

The Impact of the Regional Greenhouse Gas Initiative (RGGI) on Industrial, Commercial and Residential Electricity Bills.

Introduction

Implementing RGGI along with doubled spending on efficiency programs is likely to reduce the average customer's electric bills in all three sectors, even in the worst case scenario. In models commissioned by the participating states, RGGI was found to have a modest effect on electricity prices, raising the average price by between 0.2% and 5.5% by 2021.¹ However, if RGGI were accompanied by an increase in spending on efficiency programs, these increases would be offset by a drop in electricity use, which would lower the overall bills in each sector.

In this report, we modify the calculations of customer bill impacts made by the Massachusetts Division of Energy Resources (DOER) to reflect a more likely scenario for the allocation of efficiency spending between sectors, and correct a slight mistake in the calculations of regional averages. The resulting average savings from efficiency programs in 2021 are 10.0% in the residential sector, 7.8% in the commercial sector and 10.3% in the industrial sector. These savings would dwarf the price increases projected for most RGGI scenarios, and would more than offset even the worst case scenario of 8.4% increase in industrial prices.

Allocation of Efficiency Spending

The main change we make from the DOER calculations is in the allocation of efficiency savings between the residential, commercial and industrial sectors. (In our calculations, we keep the total level of efficiency savings that were calculated in the commissioned models, (*We do not change the total level of efficiency savings, which are taken from ICF Consulting's Integrated Planning Model (IPM),*) but change how these savings are allocated between the residential, commercial and industrial sectors.) The DOER calculations assign 42% of the savings to the residential sector, 46% to the commercial sector and 12% to the industrial sector. However, they also note that each state could choose different allocations of funds by sector to meet their efficiency goals.² It is hard to predict exactly what the breakdown will be, but the one used in the DOER calculations seems to allocate too small a percentage for the industrial sector. 22% of region-wide electricity use is in the industrial sector, and there is no compelling reason why the industrial share of savings should be a smaller portion of their total use than in other sectors. There is plenty of potential for cost effective efficiency improvements in all three sectors, and in existing programs, commercial and industrial savings are actually higher in percentage terms than residential savings.

¹ These are weighted averages for all three sectors; the low end is for the package scenario with doubled efficiency spending, the upper end is for the package scenario with a federal policy to prevent leakages.

² MA Division of Energy Resources, (2005).

The best source of information on the potential for efficiency improvements is a study conducted by NYSERDA in 2003, which was used as a basis for the efficiency inputs into the IPM model calculations. It found that in 2007, 21% of residential, 36% of commercial and 23% of industrial electricity could be saved using only techniques that would save more on electricity bills than the costs of the new technology.³ When applied to the RGGI region, this would mean that 18% of potential savings would be in the industrial sector. The cheapest sources of savings were also found in the industrial sector.

Even more important are the results from efficiency programs that are already being conducted in several states. In evaluation reports from New York, New Jersey and Massachusetts, it was found that funding was allocated roughly in proportion to total electricity use, and that commercial and industrial programs showed higher savings per dollar spent, so the percentage savings were highest in these sectors - the reverse of what was assumed for the DOER calculations.⁴

In this study, we use an allocation of efficiency savings that is proportional to total electricity demand. This is consistent with notions of equity established by existing programs: in Massachusetts, for example, one DOER goal is to “ensure that program activities are equitably allocated among customer sectors,” by allocating funds in the same proportions as they are collected, or in proportion with electricity use.⁵ Looking at the impacts on customer bills in this scenario should give us a more realistic idea of the likely effects of efficiency spending under RGGI.

Results

Our results are presented in Tables 1 to 6. Tables 1 to 3 are equivalent to tables produced by DOER, and give the effects on customer bills of an increase in electricity price brought on by RGGI, as well as the reduction of the bill due to efficiency improvements. Table 4 shows the overall effects of efficiency spending on customer bills, both in dollar terms and as a percentage of the total bill. Significant savings are achieved in all three sectors: residential customers save an average of 10.0%, commercial customers 7.8% and industrial customers 10.3%.

Tables 5 and 6 show how these savings compare to projected price increases in different policy scenarios. In the standard package run with doubled efficiency spending, the price increase is less than a tenth of the savings from efficiency programs. Even in the scenario with a federal policy in place to prevent leakages, the savings from efficiency programs are more than enough to offset the increase in price in all three sectors.

³ Calculated from Economic Potential and Electricity Demand data in NYSERDA (2003). The NYSERDA study also projects that the share of industrial savings will drop over time, but the distribution from the beginning of the study seems more reliable since it is based on more solid data.

⁴ See MA Office of Consumer Affairs and Business Regulations (2004), NYSERDA (2006), New Jersey Clean Energy Collaborative (2001).

⁵ MA Office of Consumer Affairs and Business Regulation, (2004), p. 18

Notes on our Calculations

In addition to changing the R/C/I breakdown, we also correct the weighting system used in the DOER calculations so that it accurately measures the averages for all customers in the RGGI region, by giving each customer an equal weight. We use the number of customers per state as weights in calculating the RGGI regional average electricity bills and average savings per customer from the averages for each state. By using the number of customers instead of the demand for electricity, we ensure that each customer is counted evenly in taking the regional average, and correct a bias in the average electricity bill. The DOER calculations, which used electricity demand, gave higher weights to states with high average electricity use per customer. Since these states also had high average bills per customer, states with high average bills were counted too heavily, causing an upward bias in the average customer bill for the RGGI region. This was particularly important in the industrial sector, where the average customer bills varied significantly between states.

Table 1: Residential Customer Impacts - RGGI Region

REFERENCE: Average Customer Bill 944 \$/year

Before Energy Efficiency Savings	Household Bill Impact (\$/yr)		After Energy Efficiency Savings	Household Bill Impact (\$/yr)			
				Participating Customers		If all EE savings distributed equally across all customers	
Direct impact of RGGI due to retail price change	2015	2021	Impact of RGGI after assumed EE Programs resulting in reduction in household energy usage	2015	2021	2015	2021
Standard REF Case			Standard REF Case				
Package	2.84	5.39	Package	-75.70	125.56	24.65	40.45
Package + Fed	36.06	44.92	Package + Fed	-45.23	-91.50	7.61	-2.83
Package + 2X EE	0.65	2.07	Package + 2X EE	156.01	258.94	54.18	89.29
Hi Emissions REF Case			Hi Emissions REF Case				
Package	16.39	22.65	Package	-67.77	117.21	13.07	26.30
Package + Fed	30.79	36.48	Package + Fed	-54.44	105.11	0.96	13.08

Table 2: Commercial Customer Impacts - RGGI Region

REFERENCE: Average Customer Bill 7987 \$/year

Before Energy Efficiency Savings	Commercial Customer Bill Impact (\$/yr)		After Energy Efficiency Savings	Commercial Customer Bill Impact (\$/yr)			
Direct impact of RGGI due to retail price change			Impact of RGGI after assumed EE Programs resulting in reduction in household energy usage	Participating Customers		If all EE savings distributed equally across all customers	
	2015	2021		2015	2021	2015	2021
Standard REF Case			Standard REF Case				
Package	27	51	Package	-480	-795	-150	-245
Package + Fed	340	421	Package + Fed	-187	-464	156	111
Package + 2X EE	7	18	Package + 2X EE	-1004	1667	-347	-571
Hi Emissions REF Case			Hi Emissions REF Case				
Package	155	207	Package	-393	-704	-36	-112
Package + Fed	290	336	Package + Fed	-267	-587	95	13

Table 3: Industrial Customer Impacts - RGGI Region

REFERENCE: Average Customer Bill 70346 \$/year

Before Energy Efficiency Savings	Industrial Customer Bill Impact (\$/yr)		After Energy Efficiency Savings	Industrial Customer Bill Impact (\$/yr)			
Direct impact of RGGI due to retail price change			Impact of RGGI after assumed EE Programs resulting in reduction in household energy usage	Participating Customers		If all EE savings distributed equally across all customers	
	2015	2021		2015	2021	2015	2021
Standard REF Case			Standard REF Case				
Package	381	720	Package	-5489	-9069	1674	-2706
Package + Fed	4780	5927	Package + Fed	-1425	-4532	2608	2267
Package + 2X EE	94	267	Package + 2X EE	11594	19200	3997	-6546
Hi Emissions REF Case			Hi Emissions REF Case				
Package	2090	2751	Package	-4468	-8128	-205	-1057
Package + Fed	3918	4659	Package + Fed	-2772	-6434	1577	776

Table 4. Average Annual Electric Bill Savings from Doubled Energy Efficiency Programs		
	2021	
	\$'s	Percent
Residential	-\$95	-10.0%
Commercial	-\$622	-7.8%
Industrial	-\$7,266	-10.3%
	2015	
	\$'s	Percent
Residential	-\$57	-6.0%
Commercial	-\$374	-4.7%
Industrial	-\$4,378	-6.2%

Notes: The bill savings from efficiency programs include the reduction in average electricity use as well as the drop in price caused by the decrease in demand. They are calculated from Tables 1 – 3 by taking the difference between the average bill impact with doubled efficiency spending and package scenario without efficiency savings.

Table 5. Average Electric Bill Impact From RGGI with Doubled Efficiency Programs - Standard Run, 2021			
	Efficiency Savings	Price Increase	Net Effect
Residential	-10.0%	0.6%	-9.5%
Commercial	-7.8%	0.6%	-7.2%
Industrial	-10.3%	1.0%	-9.3%

Table 6. Average Electric Bill Impact From RGGI with Doubled Efficiency Programs - Worst Case Price Rise, 2021			
	Efficiency Savings	Price Increase	Net Effect
Residential	-10.0%	4.8%	-5.3%
Commercial	-7.8%	5.3%	-2.5%
Industrial	-10.3%	8.4%	-1.9%

Notes: This is based on the model run which assumes a similar Federal and Canadian policy to prevent leakages. The efficiency savings are assumed to be the same as in the package scenario, since there was no separate IPM model run showing the combined effect of a federal policy with doubled efficiency spending.

References

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