

Preliminary Economic Impacts of RGGI under the 25% and 35% Cap Scenarios

Presented by

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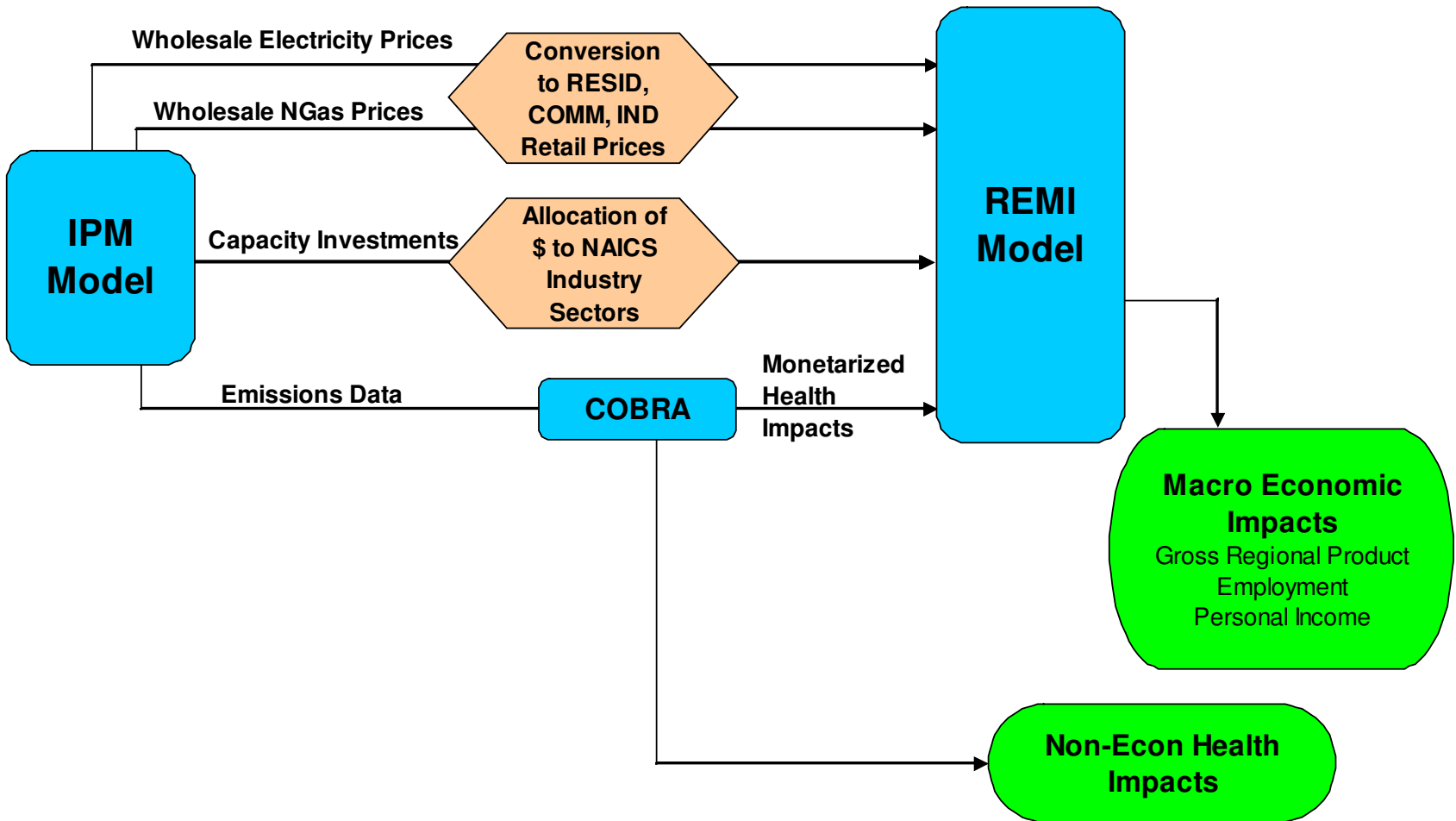
Summary of Preliminary Findings

- REMI runs have been completed for 25% and 35% cap scenarios, with and without a federal carbon policy.
- Economic impacts are small – generally well below one-tenth of 1% change in economic indicators.
- Impacts increase with cap size, but decrease when a Federal program is assumed.
- Work is continuing to incorporate flexibility mechanisms and health impacts into REMI analysis.

Context of Presentation

- Presenting results for cap scenarios 25% and 35% with and without Federal-Canadian carbon policy in 2015
 - 25% Cap = Stabilization at Current Levels
 - 35% Cap = 10% below Stabilization
- These economic results do not yet include:
 - Energy Efficiency measures accomplished as part of a complementary energy policy
 - Program flexibility mechanisms such as Offsets
 - *Monetized* health benefits associated with RGGI-driven emission reduction
- “*Impact*” means the difference between how the economy performs in a given year in a reference scenario **and** a policy (carbon cap) scenario. Performance is gauged by changes in:
 - *Gross State (or Regional) Product (GSP or GRP)*
 - *Employment*
 - *personal income*
- The Reference Scenario = IPM’s Reference Run

IPM to REMI Linkage



Wholesale to Retail Price Conversion

Conversion Factors for Wholesale to Retail Prices
(Range of Factors over 2005-2025 Period)

<i>Electricity</i>			
	New England	New York	PJM
Residential	2.1 - 2.4	2.4 - 3.0	1.8 - 2.1
Commercial	1.7 - 1.8	1.9 - 2.2	1.5 - 1.7
Industrial	1.3 - 1.6	1.0 - 1.3	1.2 - 1.6

<i>Natural Gas</i>			
	New England	New York	PJM
Residential	2.0 - 2.5	2.0 - 2.5	2.0 - 2.5
Commercial	1.6 - 2.0	1.6 - 1.9	1.6 - 1.9
Industrial	1.1 - 1.2	1.2 - 1.3	1.2 - 1.3

NEMS forecasted total retail electricity prices for each region were divided by NEMS forecasted generation prices to calculate conversion factors.

For example, total electricity price of 10 cents/kWh and a generation price of 5 cents/kWh would result in a conversion factor of 2.0.

Source for Conversion Factors: End-use Energy Prices by Sector & Source, (<http://www.eia.doe.gov/oiaf/aeo/supplement Tables 11,12, 20>).

Wholesale to Retail Price Conversion

Example:

IPM Ref Run Wholesale Electric Price Output for MA in 2015 = **\$43.9 / MWh**

Conversion Factor (New England, Commercial, 2015) = **1.7**

Therefore, Retail Commercial Electricity Price in MA = **\$74.7 / MWh**

REMI Input: REMI considers *local* retail energy prices as a cost factor relative to a national average price. The computed retail price changes for any scenario are converted to these *relative cost* factors for each end-user sector in each state over time.

Capacity Investments Distribution to REMI Economic Sectors

Economic Sector	Distribution for Three Sample Technologies		
	New CC	Pollution Control	New Wind
Utilities	31.9%		
Primary metal manufacturing	0.3%		
Fabricated metal product mfg.	14.2%	21.8%	23.8%
Machinery manufacturing	46.3%	31.0%	56.6%
Computer, electronic prod. Mfg.	1.2%	13.9%	
Electrical equipment, appliance mfg.	1.9%		
Motor vehicle manufacturing		0.1%	
Chemical mfg	3.8%		
Plastics, rubber prod mfg			
Wholesale trade			4.2%
Air transportation	0.2%		0.0%
Water transportation	0.0%		
Other transportation	0.2%		15.3%
Prof, tech services		7.8%	
Administrative, support services		25.5%	
Total Investment	100%	100%	100%

Data from internal MA DOER analyses

IMPLAN SIC sectors converted to NAICS system for REMI input

RGGI Impact on Retail Energy Prices

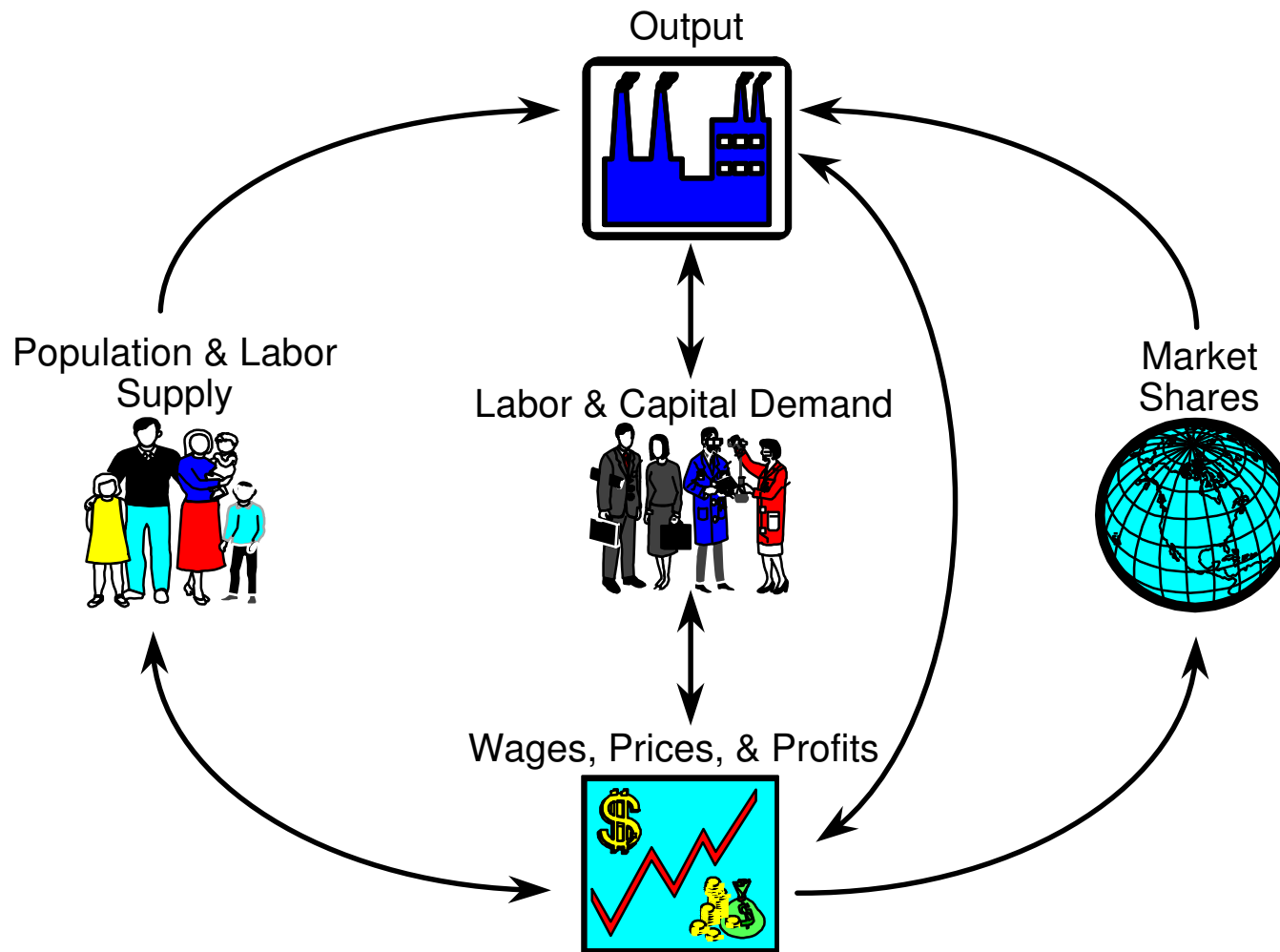
Retail Electricity Prices

- Under the straight 25% and 35% caps, retail electricity prices rise with carbon allowance prices; the increases range from 1% to under 6% through the model period.
- Under the cap scenarios with a federal carbon policy (starting in 2015), retail electricity prices rise more significantly, but RGGI region remains (or becomes more) competitive relative to the country as a whole from 2015 onward.

Natural Gas Prices

- Under the straight caps, the change in natural gas prices is negligible, given the relatively small impact on total natural gas demand.
- Under the scenarios with a federal carbon policy, national natural gas demand increases, causing retail gas prices to rise nationally by a few percent.

Review of the REMI Model's Economic Logic for Forecasting a Region



Macro Economic Impacts of RGGI

- First presentation of economic impact results from REMI.
- Results do not yet include offsets and energy efficiency flexibility mechanisms which will reduce allowance prices an increase investment.
- No health benefits incorporated.
- Economic impacts are small – generally well below one-tenth of 1% change in economic indicators.
- Impacts increase with cap size, but decrease when a Federal program is assumed.

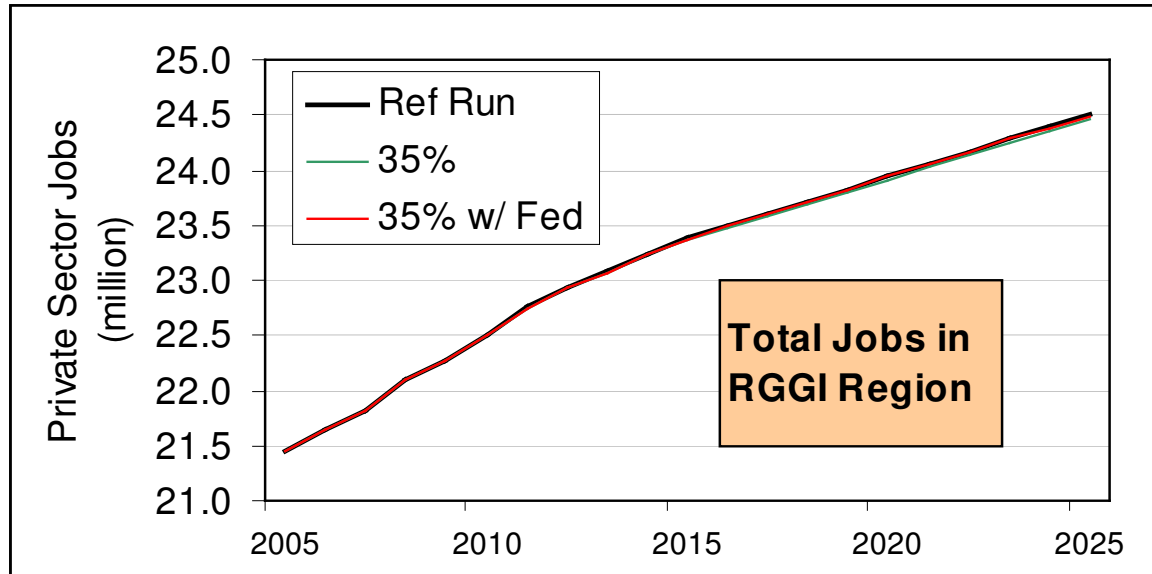
Summary of Regional Economic Impacts (%)

		2009	2015	2021
25% Cap	Total GRP	-0.01%	-0.04%	-0.07%
	Real Per Income	-0.01%	-0.05%	-0.09%
	Priv Sec Jobs	-0.01%	-0.04%	-0.06%
35% Cap	Total GRP	-0.04%	-0.09%	-0.14%
	Real Per Income	-0.06%	-0.12%	-0.19%
	Priv Sec Jobs	-0.05%	-0.09%	-0.13%
25% Cap w/ Fed Pol.	Total GRP	-0.04%	-0.01%	0.00%
	Real Per Income	-0.06%	0.01%	0.01%
	Priv Sec Jobs	-0.04%	0.01%	0.01%
35% Cap w/ Fed Pol.	Total GRP	-0.04%	-0.04%	-0.03%
	Real Per Income	-0.05%	-0.03%	-0.03%
	Priv Sec Jobs	-0.04%	-0.02%	-0.02%

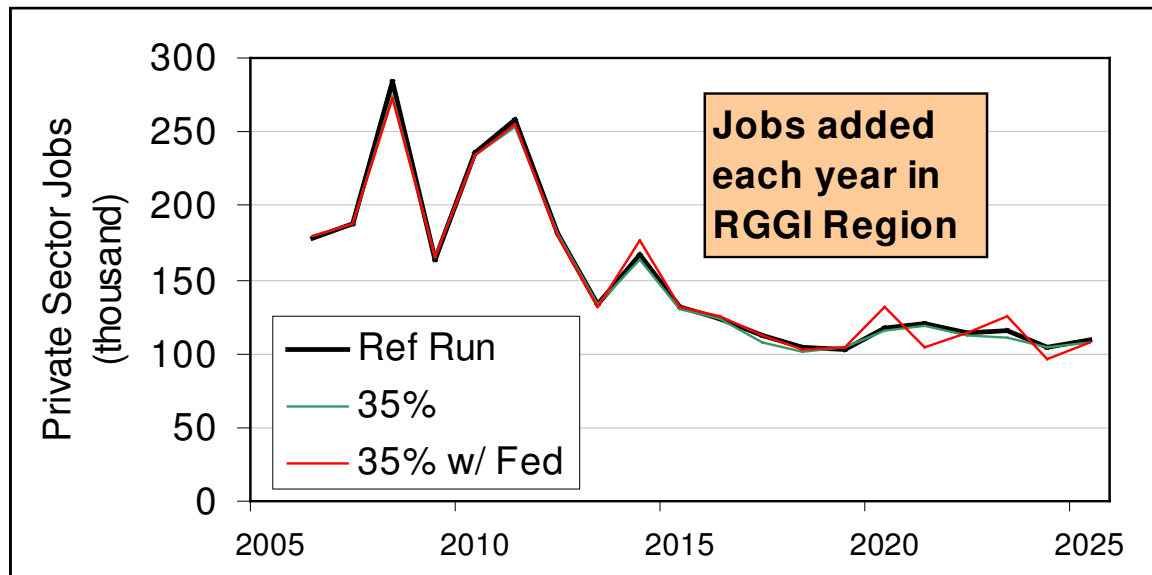
Impacts are relative to Reference Run and aggregated across RGGI Region

Results are prior to consideration of any program Flexibility Mechanisms

Job Impact of 35% RGGI Cap



Impact of RGGI program on regional employment will be difficult to discern



Job growth impact will be small

Upcoming Goals

- Update runs (as necessary) to reflect final IPM Ref. Run and complete REMI runs for selected scenarios.
- Incorporate Energy Efficiency investments into REMI.
- Incorporate Offset investments into REMI.
- Complete IPM/COBRA interface (w/ NESCAUM) and integrate economic health benefits into REMI runs.