

Energy Efficiency Standards, Codes, and Programs as a Way to Limit or Reverse the Effect of Capping Greenhouse Gas on Energy Price

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Summary of Presentation

- Energy efficiency policy can promote economic development
 - Equipment efficiency standards and building energy codes are already producing large savings in jurisdictions that have pursued them
 - These policies produce energy services at less than half the cost of conventional energy use, and
 - By restraining demand, they can reduce energy price
 - Smart growth of cities reduces oil consumption, pollution, and congestion, with even larger savings



Basic Principles of Energy Efficiency Policies

- Efficiency substitutes for new supply
- Efficiency is bigger, cheaper, faster, and greener
- Efficiency improves a nation's trade balance



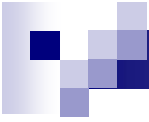
Unexpected Benefits of Efficiency

- Cost less than predicted or even less than zero, when markets are mature
- Promotes innovation and competitiveness
- Non-energy benefits may greatly exceed the value of energy savings

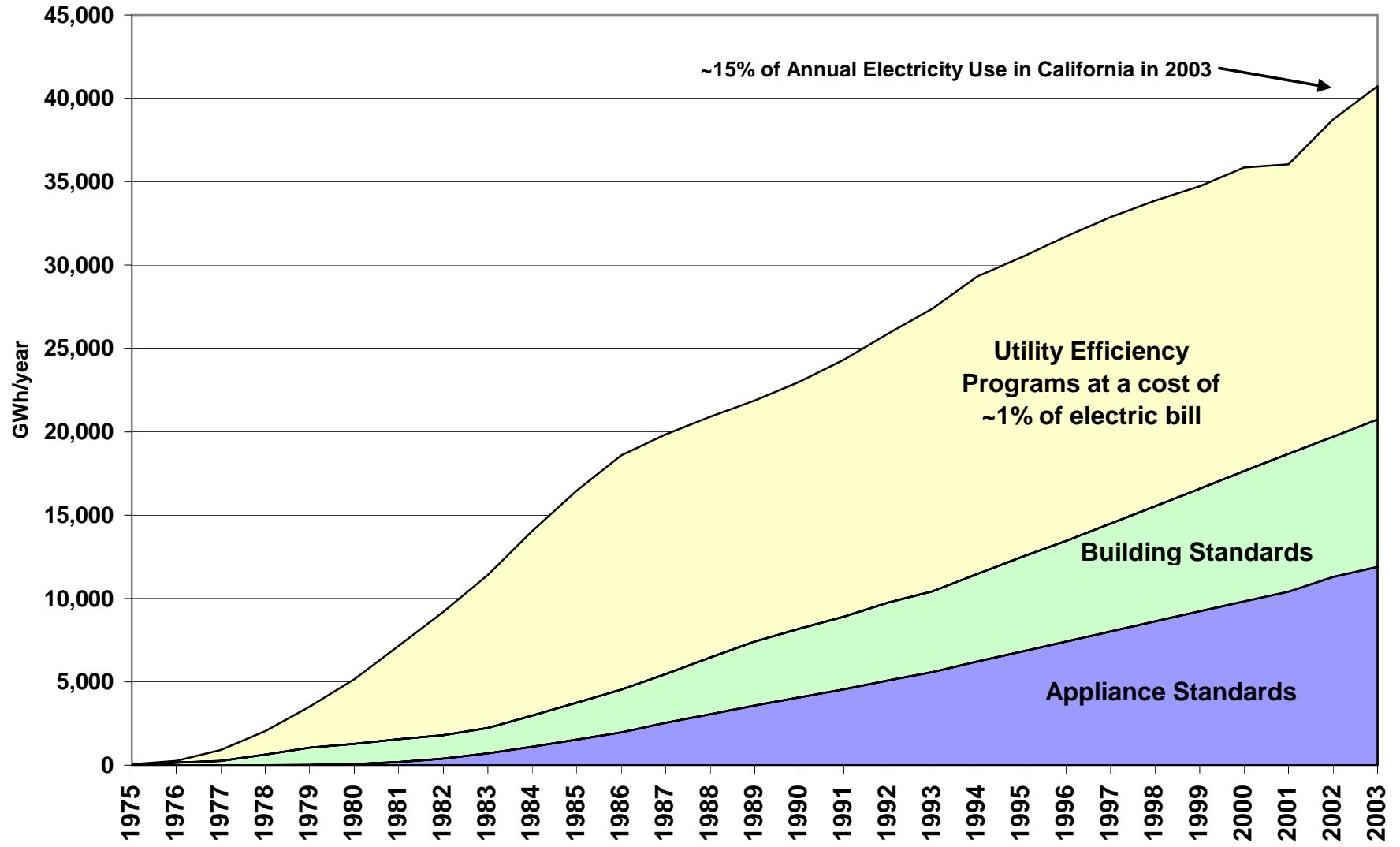


Energy Codes and Standards are the Foundation of Effective Energy Policies for Buildings and Equipment

- Buildings and equipment account for some 40% of greenhouse gas emissions in the developed world and a smaller but quickly growing fraction in developing countries
- Efficiency standards and codes have produced dramatic energy savings by themselves, but
 - Codes and standards are the foundation of a range of policy interventions that can do even more

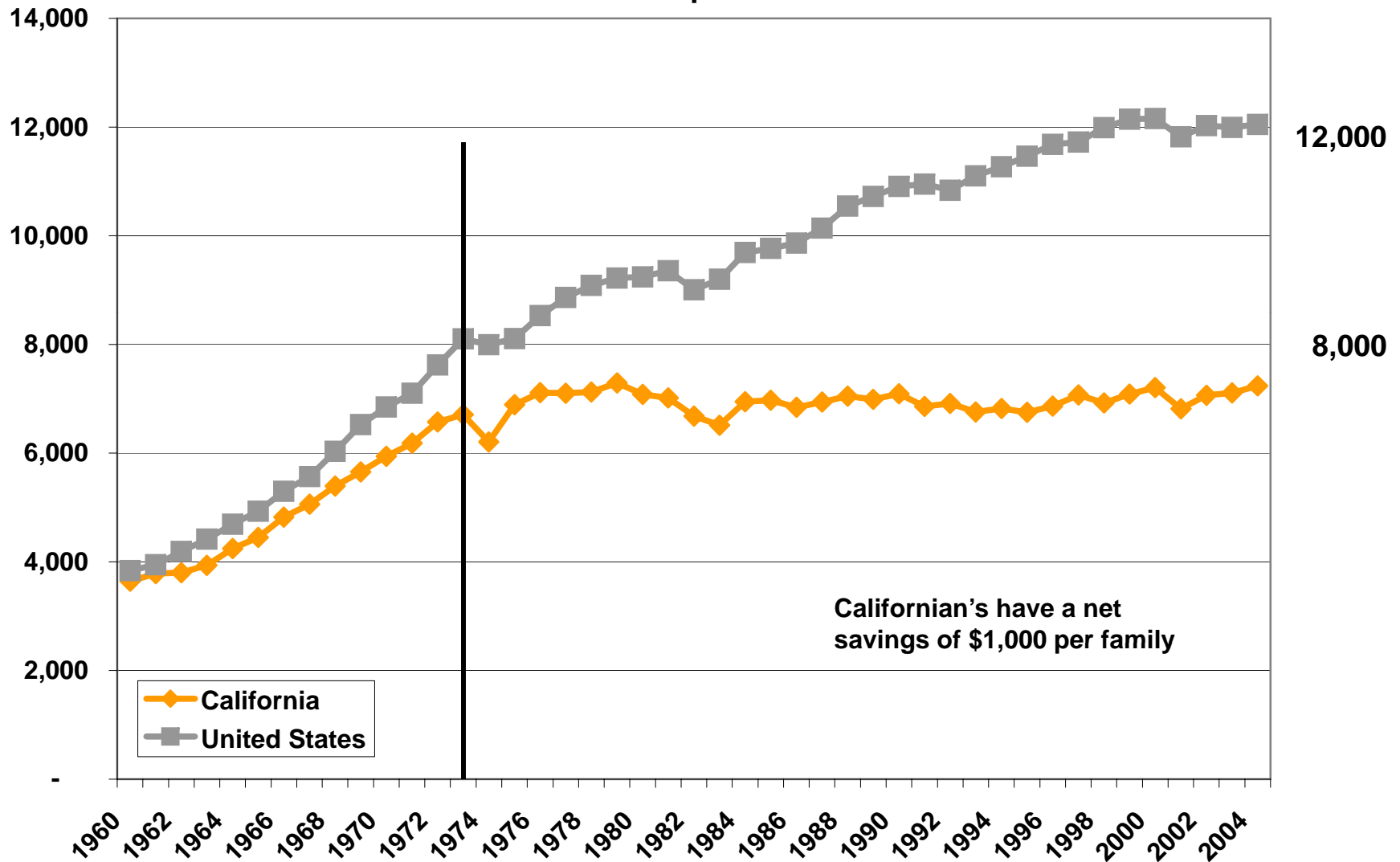


Annual Energy Savings from Efficiency Programs and Standards





Per Capita Electricity Consumption kWh/person



Source: http://www.eia.doe.gov/emeu/states/sep_use/total/csv/use_csv



Energy Codes and Standards are the Foundation of Effective Energy Policies for Buildings and Equipment II

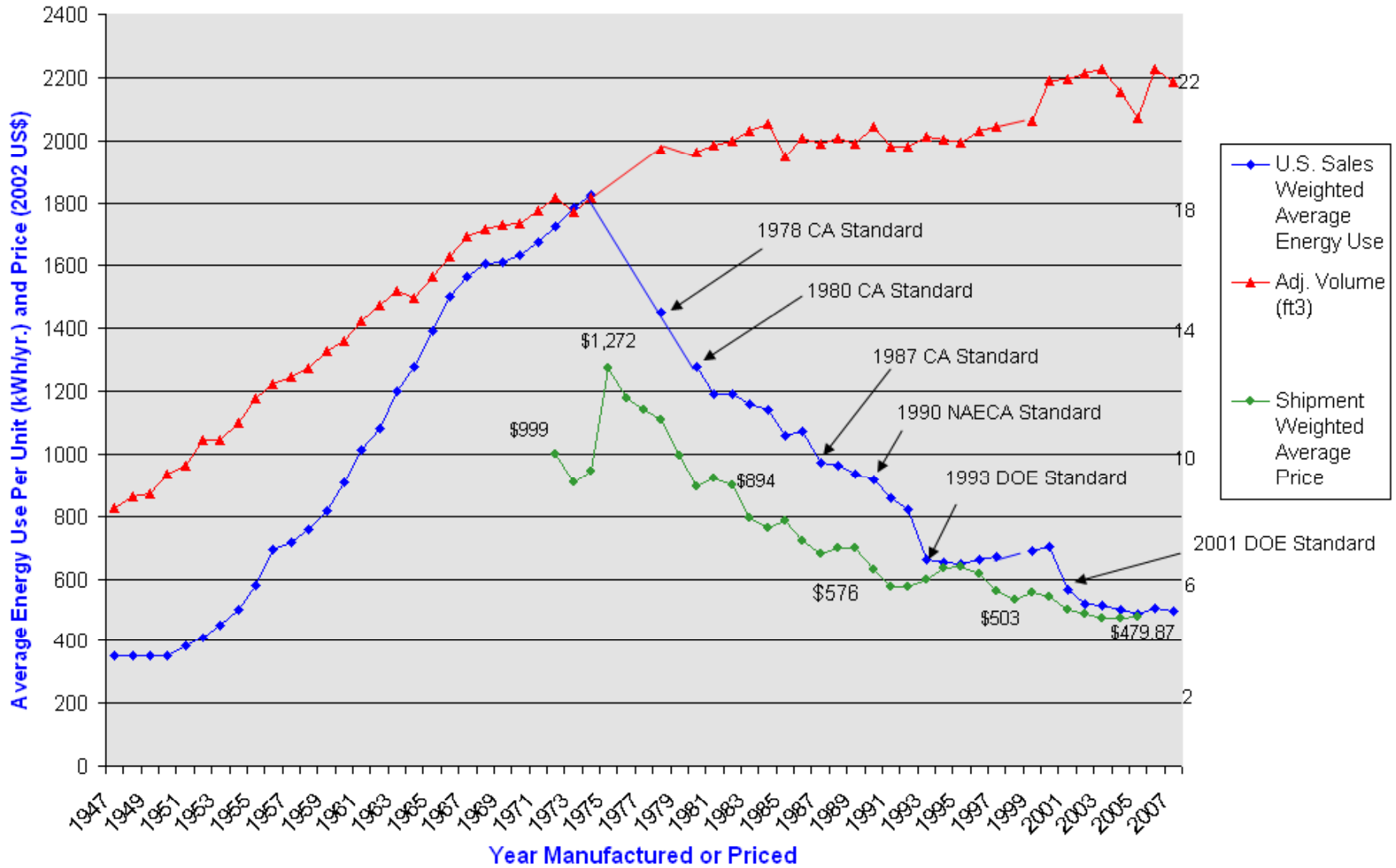
- A broad and deep array of market failures (described later) prevent the introduction of best technologies and designs in all countries
- Strong policies are necessary to overcome these barriers
- These policies can be strikingly successful particularly when complementary policies are pursued together



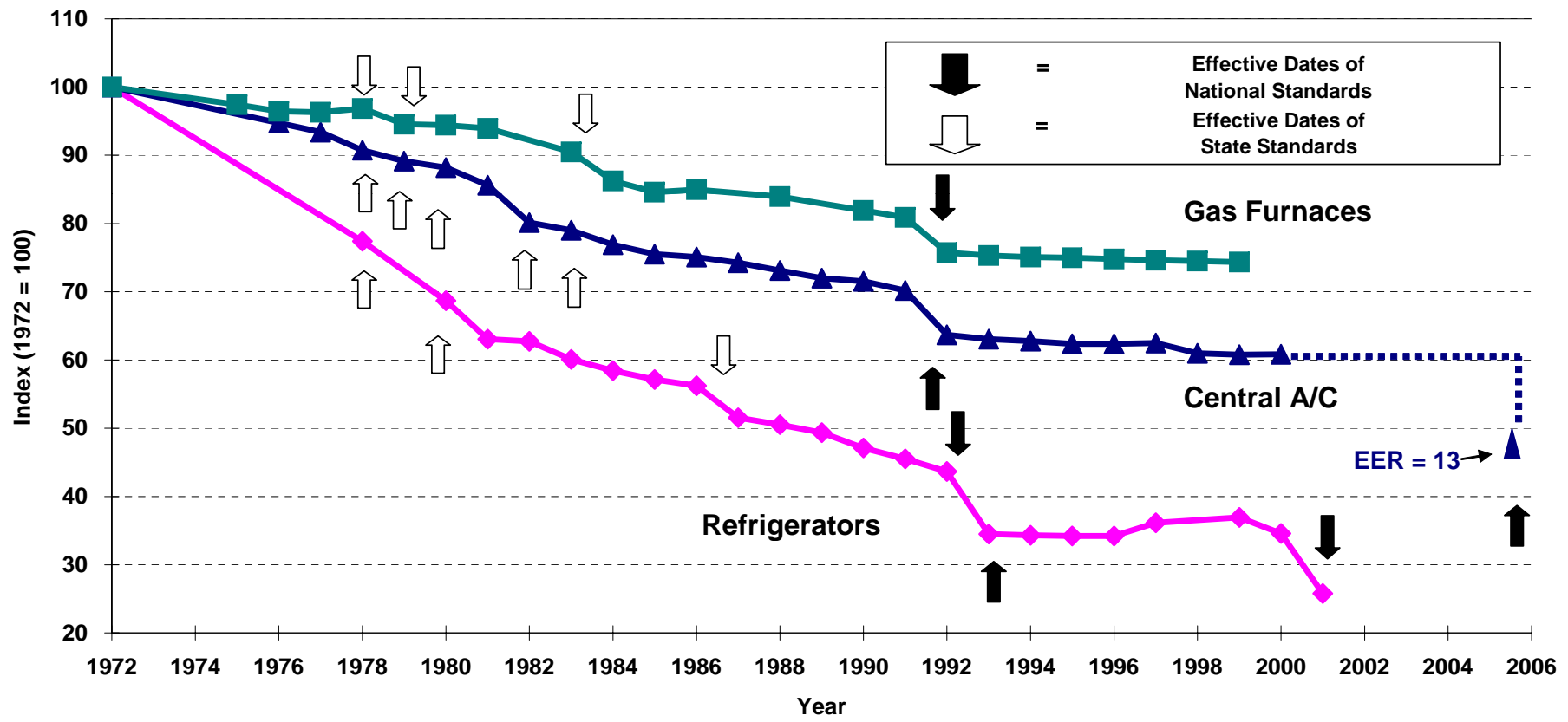
Energy Codes and Standards are the Foundation of Effective Energy Policies for Buildings and Equipment III

- Codes and standards promote continuous improvement
- Codes and standards for efficiency (coupled with other policies) create functioning markets that allow continuing technology innovation
 - Just as markets for consumer electronics and photography show dramatic continuing improvements, markets for energy efficiency can do the same
 - This push towards innovation can result in costs being much lower than projected, or even lower than zero

U.S. Refrigerator Energy Use v. Time with Real Price



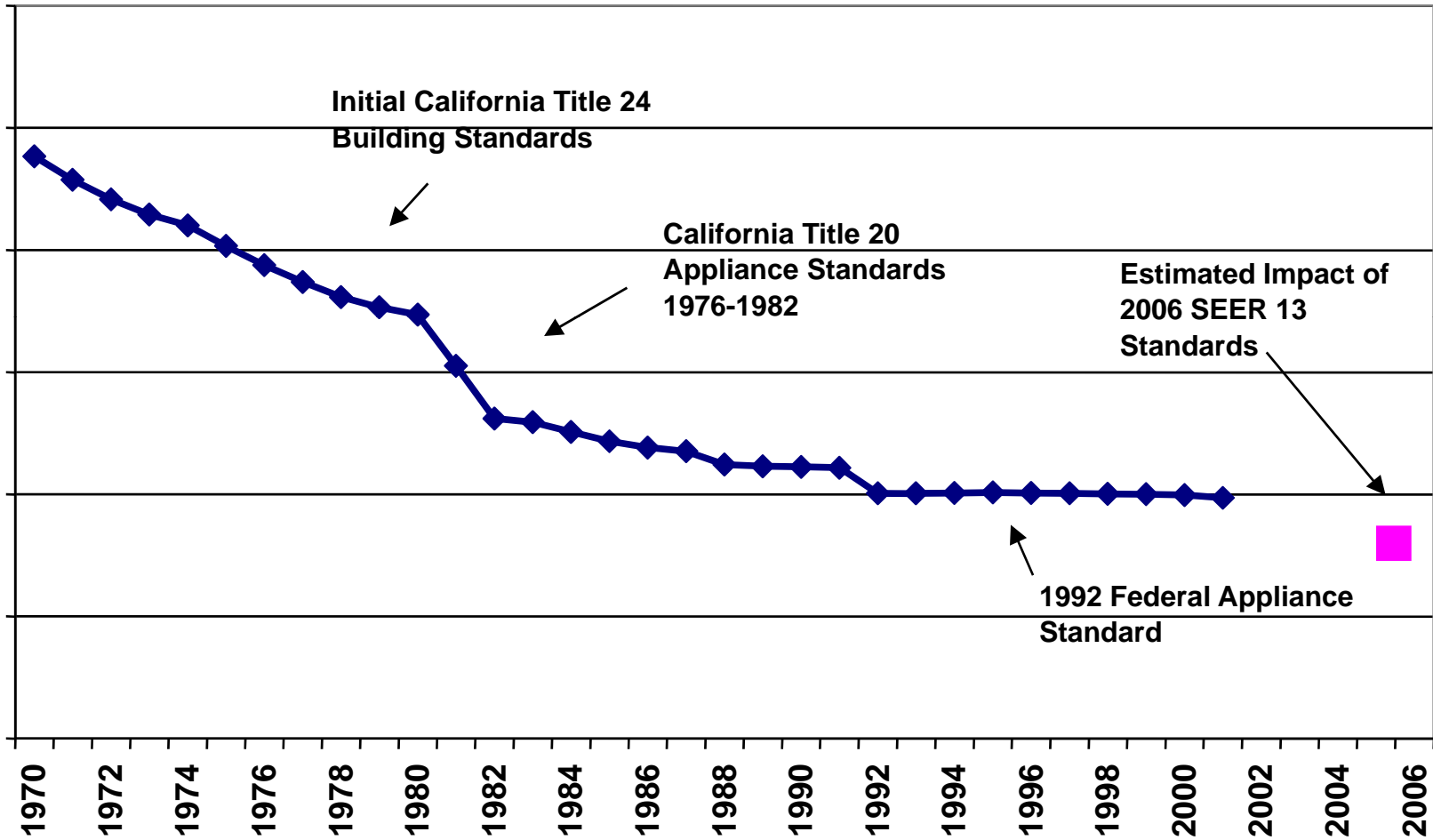
Impact of Standards on Efficiency of 3 Appliances



Source: S. Nadel, ACEEE, in ECEEE 2003 Summer Study, www.eceee.org

Annual Usage of Air Conditioning in New Homes in California

Annual drop averages 4% per year



Source: CEC Demand Analysis Office



Benefits of Codes and Standards

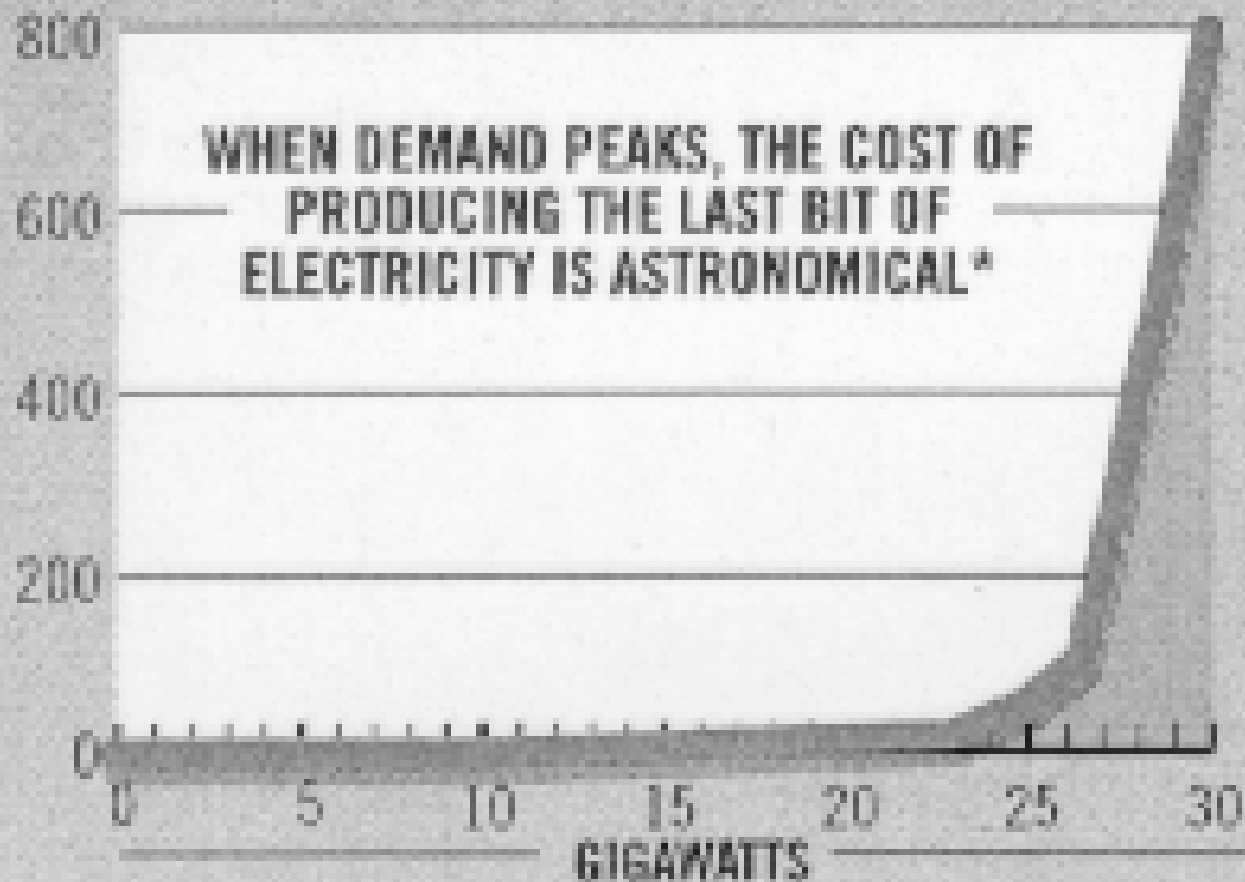
- Appliance efficiency standards already adopted in the U.S. will save 200,000 MW by 2030 and produce direct economic benefits over one half trillion dollars.
- Building efficiency standards savings in California (pop. ~38 M) will exceed 14,000 MW as of year 2010 (compared to about 50,000 MW of total electricity).



Standards Can Decrease Energy Costs

- Small fluctuations in energy demand in global markets, regional markets, and continental markets can cost changes in energy price
 - Thus, reductions in energy use due to efficiency policies can cut price

PEAK DEMAND STRAINS POWER GENERATION...



▲ PRICE PER MEGAWATT-HOUR IN DOLLARS

*DAY-AHEAD BIDS IN CALIFORNIA FOR JUNE 27, 2000



Effects of Appliance Efficiency Standards on Price

- NRDC and the Dow Chemical Company have estimated that efficiency standards on American home heating furnaces alone would reduce wholesale natural gas prices by at least 15¢/MBtu, equivalent to almost 5% of current wholesale prices for natural gas
- This relationship suggests that for every dollar saved directly from appliance efficiency standards, some 80¢ additional will be saved by lowering energy prices for everyone
- This effects change dramatically the dynamics of how a comprehensive greenhouse gas emissions reduction strategy can affect price (see next slide)



Failures of the Market

- ***Market Barriers*** include:

- Split incentives
- Lack of information

- ***Market Failures*** include:

- Diffuse decisionmaking
- Failures of price competition for new products



Failures of the Market II

■ Human failures

- Peer pressure
- “Bounded rationality” – not paying attention
- Loss aversion, risk aversion, status quo bias

■ Institutional failures

- The role of industry and industry associations in writing regulations
- To the importance of mass markets
- Informal private sector regulations that limit efficiency



Consequences of Failures of the Market

- Very low price elasticities for energy efficiency
 - A recent University of California at Davis study on gasoline price elasticity showed a short-term elasticity of -4% to -7%
 - Efficiency levels do not vary between U.S. states as a function of price or climate



Consequences of Failures of the Market II

- Therefore, pure cap-and-trade programs for emissions will not improve energy efficiency very much
 - If the current market ignores opportunities with a return on investment of 50%, and emissions trading raises the return to 60%, how much difference will that really make?
 - Emissions trading CAN affect fuel choice and behavior, however



Correcting market failure allows industry to spend less on energy

- In the 1990s citizens groups were pressuring Dow Chemical to reduce emissions of toxic materials.
 - NRDC negotiated an agreement under which a consultant would look for cost effective waste minimization opportunities.
 - The consultant found, and Dow implemented, process changes to cut emissions by 44%.
 - Annual return on investment was 160%.



Assistance to Industry to Reduce Emissions Cuts their Costs and Improves Profit

- This experience, though stunningly successful, was never replicated in another Dow plant, nor by other companies in the same industry.
- Industrial efficiency programs can counteract and reverse energy cost increases to industry from emissions caps

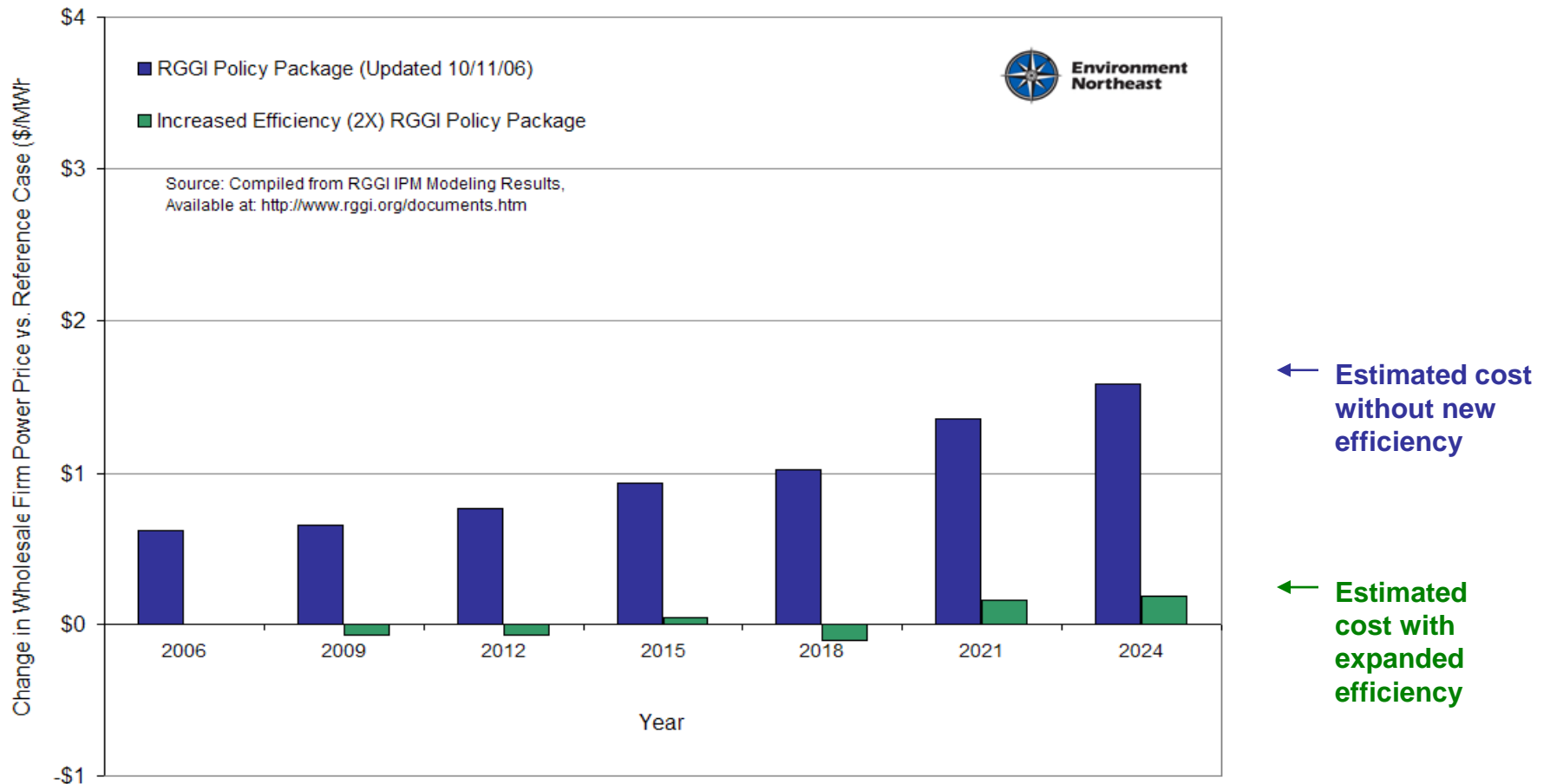


Opportunities for Emissions Cap and Efficiency

- **Assembly Bill 32: California Global Warming Solutions Act of 2006**
(<http://www.solutionsforglobalwarming.org/>) sets a carbon cap but allows the California Air Resources Board to develop implementing regulations
 - **Current studies suggest that 80% of the emissions reductions will be obtained from direct efficiency and renewables policies and only 20% from emissions permit trading**

Energy Efficiency Offers Consumer Cost Benefit

RGGI Modeling Results: Wholesale Electric Price Increases with and without Expanded Efficiency Programs



Source: Daniel Sosland, Environment Northeast ACEEE Summer Study Paper 2008



Conclusions

- Cap-and-trade-and-walk-away may have impacts on energy costs that can affect the terms of trade, BUT
- Cap-and-invest can mitigate or reverse these effects by using proceeds of emissions permits to fund effective policies



Effective Policies:

- *Set mandatory declining greenhouse gas emission caps*
 - This gets managers' attention as well as funding policies
- **Mandatory standards that encourage performance-based compliance**
 - Regular revisions to higher efficiency
 - Standards include criteria for energy ratings
 - Applicable to buildings, appliances, equipment, and cars
- **Simple normative labels to distinguish the most efficient buildings and equipment, such as the U.S. “Energy Star[®]” and “LEED[™]”**



Effective Policies: II

- Informative labels to provide the information needed to establish property values for energy efficiency
 - The Russian “Energy Passport”
 - Building energy ratings required by the EU “by 2006”
- Managed incentives for modest improvements (~15%-30%) beyond the standards.
 - Some of these programs can be operated by utilities
- Long-term incentives for 50%-75% savings.
 - S.822/H.R. 1385 is a current example

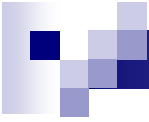


Effective Policies III:

- Reform utility and home lending regulation to align customer benefit with profit
 - Current home lending practices ignore the cost of energy and transport, and likely contributed to the global economic crisis
- Encourage location efficient development by:
 - Reducing regulatory restrictions on compact and mixed use development
 - Enhancing transit and other non-auto infrastructure



Additional Information



Residential and Industrial Per Capita Electricity Use

