

Past and Current Efficiency Successes and Future Plans

ACEEE: Energy Efficiency as a Resource
Berkeley, California
September 26 and 27, 2005

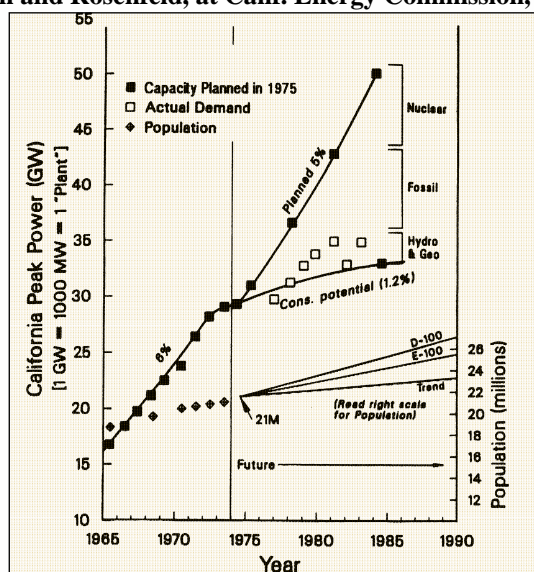
Arthur H. Rosenfeld, Commissioner
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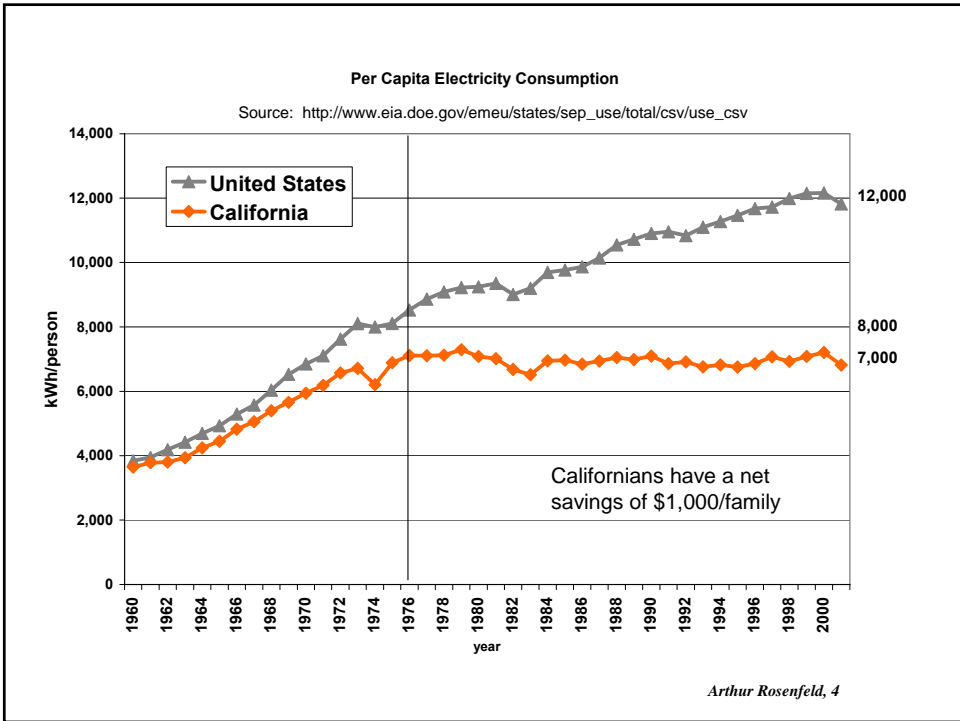
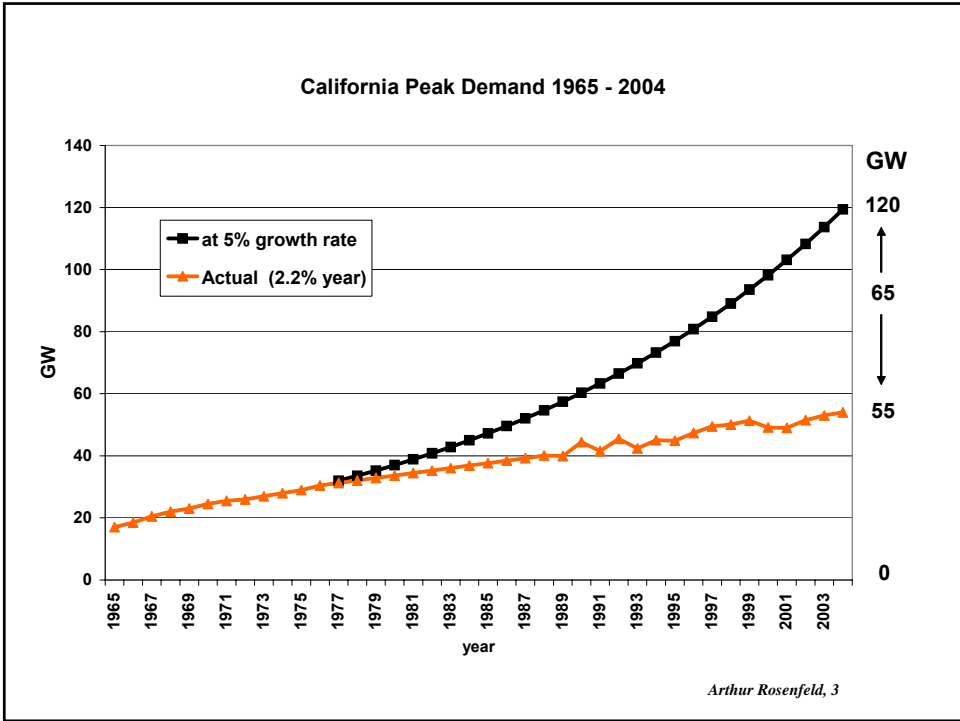
For my Autobiography, visit

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

California Peak Power Demand: Planned in 1974, and Actual to 1984
Goldstein and Rosenfeld, at Calif. Energy Commission, Dec. 1975



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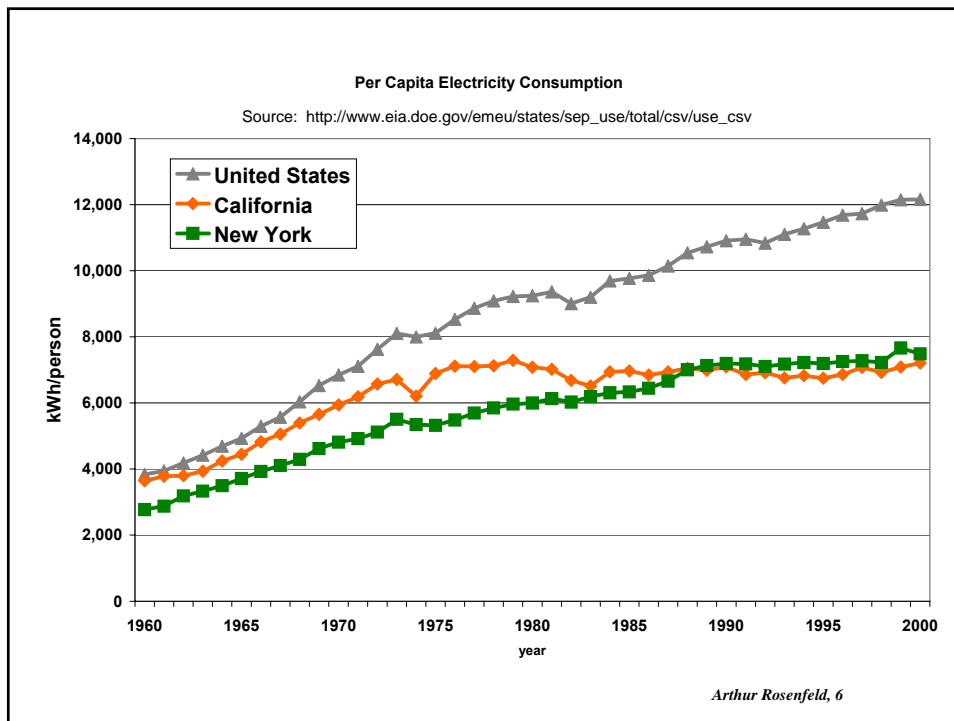


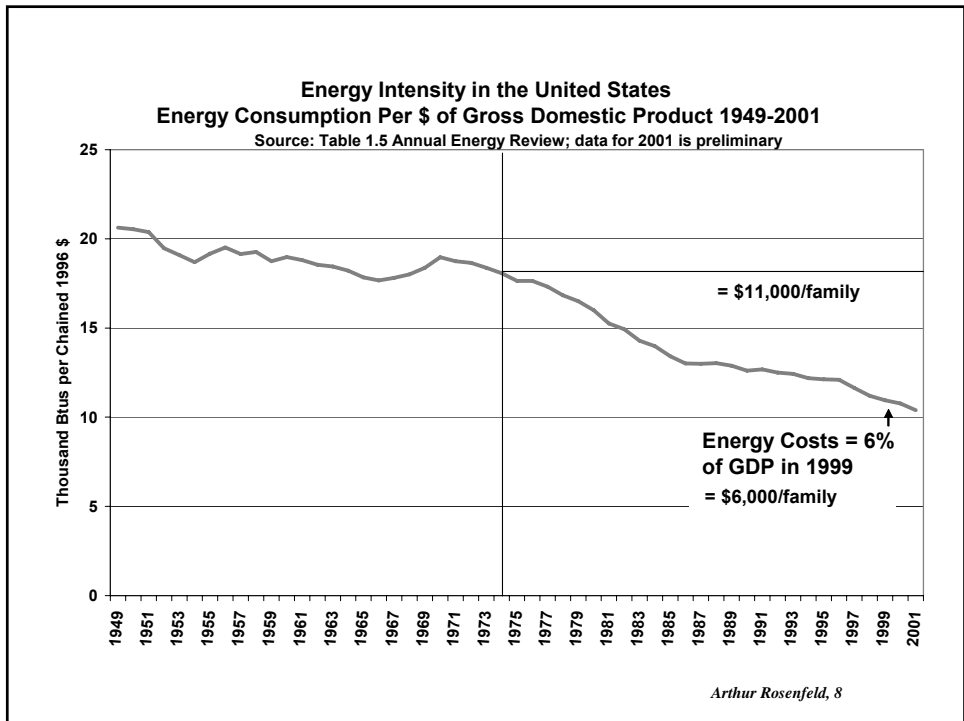
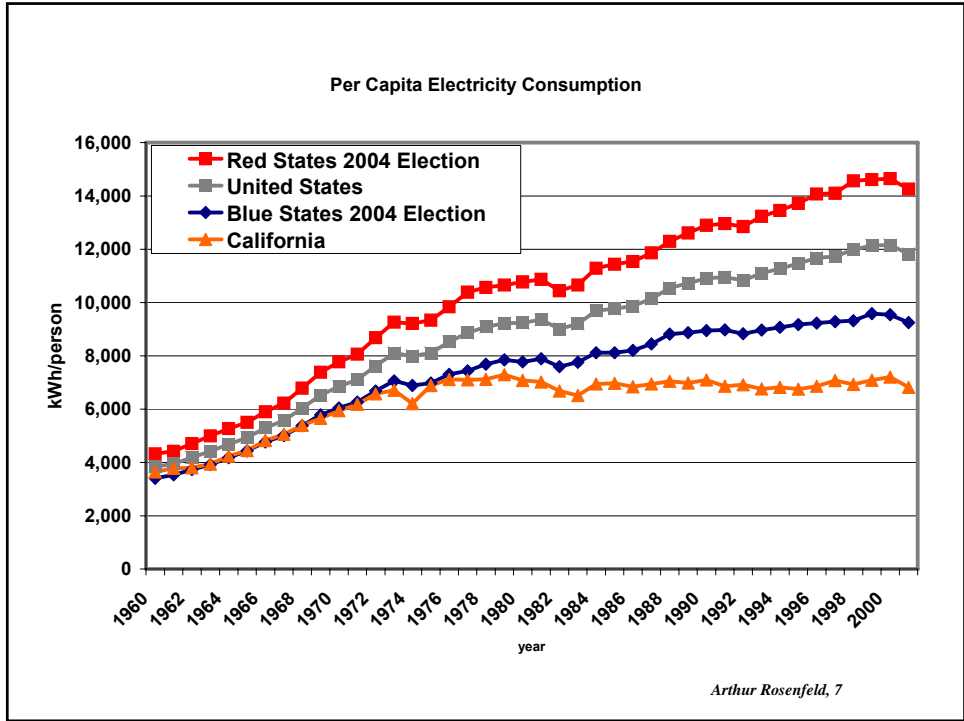
Costs and Pollution Saved by Avoiding a 50% expansion of California Electric System.

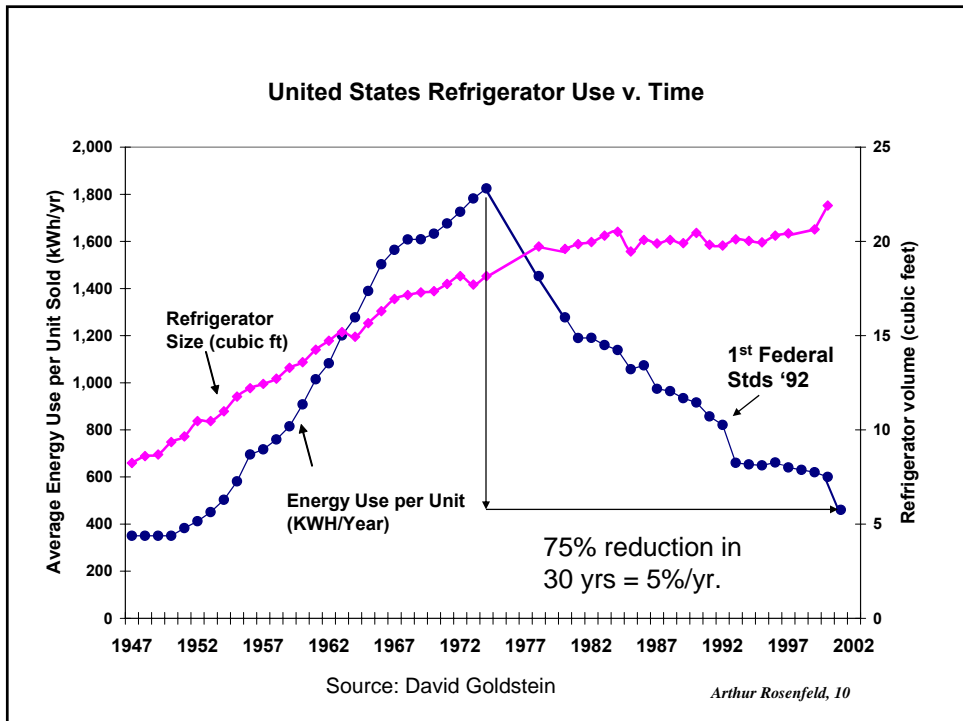
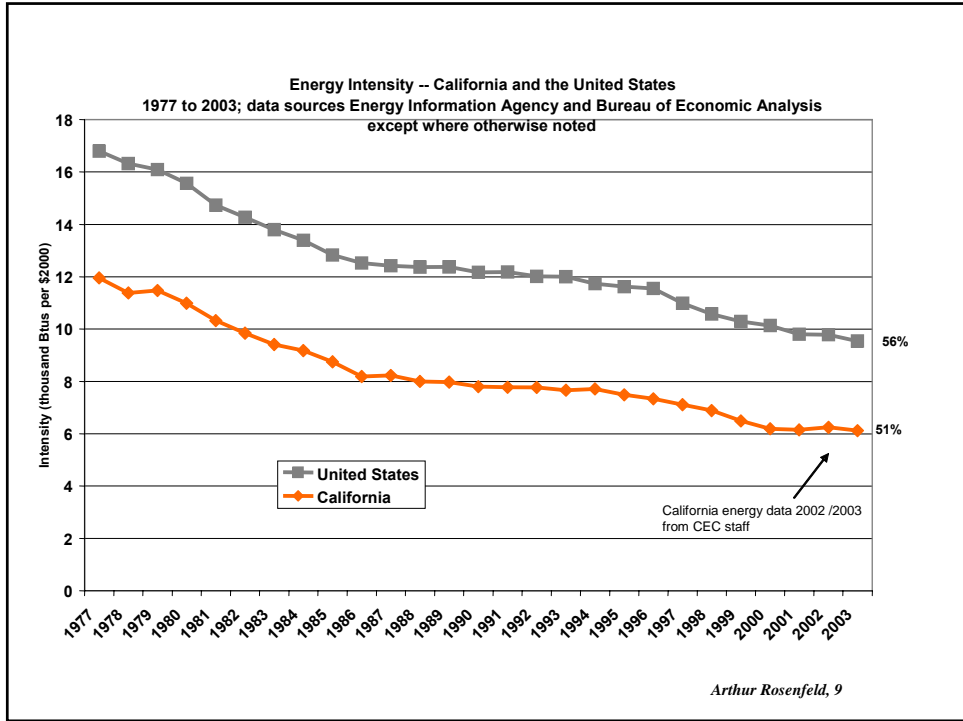
- ◆ Avoids 18 Million tons/year of Carbon
- ◆ Equivalent to getting 12 million cars off the road,
 - along with their NO_x, CO, and particulate emissions.
- ◆ California has ~25 million motor vehicles,
 - avoided 50% more equivalent pollution.
- ◆ The Pavley bill, starting in model year '09, should start to reduce another 30%.

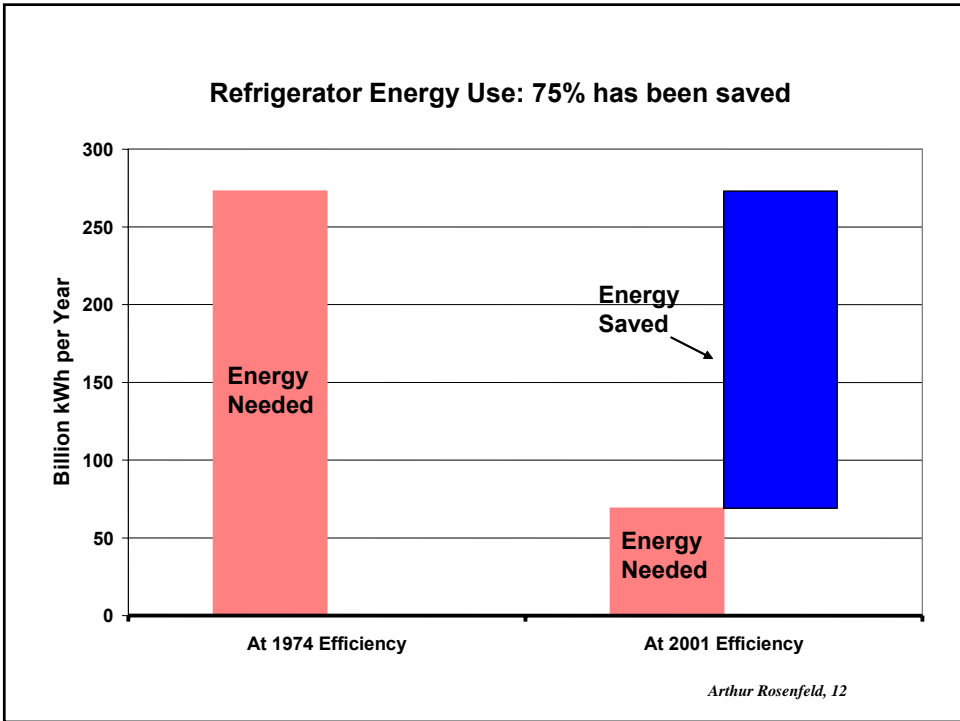
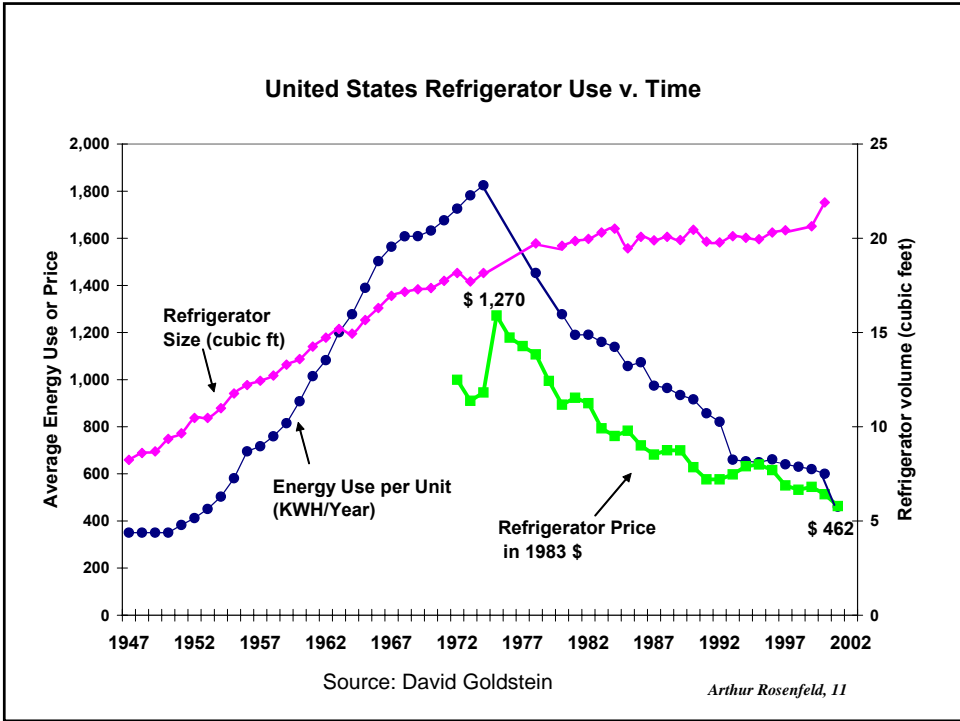
- ◆ California annual electric bill in 2004 ~ \$32 Billion
- ◆ Avoided ~\$16 Billion of bills, but net saving is only ~\$12Billion/year, i.e. **\$1000/family**.

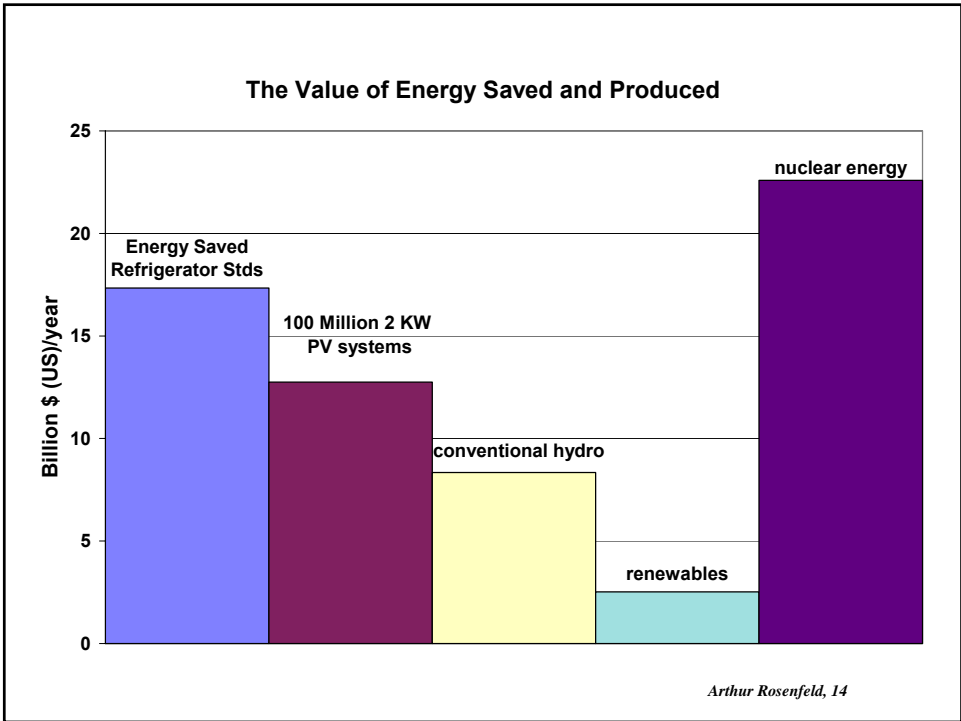
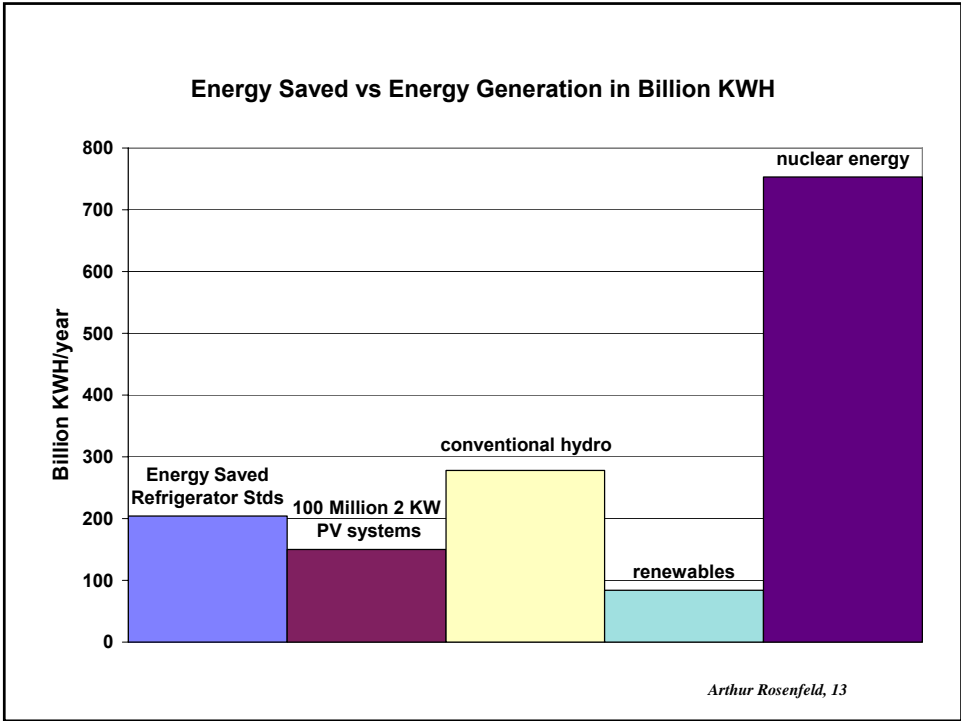
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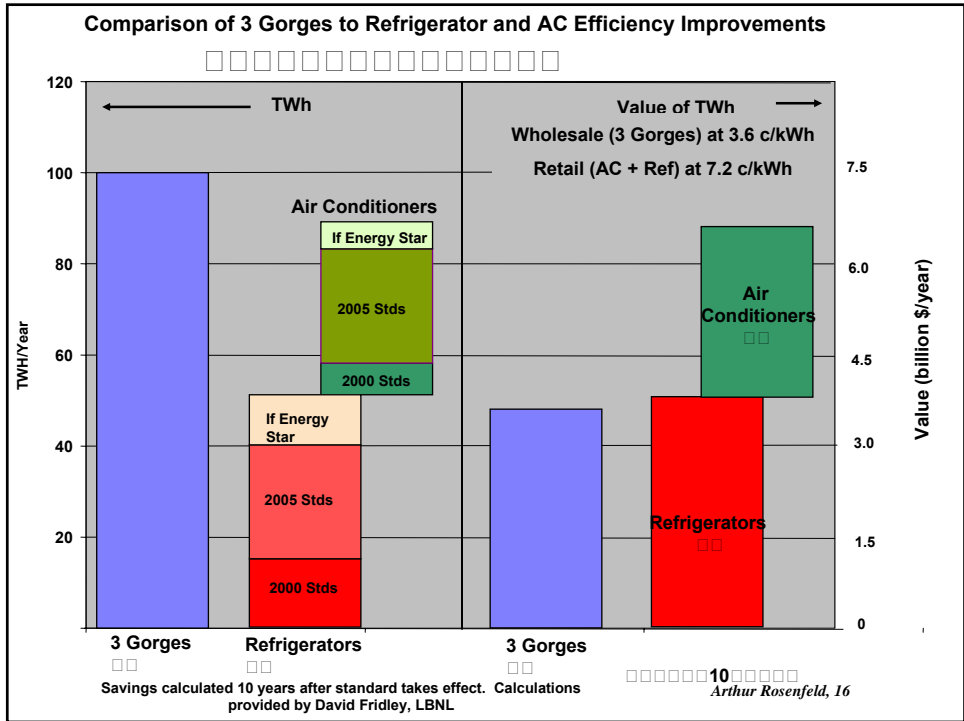
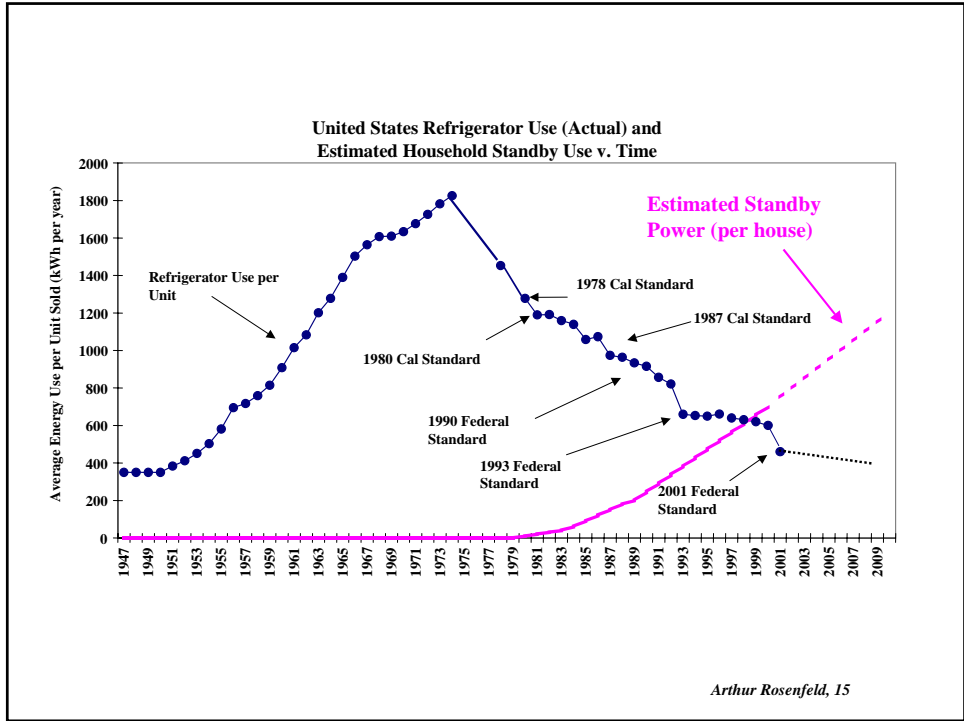


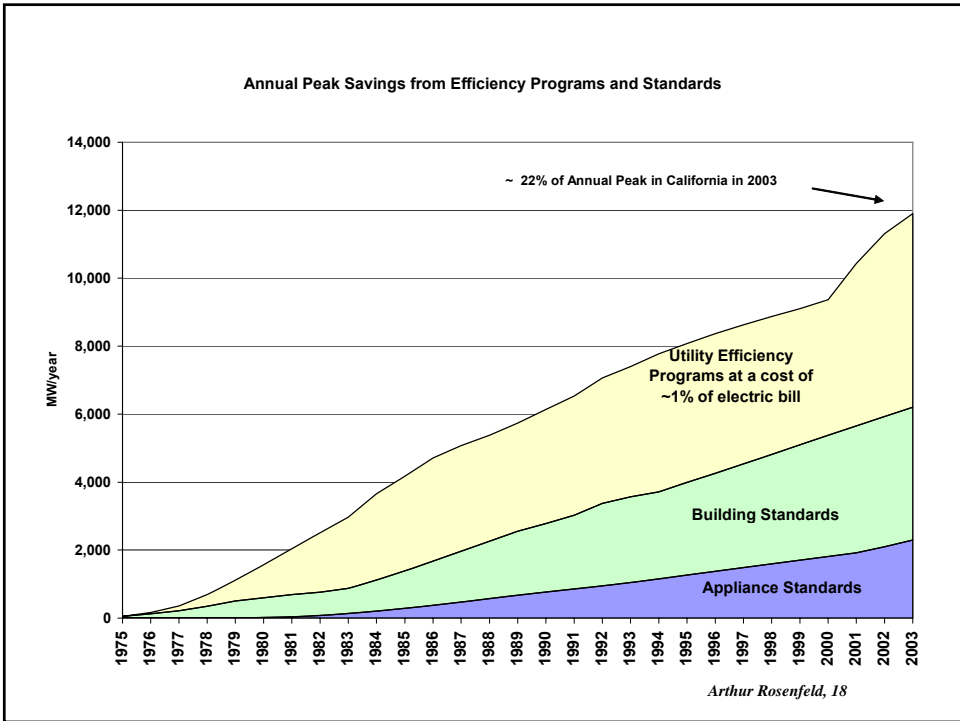
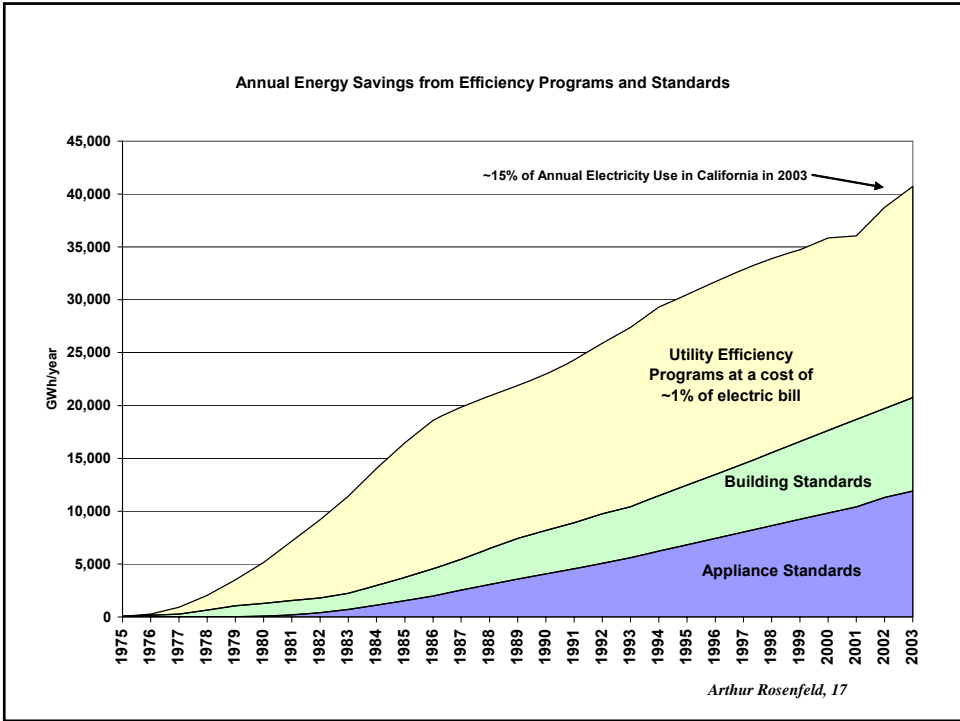




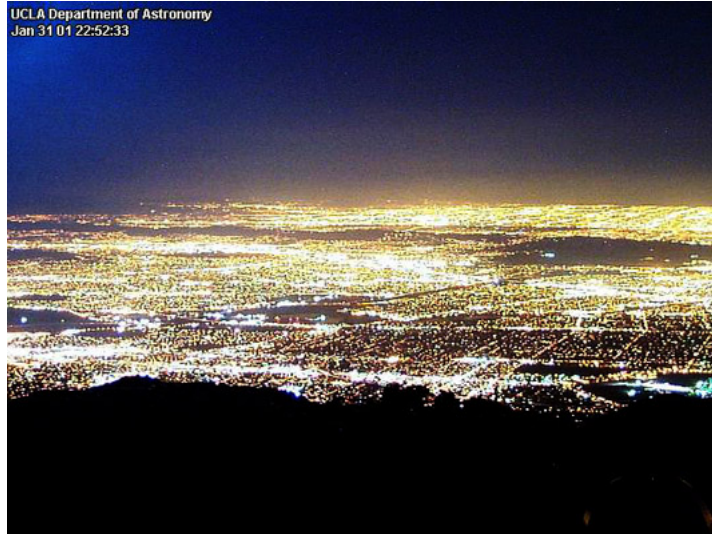








UCLA Department of Astronomy
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Illuminating Space vs. the Street



Arthur Rosenfeld, 20

Funding and Energy Savings From Investor-Owned Utility Energy Efficiency Programs In California for Program Years 2000 Through 2004

Formerly Entitled:
Funding and Savings for Energy Efficiency Programs
For Program Years 2000 Through 2004

Cynthia Rogers
Mike Messenger
Sylvia Bender

August 2005
CEC-400-2005-042-REV

<http://www.energy.ca.gov/2005publications/CEC-400-2005-042/CEC-400-2005-042-REV.PDF>

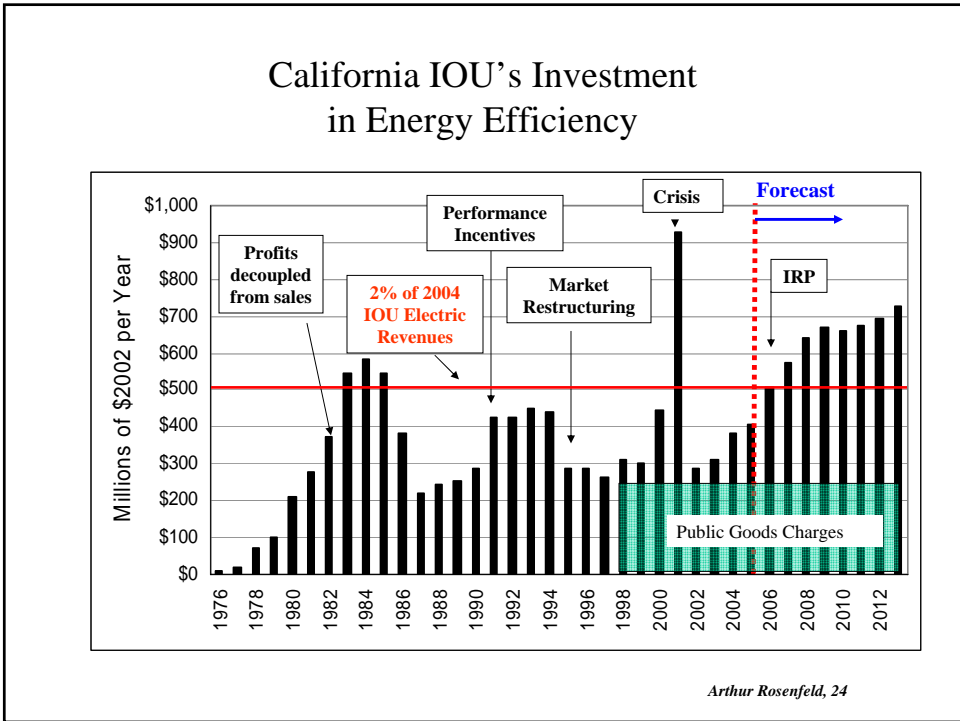
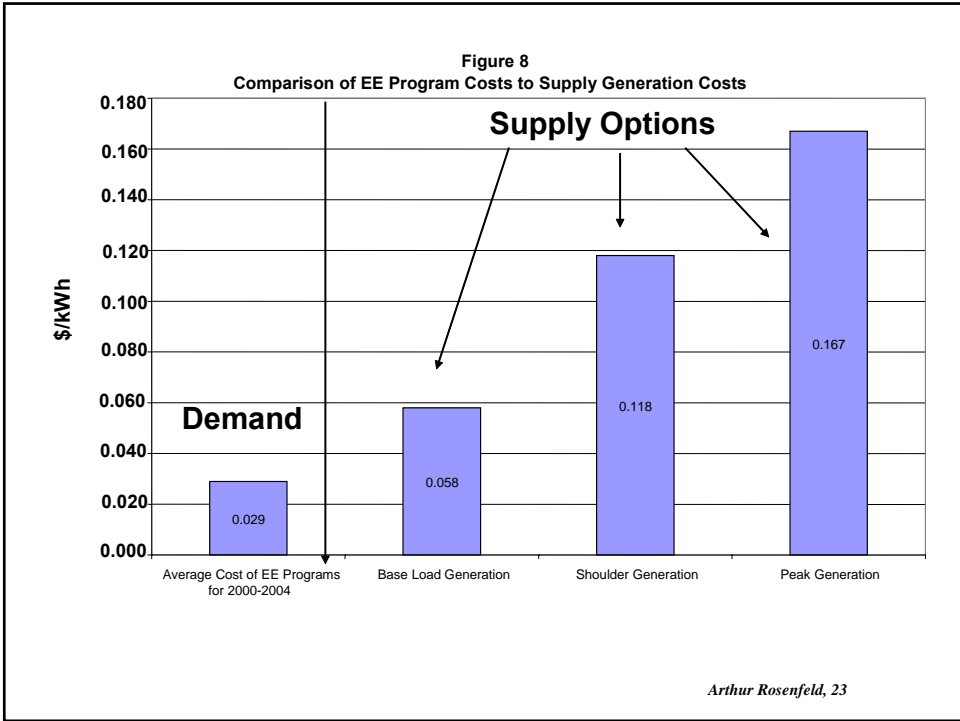
Arthur Rosenfeld, 21

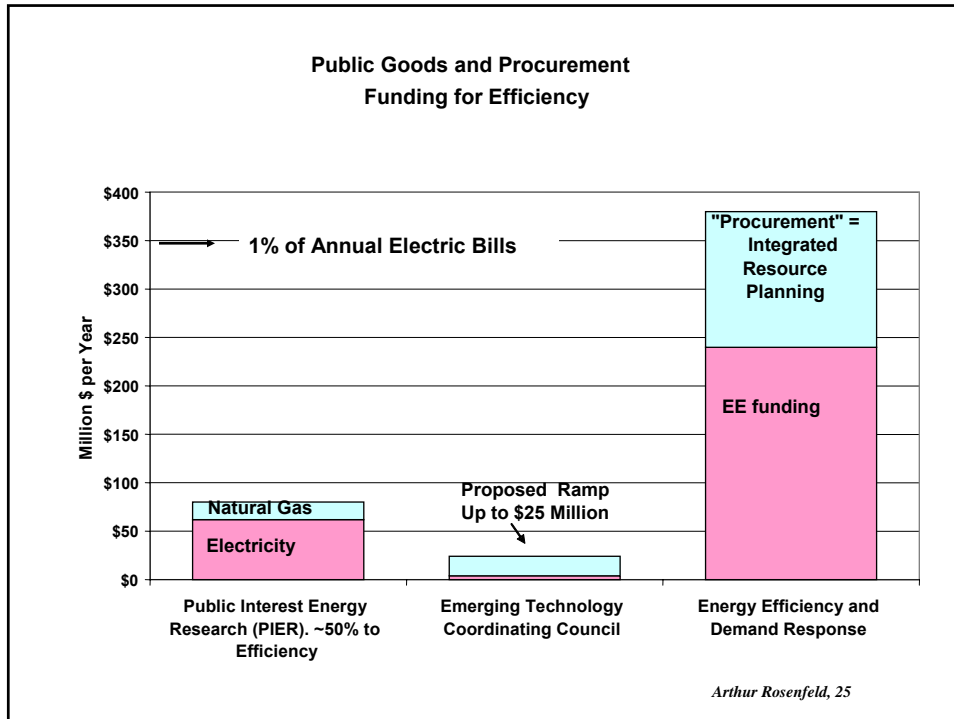
Table 1
2004 First-Year Savings (GWh) for PG&E, SCE and SDG&E, and
2004 Funding

	GWh	% of Total GWh	MW	% of Total MW	Funding (\$000)	% of Total Revenue
PG&E	623	0.8%	141	0.6%	\$132,752	1.3%
SCE	984	1.2%	185	0.9%	\$146,763	1.5%
SDG&E	236	1.4%	51	1.4%	\$37,828	1.5%
Total	1,843	1.0%	377	0.8%	\$317,343	1.4%

<http://www.energy.ca.gov/2005publications/CEC-400-2005-042/CEC-400-2005-042-REV.PDF>

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- ### EE Procurement by the IOUs
- ◆ In September 2004 The CPUC adopted aggressive goals for new energy efficiency savings, covering the next decade of IOU procurement:
 1. \$6 billion in investment over ten years.
 2. 5,000 MW of avoided traditional generation, equivalent to approximately 1% of load per year.
 3. With these goals established, the CPUC is now considering the first **three-year plans, with associated funding levels, to reach the desired targets:**
 4. \$2.7 billion in investment for 2006-2008, including customer out-of-pocket costs.
 5. Investment Increases from \$400 million to \$800 million annually.
 6. IOU efficiency procurement will defer 1500 MW of traditional generation development, with a life cycle effect equivalent to removing 1 M cars from the road.
- Arthur Rosenfeld, 26*

Energy Action Plan

The Energy Action Plan is driven by the Loading Order contained in the multi-agency Energy Action Plan. Since its enactment in 2003, the Loading Order has been integrated into the major CPUC decisions governing energy policy and procurement. Energy resources are prioritized as follows:

- ◆ **1. Energy Efficiency/Demand Response**
- ◆ **2. Renewable Generation, including renewable DG**
- ◆ **3. Increased development of affordable & reliable conventional generation**
- ◆ **4. Transmission expansion to support all of California's energy goals.**

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Next Steps - Energy Action Plan 2

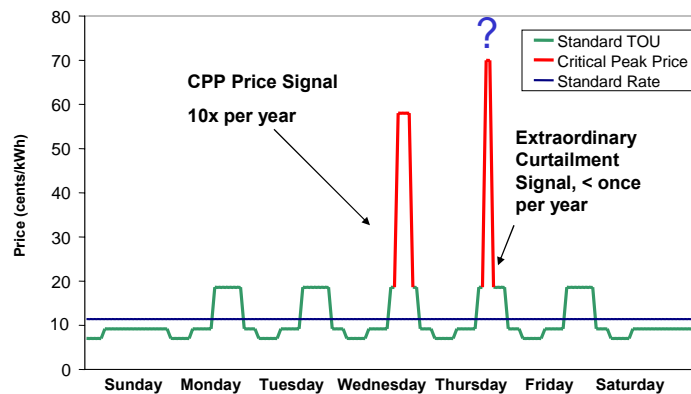
◆ The state's recently adopted EAP 2 continues to emphasize energy efficiency, demand response and renewable energy as top priorities for energy policy. Some key elements of EAP 2 follow:

- ◆ **Transportation fuels and decreased reliance on petroleum** are a new emphasis.
- ◆ RD&D objectives are to be more closely correlated with broad energy policy priorities.
- ◆ **Climate change mitigation strategies** are identified as a separate component of the EAP, and given a higher profile than in EAP 1.

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Critical Peak Pricing (CPP) with additional curtailment option

Potential Annual Customer Savings:
10 afternoons x 4 hours x 1kw = 40 kWh at 70 cents/kWh = ~\$30/year



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The California Clean Energy Fund (CalCEF)

A new \$30 million fund formed to make equity investments in clean energy technology companies in California

- Non-profit, public benefit, evergreen fund
- Established as a result of the Settlement Agreement between PG&E and the California Public Utilities Commission
- Mission is create an investment vehicle that serves as a catalyst to advance California's clean energy agenda
- Board of Directors blends public policy makers, investment professionals, and science and technology experts

Arthur Rosenfeld, 30

Board of Directors

◆ **Michael R. Peevey (Chairman)**

– President, California Public Utilities Commission.

◆ **Ralph Cavanagh**

– Co-Director, Natural Resource Defense Council (NRDC) energy program. Member U.S. Secretary of Energy Advisory Board, 1993-2003.

◆ **Jonathan Foster**

– General Counsel/VP Corporate Development, Atempo. Former deputy director of White House Office of Science and Technology Policy.

◆ **Tom Jacoby**

– Founder/President Columbia Consulting Company; Director, Homeland Energy Resources Development Corp., Director, Environmental Entrepreneurs.

◆ **Mark Levine**

– Director, Environmental Energy Technologies Division (EETD), LBNL

◆ **Nancy E. Pfund**

– Managing Director, JPMorgan. Co-head JPMorgan’s \$75M Bay Area Equity Fund.

◆ **Arthur Rosenfeld**

– Commissioner, California Energy Commission; Emeritus Professor of Physics, UC Berkeley

◆ **Mason Willrich**

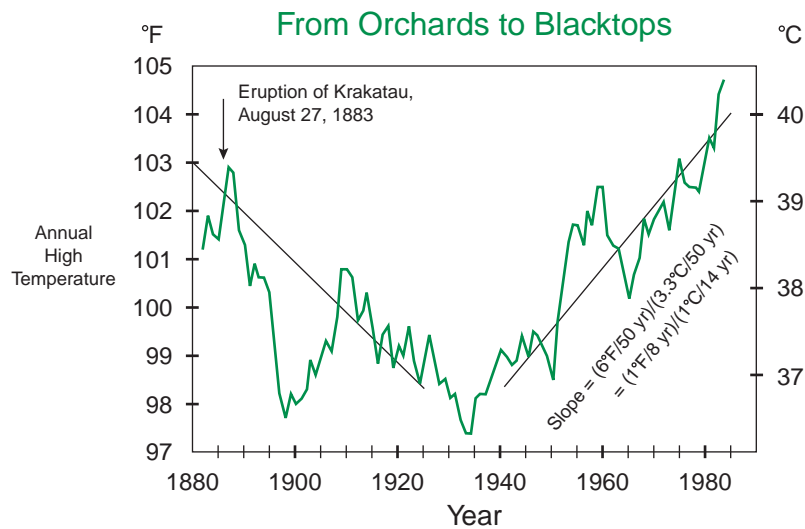
– Board of Governors, Cal-ISO, Former Nth Power partner; director of Evergreen Solar, founder and chairman of EnergyWorks LLC.

◆ **John Woolard**

– Vice President of Strategy and Business Development of Itron, Inc. Co-founded and former CEO of Silicon Energy.

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Temperature Trends in Downtown Los Angeles



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Cool Communities

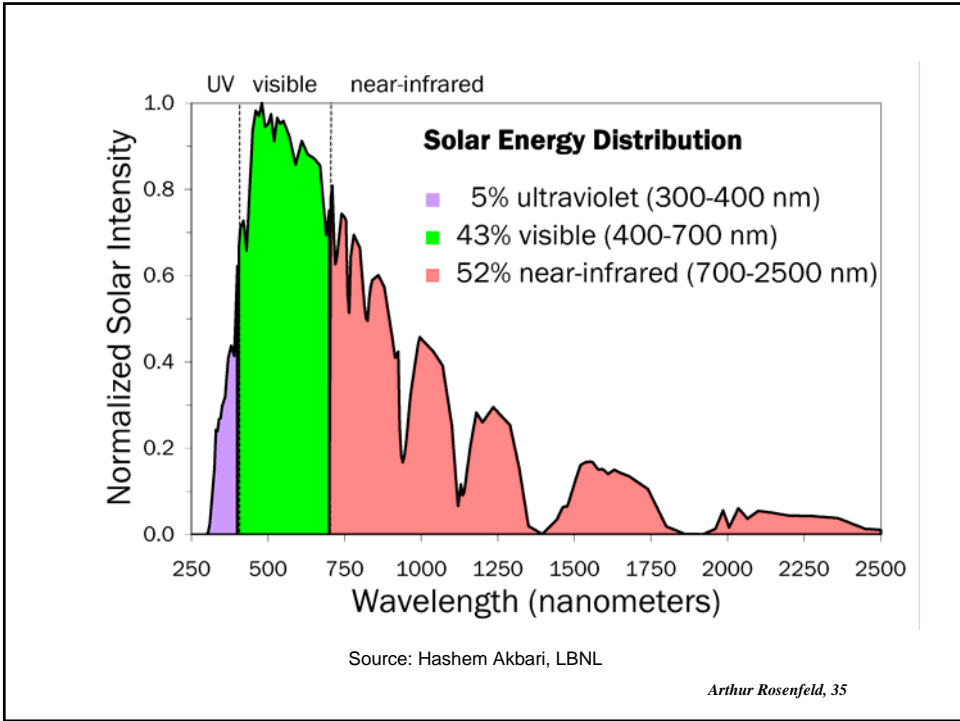
- ◆ The most lucrative way to:
 - Save air conditioning
 - Cool cities
 - Reduce Urban Ozone
- ◆ Involves 3 strategies:
 - White roofs (5,000 yr old idea) and cool **colored** roofs (a new idea)
 - Cooler pavements (concrete colored to avoid glare)
 - Shade trees (shade buildings and cool by evapo-transpiration)
- ◆ CEC spent \$10 Million for white “re-roofs” and offers credits for cool roofs in meeting new building standards
- ◆ Benefits can be substantial:
 - In LA Basin, 3 strategies can save 1,500 MW and \$ 200 million per year in A/C; Cool LA by 3-4 degrees Celsius; and reduce ozone by 4 – 8 %, worth another \$ 250 million per year in reduced sickness and sick leave

Arthur Rosenfeld, 33

California Cool Roof Policies

- ◆ Annual Public Goods-funded Utility programs of \$2 to \$3 M/year, offer rebates of ~10 cents/sqft.
- ◆ 2005 Building Standards for flat roofs: White is required.
- ◆ 2008 Building Standards for sloped roofs: Cool required (any color).
- ◆ Most buses have white roofs
- ◆ White cars should be bought for public and private fleets
- ◆ R&D
 - Cool Colored Roofs, including cars (recommended in Pavley Report) to reduce emissions by 30%
 - Service Life of Cooler Roofs
- ◆ Adding Cool communities to State Implementation Plans is frustratingly slow

Arthur Rosenfeld, 34



Cool and Standard Color-Matched Coatings for Concrete Tiles

R=0.41	R=0.44	R=0.44	R=0.48	R=0.46	R=0.41	} cool
black	blue	gray	terracotta	green	chocolate	
R=0.04	R=0.18	R=0.21	R=0.33	R=0.17	R=0.12	} standard
$\Delta R=0.37$	$\Delta R=0.26$	$\Delta R=0.23$	$\Delta R=0.15$	$\Delta R=0.29$	$\Delta R=0.29$	

- ◆ Can increase solar reflectance by 0.3 or more
- ◆ Gain greatest for dark colors

Courtesy: American Rooftile Coatings

Arthur Rosenfeld, 36

