

Energy Efficiency in the U.S. Economy: Current and Potential Investment

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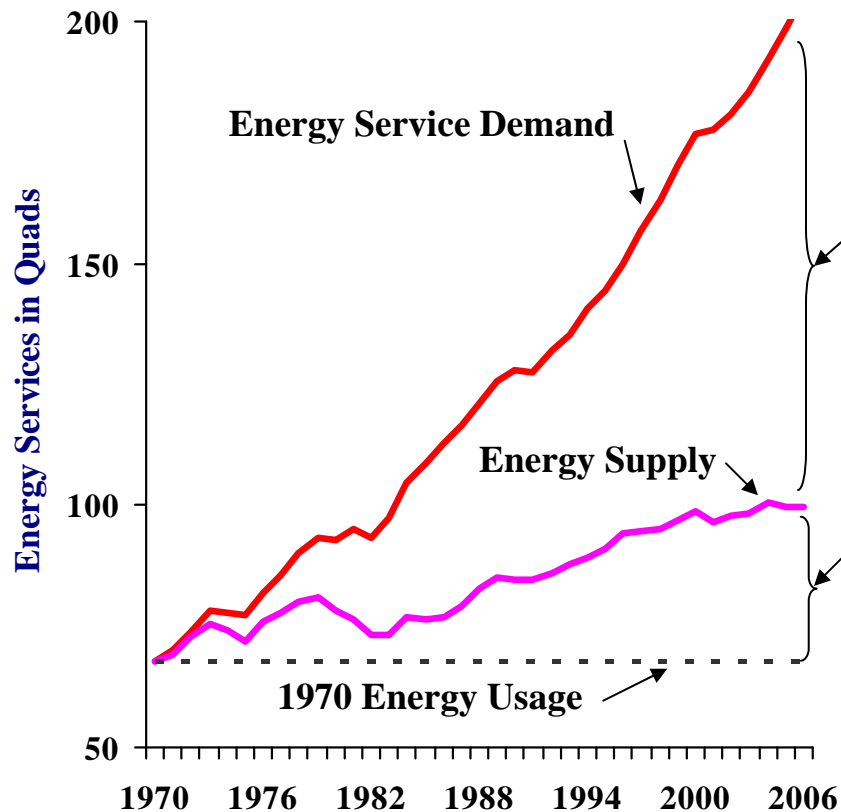
Overview

- Efficiency as the “first fuel” in the race for clean energy
- What does energy efficiency contribute to the U.S. economy?
- What is efficiency’s resource potential?
- What does energy efficiency investment look like?
- Why aren’t efficiency markets bigger?
- Policy levers that can drive bigger markets

Why the 'First Fuel'?

- No clean energy strategy will work without moderating demand growth
- Rising demand is straining conventional energy markets
- Bringing new supply capacity on line is increasingly tough—clean or dirty
- Efficiency buys us time to deploy clean supplies
- Efficiency is essential to making carbon solutions achievable and affordable

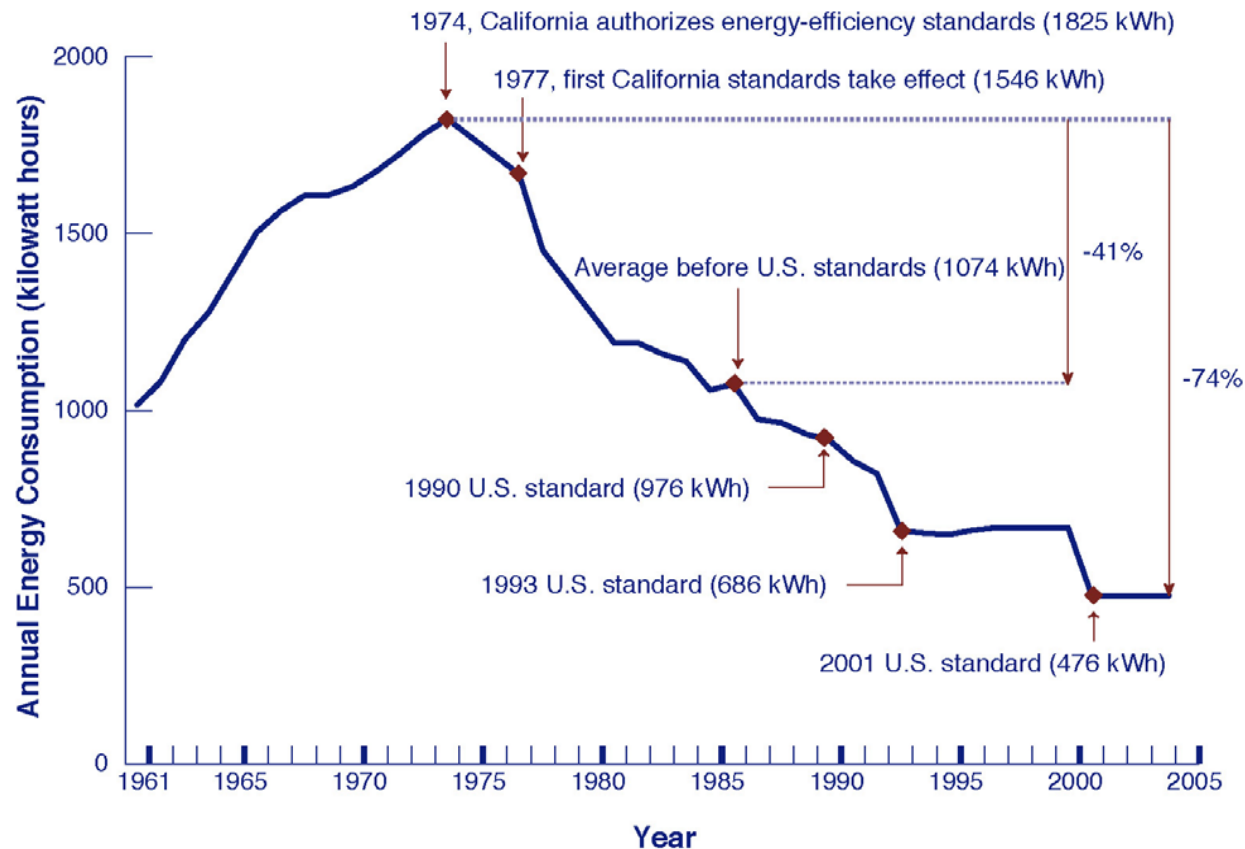
Energy Efficiency Gives More!



- Since 1970, **energy efficiency** (and **energy productivity**) has met 77% of new energy service demands in the U.S, while **new energy supplies** have contributed only 23% of new energy service demands.

How Efficiency 'Gives More'

The humble refrigerator.....

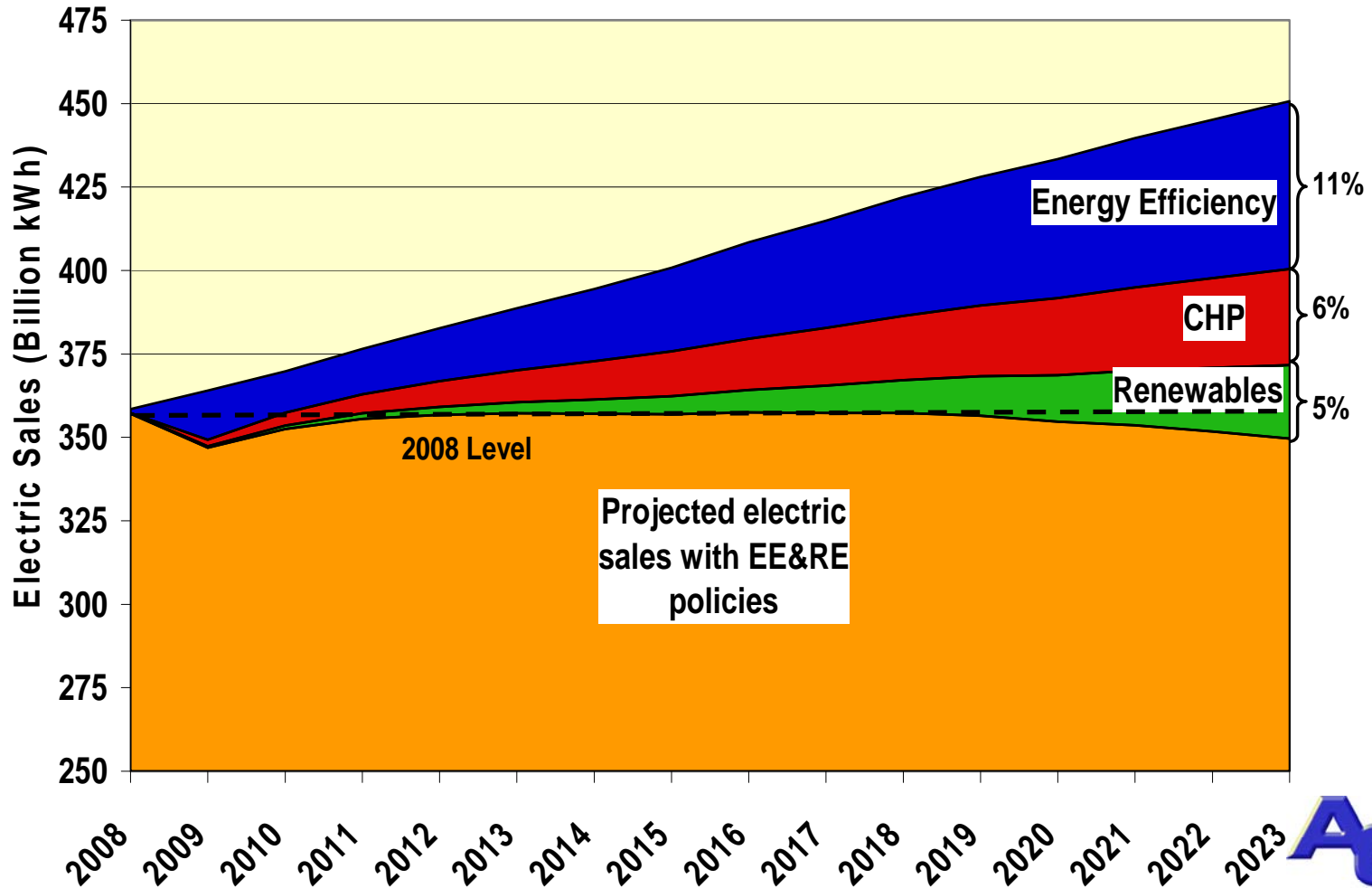


Efficiency Potential Remains Large

- Electricity resource studies show ~25% economic potential over the next 10-15 years
- Efficiency resources are renewable, as technology evolves and costs drop
- McKinsey Global Institute: North American energy demand growth through 2020 and beyond can be met through efficiency
- This means shifting capital and creativity from the supply infrastructure to the 'energy service infrastructure'

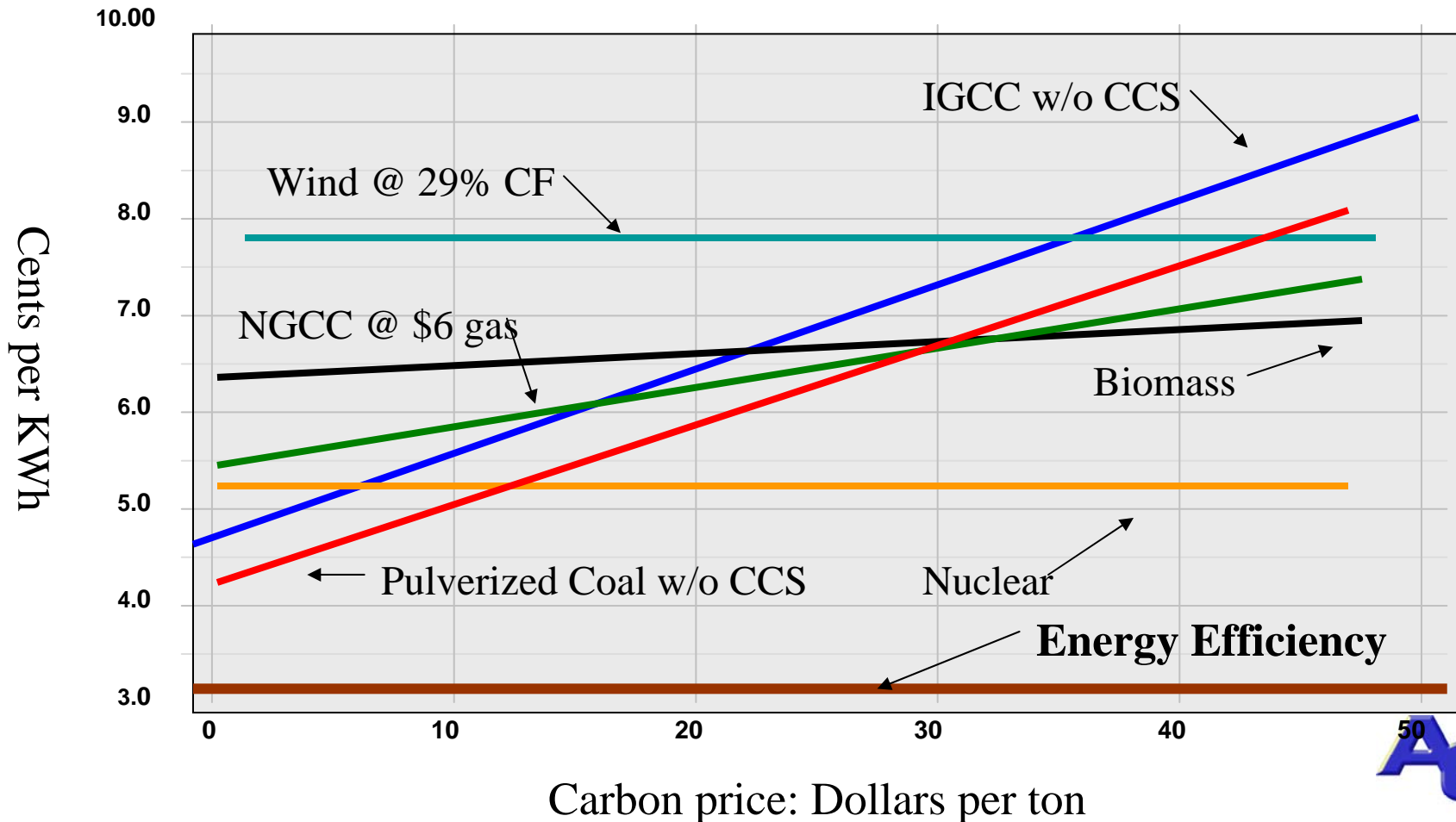


The Texas Example



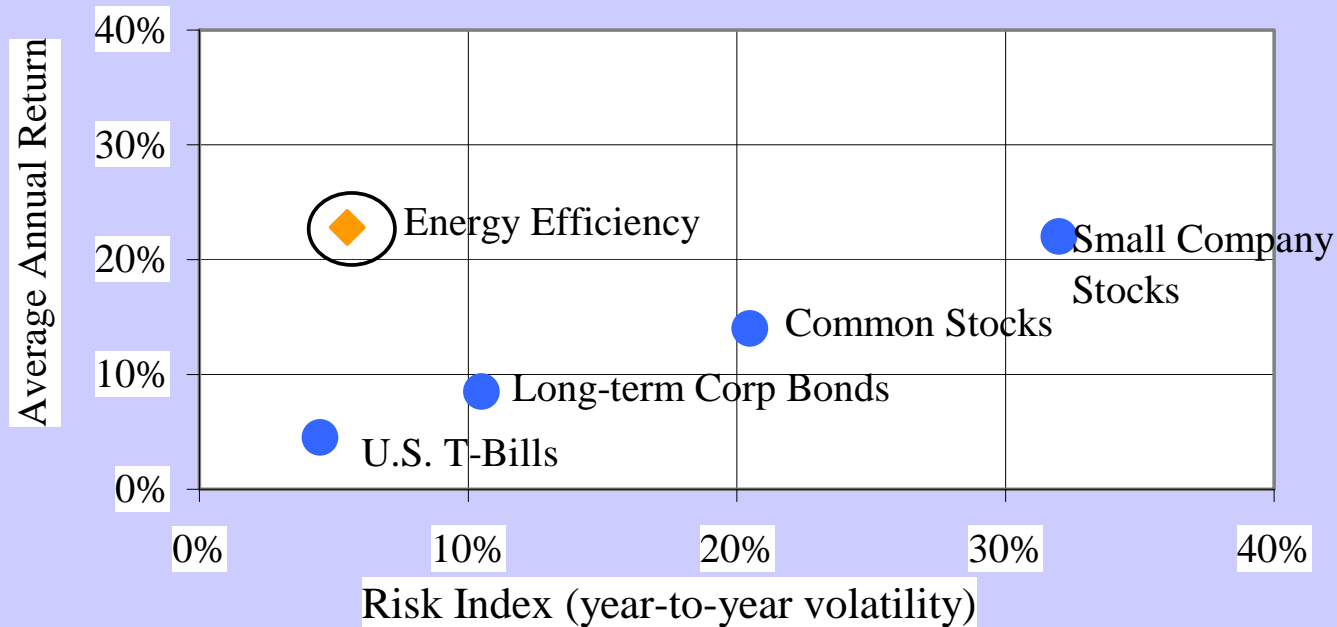
Energy Efficiency: The Cheapest Resource

Levelized Cost of Electricity by Source



Efficiency Investments: Low Risk, High Return

Efficiency Investment Risks and Returns



Energy Efficiency Investment is Big Business

- Total annual spending efficient technologies and services: \$200 billion
- U.S. state and local govt. infrastructure investment in 2007 projected at \$257 billion
- Energy Star products alone accounted for more than \$100 billion in 2004 sales
- Total annual 2004 U.S. investment in energy supply infrastructure: \$100 billion
- Inference: the “energy services” infrastructure is on par with or larger than the “energy supply” infrastructure

Efficiency Investment Could be a Much Bigger Business

- ACEEE estimates that annual energy efficiency spending could double to \$400 billion annually
- Where will the additional \$200 billion come from?
- How much of that additional \$200 billion requires additional policy support?

The Efficiency Business: A Few Examples

- End-use technologies
 - Windows: (\$13 B) low-e >> photochromics >> electrochromics >> integration with home electronics
 - Lighting: incandescent>>fluorescent>>solid state
 - Storage: batteries>>high-performance capacitors
- Enabling or platform technologies
 - Electricity grid modernization
 - Building communication/control systems
- Business models
 - Project development—CHP (>\$50 B potential)
 - Performance contracting (~\$5 B/yr)
 - Smart grid technologies (>\$20 B potential)
 - Utility program delivery (~\$2 B/yr)



How is Efficiency Financed?

- Cash and personal/business credit
- Project finance
 - CHP and recycled energy: commercial/industrial facilities
 - Performance Contracting: C/I and 'MUSH' markets
 - Vendors offering value added services: CC/I
- Institutional debt mechanisms
 - Residential—Energy Efficient Mortgages/MBS
 - Commercial—REIT/portfolio investment/MBS
 - Bond financing/pooled loans
 - Credit enhancement
- Equity mechanisms
 - Private equity and venture capital
 - Stock offerings
- Combinations of Equity and Debt



But if it's such a good deal.....

Why aren't EE markets doing more?

- Regulatory barriers—utility regulation especially
- Limited price effects:
 - Price elasticity diluted by income and cross elasticity
- Market barriers
 - Principal-Agent: ACEEE research for IEA shows principal-agent problem affects ~half of buildings energy use
 - Information/transaction costs: the “Warren Buffet problem”

The Warren Buffet Problem

- When asked why he was buying PacifiCorp instead of individual powerplants, Mr. Buffett said:
 - “It’s a lot easier to do one \$10 billion deal than 10 \$1 billion deals”

...which is a whole lot easier than doing 10 million \$1000 deals!



How Can Efficiency Policy Drive Market Opportunity?

- Given market barriers and limited price effects, policy is needed to accelerate investment...
 - What policies will best drive new markets?
- Efficiency policies
 - RD&D
 - Rating and labeling
 - Appliance/Fuel Economy Standards
 - Building Codes
 - Utility policies
 - Land use/transportation policies
 - Tax Policies

A Few Policies to Watch

- Utility policy
 - New regulatory paradigms—in states like CA, NC, MN, NY, NJ, NV, CT, TX, UT, IL—are beginning to drive utilities to make major new investments
 - “White tags” efficiency credits markets, analogous to RECs, may evolve at state, regional, or national levels
 - EG: House RPS bill allows efficiency to meet up to 27% of requirements; 4% of 2020 sales from efficiency, valued at more than \$3 billion annually at 2 cents/kWh

A Few Policies to Watch

- Real Estate and Tax Policies
 - Energy Efficient Mortgages—need federal credit enhancement
 - Green Building MBS—seem to be forming without federal intervention
 - House Ways and Means proposing bond financing instead of traditional incentives
 - Federal loan guarantees could be used for efficiency financing credit enhancement

A Few Policies to Watch

- Climate policy
 - Conventional cap and trade will NOT drive efficiency investment...
 - But complementary/allocation policies might
 - RGGI states auctioning 25-100% of allowances, mostly for efficiency (\$100-500 million value)
 - New Congressional climate bills beginning to shift allocation policies toward RGGI model
 - RGGI states also advancing EERS as complementary policy
 - We could see a white tags market operating in parallel with a carbon allowance market

Conclusions

- Efficiency is a huge energy resource and a large fraction of U.S. infrastructure investment
- Efficiency investment could grow dramatically, with policy support
- States, and Congress to an extent, are increasing EE policy focus

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