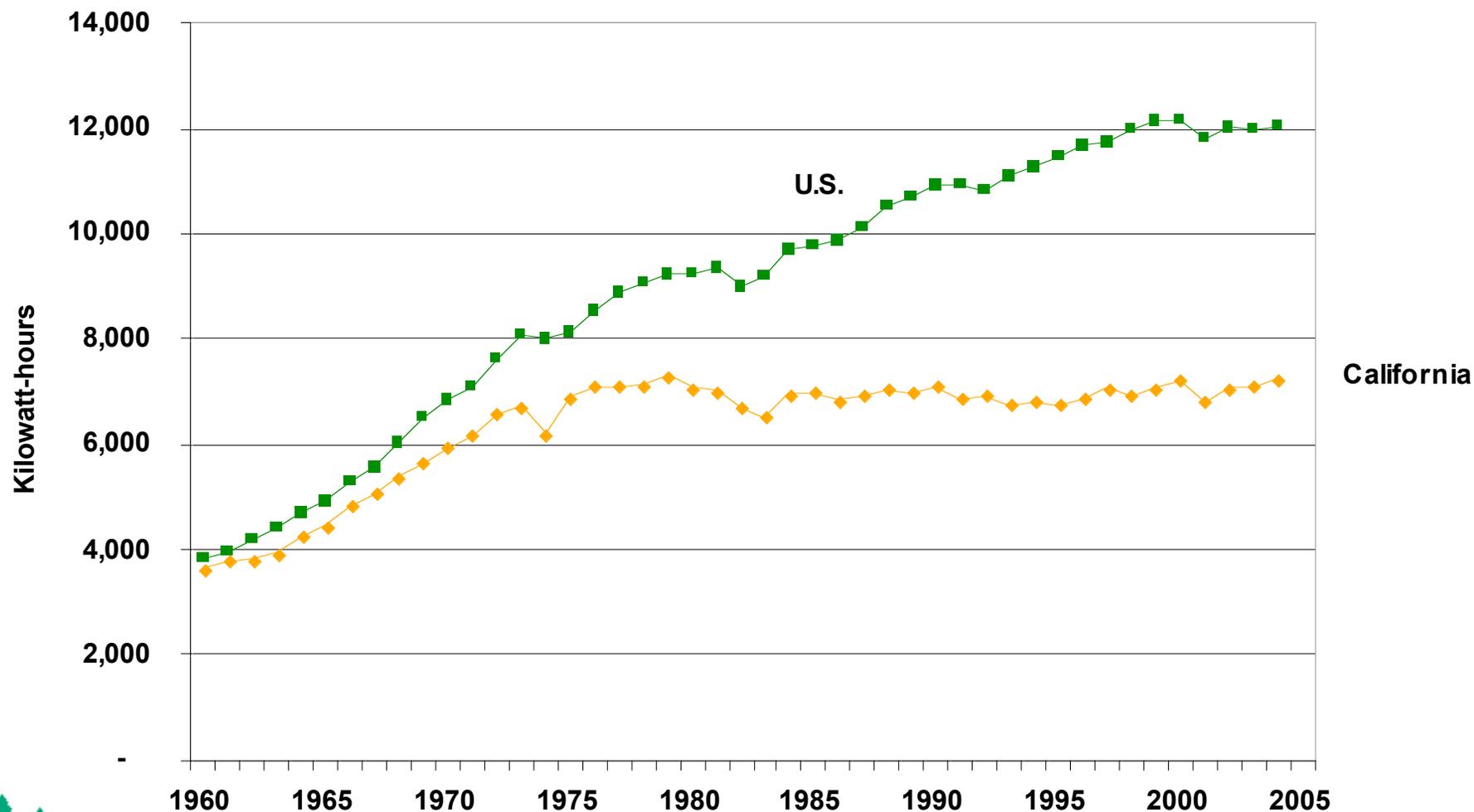


We Found It!



Art Makes California a National Leader

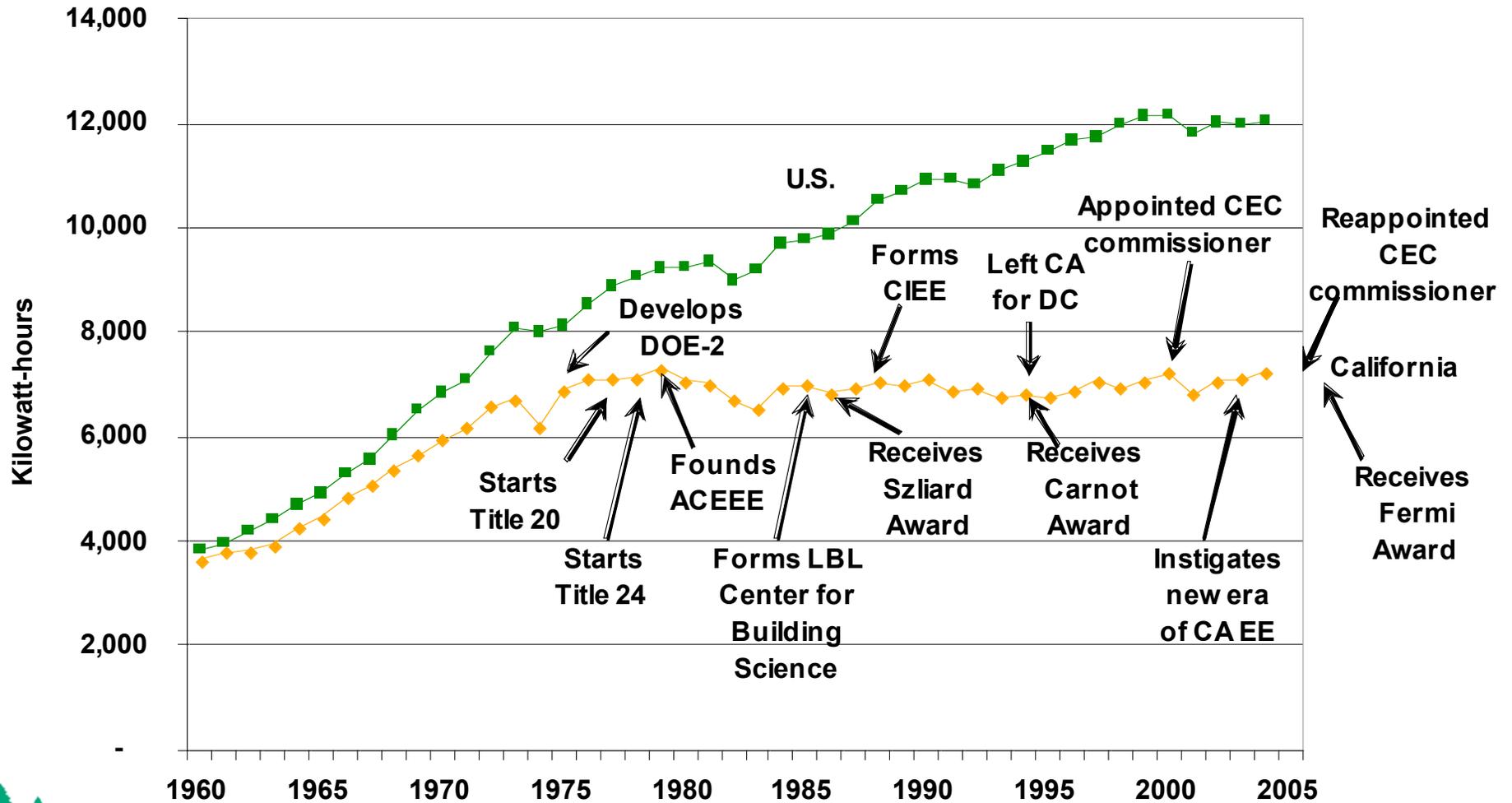
Comparison of Per Capita Electricity Consumption in U.S. and California



Source: California Energy Commission, 2004

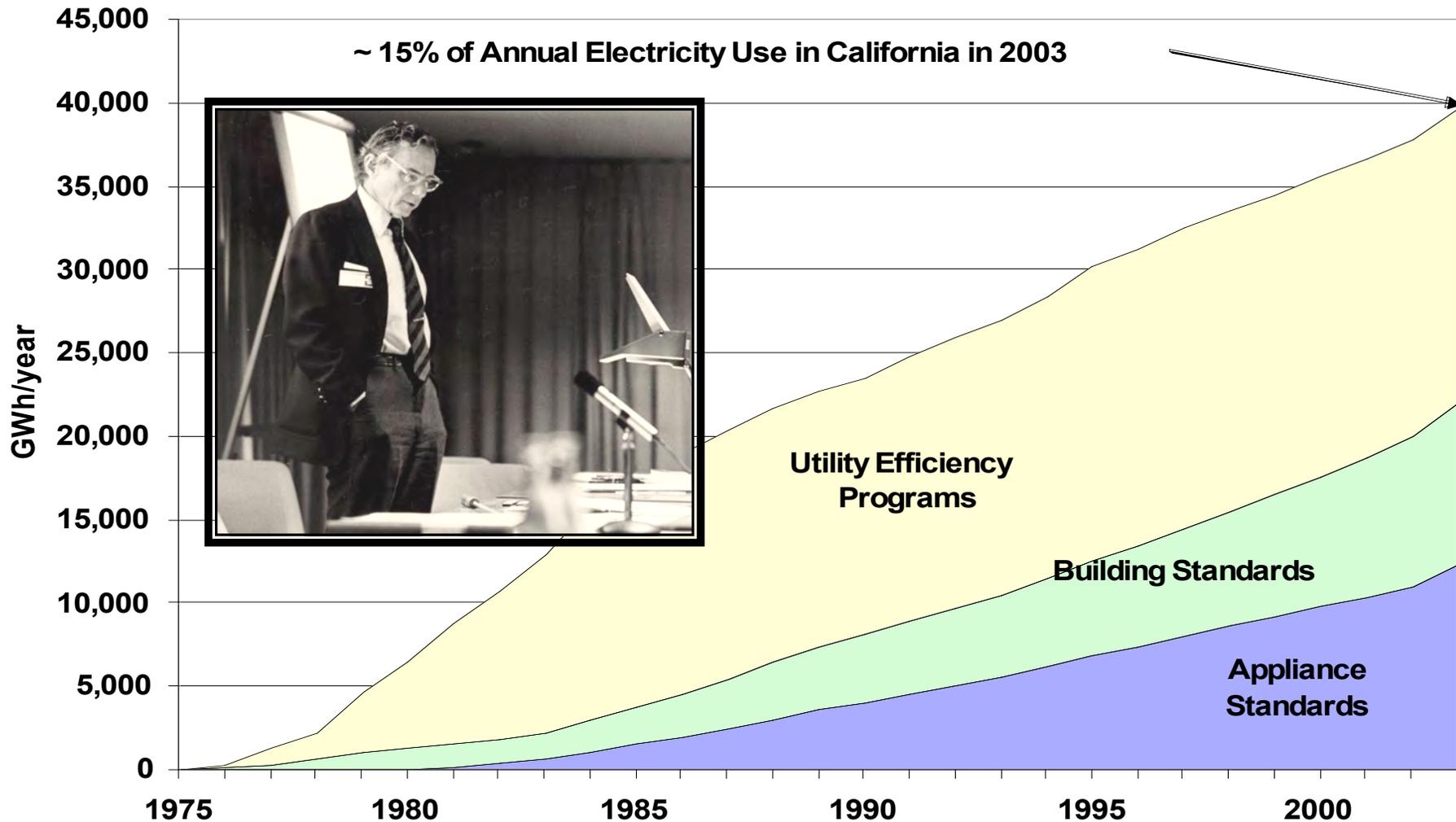
Or to put it another way...

Comparison of Per Capita Electricity Consumption in U.S. and California



Source: California Energy Commission, 2004

The House That Art Built

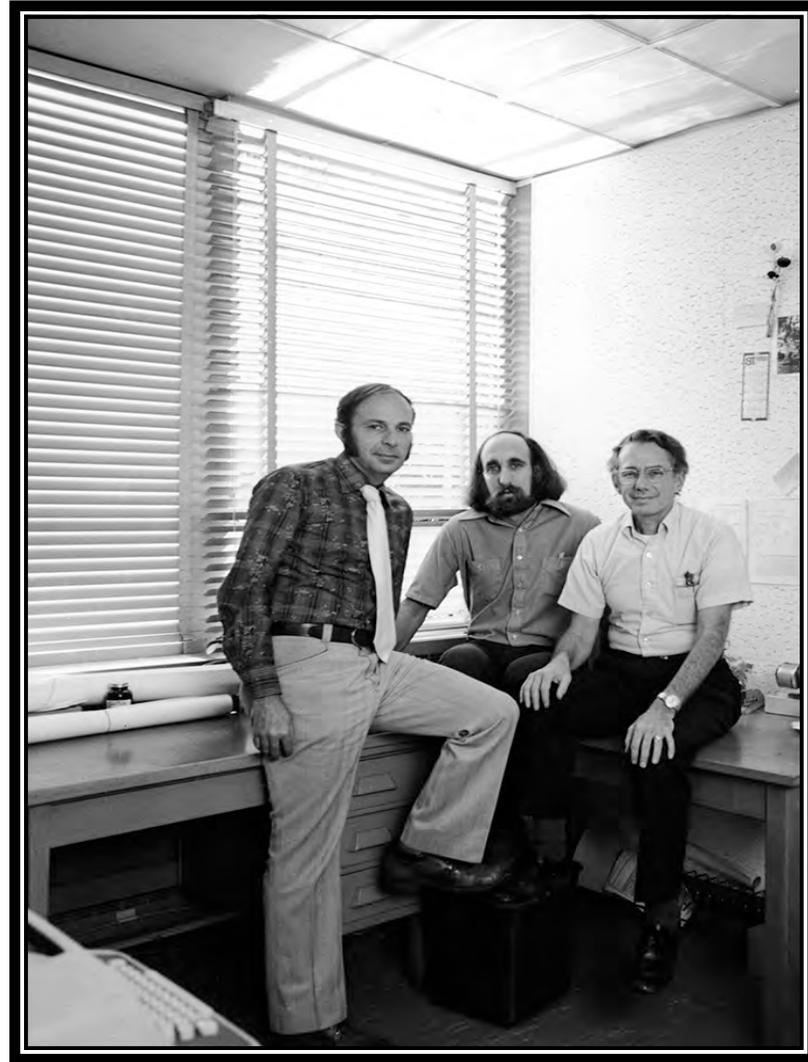


RD&D → Energy Efficiency Programs → Standards

Art Founds and Directs First Energy Efficiency Research Center

Center for Building Science at LBNL

(formerly known as Energy
Efficient Buildings
program)



Art Creates CFLs



- High Frequency Ballast invented
- Philips runs with it and develops CFLs
- Programs and standards helped CFL costs drop from \$25 in 1980s to about \$3 today
- Now provide large portion of program savings

Art Saves U.S. \$42 billion / year...

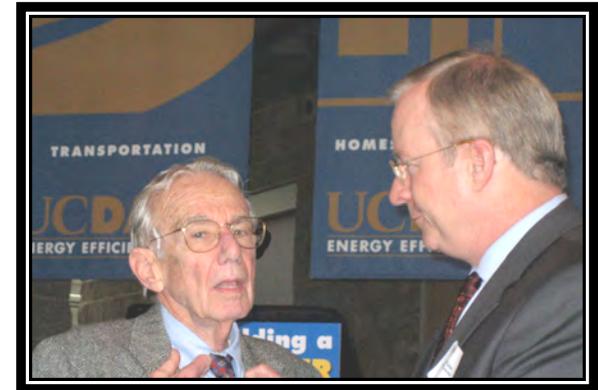
- DOE-2 (\$10 billion)
- High-frequency ballasts (\$5 billion)
- Low-e windows (\$5-10 billion)
- Refrigerators (\$17 billion)



...and counting.

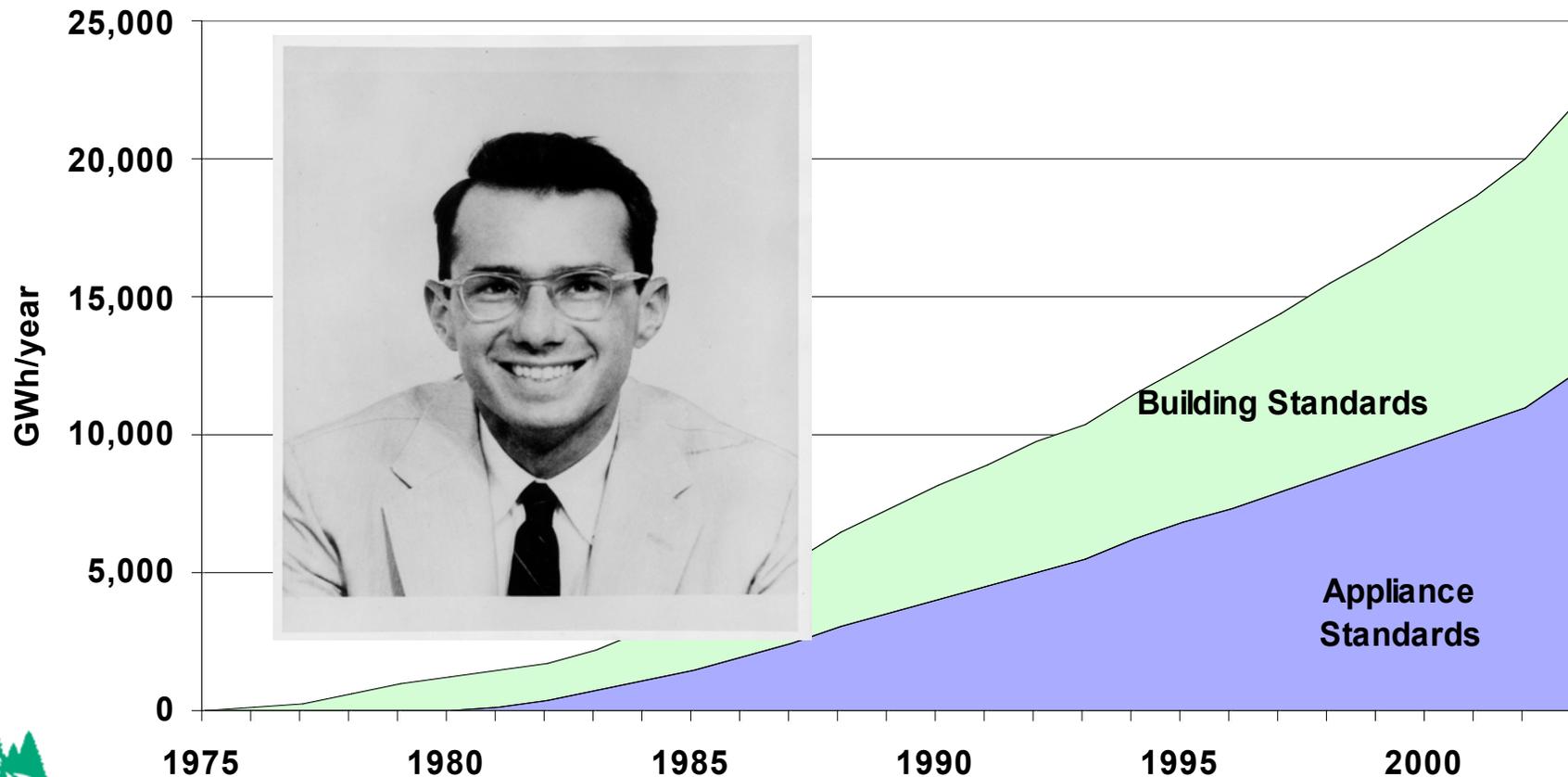
Art Continues RD&D Leadership

- CEC's Public Interest Energy Research Program (PIER)
- LBL's Center for Building Science
- CPUC's Emerging Technologies Fund
- California Clean Energy Fund (CalCEF)



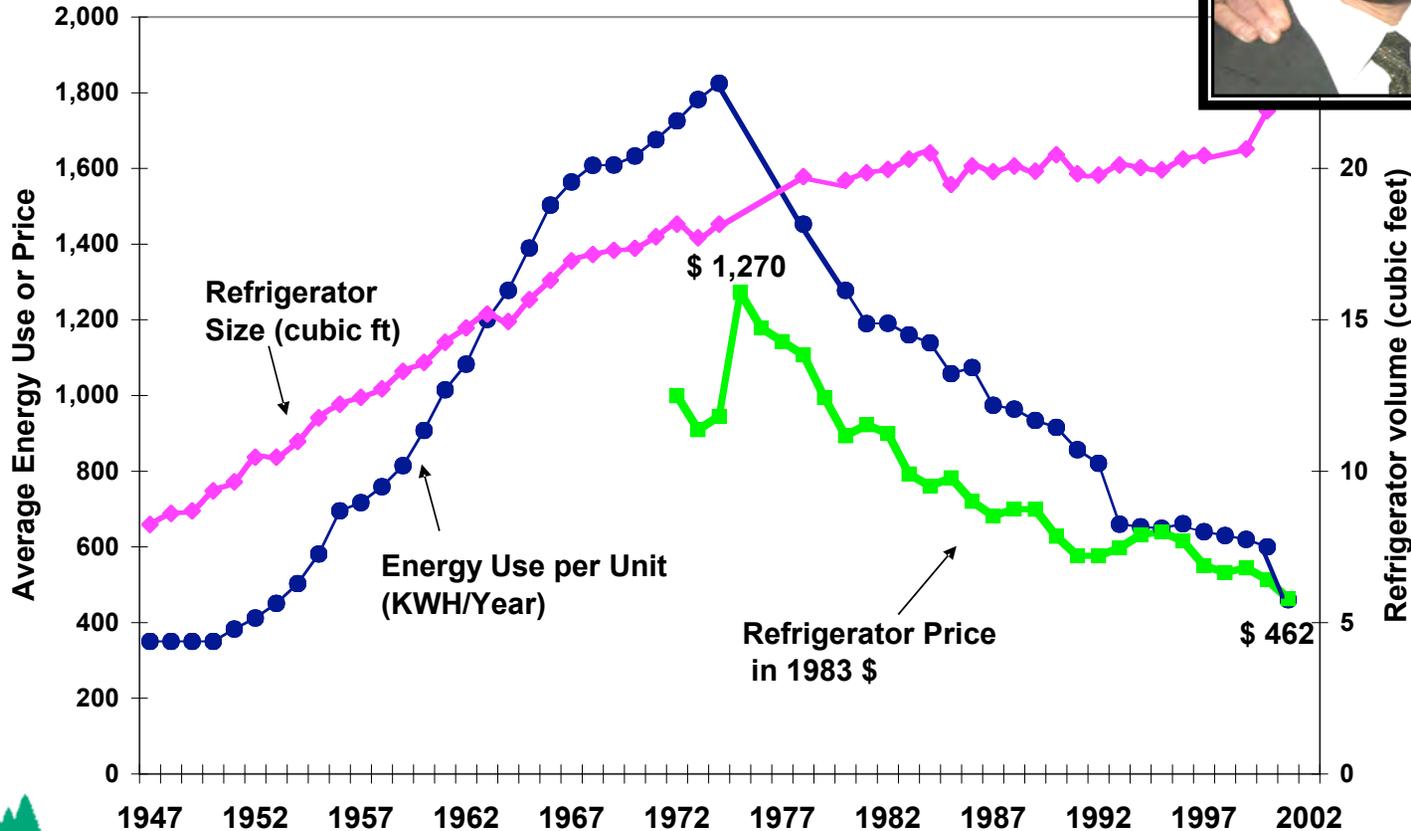
Art Invents Title 24 & Title 20

- So far, CA has avoided need for 16 new power plants.
- Most recent updates will save 2,800 MW and another 5 power plants over next 10 years.



Art Pioneers Appliance Standards...

...And saves the nation 130,000 MW (so far) through efficient refrigerators



Source: David Goldstein

Art Knocks Out 300 Power Plants

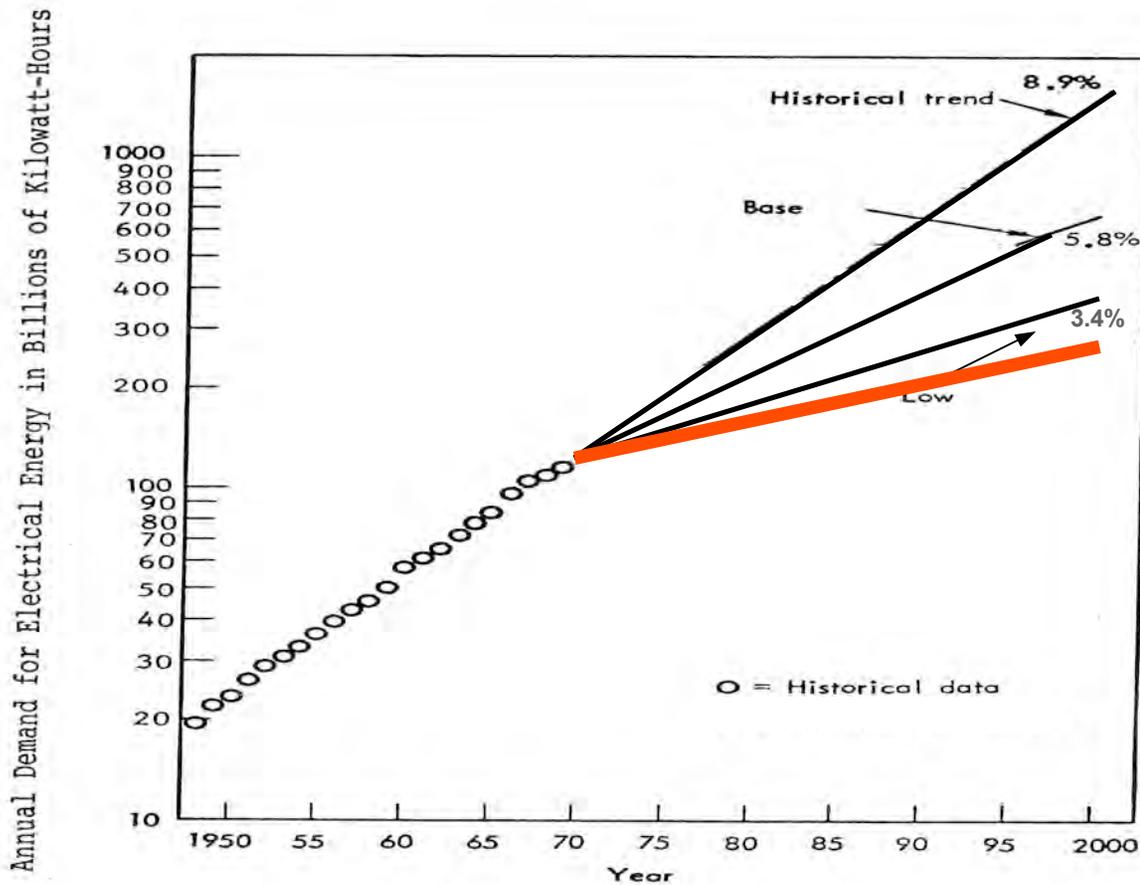


Figure II-3. The Rand Forecasts.

Source: W. MOOZ & C. MOW, *supra* note 5, at 13.

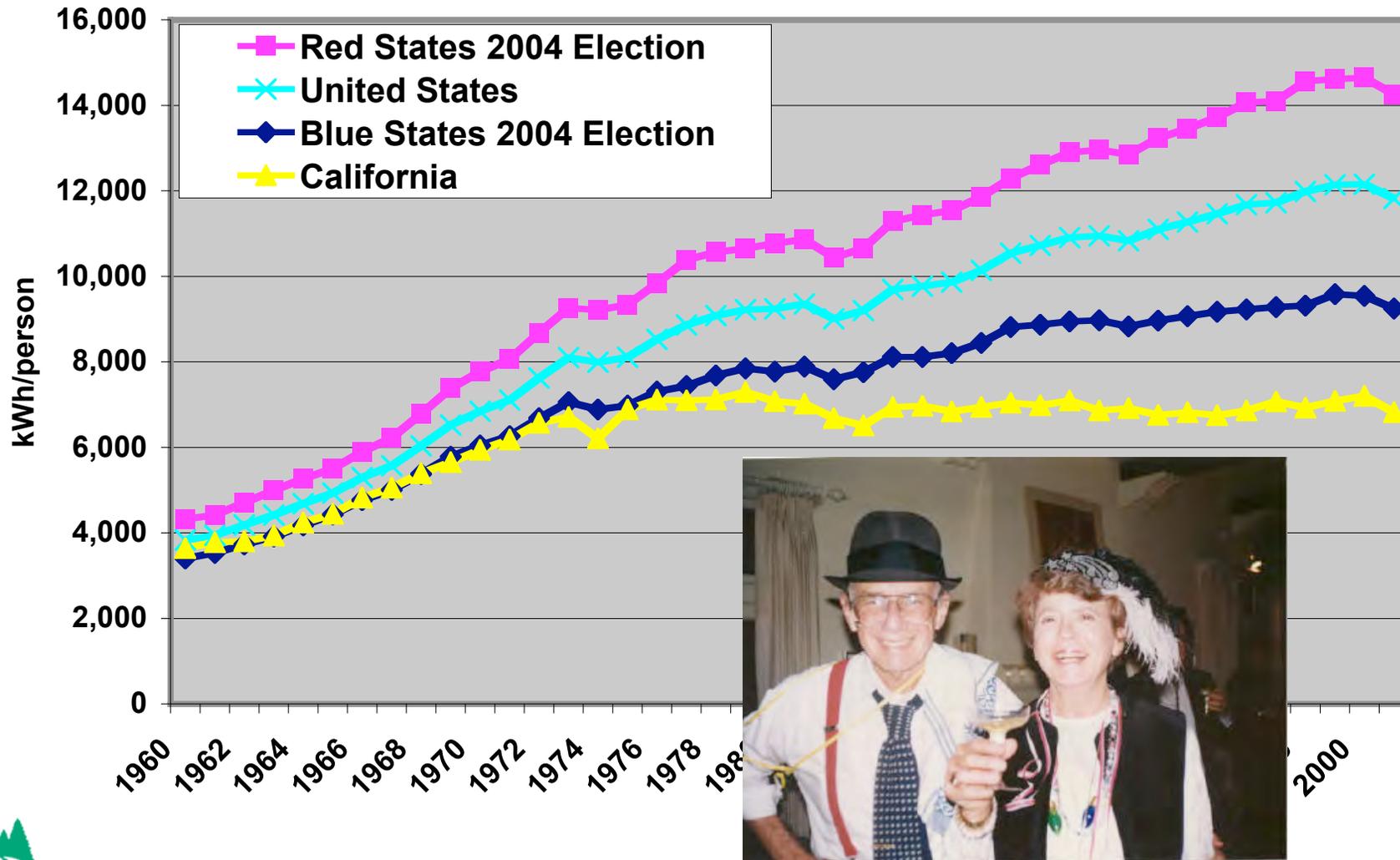
The World Copies Art's Standards

U.S., Russia, China. Who's next?



Throughout, Art Adds Personality

Per Capita Electricity Consumption



Art's Recipe for CA's EE Success



1. RD&D and Standards
2. Integrate energy efficiency into resource procurement
3. Motivate utilities by decoupling revenues from sales
4. Set energy saving targets
5. Well-designed programs
6. Independent evaluation of savings
7. Performance-based incentives

Eliminating Disincentives

The Problem:

Regulators establish an electricity sales forecast, determine an authorized revenue requirement (including both fixed and variable costs of production), and set rates by dividing the two.

BUT, if actual annual electricity sales diverge from the forecast, the utility will either under- or over-recover the fixed-cost element of its revenue requirement.

The Solution:

Use modest, regular true-ups in rates to ensure that any fixed costs recovered in kilowatt-hour charges are not held hostage to sales volume.

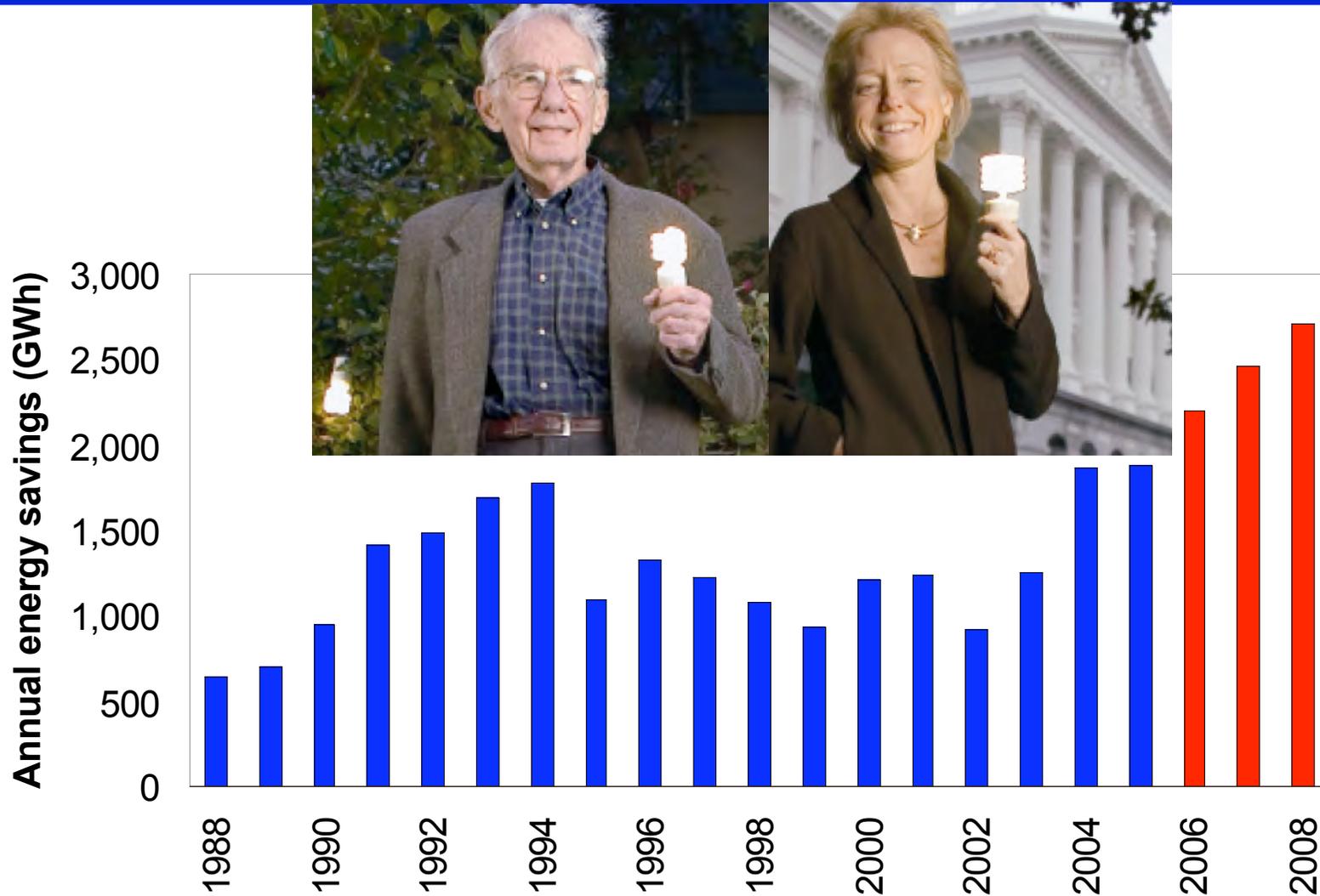
If sales are higher than expected, return over-collected revenues to customers, and vice versa.

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Art Launches Most Aggressive Program Ever



Sources: California Energy Commission; IOU Annual Reports; California Public Utilities Commission

Art Saves California's Money and Air

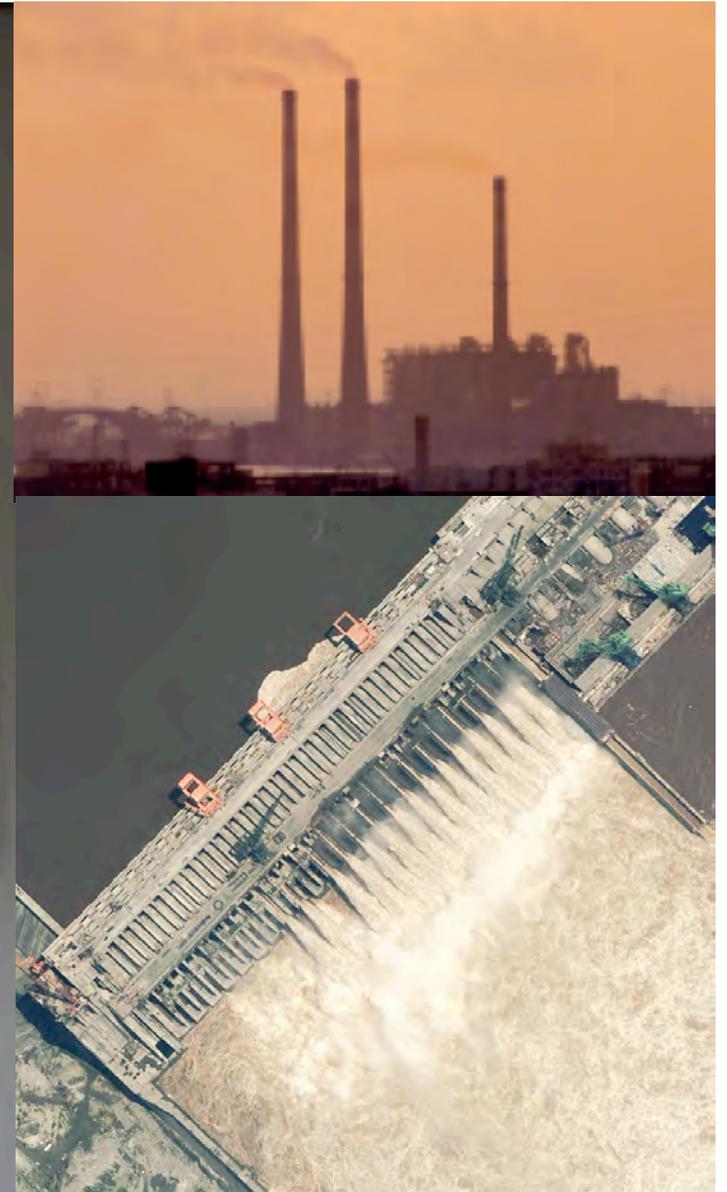
The \$2 billion investment for 2006-08 will yield:

- Net benefits of almost \$3 billion
- 1,500 MW saved for less than half the cost of avoided generation (averaging only 3 c/kWh)
- CO₂ emission savings of more than 3 million tons per year by 2008, equivalent to taking 650,000 cars off the road.

Source: California Public Utilities Commission Decision 05-09-043

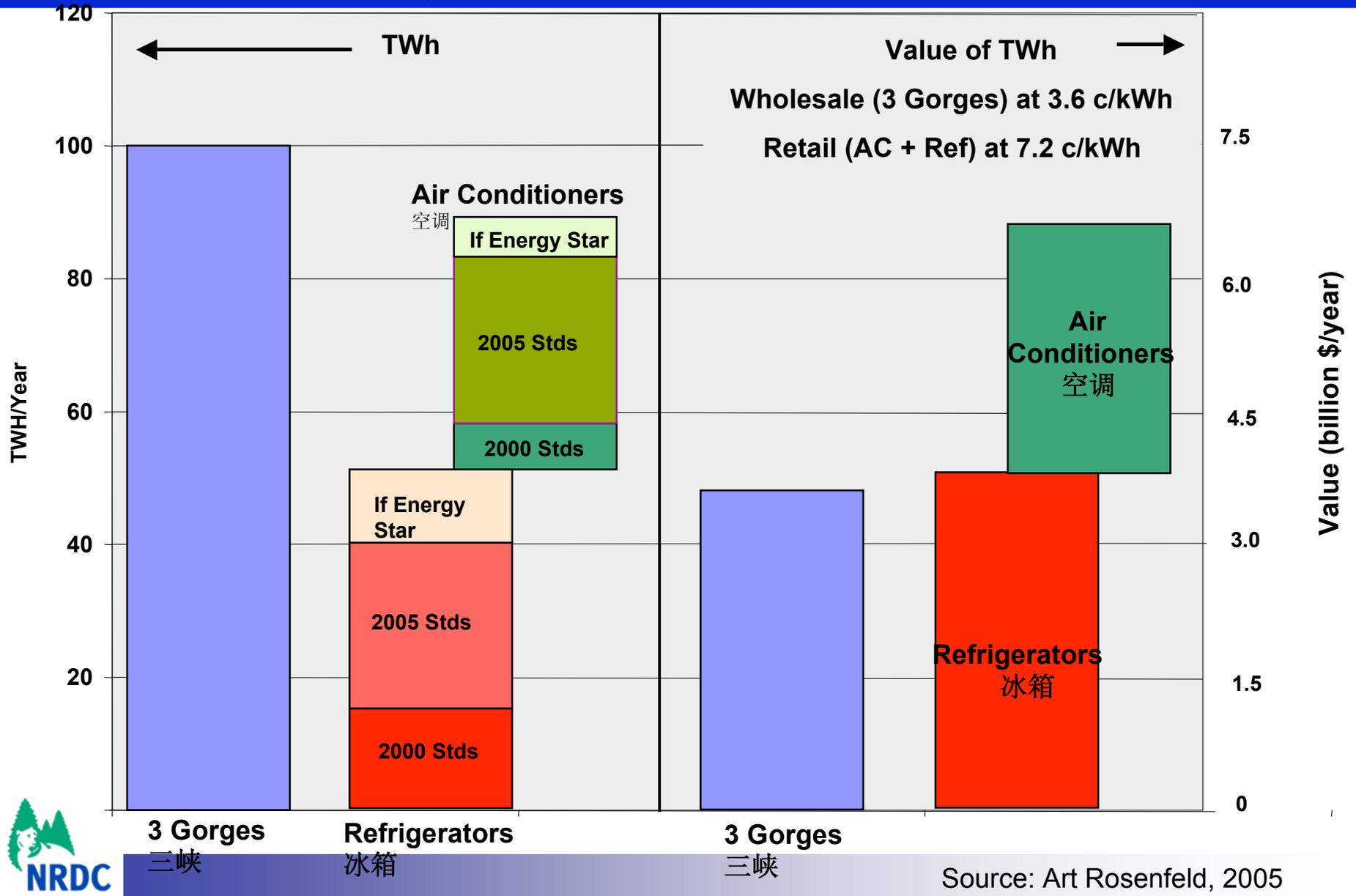


Art Goes to China

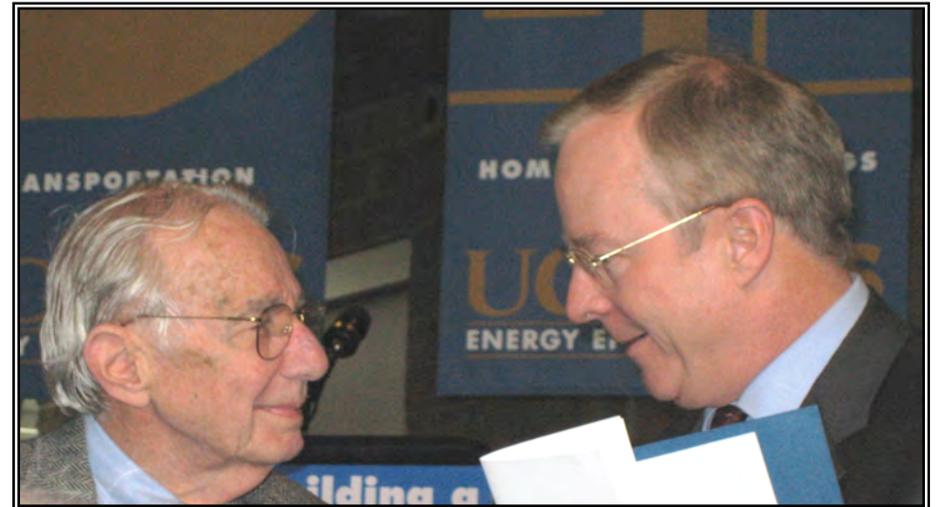
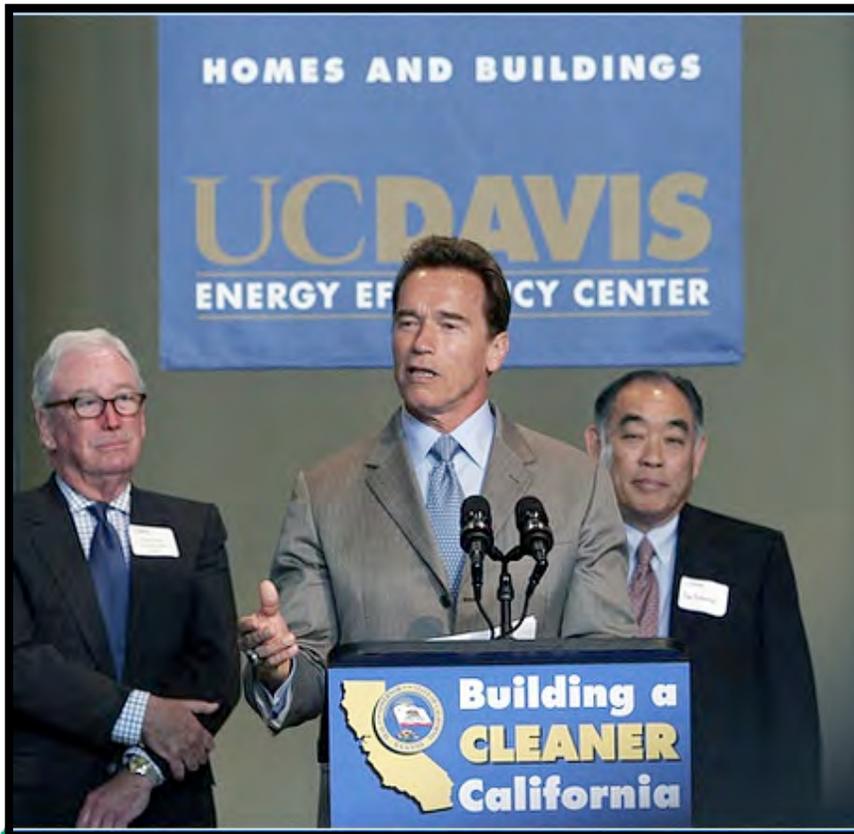


Art Goes to China

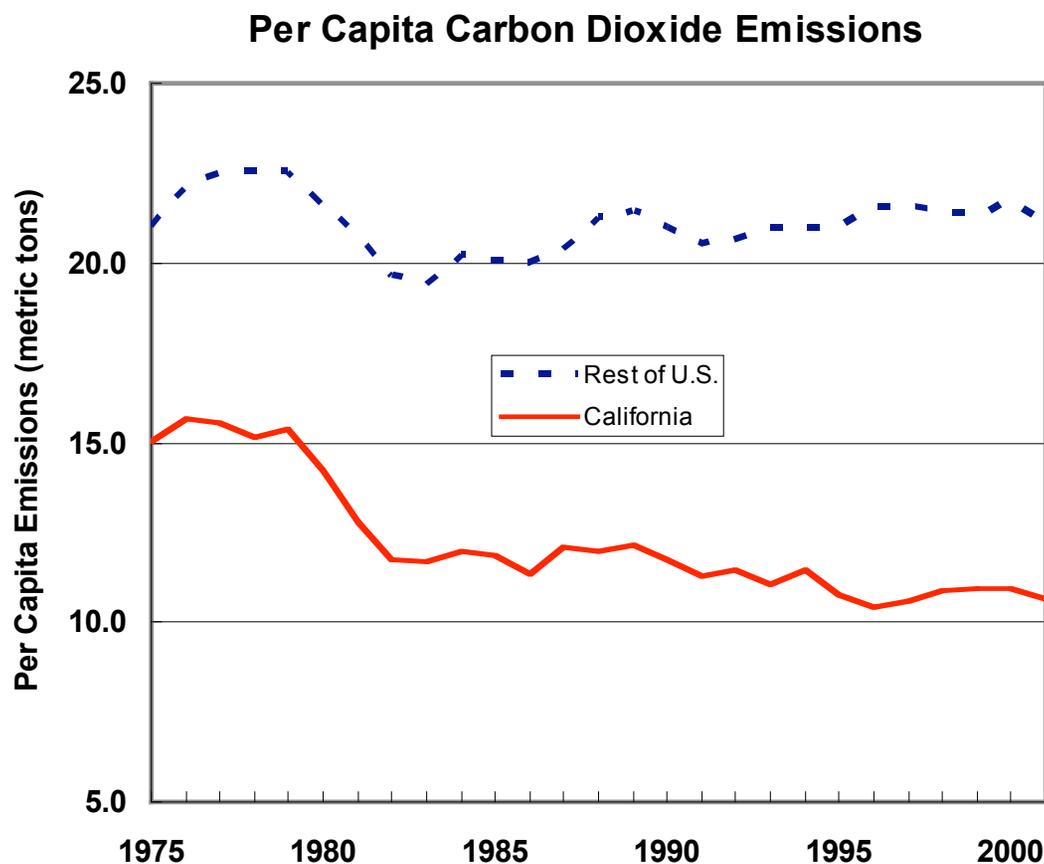
Comparison of 3 Gorges to Refrigerator and AC Efficiency Improvements



Art Launches University Center of Excellence



Art Spurs CA to Lead on Global Warming



Source: Oak Ridge National Laboratory, 2004

Governor's Targets

- 2000 levels by 2010
- 1990 levels by 2020
- 80% below 1990 by 2050

SB 1368 (Perata):

Greenhouse Gas
Performance Standard

AB 2021 (Levine): Public
Utilities' Energy Efficiency

AB 32 (Núñez-Pavley):
Global Warming Solutions
Act

Thank You, Art and Roz!

