Energy Efficiency and Climate Policy: Mining the First Fuel in the Race for Clean Energy

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Overview

- Why efficiency is the first fuel
- Documenting the benefits of efficiency investment for energy and climate policy
- Why conventional climate policy won't mine enough efficiency
- How to design climate policies that tap efficiency effectively

Why Efficiency is the First Fuel: the McKinsey-Vattenfall Curve

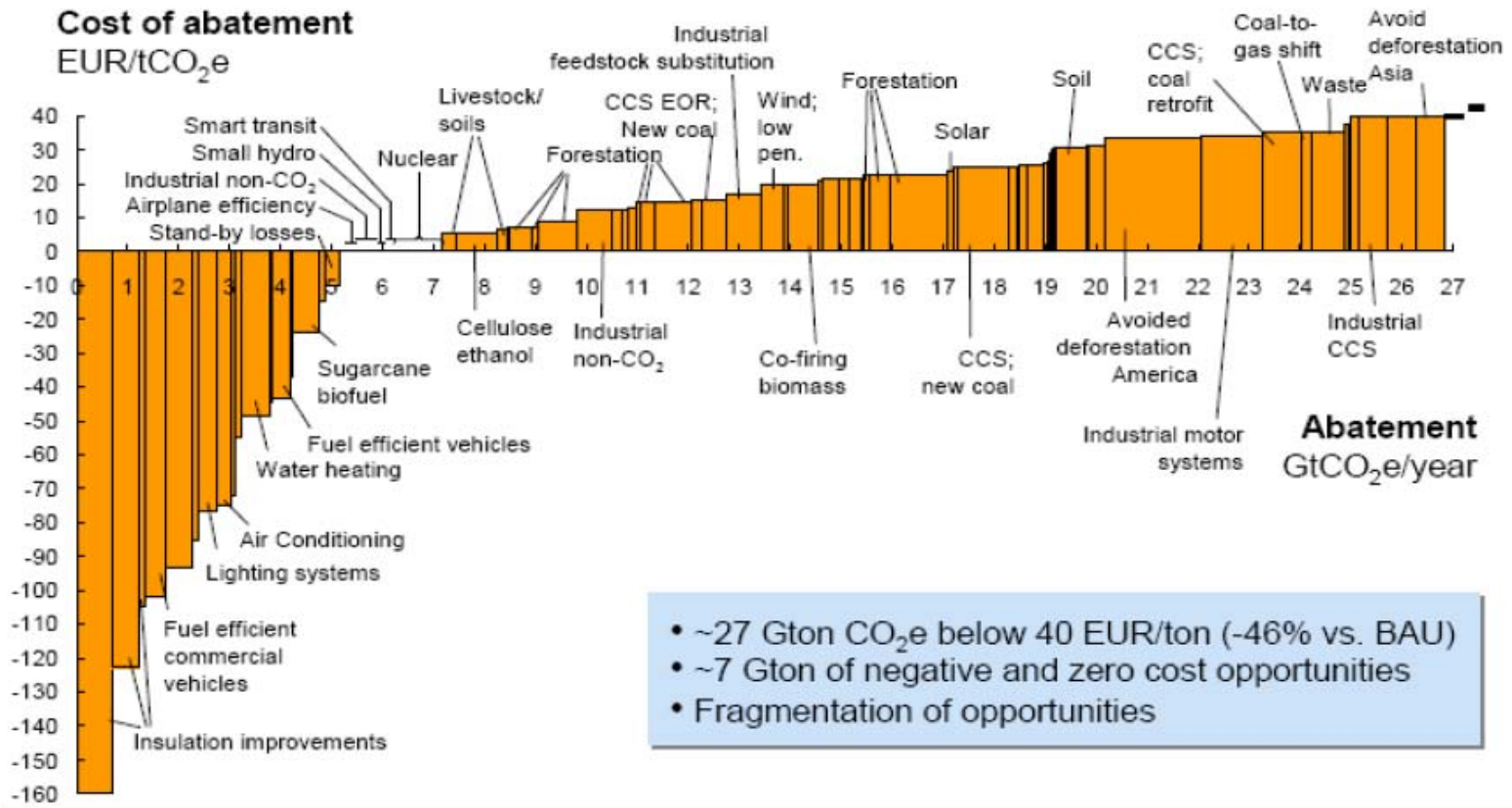


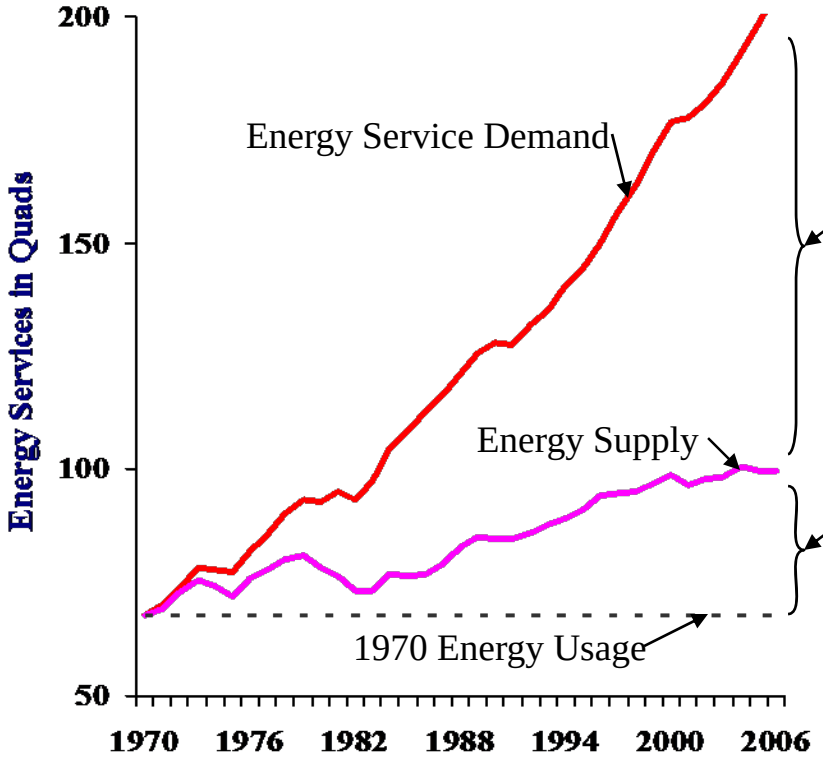
Figure 5. Financial cost-benefit analysis of CO_2 mitigation options prepared by Vattenfall, 2007.

Why Efficiency is the First Fuel

- Clean supply is essential, but can't catch up with historical demand growth rates
- Delivering energy supply to the market is hard, and getting harder
- Unless we moderate demand growth, no clean energy supply strategy will be able to achieve deep carbon emissions reductions, or will make costs untenable

…which is the same thing

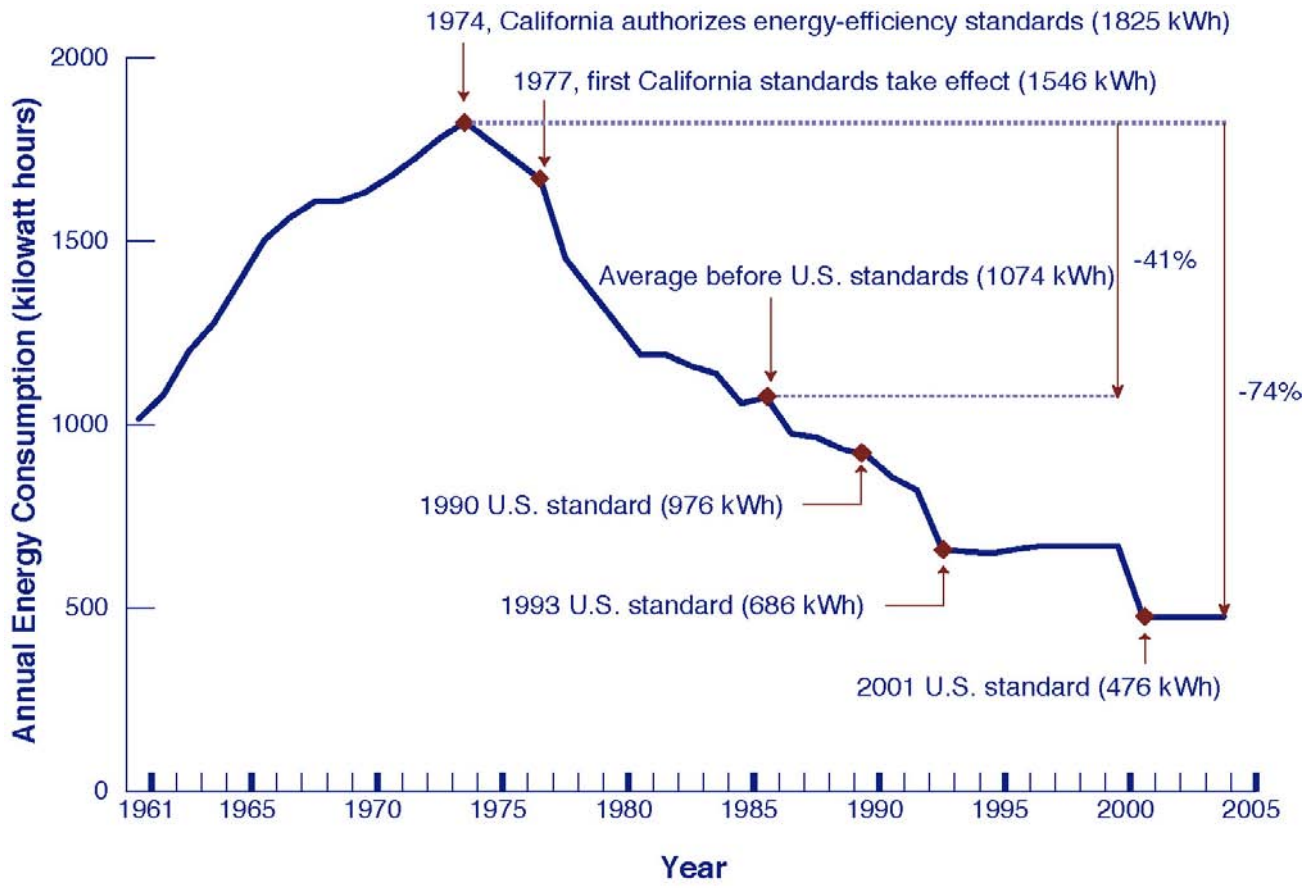
Efficiency as a Driver of Economic Prosperity



- Since 1970, ***energy efficiency*** and related productivity gains have 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 Drives Prosperity

The humble refrigerator…



Efficiency as infrastructure Investment

- Total 2004 annual investment in energy-efficient technologies and services = $300+ billion
  - Energy Star Product sales = $88 billion
  - Efficiency value added is not 100% of all investments
- Total 2004 U.S. investment in *energy supply* infrastructure = $100 billion
- **Inference**: U.S. energy services infrastructure investment exceeds energy supply infrastructure investment
- **Implication:** Investment opportunity is larger on the demand side than the supply side

Examples of EE Investment

- $88 billion on Energy Star Products
- $29 billion on Energy Star Homes
- $12 billion on Energy Star windows
- $5 billion on insulation
- $32 billion on vehicles

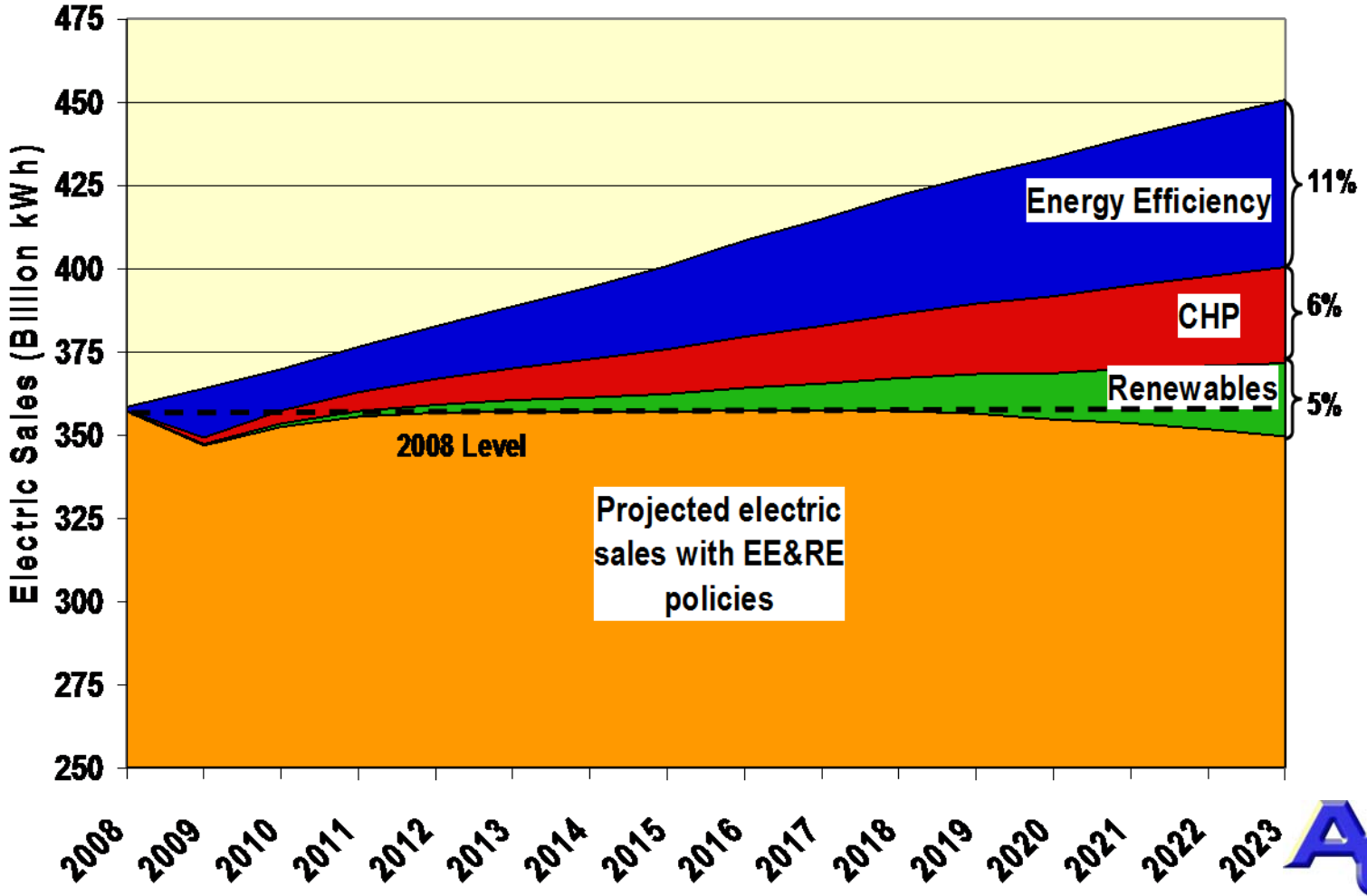
Efficiency Investment and Job Creation

- 2004 energy efficiency investment supports 1.6 million U.S. jobs
  - 230,000 directly attributable to efficiency value added
  - Distributed among manufacturing, services, construction
  - Jobs created in more labor-intensive sectors than those stimulated by energy supply investments
  - Direct jobs multiplier:
    - > 6 jobs per $ million invested, vs.
    - ~ 2 jobs/$ million for typical supply investments

Efficiency as a Large and Renewable Resource

- In the beginning, there was…not much
- Today, we have efficient technologies in all end-use sectors
- Efficiency potential studies show we can cut demand growth by more than half
- Efficiency potentials stay high; new technologies and cost drops keep “refilling the well”

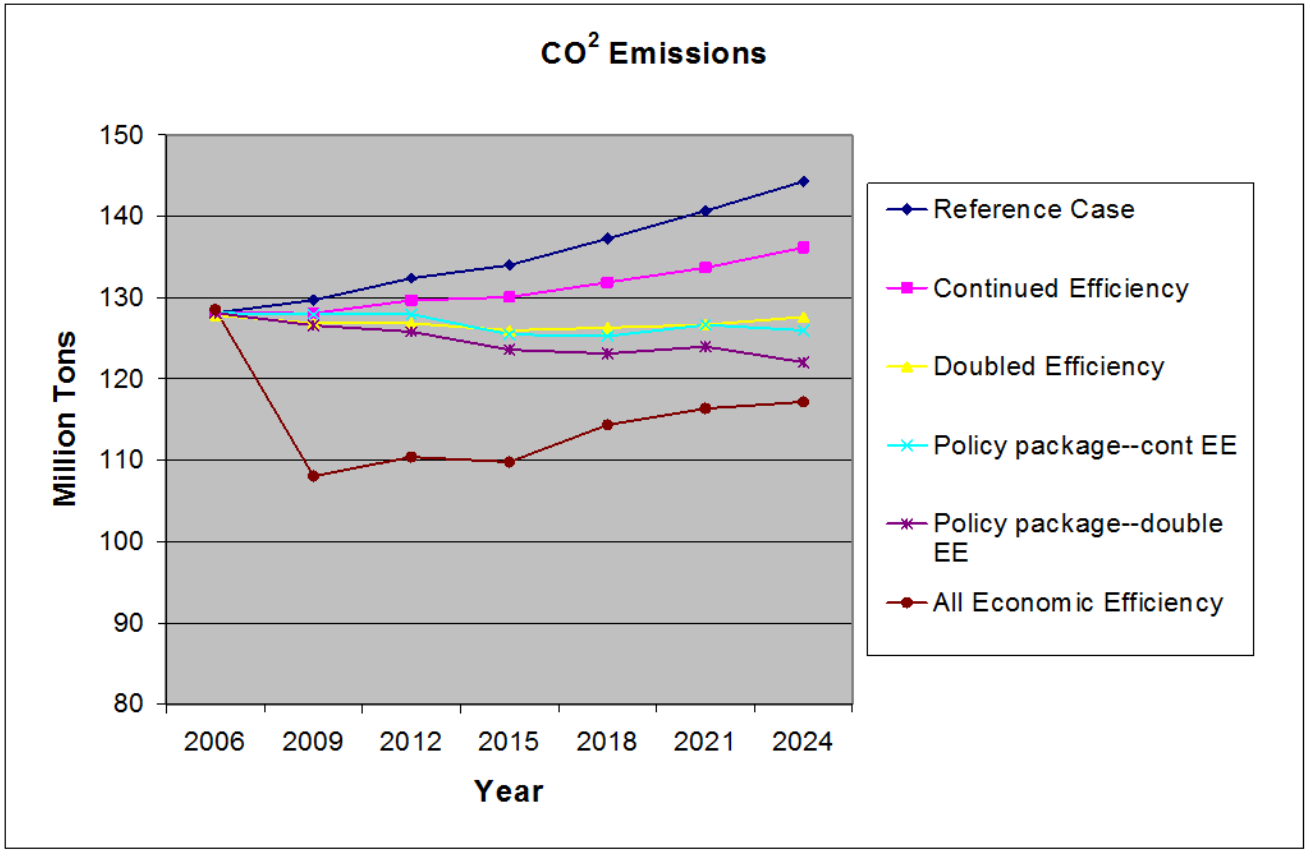
Meeting Texas' Electricity Needs



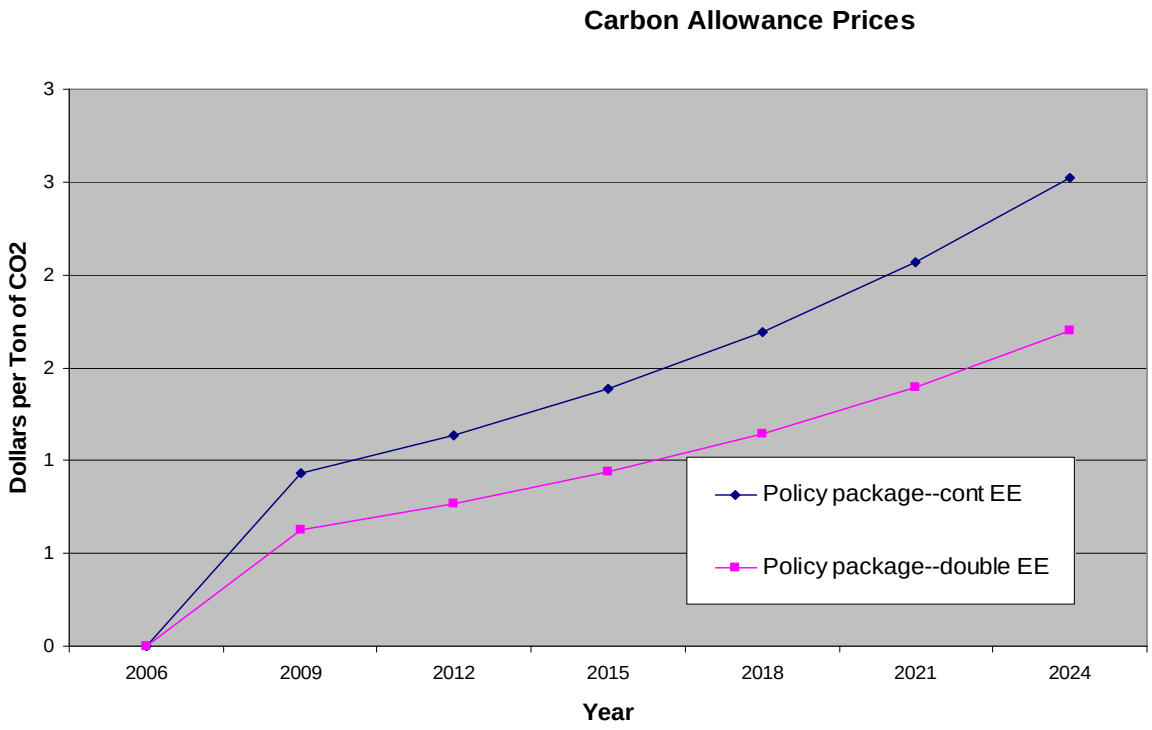
Efficiency and Climate Policy

- The Regional Greenhouse Gas Initiative (RGGI)
- ACEEE served as a stakeholder organization, and provided input to the modeling process
- RGGI staff used IPM and REMI models to assess policy impacts, including effects of increased efficiency investment

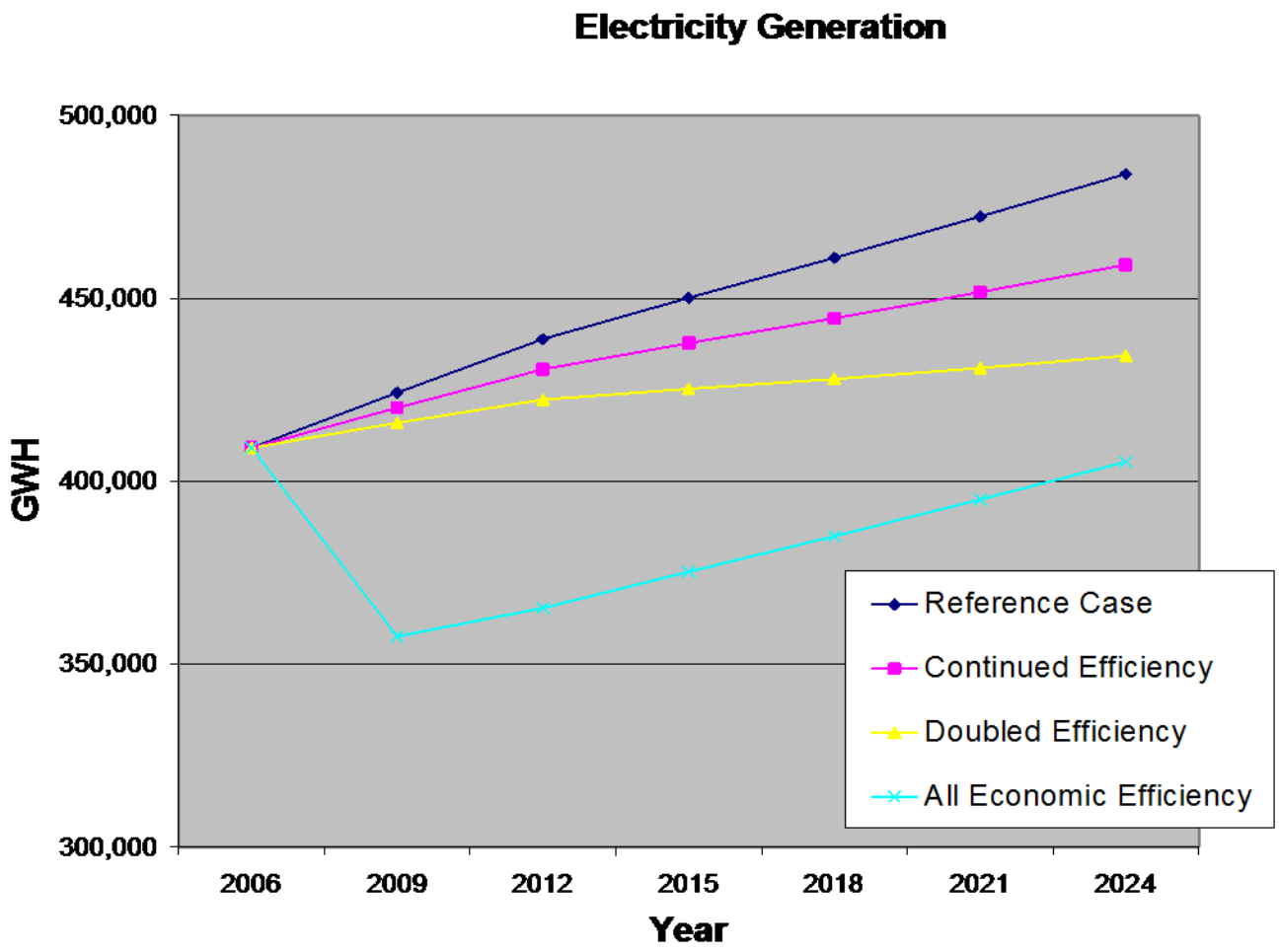
RGGI Results: Carbon Emissions



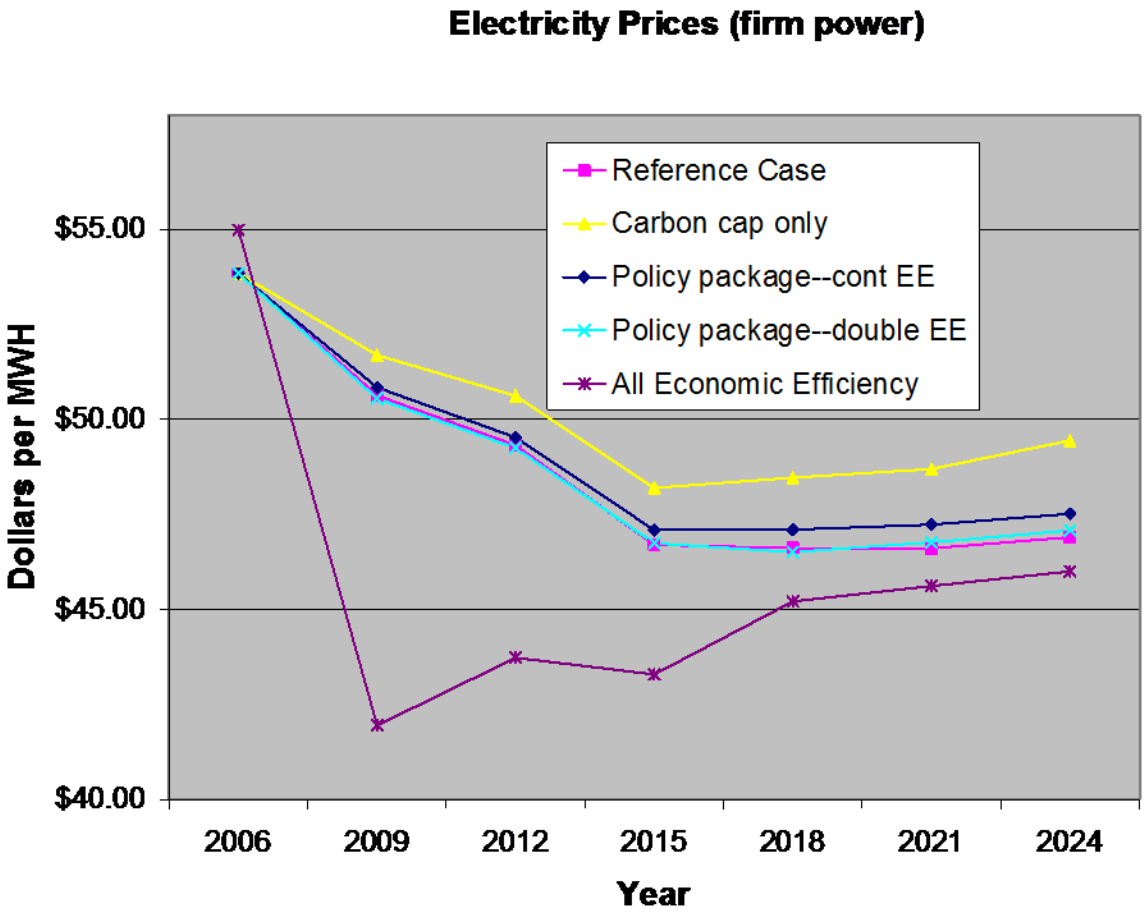
RGGI Results: Carbon Prices



RGGI Results: Power Sales



RGGI Results: Electricity Prices



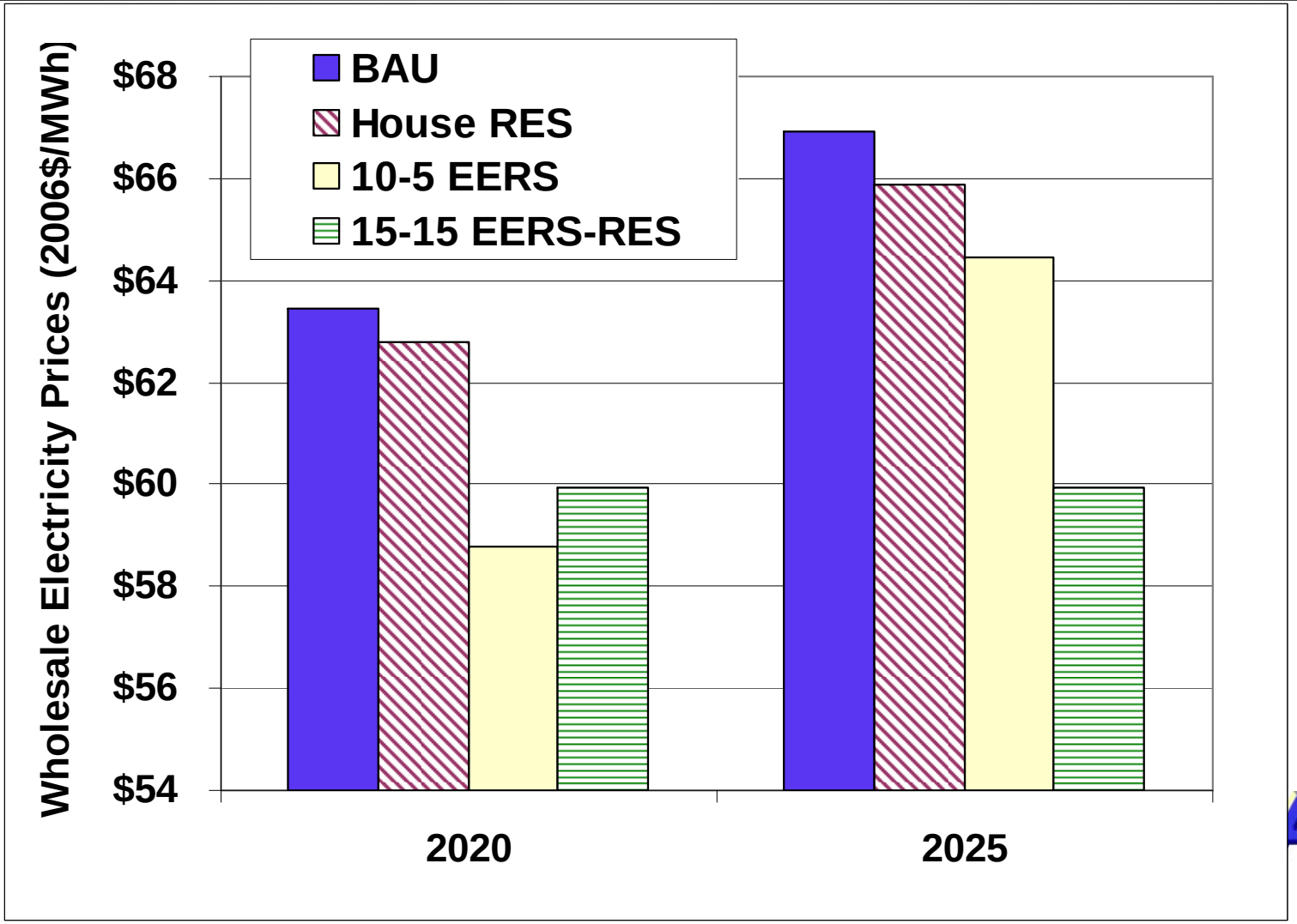
RGGI Results: Energy Bill Impacts

Average Energy Bill Savings—RGGI Package with Doubled Efficiency					
Residential		**Commercial**		**Industrial**	
2015	**2021**	**2015**	**2021**	**2015**	**2021**
$71	$118	$390	$650	$2468	$4092
7.5%	***12.4%***	***4.8%***	***8.1%***	***2.8%***	***4.7%***

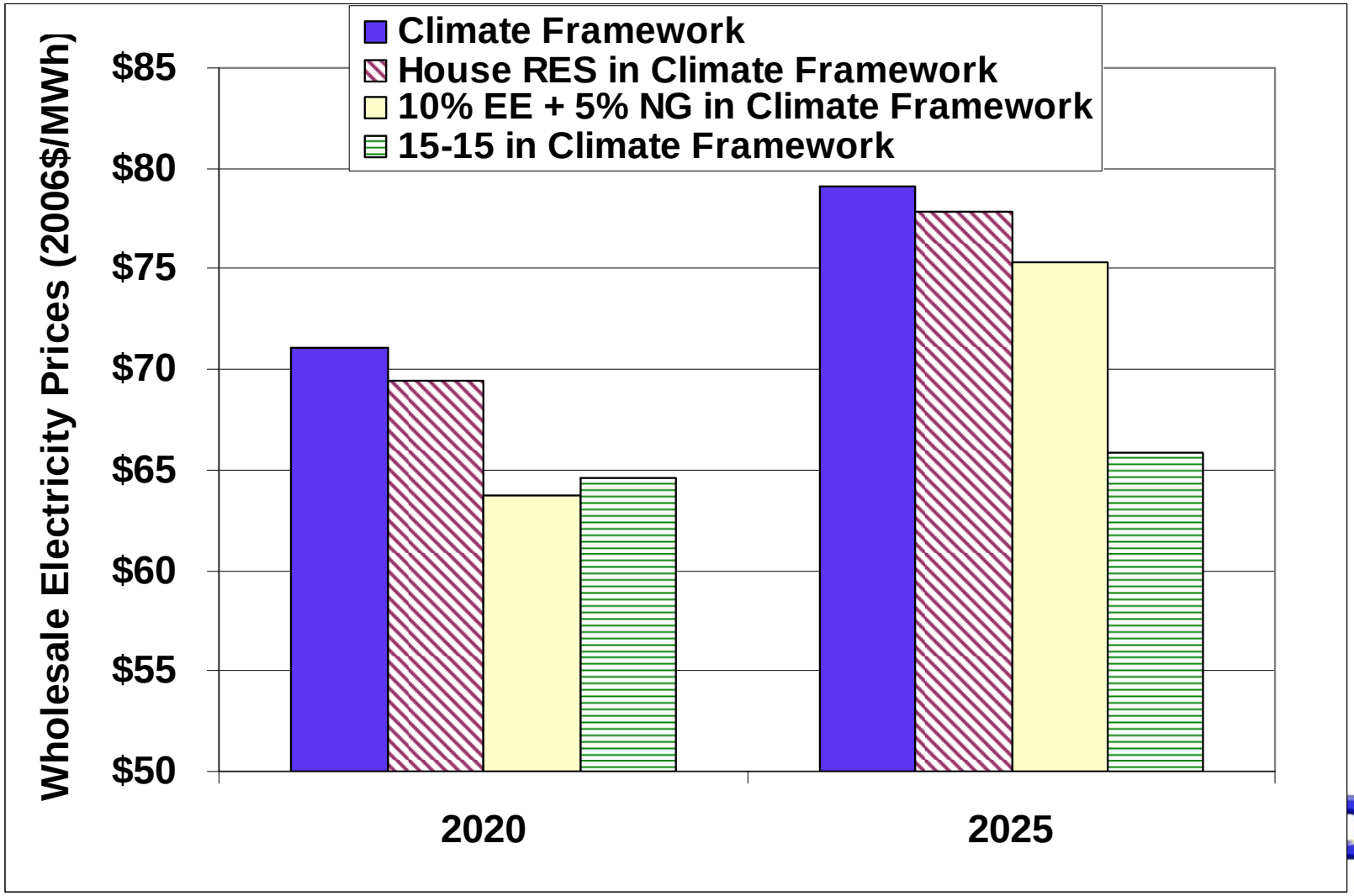
Today's Energy Bill: RES and Energy Efficiency

- RES provision: 15% renewable electricity target by 2020 includes efficiency—can provide up to 27% of resource target
- ACEEE used IPM to model impacts of House RES, and more aggressive targets (15% RE, 15% EE)
- We also modeled RES in a climate policy framework, akin to Lieberman-Warner

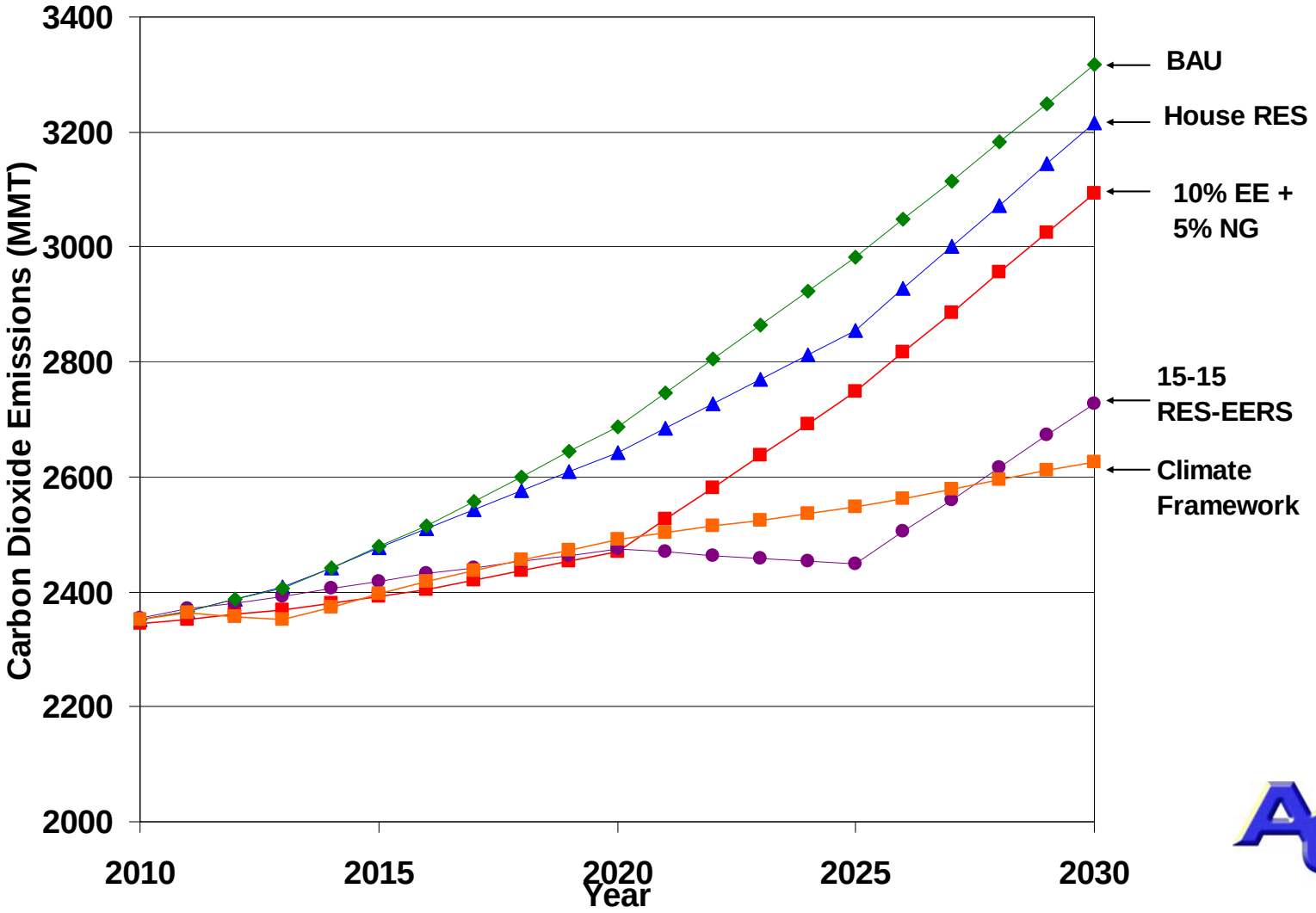
National Wholesale Electricity Prices: BAU reference case



National Wholesale Electricity Prices: Climate reference case



CO2 Emissions in BAU and Clean Energy Scenarios



Why Cap and Trade Alone Won't Mine Enough Efficiency

- Caps placed upstream lock out downstream emission reductions from trading markets
  - The indirect-reduction/double-counting problem
- Price elasticity effects of carbon prices are blunted by income elasticity, cross elasticity, and market barriers
  - Principal-agent problem affects 50% of basic building energy use

Hybrid Cap and Trade Policies Can Better Mine Efficiency

- Allocation/auction policy
  - RGGI states auctioning 25%-100% of allowances, and using most proceeds for EE
  - Lieberman-Warner auctions 24%-73% of allowances, stipulating some EE uses
  - Lieberman-Warner makes direct allocations to
    - States, with EE stipulations
    - Distribution utilities (Load-serving entities), with EE stipulations

Hybrid Cap and Trade Policies Can Better Mine Efficiency

- Complementary policies
  - Energy Efficiency Resource Standards
    - RES analysis shows the benefits
  - Building codes
    - Lieberman-Warner includes House codes provision
  - Appliance standards
    - Lieberman-Warner includes House standards
  - Fuel economy standards

Summary

- Efficiency is the First Fuel in the race to contain global warming
  - If we don’t drive down demand, we will not win
- Efficiency resources are abundant and affordable
- Efficiency takes policy action—markets alone won’t invest enough
- Hybrid climate policy can mine EE to achieve deep emission reductions at modest costs

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