



Potential Effects of Proposed Climate Change Policies on PJM's Energy Market

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Cost of CO₂ Reduction Through Re-Dispatch

Marginal Cost of Abatement (\$/short ton)

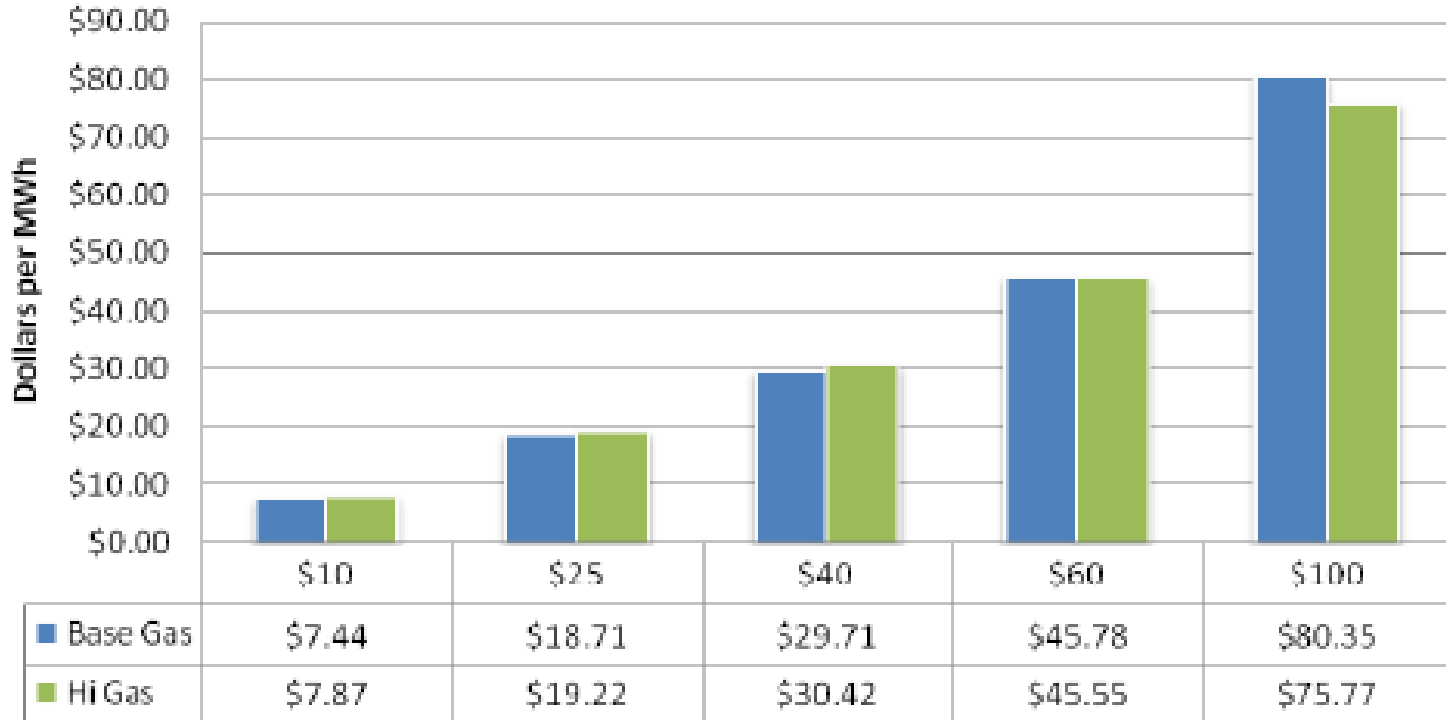
Re-dispatch from Coal (10 mmBtu/MWh) to Gas
Combined Cycle (7 mmBtu/MWh)

Gas price (\$/mmBtu)

Region	Coal Price (\$/mmBtu)	Gas price (\$/mmBtu) (\$3.80 (Recent)	Gas price (\$/mmBtu) (\$6.44 (Base)	Gas price (\$/mmBtu) (\$10.00 (High)
Mid-Atl	\$2.30	\$5.84	\$35.80	\$76.21
ComEd	\$1.54	\$18.16	\$48.13	\$88.53
West	\$1.97	\$11.19	\$41.15	\$81.56
South	\$2.43	\$3.73	\$33.69	\$74.10

Change in Load-Weighted Average LMP

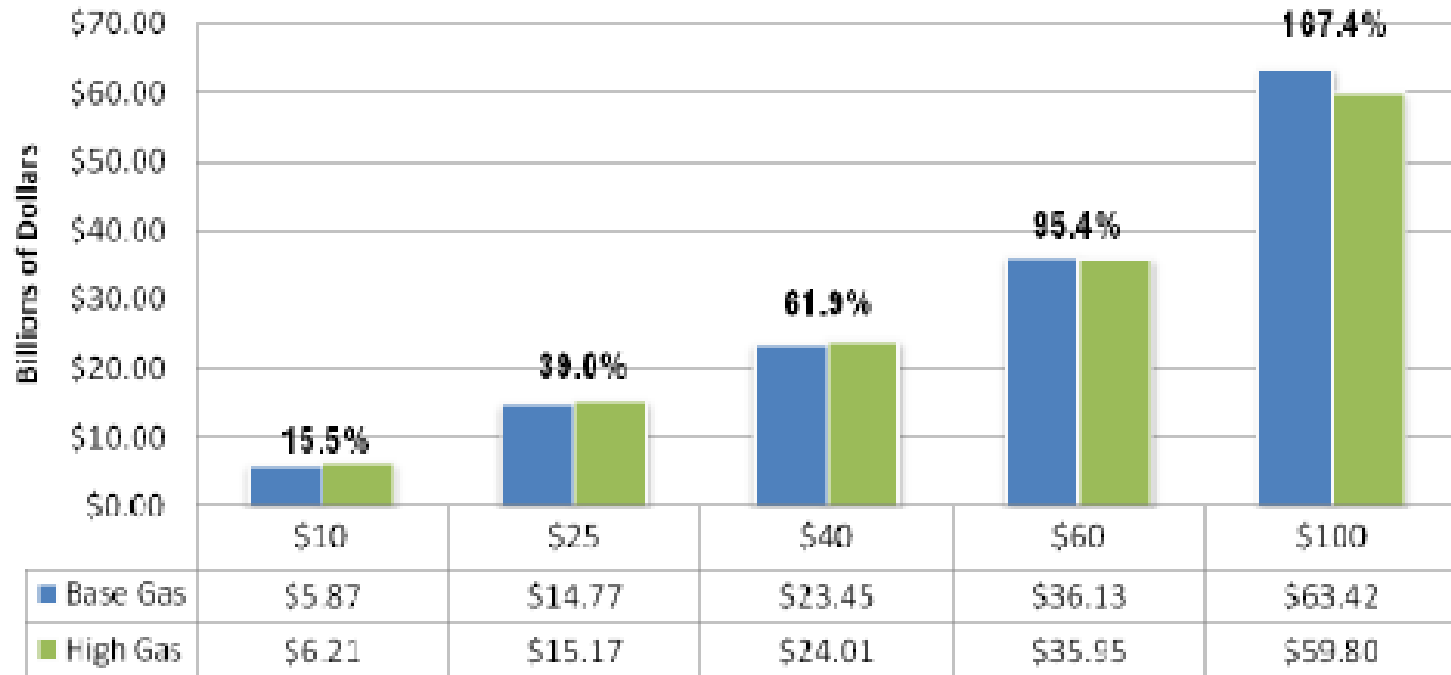
Figure 1: LMP Increase by CO₂ Price and Gas Price



Approximately 75-80% of CO₂ price is transmitted to load-weighted Average LMP.

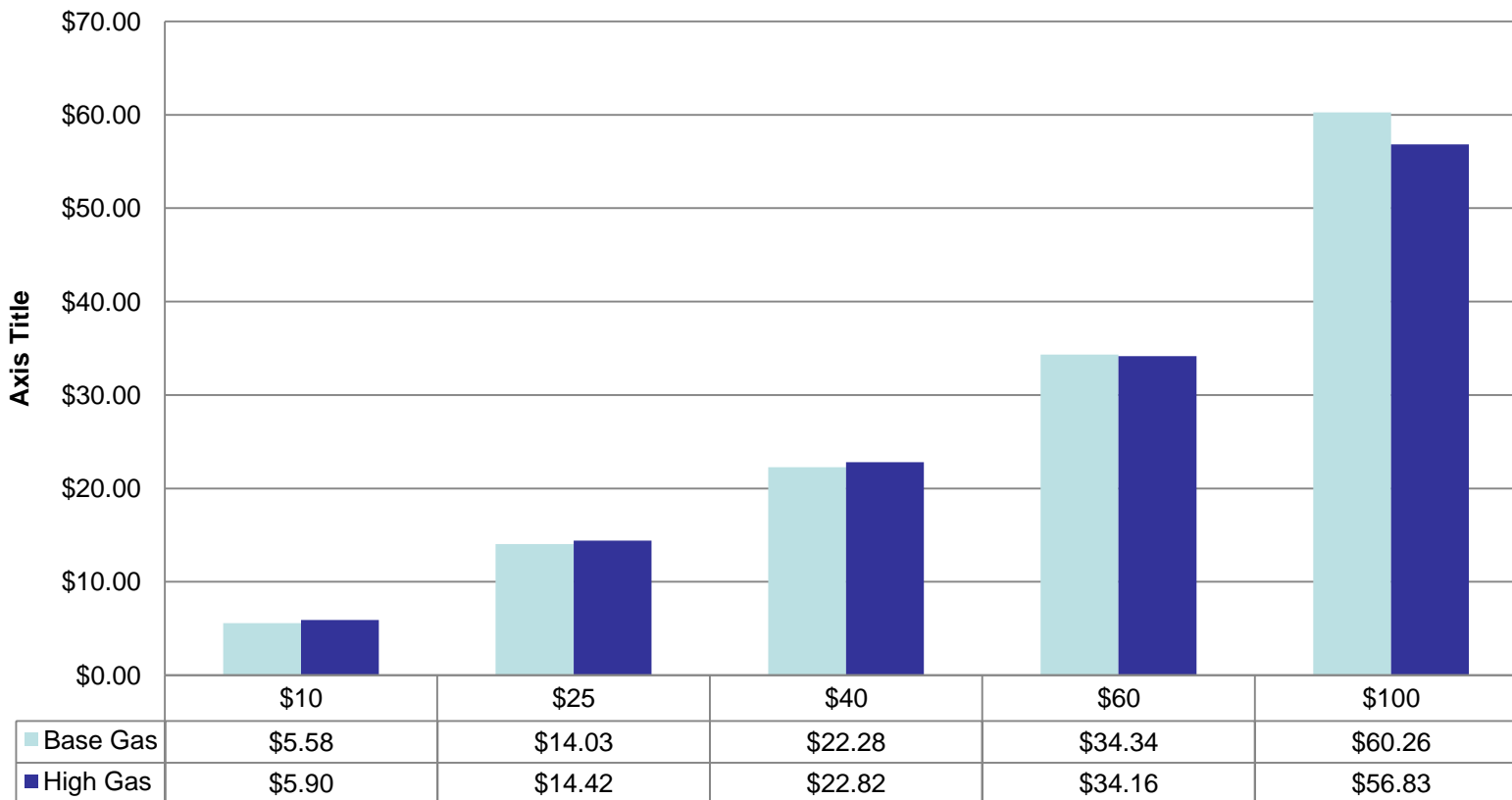
Change in Wholesale Power Costs

Percentages shown are for Base Gas only

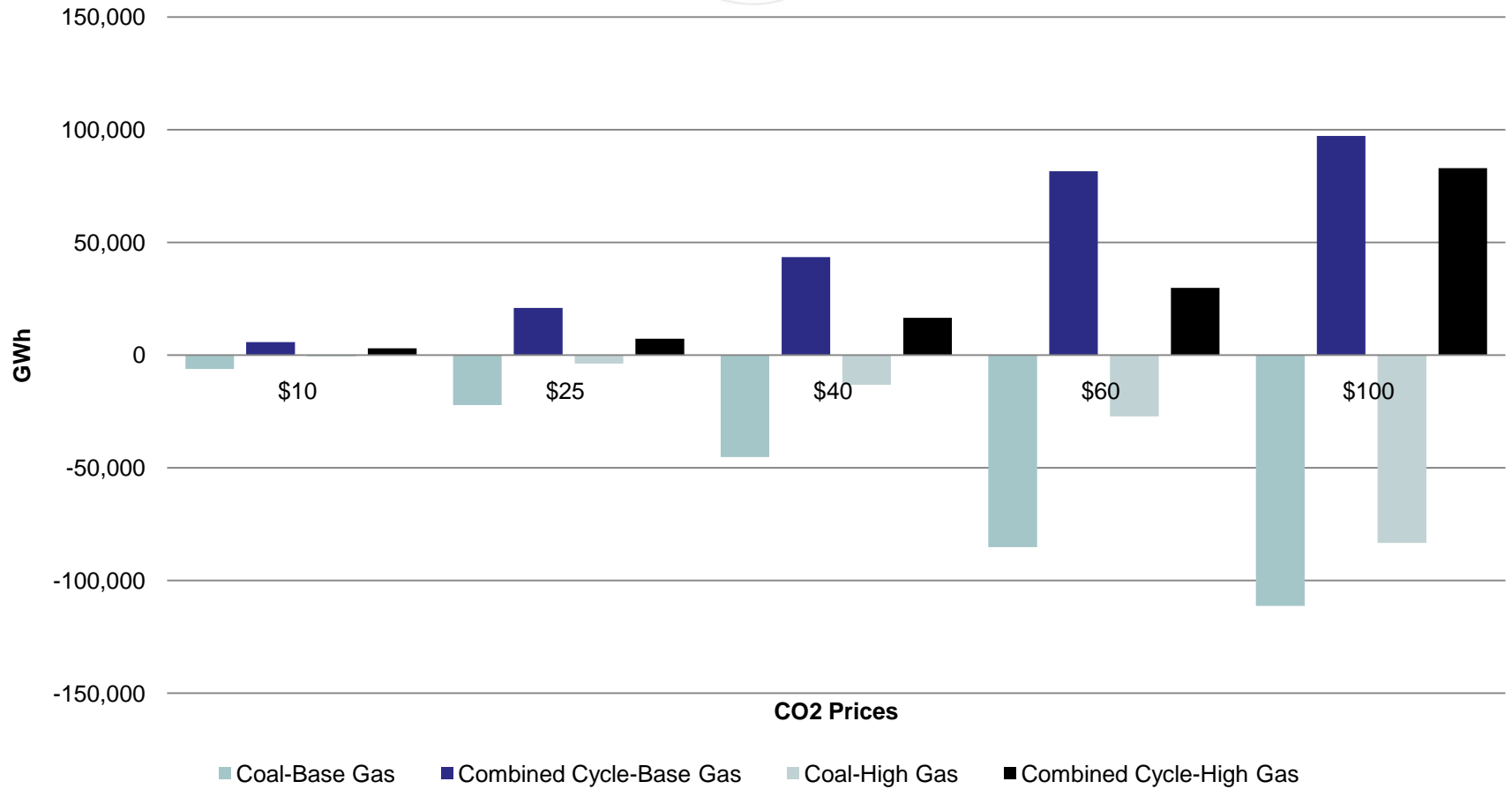


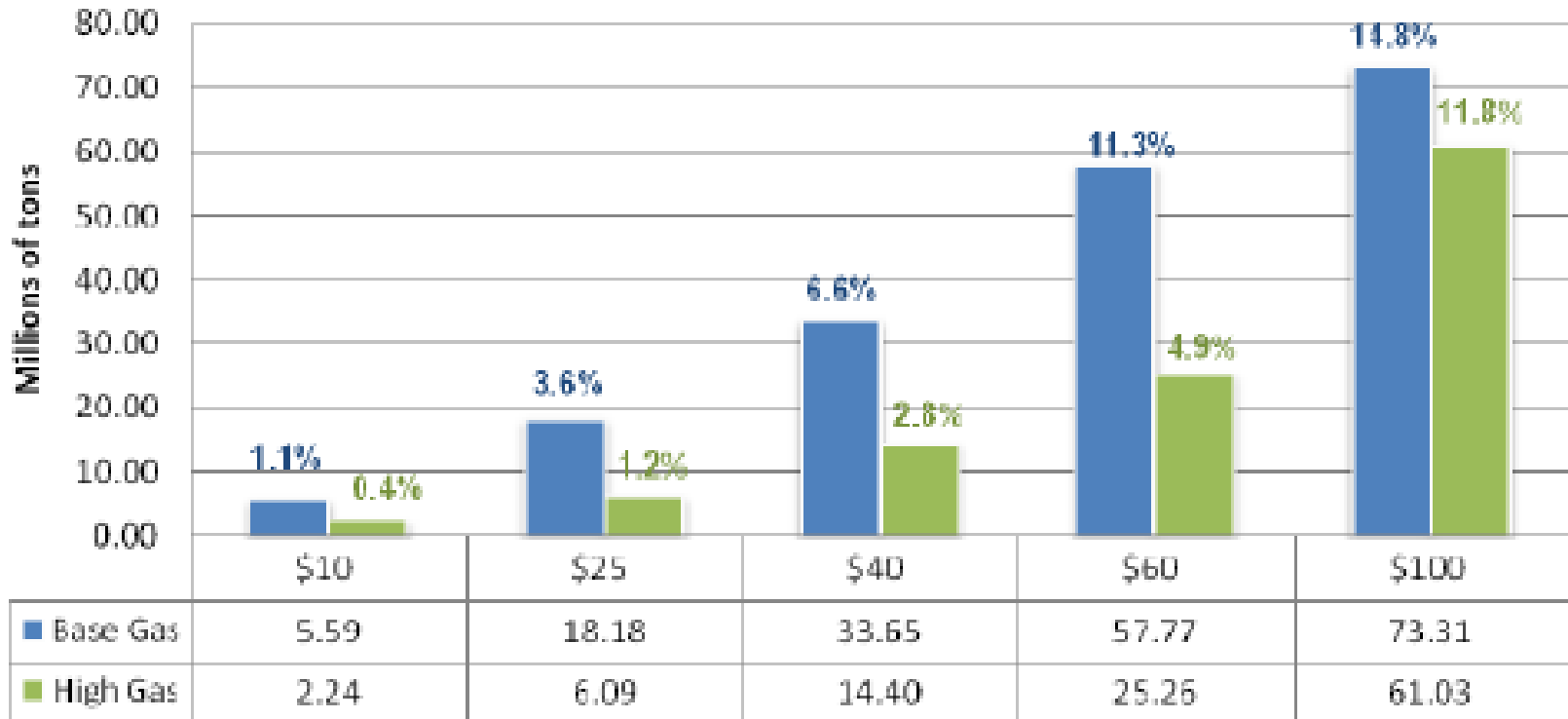
Potential Consumer Bill Impacts

Increase in Monthly Bill of a Residential Customer Using 750 kWh



Change in Coal and Combined Cycle Generation by Price





Amounts by Which Price and Cost Increases are Mitigated

	Load Reduction Percentage			15 GW Wind
	2%	5%	10%	
LMP (\$/MWh)	\$2-\$4	\$5-\$9	\$11-\$17	\$5-\$5.50
Wholesale Power Cost	\$3-\$4 billion	\$6-\$11 billion	\$10-\$18 billion	\$4-\$4.5 billion
Consumer Bill (monthly)	\$1-\$3	\$4-\$6.50	\$7-\$12.50	\$3.50-\$4

- 15 GW of wind has the same impact as somewhere between a 2% and 5% load reduction
- Displaced generation is at a \$0 CO₂ price in the base gas case only.

Amounts by Which Generation is Displaced and Additional Emissions Reductions Achieved

	Load Reduction Percentage			15 GW Wind
	2%	5%	10%	
Coal	6,741 GWh	18,376 GWh	41,972 GWh	26,303 GWh
Combined Cycle Gas	6,555 GWh	15,685 GWh	28,587 GWh	13,009 GWh
Additional CO ₂ Reductions (tons)	10-14 million	29-34 million	58-64 million	34-37 million

- Has approximately the same effect as a 5% reduction in load with regard to emissions impacts gas displaced.
- Displaced generation is at a \$0 CO₂ price in the base gas case only.

- Load-weighted average LMP increases by about 75-80% of the CO₂ price in short tons.
 - With the associated increase in wholesale power costs and customer bills
- Re-dispatch of combined cycle gas ahead of coal on a large scale (and associated emissions reductions) only occurs at
 - Approximately \$40/ton in the base gas case (\$6.44/mmBtu)
 - Approximately \$80/ton in the high gas case (\$10/mmBtu)
- Penetration of actions that reduce consumption and wind power have mitigating effects on LMP, wholesale power costs, and customer bills while enhancing emissions reductions
 - Displaces emitting resources with non-emitting resources/actions.