

Energy Efficiency's Role in Limiting RGGI Leakage

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Overview

- How efficiency was modeled in the RGGI development process
- Summary of modeling results
- Implications for the RGGI Rule, and for state parallel policies
- Role of efficiency as part of a leakage minimization policy package



ACEEE's Role in the RGGI Modeling Process

- The RGGI working group used the IPM model to project the program's effects on the region's power sector. IPM is widely used by EPA and states for air quality policy modeling.
- We developed resource characterizations for efficiency that IPM can use to “build” efficiency along with supply options.
- The working group also used the REMI regional economic model to assess economic impacts.



Characterizing Efficiency Resources for the IPM Model

- We used the NYSERDA 2003 potential study, checked against other RGGI state analyses, as the primary data source
- We aggregated 262 measure types into 15 “bins” acceptable to IPM format:
 - 5 end-use sectors: Residential peak/off-peak, commercial peak/off-peak, and industrial
 - High, medium, and low-cost bins for each sector
- IPM “builds” these resources in 12 RGGI sub-regions in six model run years



Constraining EE Resources in IPM

- We discussed several ways of constraining the “available” EE in a given model year: by a % of load growth, on a straight-line basis, and based on a funding limit
- RGGI staff selected funding limits as the constraining parameter; they examined two levels of spending: current (about \$500M) and doubled (about \$1B)
- IPM also modeled a scenario in which all cost-effective efficiency resources were acquired in each model year, to set an upper bound for what might be possible



IPM Modeling Results

Key IPM results included:

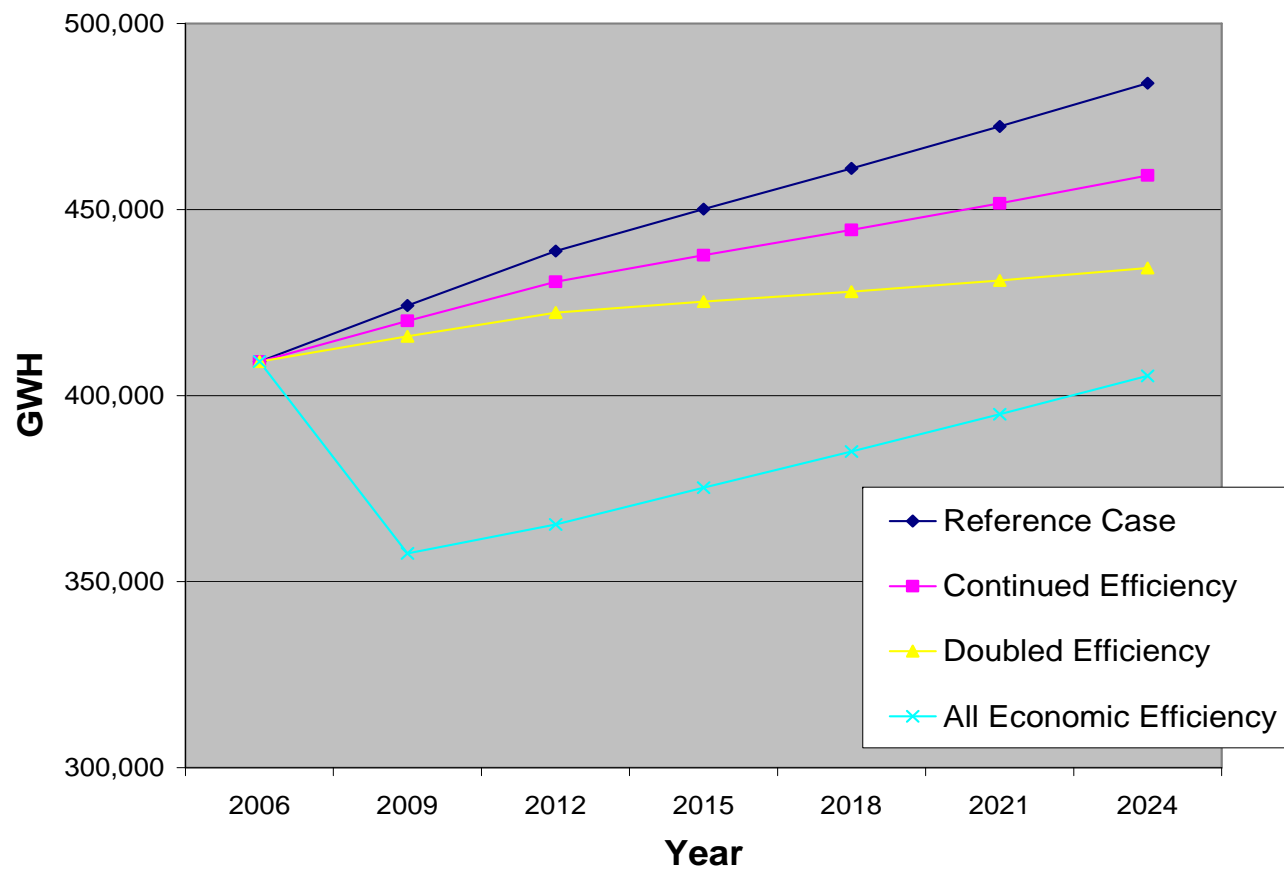
- Change in projected electricity consumption growth
- Change in carbon emissions
- Change in wholesale power prices
- Change in carbon allowance prices
- Change in carbon emissions leakage

(all with respect to the reference case)

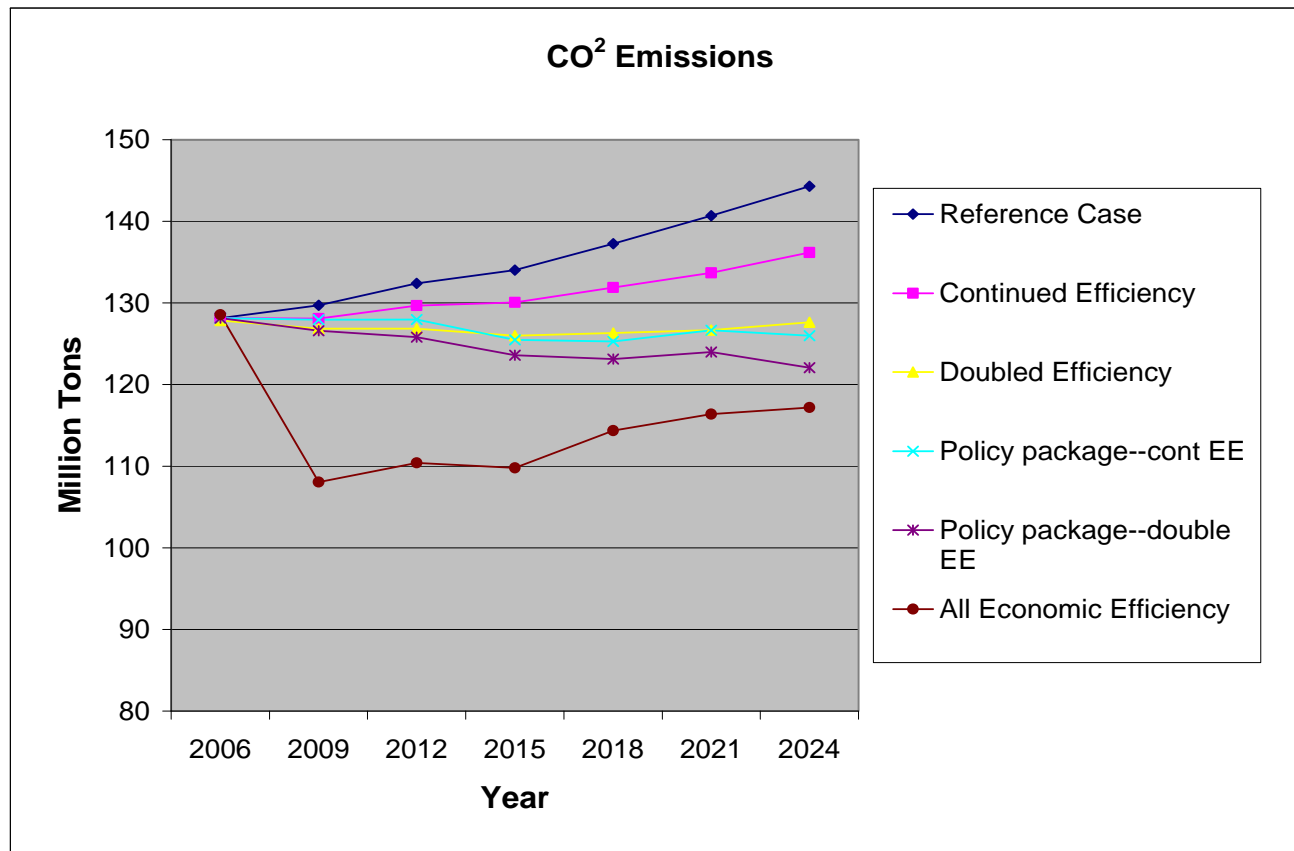


IPM Results: Power Sales

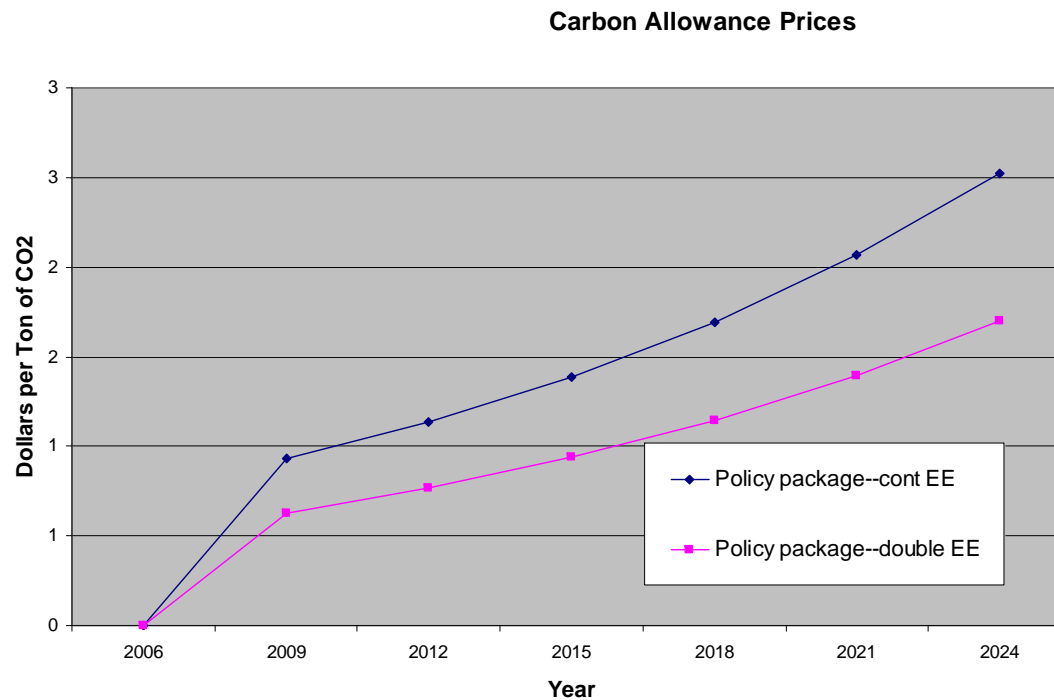
Electricity Generation



IPM Results: Carbon Emissions

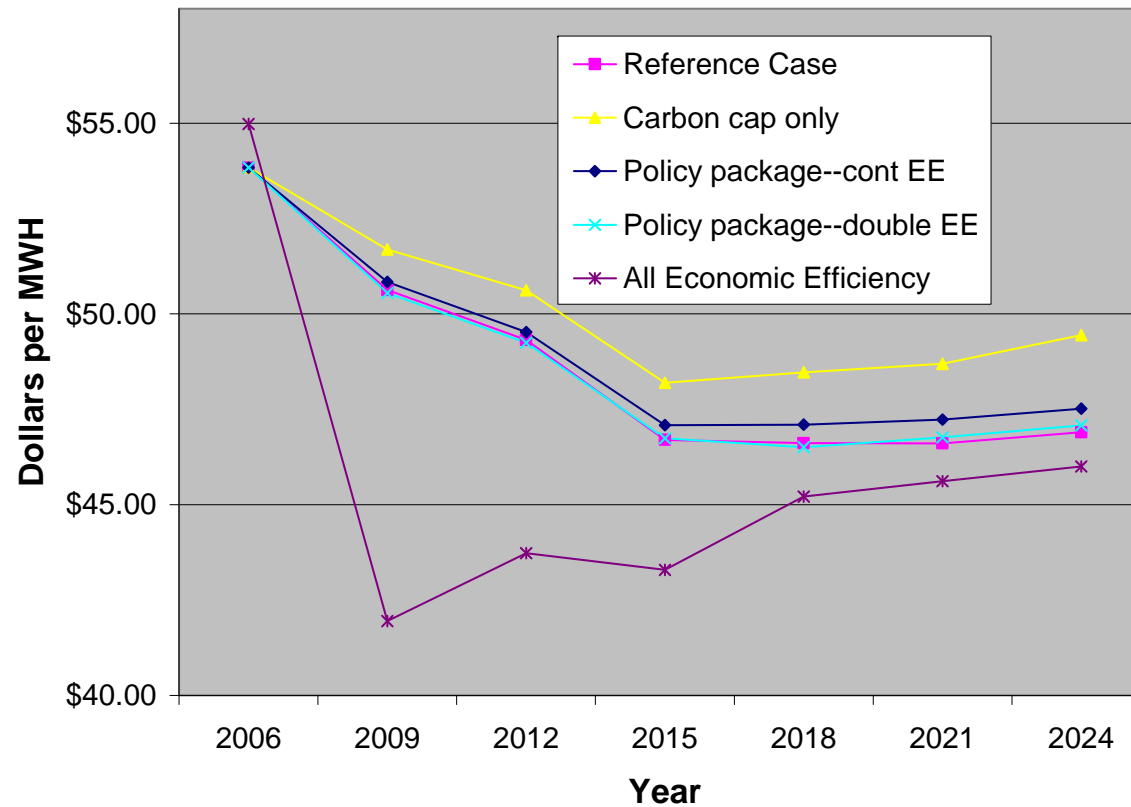


IPM Results: Carbon Prices



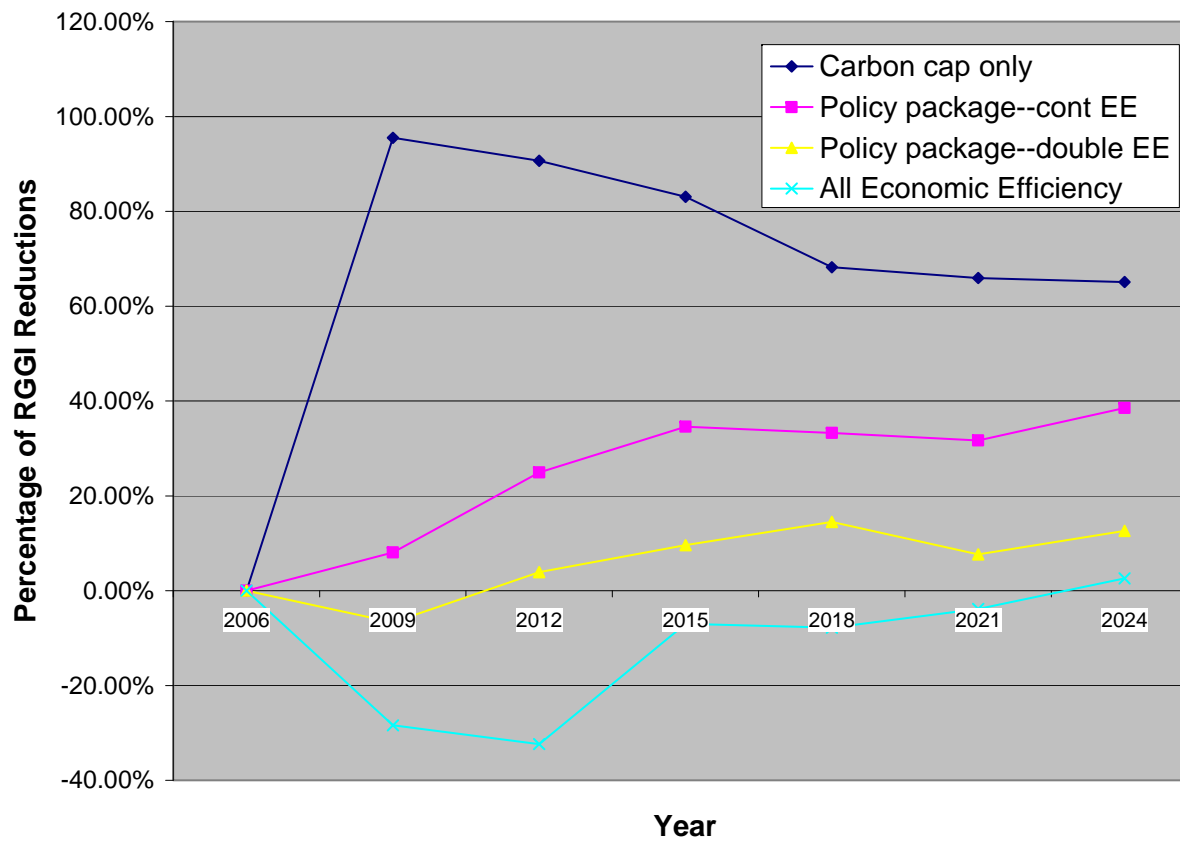
IPM Results: Electricity Prices

Electricity Prices (firm power)



IPM Results: Leakage

Carbon Emissions Leakage



Caveats on Leakage Modeling

- IPM runs were based on “ceteris paribus”
- Other factors, including plant siting decisions, transmission constraints, and fuel price dynamics, strongly affect leakage
- Efficiency will not solve the leakage problem by itself, but....
- Efficiency provides cheap leakage insurance using proven approaches



REMI Modeling

- REMI is a regional input-output model that projects key indicators including gross regional product, personal income, and private employment
- IPM outputs were used to create REMI inputs for assessing the regional economic impacts of RGGI



REMI Results--Summary

- The RGGI program as proposed would increase economic output, income and jobs by very small amounts—1 to 2 100ths of a percent—over the next 20 years
- Doubling energy efficiency, however, increases economic benefits several-fold, up to 8-100ths of one percent



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%



What do the Modeling Results Mean?

- IPM results clearly show that efficiency can make RGGI more affordable and effective.
- REMI results show that RGGI has positive economic impacts, and that greater efficiency investment increases those benefits.
- An increased commitment to energy efficiency can reduce leakage while providing multiple other benefits.



How Does Efficiency Fit into a RGGI Policy Package?

- The modeling supports a doubling of energy efficiency results in the region. This can be achieved through:
 1. Allocating a high percentage of allowances to public goods, especially for efficiency investment. 25% is a minimum—the data justifies a higher percentage—and using the majority of the proceeds for efficiency.
 2. Pursuing parallel policies, especially Efficiency Resource Standards, Building Codes, and Appliance Standards.



Efficiency, Leakage, and RGGI

- Efficiency is the key to a least-cost RGGI policy package
- Efficiency also limits leakage, and should part of a leakage minimization package
- Utility commissions will need to take on part of the RGGI policy package
 - Allowance allocations are unlikely to fund a doubling of efficiency impacts
 - EERS, such as Connecticut has created, offers the most straightforward solution



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