



Exploring the Macroeconomic Benefits of Smart Climate and Energy Policies: *The Role of Productive Investment in Economic Activity**

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Reexamining Perspectives on Climate Economics

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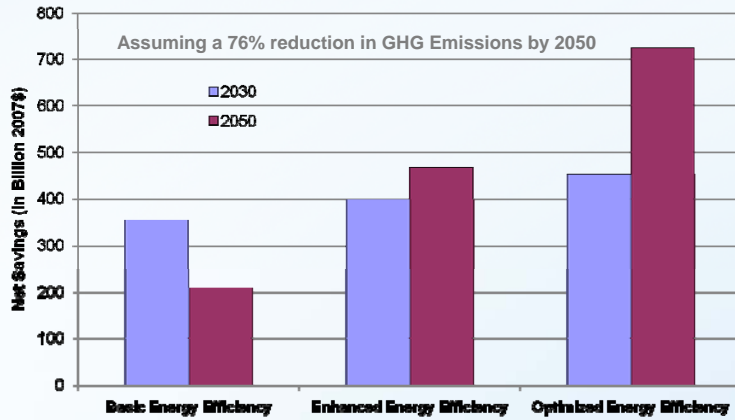
* From the October 2009 ACEEE report, *Climate Change Policy as an Economic Re-development Opportunity: The Role of Productive Investments in Mitigating Greenhouse Gas Emissions*. See, <http://www.aceee.org/press/e098pr.htm>.

The Findings in Brief

- Most previous assessments of climate change policies examine only the costs – with little integration of benefits that might logically follow from such policies.
- This analysis explores the energy productivity benefits of smart investments in more energy-efficient behaviors, technologies, and infrastructure.
- In effect, we ask the question: “How do we achieve the twin goals of a healthy economy and a healthy climate?”
- Our findings suggest that a climate policy that drives more productive investments can generate net savings, increase jobs, and significantly reduce greenhouse gas emissions – even without accounting for the avoided costs of more extreme weather, rising sea levels, public health impacts, and other effects of climate change.

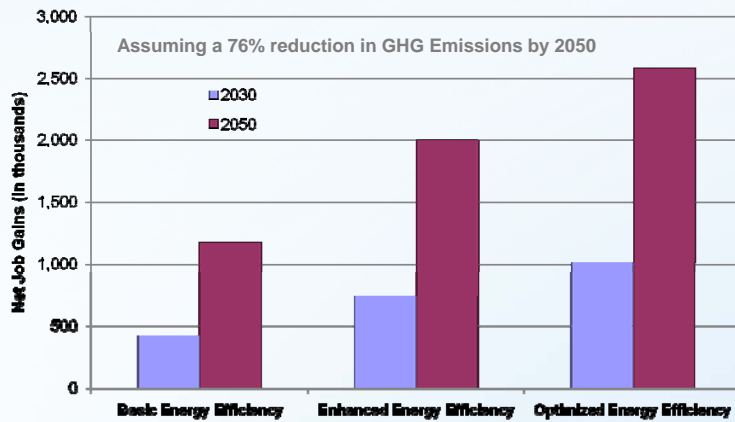


Net Energy Bill Savings of Greater Energy Efficiency Investments



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The Net Job Impacts of Greater Energy Efficiency Investments



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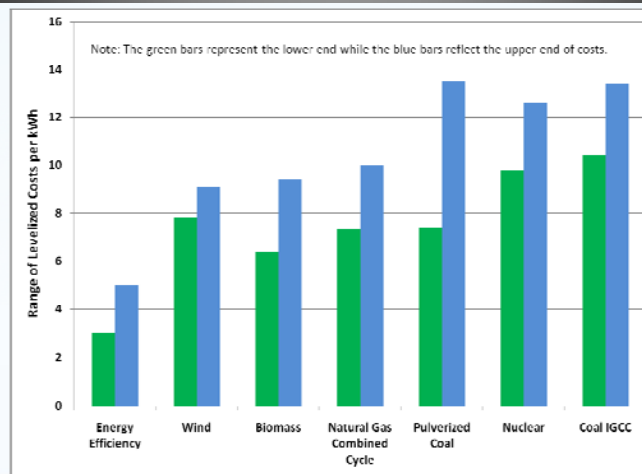
Key Insight #1: The Effect of Efficiency Policies and Consumer Behavior on Prices

Table 1: Illustrating the Impact of Programs and Consumer Behavior on CO₂ Prices in 2050

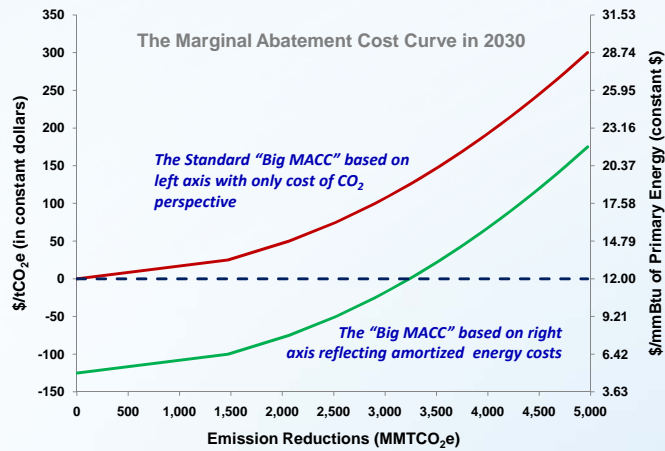
Assumed Policy Scenario	\$/CO ₂
Pricing policy with some complementary programs and limited change in behavior	\$753
Pricing policy with more complementary programs and evolving consumer behavior	\$239
Pricing policy with significant complementary programs and big shift in behavior	\$57



Key Insight #2: Efficiency Investments Are Almost Always Less Expensive

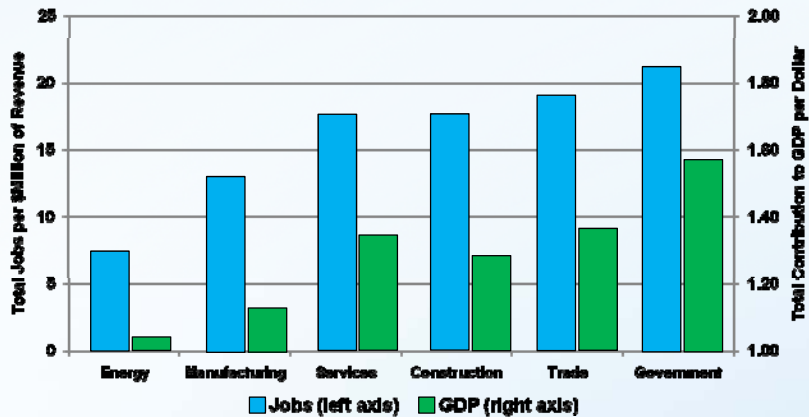


Key Insight #3: Productive Investments Generate a Net Positive Return



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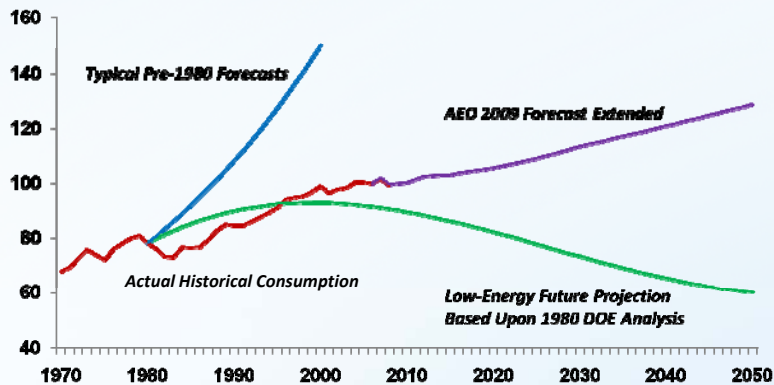
Key Insight #4: Energy Productivity Shifts Spending To Greater Labor and GDP Impacts



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Source: 2007 IMPLAN data set for the U.S. economy (2009).

Key Insight #5: The Energy Efficiency Resource Is Larger than Generally Believed



Source: DOE 1980 Policy Analysis, AEO 2009, and ACEEE estimates 2009

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How Big Energy Efficiency?

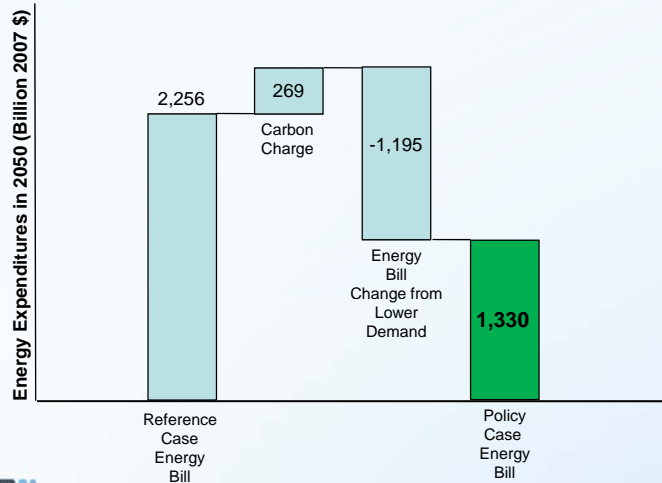
- Since 1970 energy efficiency – in its various forms – has satisfied ~75 percent of our nation’s increased demand for energy-related services while new energy supplies only 25 percent of the new demands.
- Preliminary estimates suggest that greater levels of energy productivity can provide as much as 60 percent of the needed reductions in total greenhouse gas emissions by 2050 – if we choose to develop and invest in that resource.
- Citing two of the many examples omitted from usual modeling exercises:
 - Our nation’s electricity generation system is at best 32 percent efficient, a level that is essentially unchanged since 1960. What we waste in the generation, transmission and distribution of electricity is more than Japan uses to power its entire economy. There are many cost-effective solutions available to recycle this huge level of waste.
 - A 2007 DOE-sponsored study suggested that if all commercial buildings were rebuilt by applying a comprehensive package of energy efficiency technologies and practices, they could reduce their typical energy use by 60 percent. Adding the widespread installation of rooftop photovoltaic power systems could lead to an average 88 percent reduction in the use of conventional energy resources.

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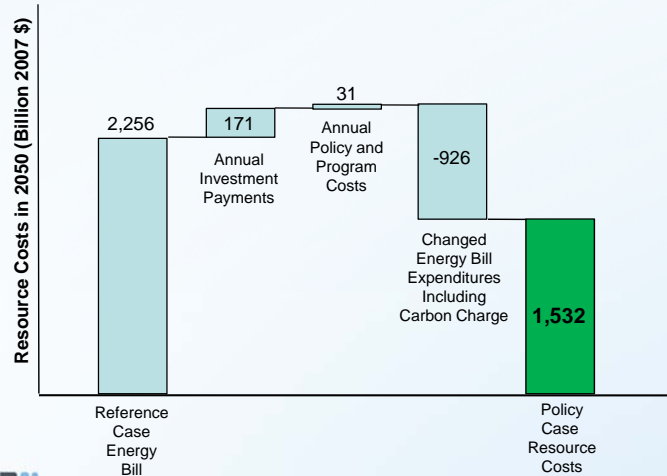
Table 3. Highlighting the Impact of Key Scenario Assumptions in 2050

	Case #1	Case #2	Case #3	Case #4	Case #5	Case #6
	Big Tech- Big Price	Big Tech- Little Policy	H.R. 2454 Basic EE	H.R. 2454 Enhanced EE	H.R. 2454 Optimal EE	H.R. 2454 Optimal EE Big Behavior
Scenario Comparison — Year 2050						
Policy Levers	Price Only	Basic EE	Basic EE	Enhanced EE	Optimal EE	Behavior- Directed Optimal EE
Implicit Discount Rate Start	30%	30%	30%	30%	30%	30%
Implicit Discount Rate End	25%	25%	20%	20%	20%	15%
Year 2050 Results						
Emissions Price (\$/tCO _{2e} in 2007 \$)	\$1,839	\$753	\$239	\$185	\$128	\$57
End-Use Energy Savings	29%	36%	43%	46%	52%	61%
Energy Price Increase	316%	144%	52%	38%	24%	10%
Energy Expenditure Increase	195%	56%	-13%	-26%	-41%	-57%
Reference Case Emissions (MMtCO _{2e})	8,879	8,879	8,879	8,879	8,879	8,879
Policy Case Emissions (MMtCO _{2e})	2,096	2,098	2,095	2,102	2,098	2,089
Emissions Reductions	76%	76%	76%	76%	76%	76%
Cumulative Efficiency Investments 2012 through 2050 (Billion \$2007)	1,412	1,929	2,612	3,067	4,120	5,922
Average 2012 Energy Efficiency Payback (Years)	2.50	2.68	2.69	2.88	2.99	3.02
Average 2050 Energy Efficiency Payback (Years)	4.42	4.24	5.26	5.41	6.81	9.64

Changes in U.S. Energy Expenditures from Adoption of Climate Policies by 2050



Changes in the 2050 Resource Costs from the Adoption of U.S. Climate Policies



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Source: Diagnostic Assessment of Case #5.

Good News About the Transition to a More Energy Productive, Climate-Friendly Economy

- It does not have to be about ratcheting down our economy;
- Rather, it can be all about:
 - using innovation and our technological leadership;
 - investing in more energy productive technologies (including both existing and new technologies); and
 - developing new ways to make things, and new ways to get where we want to go, where we want to work, and where we want to play.
- ***Most conventional assessments appear to assume the former – to the detriment of smart energy, economic, and climate policy.***

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