



National Action Plan for Energy Efficiency

[www.epa.gov/
eeactionplan](http://www.epa.gov/eeactionplan)

Energy Efficiency and Carbon Policy

Tapping the “first fuel” in the race
for clean energy

Bill Prindle
January 7, 2008



Overview

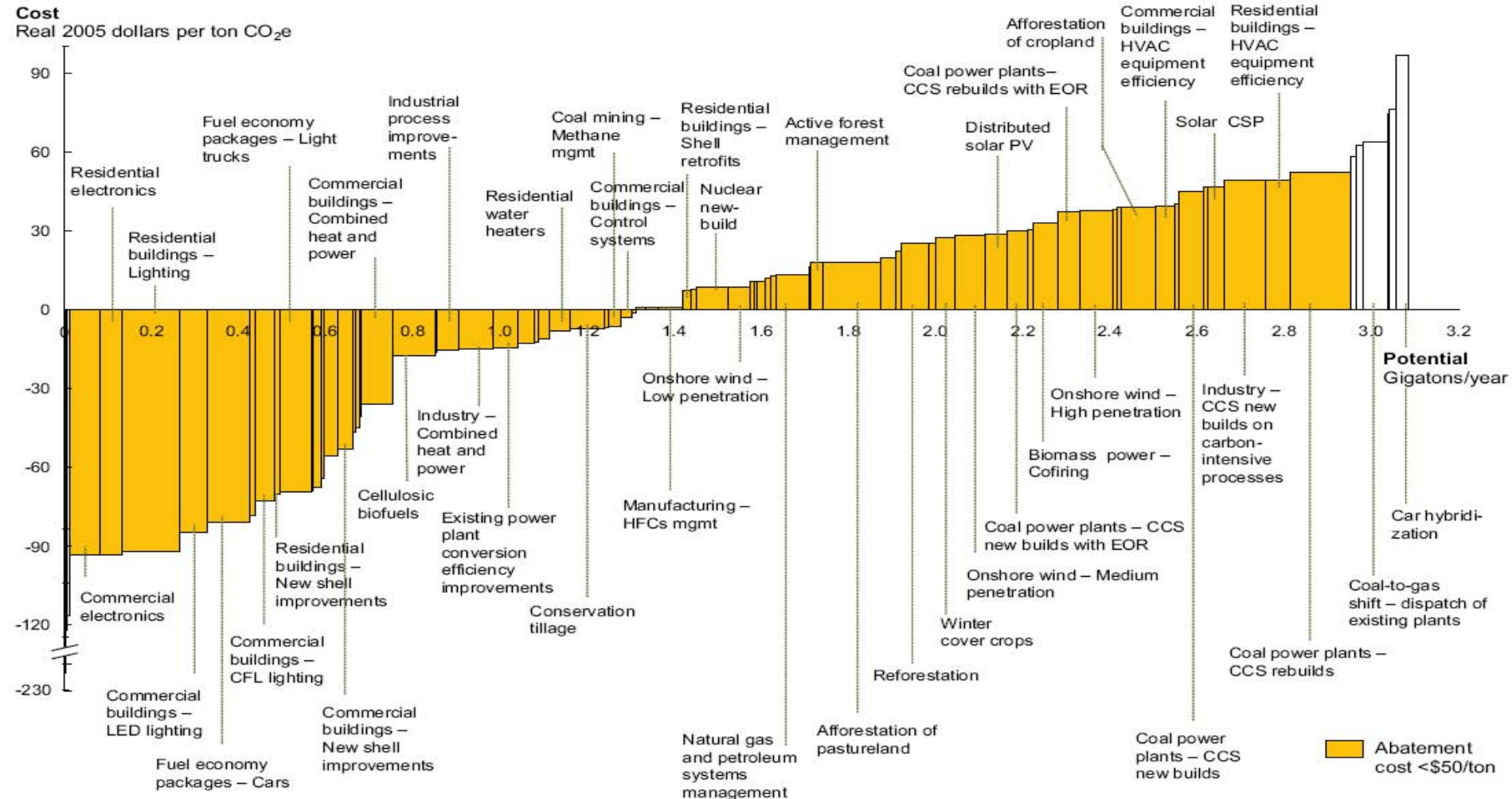
- Efficiency's economic and carbon reduction resource value
- Efficiency's role in a carbon policy context
- Policy options for EE in carbon policy
- NAPEE's role in the EE-carbon nexus
 - Objectives and possible products for Year 3 efficiency-carbon workgroup
 - Proposed products and timeline



McKinsey Carbon Cost Curve

(Source: NRDC, *The New Energy Economy* (2007))

U.S. Mid-Range Abatement Curve – 2030



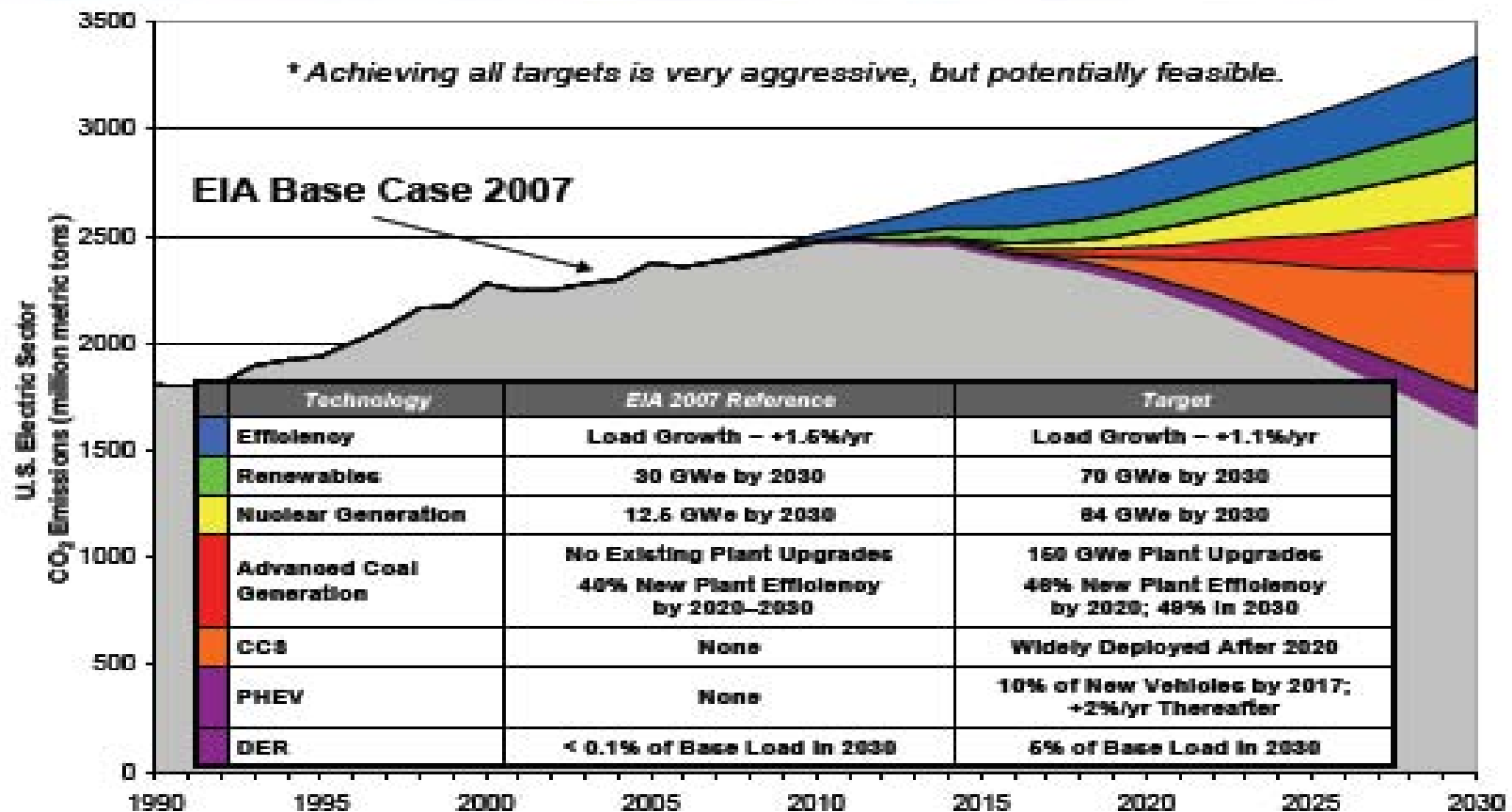
Source: McKinsey analysis

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



EPRI's PRISM Analysis

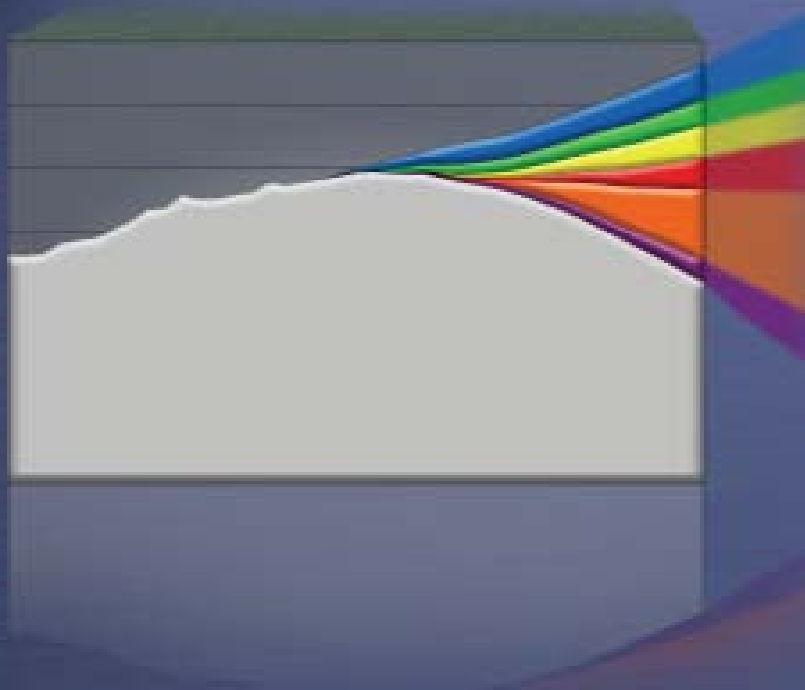
CO₂ Reductions ... Technical Potential*





EPRI's PRISM Analysis

EPRI "PRISM" - CO₂ Reductions



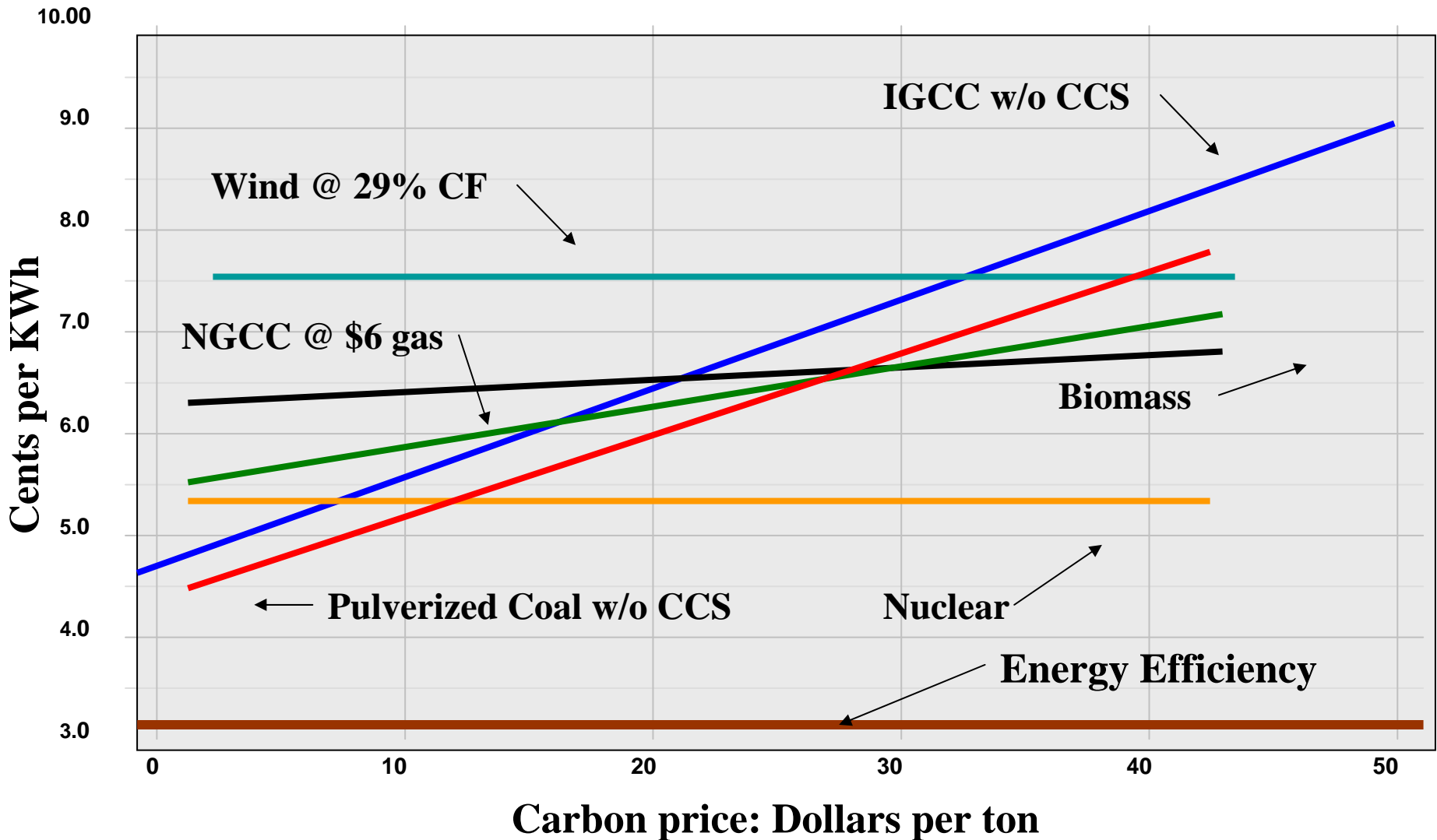
<i>Technology</i>	<i>EPRI Analysis Target</i>
Efficiency	Reduced Load Growth by ~30%
Renewables	70 GWe by 2030 (2X EIA projection)
Nuclear Generation	64 GWe by 2030 (~ 50 Plants > EIA)
Advanced Coal Generation	Existing Plant Efficiency Upgrades New Plant Efficiency 46% by 2020; 49% in 2030
Carbon Capture and Storage (CCS)	All Coal Plants after 2020 Capture 90% of CO ₂
Plug-in Hybrid Electric Vehicles (PHEV)	~1/3 of New Vehicle Sales in 2030
Distributed Energy Resources (DER)	5% of Load "off-grid" in 2030



Why EE is Least Cost

(Source: EPRI and ACEEE data)

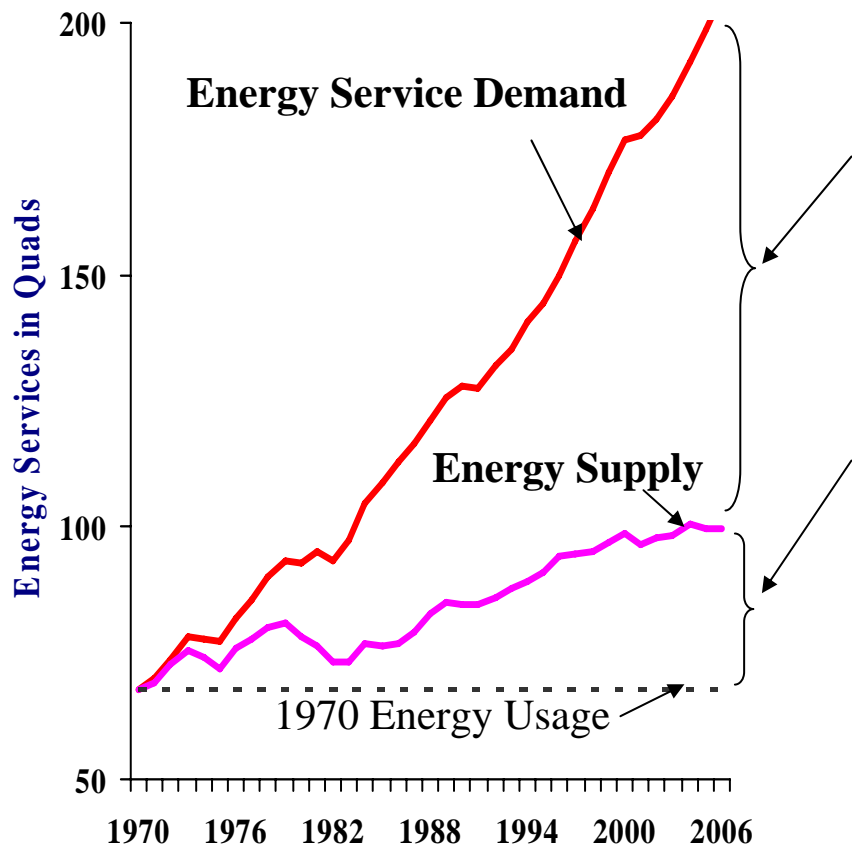
Levelized Cost of Electricity by Source





Efficiency's Economic Benefits

(Source: ACEEE Staff Analysis)



- 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.



Efficiency as Infrastructure Investment

(Source: forthcoming ACEEE report)

2004 Analysis

- Total 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 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

U.S. EE Spending

(annual expenditures, c. 2004)

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



Efficiency Investment and Job Creation

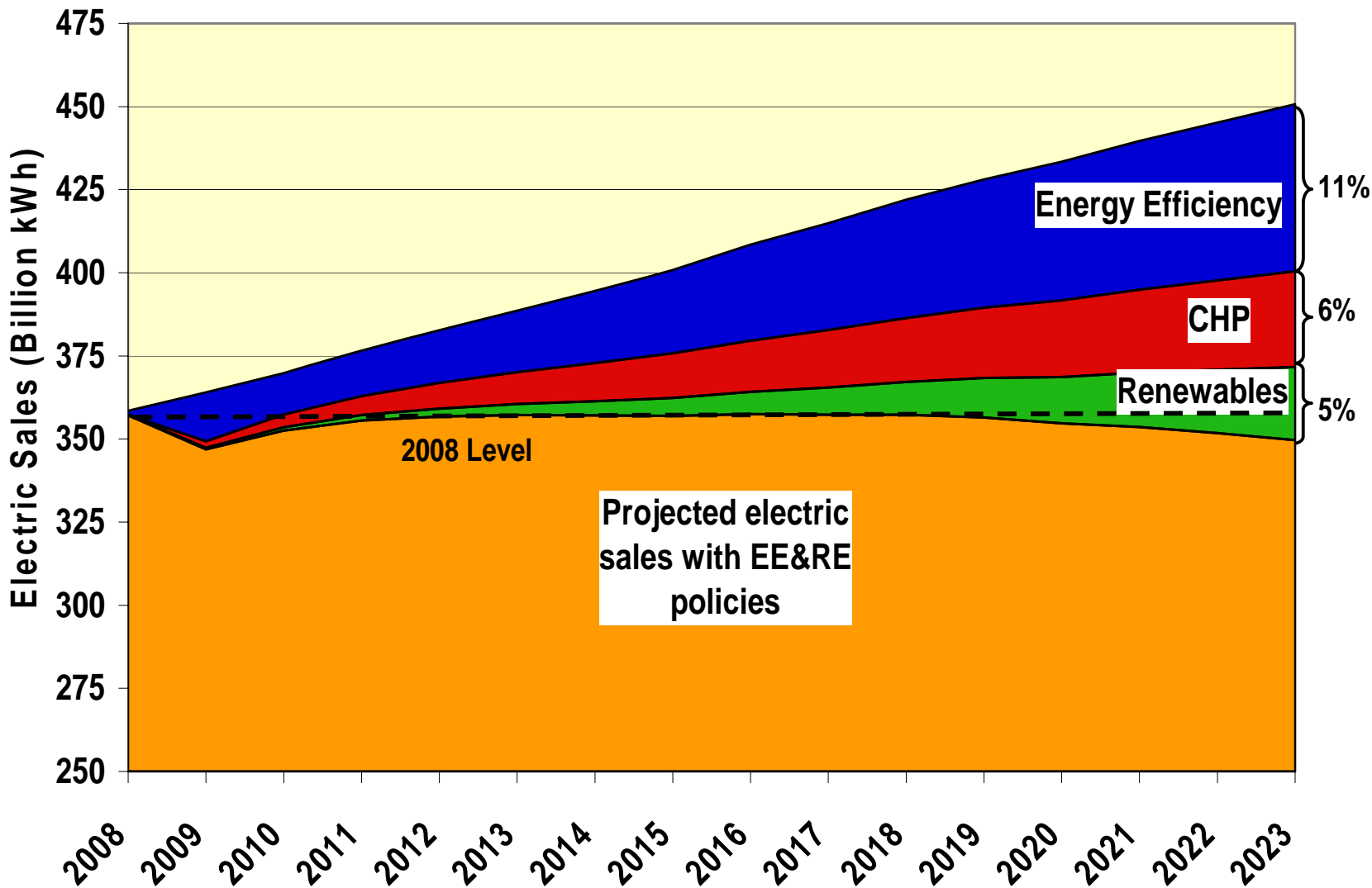
(Source: forthcoming ACEEE report)

- 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's Potential: Texas Example

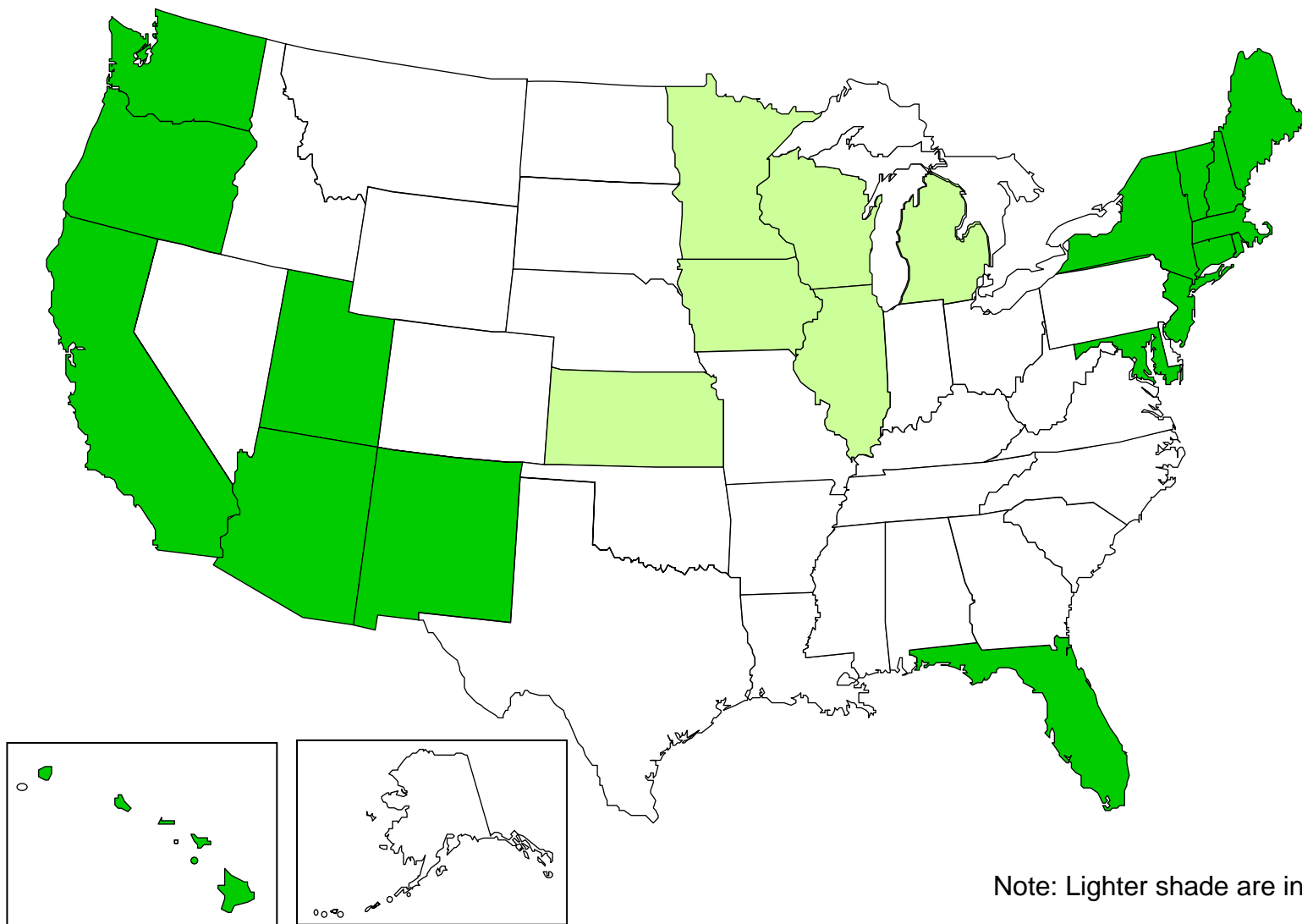
(Source: ED/ACEEE report 2007)





States with GHG Emissions Targets

(Source: EPA's Clean Energy-Environment State and Local Program)

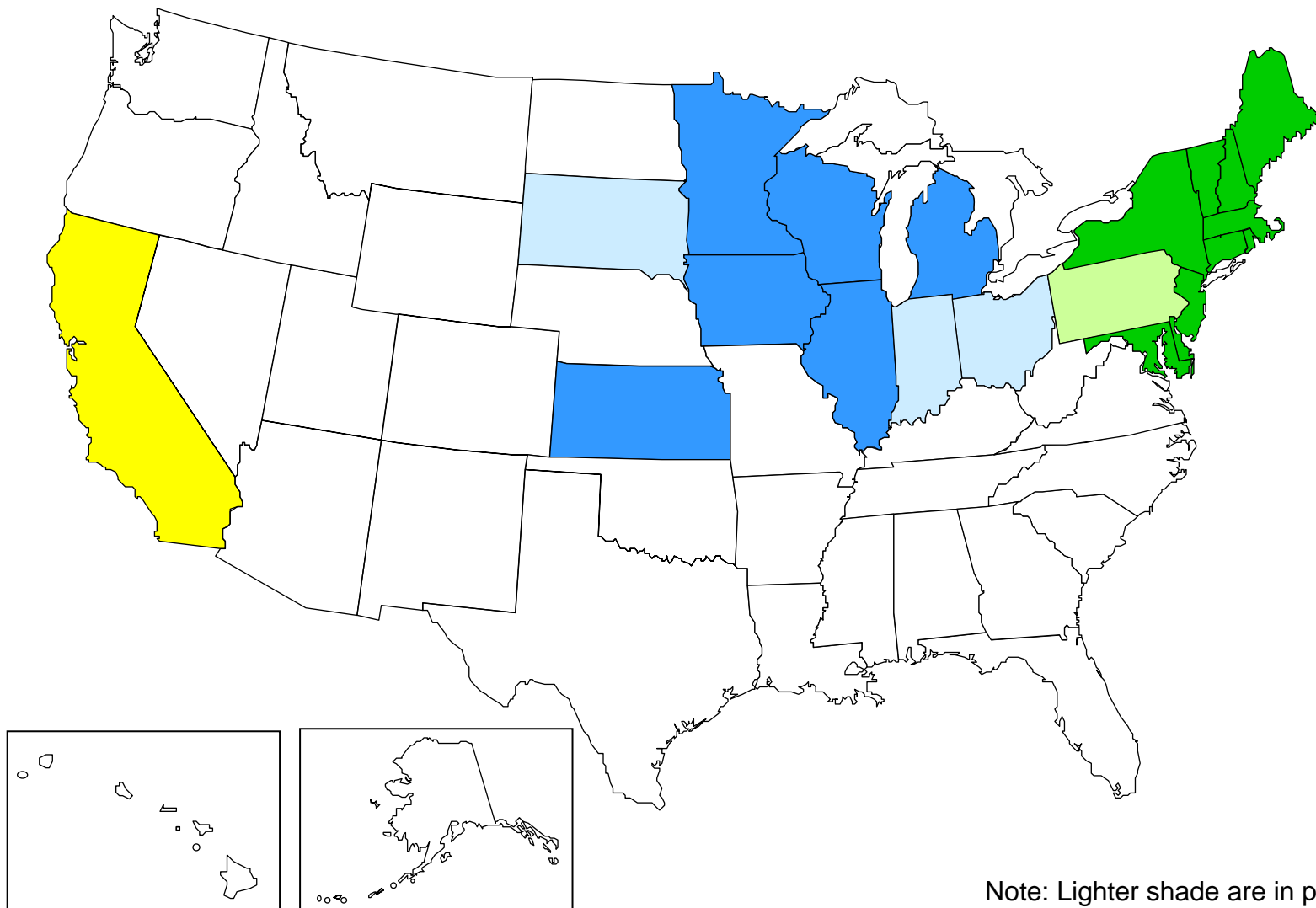


Note: Lighter shade are in process



States Instituting GHG Cap & Trade Programs

(Source: EPA's Clean Energy-Environment State Program)



Note: Lighter shade are in process



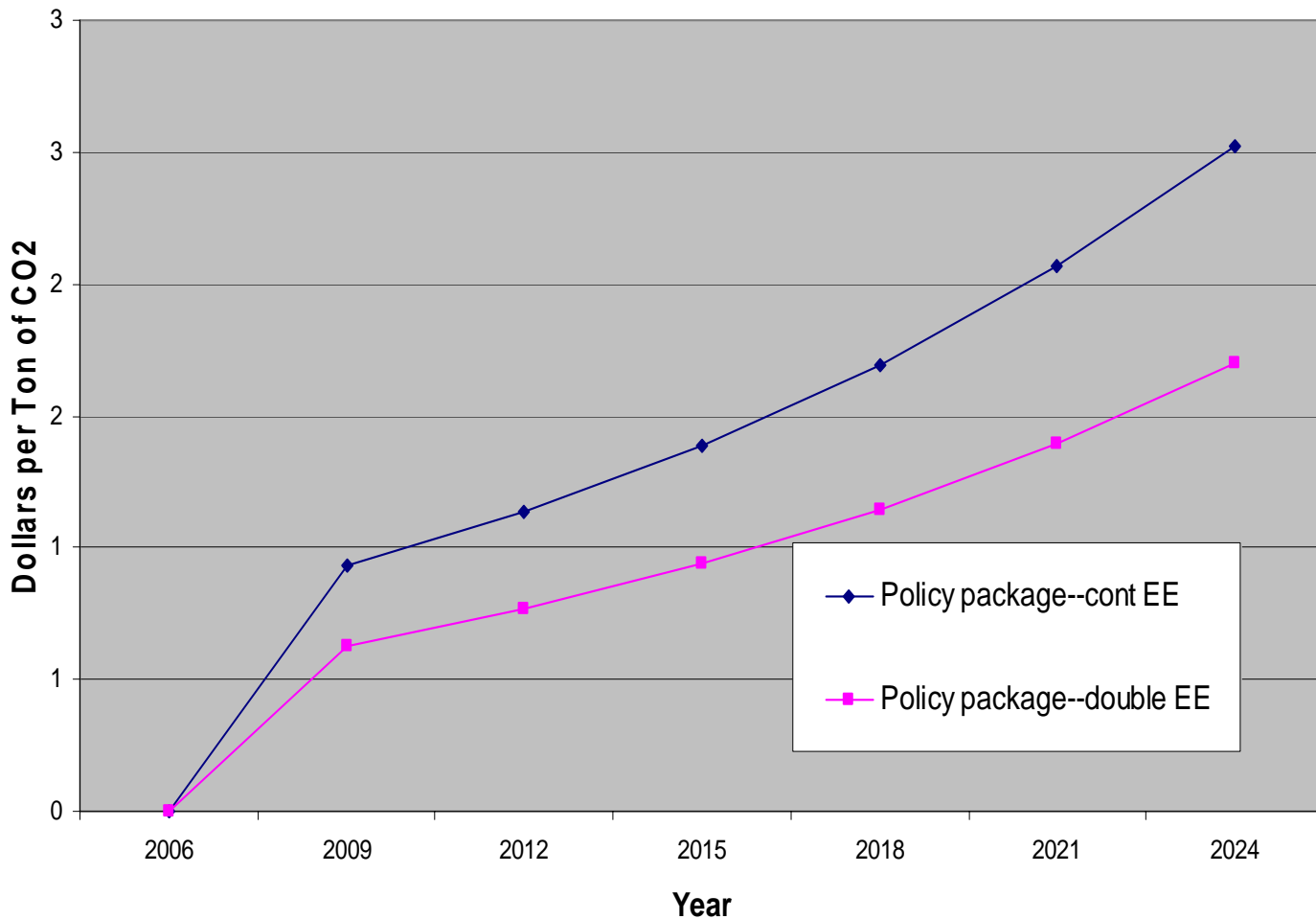
Efficiency in State Carbon Policy: RGGI

- Regional Greenhouse Gas Initiative (RGGI)
 - Ten NE states set 10% carbon emission reduction target for 2018
 - Efficiency analyzed in detail along with other options
 - ACEEE provided EE cost data
 - ICF used IPM to model impacts
 - Doubled efficiency investment produced the lowest energy and carbon prices



RGGI IPM Results: Carbon Prices

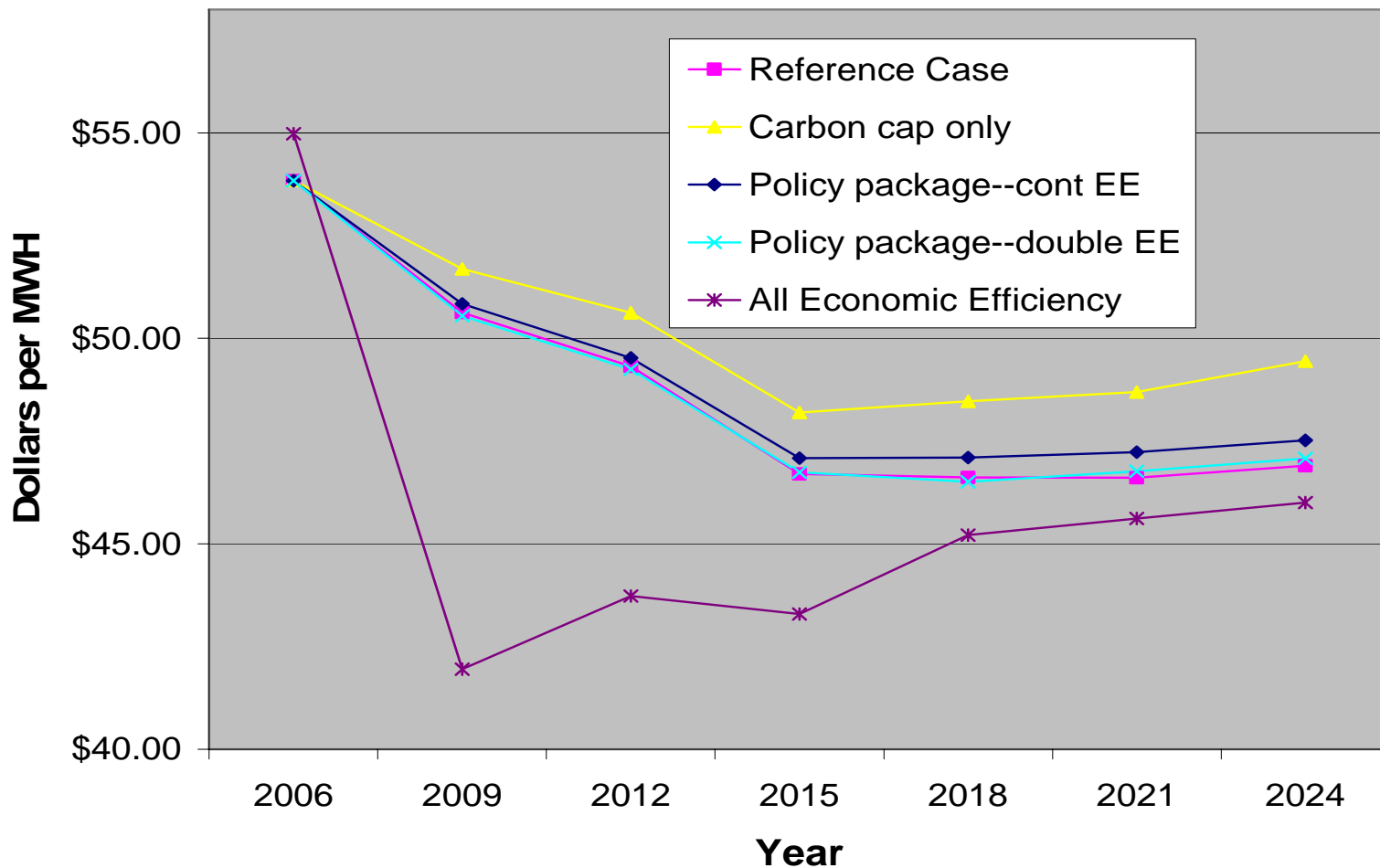
Carbon Allowance Prices





RGGI IPM Results: Electricity Prices

Electricity Prices (firm power)





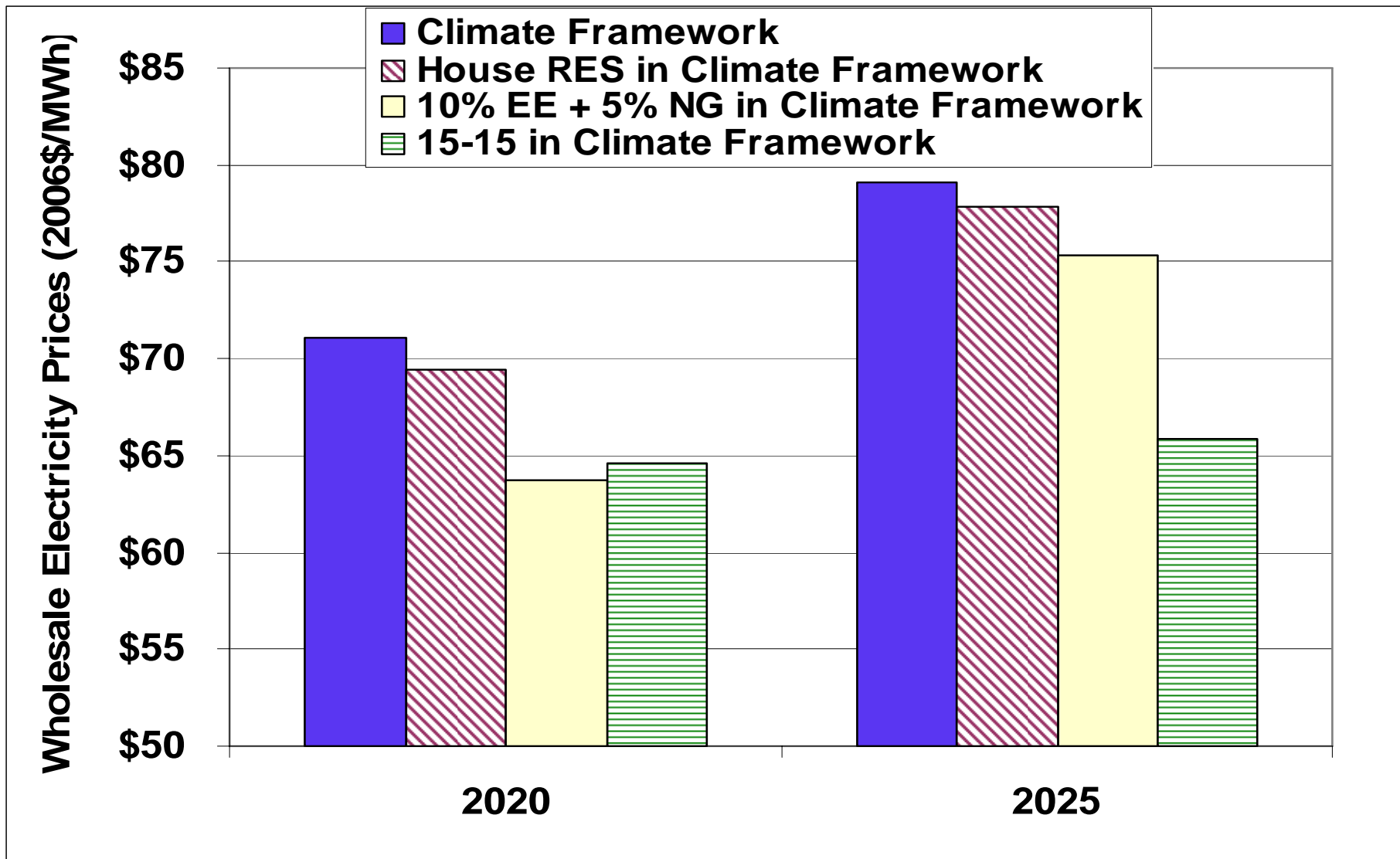
RGGI Results: Energy Bill Impacts

Average Annual 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%

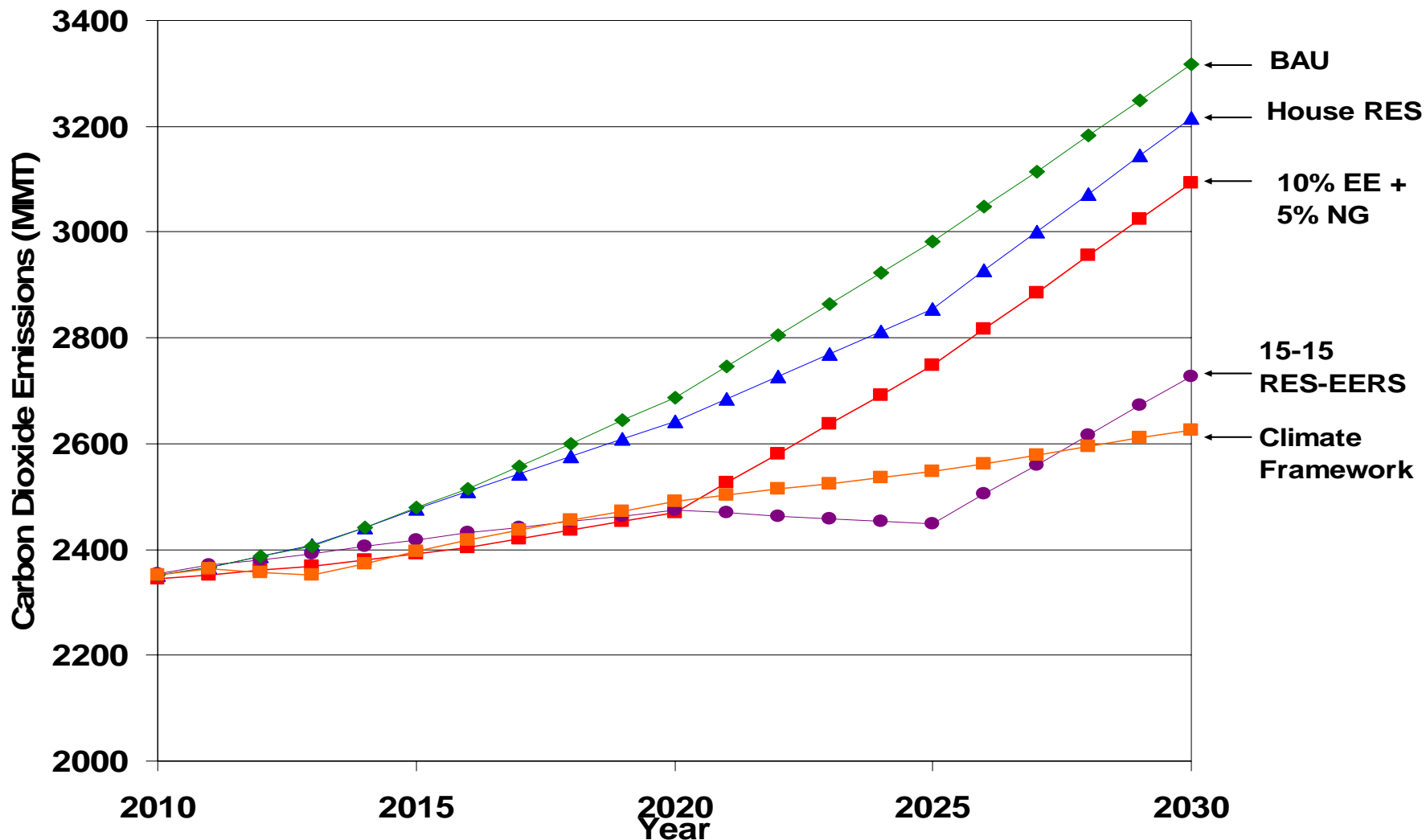


ACEEE/ICF IPM Analysis of National RES-EERS





ACEEE/ICF IPM Analysis of National RES-EERS





Carbon Policy Alone Will Not Leverage EE Opportunity

- Cap and Trade or Carbon Tax lead to energy price increases but leave EE barriers unaddressed
 - Price elasticity effects are muted by
 - Income elasticity
 - Cross-elasticity
 - Market barriers remain large and persistent:
 - The “principal-agent” problem
 - The “Warren Buffet” problem



Options for Use of EE in Carbon Policy

- Cap-and-Trade
 - Use allowance allocation policies and auction proceeds to support efficiency
 - Pursue complementary EE policies— EERS, building codes, appliance stds., etc.
- Carbon taxes
 - Use portion of tax revenues to fund efficiency



Options for Use of EE in Carbon Policy: RGGI

- Examples from RGGI states:
 - Minimum 25% allowance auction, prioritize use of auction \$ for EE
 - Most RGGI states auctioning 100%
 - Most RGGI states pursuing EERS, building codes, and appliance standards as complementary policies



What does this mean for NAPEE?

- Our job is more important than ever
- State and national carbon policies may or may not “get it right” regarding complementary EE policies
- NAPEE’s efforts can drive efficiency investment that markets won’t capture by themselves. This will:
 - Moderate demand growth
 - Give low-carbon generation a chance to catch up
 - Moderate future electricity and gas prices
 - Moderate future carbon prices
 - Keep economic growth strong while driving down carbon emissions



Proposed Year 3 Work Area: Energy Efficiency Links to Carbon Policy

- Proposed objectives are to outline:
 - Role of cost-effective EE in lowering cost of carbon policy/regulation;
 - Why carbon policy/regulation does not ensure capture of cost-effective EE; and
 - Range of options for complementary approaches between carbon policy/regulation and state EE policies
- Possible work products:
 - White paper
 - Summary fact sheets, brochures, etc.
 - Presentation materials



Proposed Process and Timeline

- Leadership Group members volunteer for Work Group
 - Volunteers by end of January
- Work Group discusses and outlines work product
 - Circulate proposal by end of February
- Leadership Group reviews and comments on proposal
 - Comments by mid-March
- Draft product and incorporate comments from Work Group and Leadership Group
 - Final product by end of August



Questions for Leadership Group

- Do the proposed objectives and work products for addressing EE links to carbon policy make sense?
 - Is anything missing?
- Is the process for proceeding appropriate?
- What organizations and/or experts should be included in project Work Group?