

Affordable Heat: Lowering Vermont's Fuel Bills -- and Greenhouse Emissions

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Two Themes Today

1. Vermont's "all-fuels/whole buildings" program for thermal efficiency (S.209, 2008)

- ❖ Statewide goals, may triple Vermont Gas EE programs, extend WAP and electric EE programs
- ❖ New funding for liquid fuel efficiency: from RGGI & ISO-NE Forward Capacity Market revenues –
- ❖ BUT: New revenue not adequate to meet adopted goals – no new tax \$\$
- ❖ Comprehensive, not low income alone

2. Efficiency and Climate Strategy

- ❖ Top-down, price-driven GHG reduction is the expensive way to go !
- ❖ NOT "Cap and Give" or "Cap and Dividend"
- ❖ BETTER : "Cap and Invest"

Affordable Heat: The Challenge

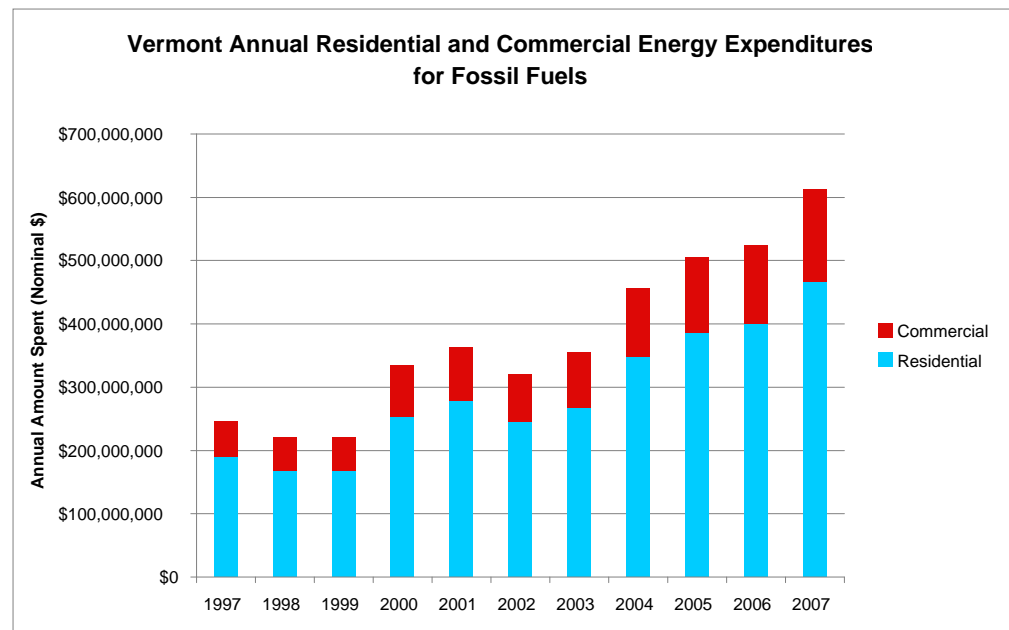
Fossil Fuel Bill: **\$~800M**
per year

up \$340M in 4 years

Fossil fuels for buildings
are VT's second-largest
source of GHG
emissions

Future risks of price
increases and carbon
policy costs

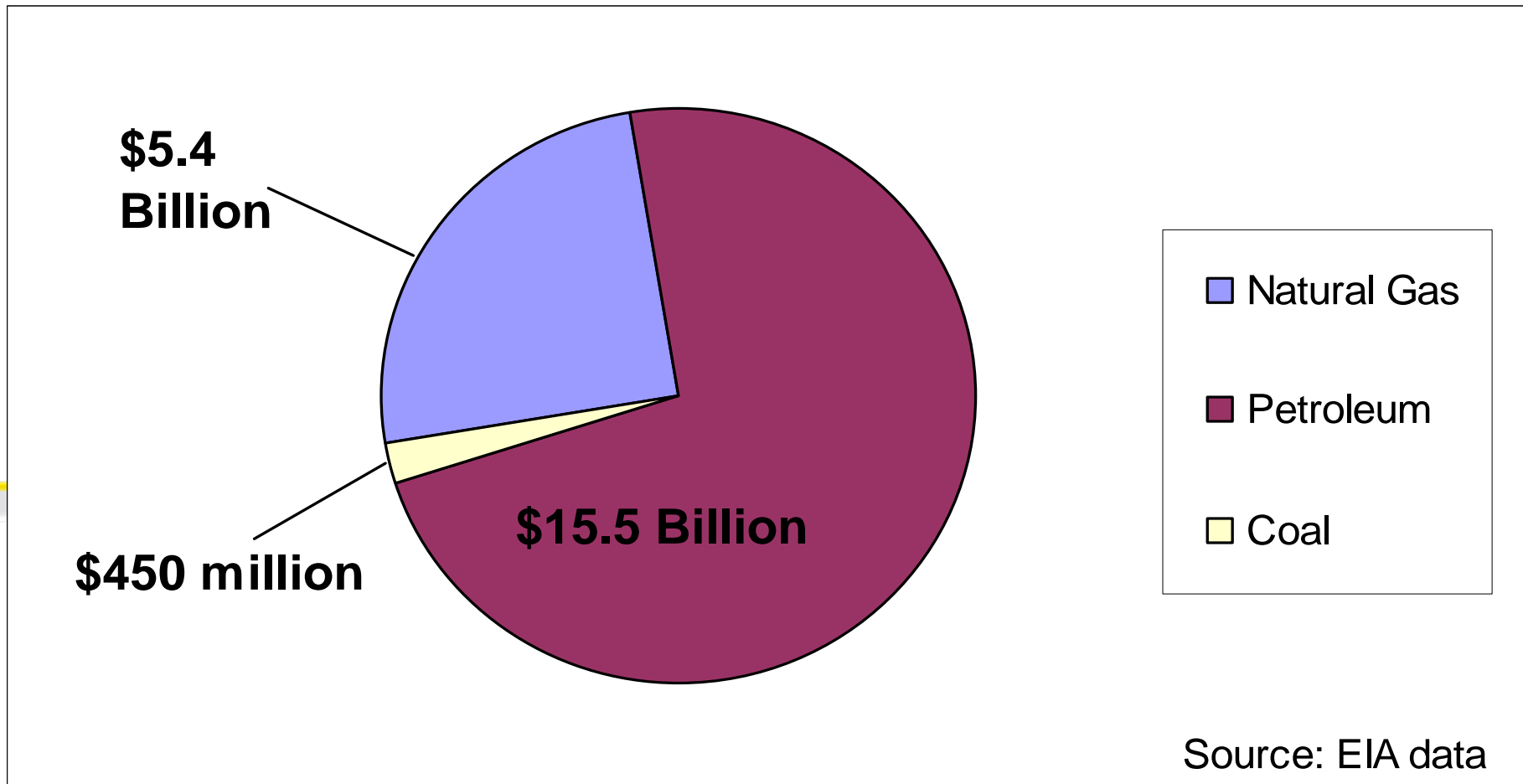
Fuel dollars quickly leave
Vermont



Framing: The High Cost of Importing Carbon

Wholesale Fossil Fuel Expenditures

Total New England Fossil Fuel Expenditures in 2004 = \$21 Billion



Framing: Affordable heat is a cost-effective investment opportunity

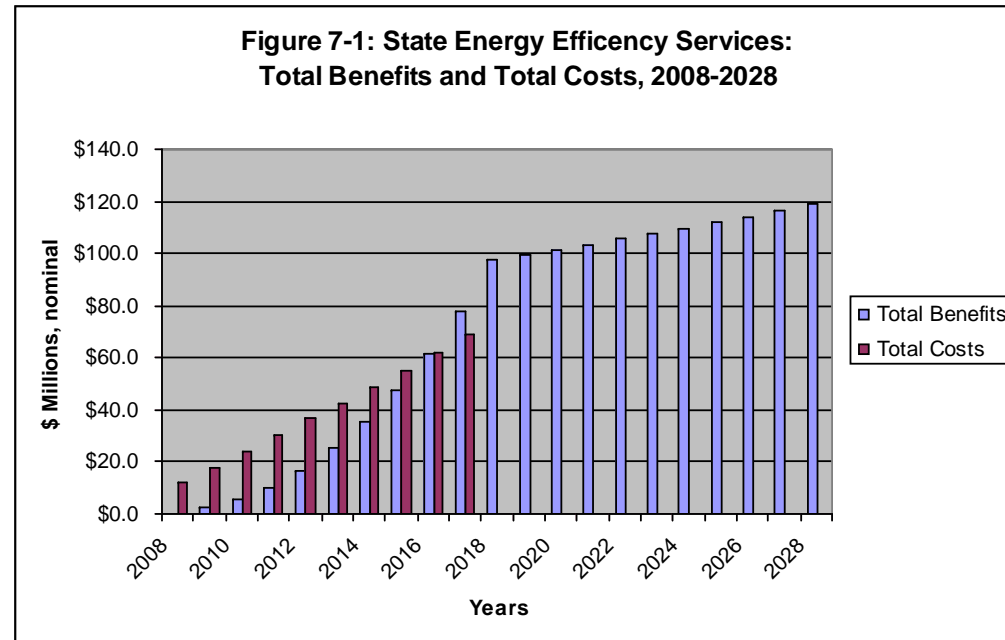
Report recommended:

20% of housing stock
treated 2017 60,000

In treated HH, lower fuel
bills by average **25%**

Fuel savings would
exceed **\$1.5 Billion**
from measures installed
over 10 years

Reduce Vermont's annual
fuel use by **6%** by 2017

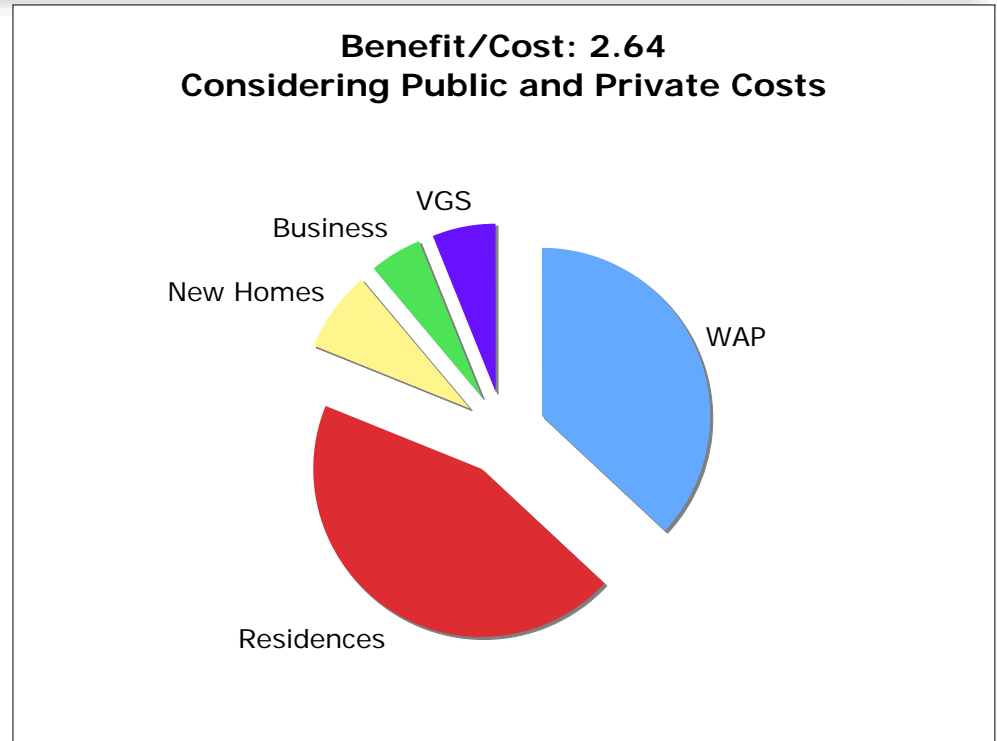


Save **\$100 million per year**



Goal: 60,000+ Buildings

- Low income Weatherization
- Res and Comm Building Efficiency
- New Construction
- Vermont Gas
- Plus effect of building energy codes
- Total cost: \$400 million over ten years



Phase in: **2300** buildings in 2008;
9600 buildings in 2017



Proposed: Double the low-income weatherization program

- Need: 50,000 eligible low-income HH
- WAP today serves ~1450 units/year
- Average fuel savings: 21% plus health, comfort, life safety, reduced public assistance & bad debt. \$2 to \$5 saved for each dollar invested
- Average cost/unit: ~\$5300
- Goal: ramp up to 3050 units/year by 2016
- 10-year goal = 23,875 units total



Funding Affordable Heat--

Where would \$400 million come from?

- ~50% Private capital leveraged with loans and incentives
- Existing sources: Gross Receipts Tax, VGS and existing Efficiency Vermont: ~25%
- RGGI and FCM revenues: 10%
- New public revenues needed (GRT increase or General Fund, etc.) 15%



Vermont Energy Efficiency and Affordability Act (S.209, 2008)

- Sets thermal efficiency goals (units and %s)
- Tightens building codes
- Creates Fuel Efficiency Fund, administered by DPS and PSB, funded by RGGI allowance proceeds
- Adds FCM \$ to Efficiency Vermont revenue pool for “whole buildings” EE
- Encourages PSB and Vermont Gas to expand natural gas DSM
- Studies (only) increase in Energy GR Tax
- (Also: net metering, green pricing, renewables)

Resisting temptation





Theme 2: Reworking Climate Strategy

- “Top down” cap and trade relying on price alone is more expensive, less likely to succeed than a portfolio-based policy menu (plus a cap);
- Carbon allocation can accelerate cap/trade success, lower program costs – build EE into national programs;
- State policies (EE, codes, portfolio mgt, RPS, etc.) are crucial to success;
- Low-income EE can serve both climate and equity goals.

Why carbon taxes and auctions create “high cost tons”

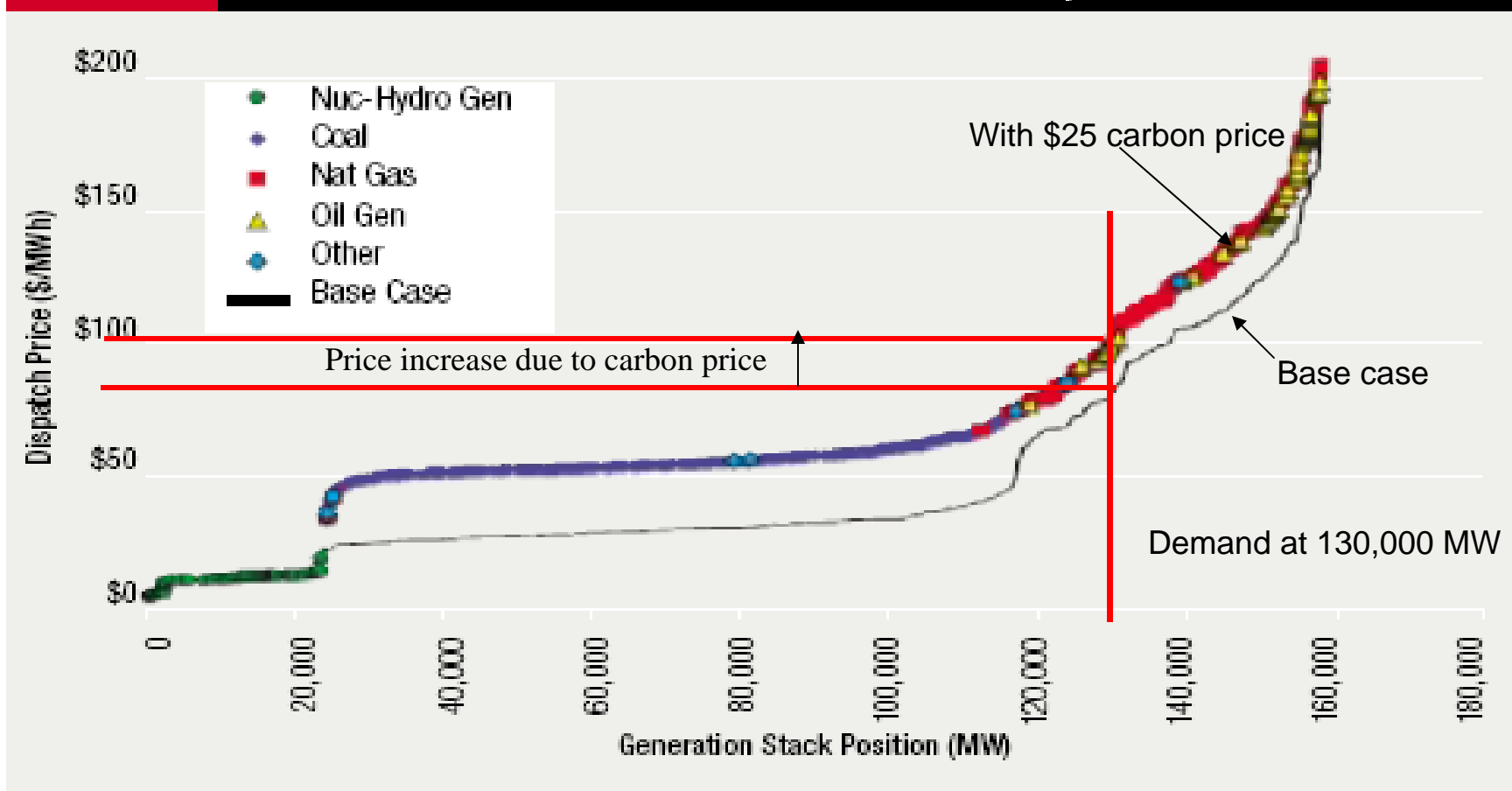


- Carbon price must be very high to save many tons (for gas to displace coal, etc.)
- Fossil units almost always set the clearing price
- Short-term clearing price provides the benchmark for longer-term and bilateral contracts
- SO: Carbon penalty on sellers raises prices generally
- Inframarginal rent a/k/a “windfall gains” to generators paid for by consumers

Problem #1: Carbon taxes and auctions to sources can increase wholesale power prices with little effect on dispatch or emissions

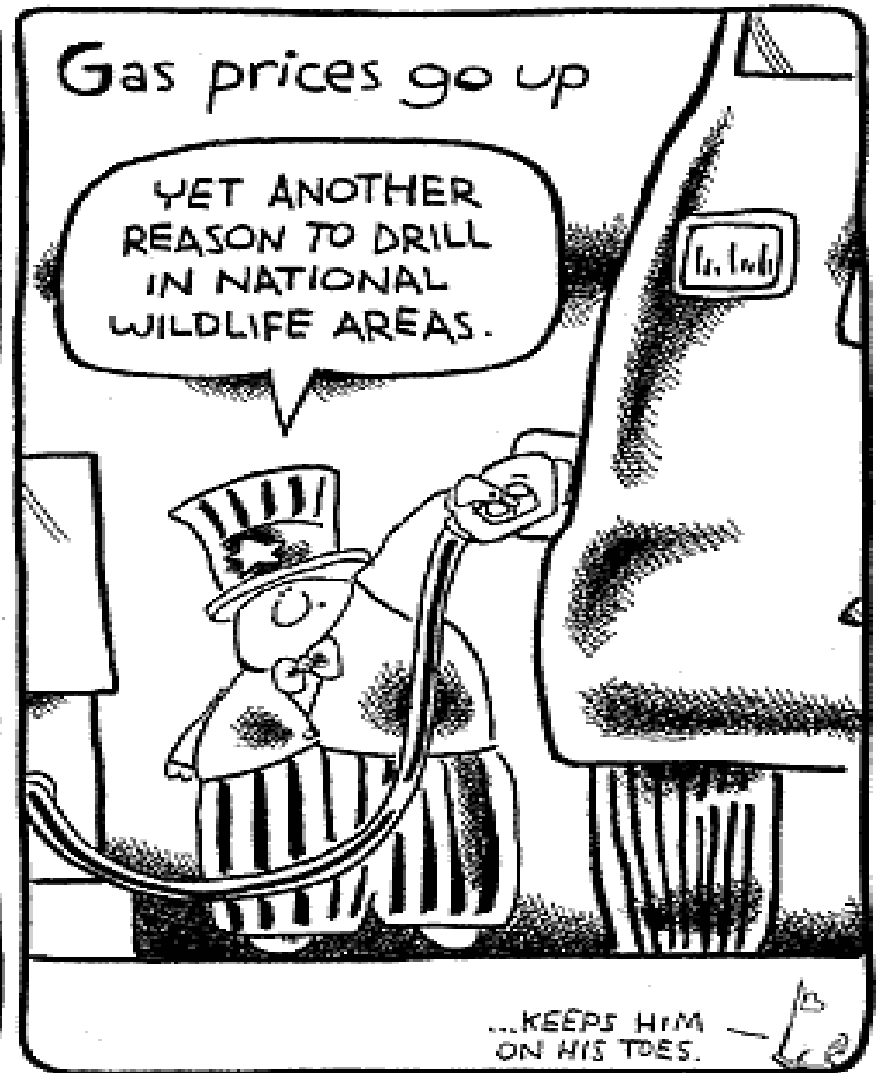
FIG. 3

SUPPLY CURVE WITH EMISSIONS PENALTY OF \$25/TON CO₂

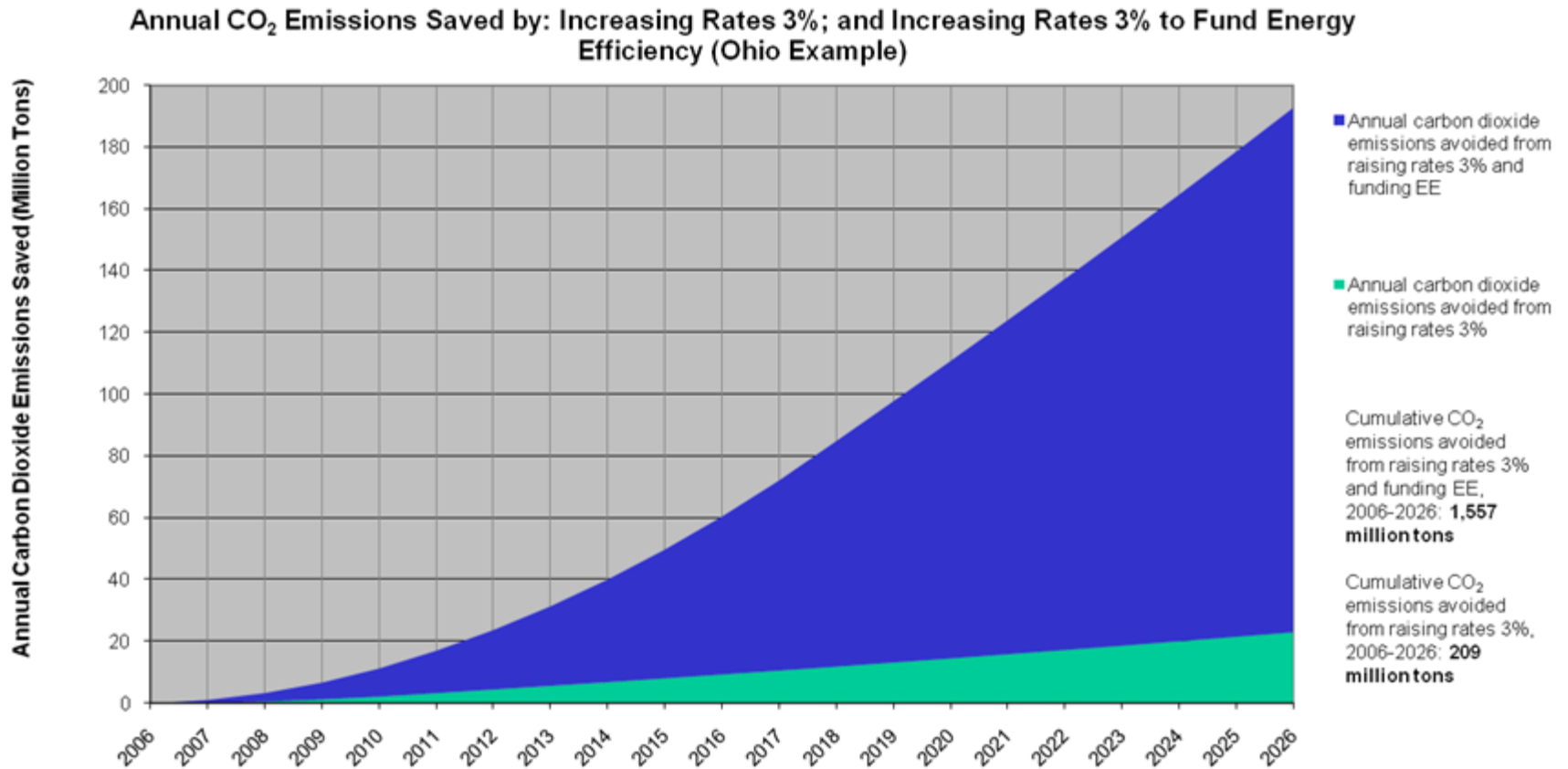


Source: "The Change in Profit Climate: How will carbon-emissions policies affect the generation fleet?"
Victor Niemeyer, (EPRI) -- Public Utilities Fortnightly May 2007 <some captions, demand and price lines added>

Americans need help when it comes to energy efficiency



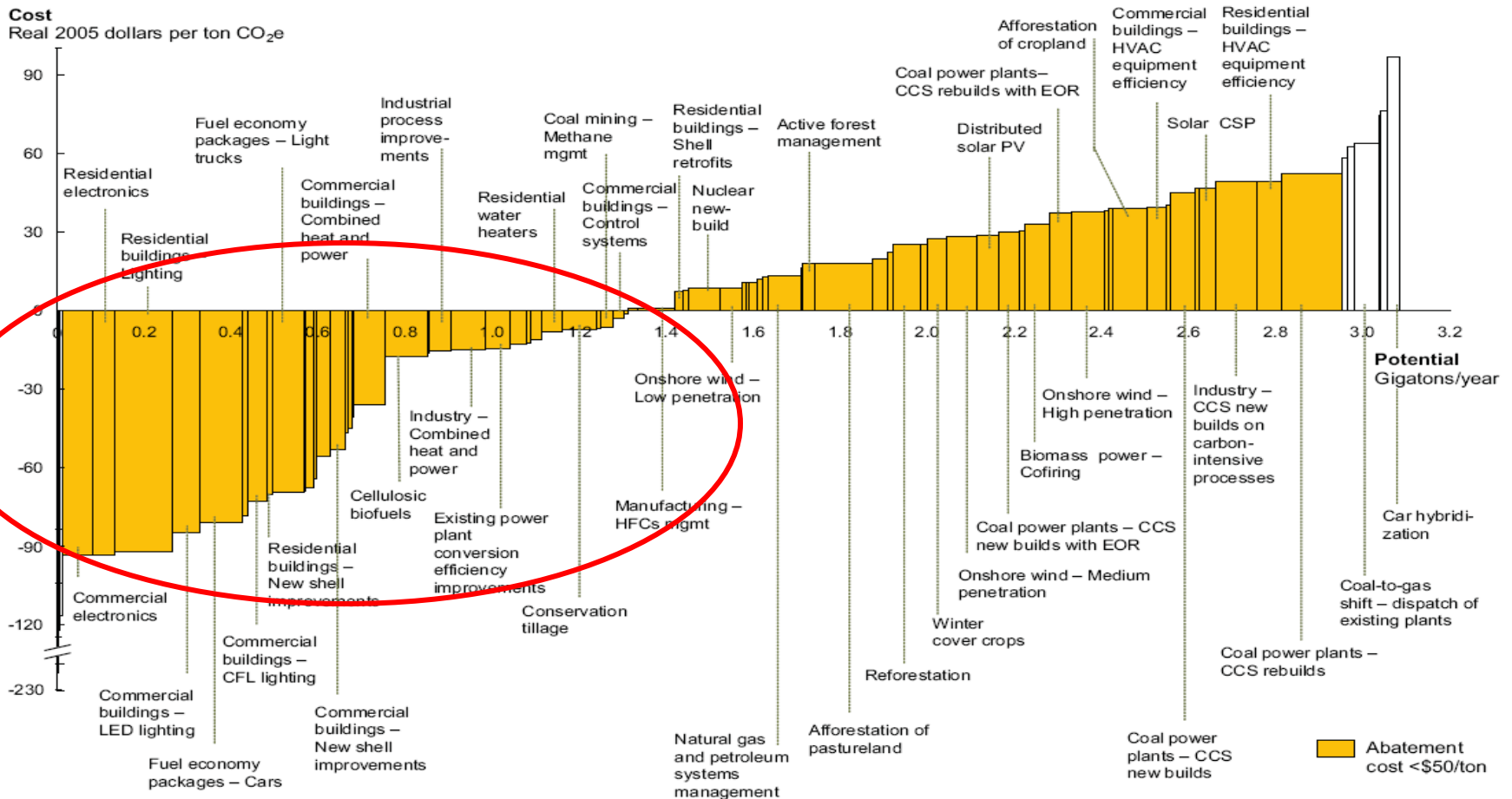
Efficiency programs can save 7 times more carbon per consumer \$ than carbon taxes



Assumptions: Electricity use increases by 1.7% per year; Retail electric sales increase by 3%; Price elasticity is -0.25 (-0.75 for a 3% increase), distributed over 5 years; Carbon dioxide emissions are 0.915 tons per MWh in Ohio; Cost of EE is 3 cents per kWh; Average EE measure life is 12 years

Response #1: Efficiency is the low-cost “carbon scrubber”

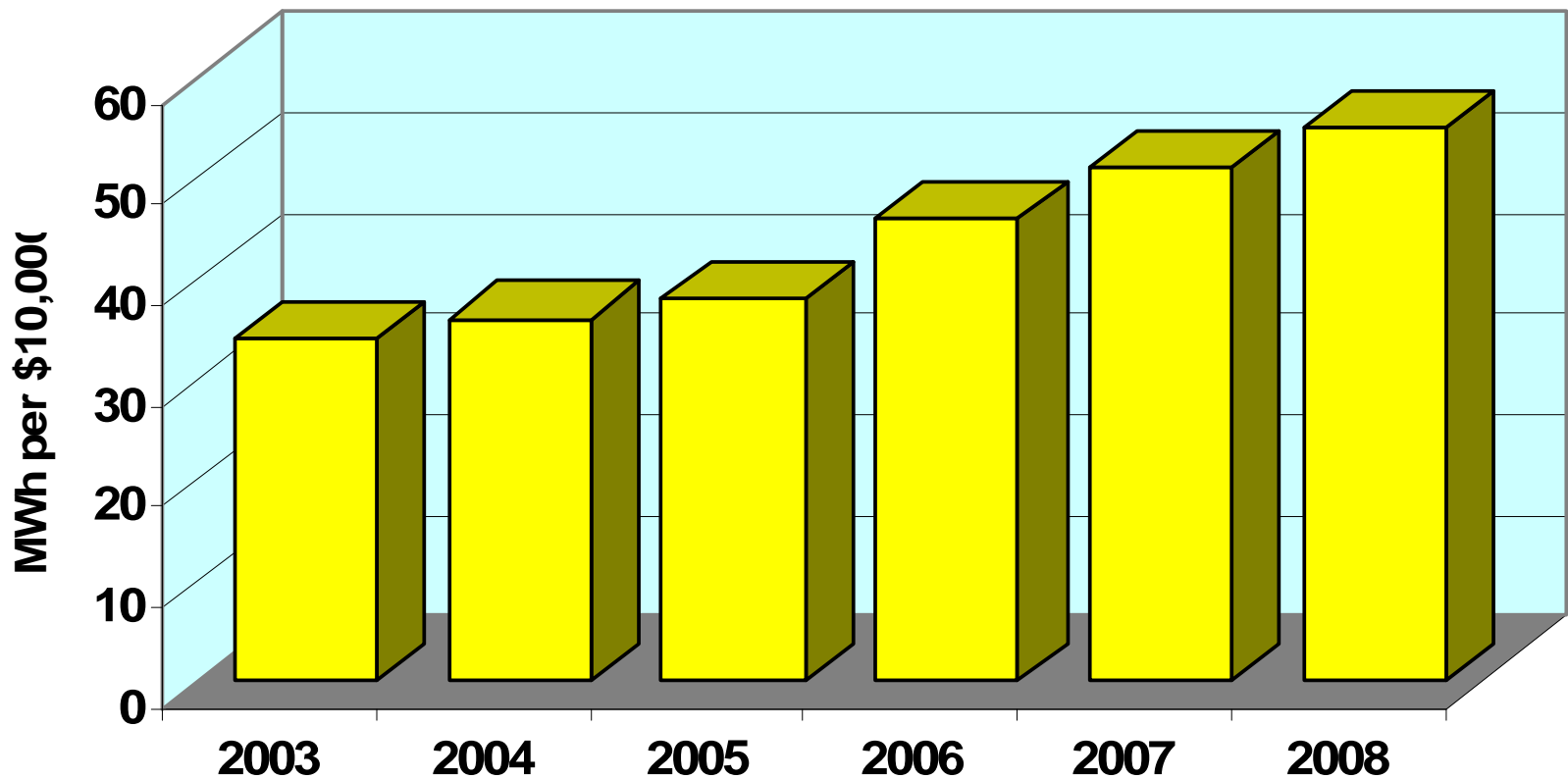
U.S. Mid-Range Abatement Curve – 2030



Source: McKinsey analysis

Note: The McKinsey report only examines a scenario through 2030. NRDC recommends a goal of 80 percent emissions reductions by 2050.

Lots of Low-hanging fruit: Efficiency Vermont Savings Yield Rates (MWh per \$10,000 invested)




2006-2008 values are estimates

Lessons for national legislation -- Carbon

credit allocation can mobilize efficiency

- Key point: **A carbon program that directly mobilizes end use efficiency will cost less and achieve more** than one that focuses only on smokestacks.
 - ❖ Lower cost attainment – that’s the whole point of cap and trade in the first place
- Cap/trade techniques can tap the carbon value of efficiency:
 - ❖ **Consumer allocation (RGGI region)**
 - ❖ **Load-side caps – carbon budgets for utility companies, akin to Renewable Portfolio Standards**
 - ❖ **National Efficiency Allocation (RAP & ACEEE proposal)**

National Efficiency Allocation*

- 
- Proposal: Allocate a pool of carbon allowances to states or LSEs to promote end-use efficiency
 - **Allocation should be performance-based:**
 - ❖ Reward actual EE success, not expenditures or particular policy approaches
 - **How to measure EE success?**
 - ❖ Key feature: % improvement compared to a baseline
 - ❖ Each state (or LSE) has its *own baseline*
 - ❖ *Indiana compared to Indiana, not Indiana compared to California*
 - ❖ *Sets up a “virtuous circle” of competition among entities – those who improve faster earn a bigger fraction of the pool.*

**As proposed by R Cowart (RAP) and S Nadel (ACEEE) March 2008 – comments and improvements are welcome*

Is allocation just “distributional”?

DC version: allocation for 60 votes





For more information...

- *“Affordable Heat: A Whole-Buildings Efficiency Service for Vermont Families and Businesses”*
(RAP study for Vermont Legislature January 2008)
- *Carbon Caps and Energy Efficiency: The Marriage of Need and Potential* (Energy Efficiency Finance Forum April 2007)
- *“Power System Carbon Caps: Portfolio-based Carbon Management”* (NREL Carbon Analysis Forum November 2007)
- *“Why Carbon Allocation Matters – Issues for Energy Regulators”* (March 2005)
- *“Another Option for Power Sector Carbon Cap and Trade Systems – Allocating to Load”* (May 2004)

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