Synapse
Energy Economics, Inc.

Productive and Unproductive Costs of CO_2 Cap-and-Trade:

Impacts on Electricity Consumers and Producers

Ezra D. Hausman, Ph.D.
Jeremy I. Fisher, Ph.D.
Lauri A. Mancinelli
Bruce E. Biewald

Prepared for:

The National Association of Regulatory Utility Commissioners (NARUC)

The National Association of State Utility Consumer Advocates (NASUCA)

The National Rural Electric Cooperative Association (NRECA)

The American Public Power Association (APPA)

July 15, 2009

22 Pearl Street
Cambridge, MA 02139
www.synapse-energy.com
617.661.3248

Table of Contents

Acknowledgements

The authors would like to thank the sponsoring organizations for their support and their input into this report. We would also like to thank our outside reviewers, Professor Andy Keeler of Ohio State University, and Rich Cowart and David Farnsworth of the Regulatory Assistance Project, for their helpful comments and suggestions.

Any errors and omissions are our own.

Synapse Energy Economics, Inc. is a research and consulting firm specializing in energy, economic, and environmental topics. Synapse provides research, testimony, reports, and regulatory support to consumer advocates, environmental organizations, regulatory commissions, state energy offices, and others. The firm was founded in May 1996. For more information please visit www.synapse-energy.com.

1. Background

Within the next few years, the Federal government will likely implement greenhouse gas regulations to address the threat posed by global warming. Many proposals for such regulations, including the Waxman-Markey bill (H.R. 2452) recently approved by the House of Representatives, promote a nationwide cap-and-trade program. Under cap-and-trade, emitters of greenhouse gases would be required to hold allowances, or credits, equivalent to the number of tons of greenhouse gas emissions they produce. Any cap-and-trade policy must include measures for how the government will allocate the annual supply of allowances. After the initial allocation, allowances may be bought and sold on a national, or even international, market.

In this analysis we have modeled the impacts of a range of allowance allocation schemes on consumer and generator welfare in regulated and unregulated electricity markets during the early years of federal cap-and-trade greenhouse gas regulation. We have based our work upon publicly-available data on plant operations and ownership, as well as on operational and emissions data from the U.S. EPA Clean Air Markets Division. We believe that this analysis is unique in its detailed treatment of economic impacts at the individual generating plant level, and in its focus on consumer impacts at the state and regional levels.

We say that this analysis pertains to the "early years" of greenhouse gas policy because it does not take into account changes in generating infrastructure, or reductions in load, relative to the present. Over time, a successful climate policy will lead to investments in energy efficiency and renewable energy, technological innovation, and other carbon emissions mitigation strategies that will alter the economic impact on consumers.

The results of our analysis show that, under cap-and-trade regulation, the cost impacts on consumers will vary based on both the electricity market structure and the chosen approach to emissions allowance allocation. In deregulated markets, it is likely that *any* allowance allocation will result in consumer-funded windfall profits for certain generating plant owners, at least in the early years. Any free allocation of allowances to merchant generators[1] will serve to increase these windfall profits, and to increase costs to consumers in both regulated and deregulated electricity markets.

The ultimate cost to consumers will also depend on how allowance auction proceeds are used. Investing these funds in technologies and strategies that directly reduce energy use and mitigate greenhouse gas emissions is one effective strategy for lowering consumer costs.[2] Although such strategies are not represented in this analysis, they will

[1] "Merchant" generators are unregulated entities that produce power to sell at market rates. Most generators in unregulated markets are merchants. There are also merchant generators who sell power to regulated utilities throughout the United States.

[2] This topic has been discussed in detail, for example, in Cowart, R., "Carbon Caps and Efficiency Resources: How Climate Legislation can Mobilize Efficiency and Lower the Cost of Greenhouse Gas Emission Reduction", *Vermont Law Review 33:*201, pp 201-223, 2009.

be a crucial determinant of consumer costs and probably represent the most important next step for investigating the impact of climate policies on the public.

In this analysis, we have not attempted to quantify the many likely benefits of federal greenhouse gas regulation. These benefits include reduced dependence on fossil fuels, cleaner air and other environmental and health benefits, technological and market innovation, and most importantly, reducing the risks and costs associated with climate change. It is neither the authors' nor the sponsors' position that greenhouse gas regulation in general is prohibitively expensive, or that the costs are likely to exceed the benefits. Our intention is to highlight and quantify the ways in which specific policy details may impact consumers, and to provide perspective on which consumers and producers are likely to experience the financial costs and benefits of federal cap-and-trade for carbon emissions.

While we offer no specific policy prescriptions, our intention is to inform the policymaking process by illuminating the impact of policy design choices on generator profits and consumer welfare.

Productive vs. Unproductive Costs

In considering the cost of greenhouse gas regulation in the electric sector, it is helpful to distinguish between productive mitigation costs and unproductive costs for electricity consumers. Productive mitigation costs are those required to achieve the goals of the cap-and-trade policy: that is, to fund technology and operating practices that reduce greenhouse gas emissions. These costs include investments in energy efficiency and renewable energy, clean energy research and development (including development of carbon capture and storage technology), switching to less carbon-intensive fuels, and investments in low-carbon energy sources such as new nuclear and hydropower generating plants. Productive investments not only reduce greenhouse gas emissions, they also create jobs, spur investment and innovation, and generally have beneficial economic impacts for society.

Unproductive costs represent costs for electricity consumers that provide little if any of these benefits. These unproductive costs will result, in part, from the underlying single-clearing-price structure of deregulated electricity markets in the United States, in which an increase in costs for just a few generating plants can lead to an increase in revenues for all generating plant owners. While many analysts consider such "transfer payments" from consumers to producers as unimportant in assessing overall cost to society, they are harmful to consumers and thus to the economy as a whole. As will be shown, the level of unproductive cost under cap-and-trade is also strongly affected by the initial allocation of emissions allowances.

In single-clearing price wholesale electricity market auctions,[3] any increase in costs for the one or more generators "on the margin" will result in a higher price for all electricity sold in the market. This is illustrated in Figure 1. As CO_2 emissions costs increase the offer price for the generator on the margin, the clearing price for electricity is increased, leading to higher revenues for all generators—even for those that have no emissions compliance cost. In the Figure, the wholesale price of electricity increases during the hour shown by $12 per megawatt-hour (MWh), reflecting the cost of allowances for the gas-fired generator on the margin. As a result, all generators (including emissions-free resources) receive an additional $12 for every MWh sold.

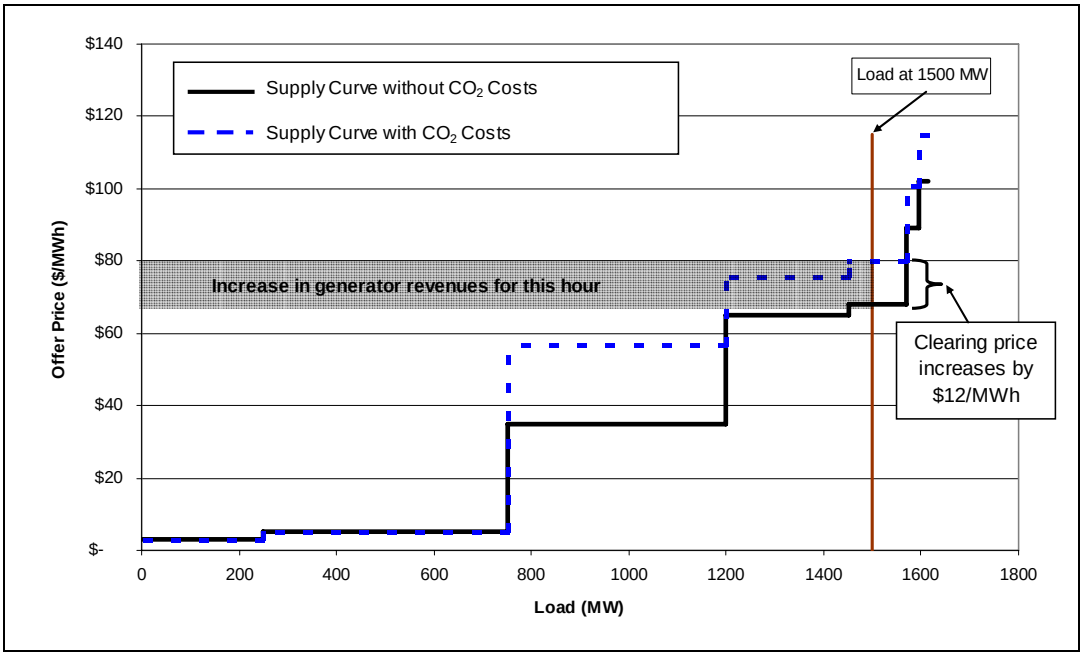


Figure 1. Increasing the costs for the generator on the margin in a single-clearing-price market increases revenues for all generators. In this illustrative example, an emission allowance price of $20/ton raises the offer price of the generator on the margin for this hour by $12 (the marginal emission rate is 0.6 tons/MWh.) The increase in generator revenues for the hour is $18,000 (grey box), while the total increase in generator cost for the hour is $13,250. This yields a net profit of $4,750 before any free allocation of allowances. Note that the generators on the left have no CO_2 emissions and thus no increase in cost.

In the current study we find that in the PJM market, where about 430 million megawatt-hours are sold annually from deregulated generators, the effect illustrated in Figure 1 would help to translate a $20/ton allowance price into new annual consumer costs of almost $6.5 billion.[4]

[3] In deregulated markets, electricity prices are set hourly based on generator offers. The market clearing price is the offer price of the most expensive generator needed to meet load; this generator is said to be "on the margin" because it is receiving exactly its offer price for electricity. All generators in the system are paid for energy based on the offer price of the generator on the margin.

[4] PJM found in a recent analysis that a $20 allowance price would lead to wholesale price increase of $11.78 Billion. (http://www.pjm.com/documents/~/media/documents/reports/20090127-carbon-emissions-whitepaper.ashx.) However, they did not consider the fact that almost 41% of the energy sold in PJM is from cost-regulated generators.

Free allocation of allowances to merchant generators would exacerbate unproductive costs for consumers. Since allowances are tradable and have market value, consumers in unregulated markets will pay the cost of retired allowances even if the generator received them for free. The clearing price dynamics, illustrated above, suggest that such a subsidy is not necessary to protect merchant generators from the impact of greenhouse gas regulations.

One particularly dramatic manifestation of these effects is the windfall profits that would accrue to the owners of unregulated, non-emitting generators (i.e. nuclear and hydroelectric) under cap-and-trade. This windfall would amount to several billion dollars annually. For example, assuming a $20/ton allowance price, unregulated nuclear generating plants in PJM alone would receive over $2.6 billion per year in additional revenues with no commensurate increase in costs. Such windfall profits are inefficient in the short run because they increase electricity costs, but do not produce incremental reductions in targeted emissions.

In the long run, the economic rewards of avoiding emissions costs may be an efficient driver for the development of new low-carbon resources, including new nuclear plants, to replace existing carbon-intensive resources. One metric for successful policy design may be the extent to which it minimizes unproductive costs, while effectively targeting consumer dollars and incentives toward investments which serve the intended policy goal.

Summary of Conclusions

Throughout the continental United States, per-kWh electricity costs are likely to rise as a result of greenhouse gas regulations. These increases will be driven by productive costs, which fund investments that lead to reductions in emissions and yield numerous other economic benefits, and by unproductive costs, which produce little of these benefits. The level of productive cost is a function of the actions taken to reduce greenhouse gas emissions, including investments in energy efficiency, new and improved generating technologies, and perhaps technologies to capture and permanently sequester carbon dioxide. Some of these actions have low cost; in our analysis we assume that they cost half of the cost of emissions allowances, on average. In general, the level of productive cost is not affected by the initial allocation of allowances in a cap-and-trade regulatory regime.

The level of unproductive cost, on the other hand, is strongly affected by how emissions allowances are allocated. To demonstrate this, we consider three allowance allocation scenarios: allocation for free to generators in proportion to historic emissions; allocation for free to regulated Local Distribution Companies (LDCs) based on historic emissions and energy sales; and an allocation scenario in which 10% of electric sector allowances are distributed for free to merchant coal generators, with the balance allocated for free to LDCs.

Table 1 and Figure 2 show our estimate of the total productive and unproductive costs, by region[5] and by scenario, for a $20 per ton CO_2 emission allowance price.[6]

Table 1. Annual cost of abatement vs. annual cost to consumers by region for each scenario.

Region[a]	Cost of Emission Abatement ($M)[b]	Incremental Cost for Consumers ($M)		
		Scenario 1: Free Allocation to Generators[c]	Scenario 2: Free Allocation to LDCs[d]	Scenario 3: Free Allocation to Merchant Coal and LDCs[e]
CAISO	$ 83	$ 1,253	$ 70	$ 210
ISO-NE	$ 79	$ 1,496	$ 547	$ 655
PJM	$ 645	$ 7,740	$ 4,057	$ 4,756
NYISO	$ 86	$ 1,679	$ 749	$ 868
ERCOT	$ 308	$ 3,302	$ 848	$ 1,170
Non-RTO East	$ 2,114	$ 8,815	$ 6,596	$ 8,697
Non-RTO West	$ 468	$ 2,956	$ 1,123	$ 1,635
48-State Total	*$ 3,783*	*$ 27,240*	*$ 13,991*	*$ 17,991*

[a]ISO = Independent System Operator; CAISO = California ISO; ISO-NE = ISO New England; PJM = PJM Interconnection; NYISO = New York ISO; ERCOT = Electric Reliability Council of Texas; RTO = Regional Transmission Organizations. Non-RTO regions are bilateral market areas in the eastern and western electricity grids, respectively.

[b]Cost of avoiding 15.8% of 2005 electric sector emissions at $10/ton – similar to H.R. 2452 goals.

[c]Free allocation equivalent to 84.2% (= 100% - 15.8%) of 2005 emissions at $20/ton.

[d]Free allocation representing 84.2% of emissions, 50% in proportion to 2005 emissions and 50% in proportion to 2005 energy production, at $20/ton.

[e]Free Allocation of 200 million tons (~10%) of electric sector emissions allowances to merchant coal, with the balance allocated for free to LDCs, at $20/ton.

The approach that yields the highest cost for consumers is allocation of allowances for free to generators. This is because consumers in deregulated regions will pay much more than the cost of mitigation in increased energy costs, whether or not generators themselves pay for the allowances. Unregulated generators will include the *opportunity cost* of allowances in their offers to sell electricity, as they should if the underlying economics of cap-and-trade are to function. Thus allocation for free to unregulated generators represents an additional source of windfall profits for their shareholders, and is not necessary to offset costs associated with emission regulations.

The scenario in our analysis with the lowest cost for consumers involves allocation of allowances for free to LDCs.[7] In regulated areas, the LDCs are the vertically integrated

[5] The electricity market regions considered throughout this analysis are the five Regional Tariff Organizations (RTOs) identified as control areas in the EPA eGRID database (discussed below), plus the aggregated non-RTO regions of the western and eastern interconnections. The Midwest ISO is not included as a control area in eGRID, perhaps because it was not administering an electricity market prior to 2005. It is thus treated as part of the "Non-RTO East" region for this analysis.

[6] There has been a wide range of estimates of the likely price of allowances under the bills considered by Congress. For Synapse' most recent (July 2008) discussion of this issue and carbon emissions price forecast, see http://www.synapse-energy.com/Downloads/SynapsePaper.2008-07.0.2008-Carbon-Paper.A0020.pdf. We have used an allowance price of $20/ton throughout this analysis because it appears within the reasonable range and is consistent with other recent policy analyses.

utilities that own much of the generation; in unregulated generation markets LDCs are the regulated "wires" companies that purchase wholesale power and distribute it to customers at retail, or that deliver retail electricity to customers from competitive suppliers. In both types of markets, cost-based regulation means that LDCs should pass all costs and benefits through to ratepayers, and thus cannot keep any windfall profits resulting from free allowance allocations.

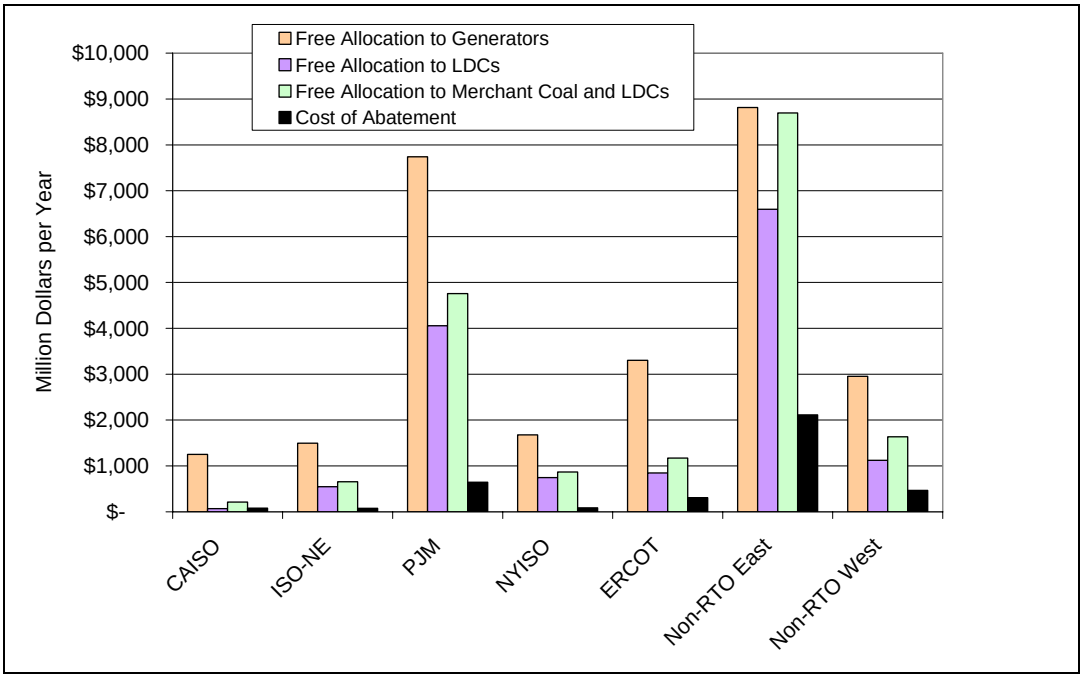


Figure 2. Cost of abatement vs. cost to consumers by region for each allowance allocation scenario considered. (Comparisons should be made within regions—differences between regions mostly reflect the size of each region.)

Nonetheless, significant generator windfall profits remain in unregulated markets even with free allocation to LDCs. This is because all generators in these markets will receive the benefit of higher wholesale electricity prices, while some, such as nuclear generators, will have little to no compliance costs. In cost-regulated markets, this benefit would be passed through to ratepayers.

The final scenario includes free allocation of allowances for 200 million tons of CO_2 emissions (~10% of electric sector emissions) to merchant coal generators, with the balance allocated for free to LDCs. This approximates one aspect of the allowance allocation under the Waxman-Markey bill.[8] This allocation scheme would result in a higher cost to customers relative to a strict free allocation to LDCs because it diverts a

[7] For a fuller discussion of this issue, see Keeler, A., "State Commission Electricity Regulation Under a Federal Greenhouse Gas Cap-and-Trade Policy", National Regulatory Research Institute, January 2008. (http://nrri.org/pubs/electricity/08-01.pdf.)

[8] Waxman-Markey also includes numerous aspects not replicated here, including allocation to generators under long-term contracts and a special allocation to small LDCs. The bill also includes mandates for energy efficiency and other direct emission reduction strategies that should serve to mitigate cost impacts.

large number of free allowances to unregulated coal-fired generators, reducing the number available for the benefit of consumers in both regulated and unregulated markets. As demonstrated here, allocation of free allowances to merchant coal generators is largely unnecessary, as most merchant generators are unlikely to face much, if any, reduction in profits. In addition, the owners of these plants are often owners of other power plants as well, and their overall profits may increase substantially.

The cost of federal climate regulations to consumers will vary by region, and will be strongly affected by the allocation scheme for emissions allowances. These costs could be at least partially offset by investments in energy efficiency and renewable energy sources that would reduce the need for carbon-intensive generating technologies. All of the scenarios considered here would have the intended effect of making conventional, high-emissions generating plants less economical, promoting a transition to a lower-emissions electricity generating sector in the long term. The details are important, however, and the choices made in designing greenhouse gas regulations can lead to costs or savings of tens of billions of consumer dollars every year.

2. Methodology

Data Sources and Aggregation

All of the analysis reported here was performed on a generating-plant level, based largely on EPA Clean Air Markets Division (CAMD)[9] and eGRID[10] data. All generation and emissions data used in this analysis are from calendar year 2005, which is the most recent data available from eGRID. For the purposes of this analysis, only direct CO_2 emissions from electricity generating plants are considered.

Plant ownership is based on eGRID and on NERC Electricity Supply and Demand (ES&D)[11] data. If a plant has more than one owner, it is treated as multiple plant fractions with costs, revenues, energy output, and emissions divided *pro rata* according to ownership shares. Plants (or shares of plants) are considered "cost-regulated" if their owners are identified as investor-owned utilities, municipal utilities, cooperatives, or government entities. All other plant owners are considered market-based. Individual plant may be divided among regulated and market-based owners and the shares are treated accordingly.

Plants can be identified with states, control areas, Regional Transmission Organizations (RTOs), and/or eGRID subregions (Figure 3) based on the eGRID database. For most of the current analysis we have divided the contiguous United States into the following regions:

- California ISO
- ERCOT ISO

[9] http://www.epa.gov/airmarkets/
[10] http://www.epa.gov/cleanenergy/energy-resources/egrid/index.html
[11] http://www.nerc.com/page.php?cid=4|38

- New England ISO
- New York ISO
- PJM Interconnection
- Non-RTO Western interconnection
- Non-RTO Eastern interconnection

The Midwest ISO is treated as part of the Non-RTO East, as it is not identified as a control area in the 2005 eGRID data.

The logic behind this aggregation is that RTO regions are each internally dispatched, and approximately represent independent electricity markets.[12] The last two regions represent the non-RTO areas of the country, in which inter-company power transactions occur on a bilateral basis. Each of these markets is assumed to approximate a single clearing price market in terms of the prices paid for merchant power. The western and eastern interconnections are physically separate electric grids (as is the ERCOT region comprising most of Texas) and are properly treated as separate electric power markets.

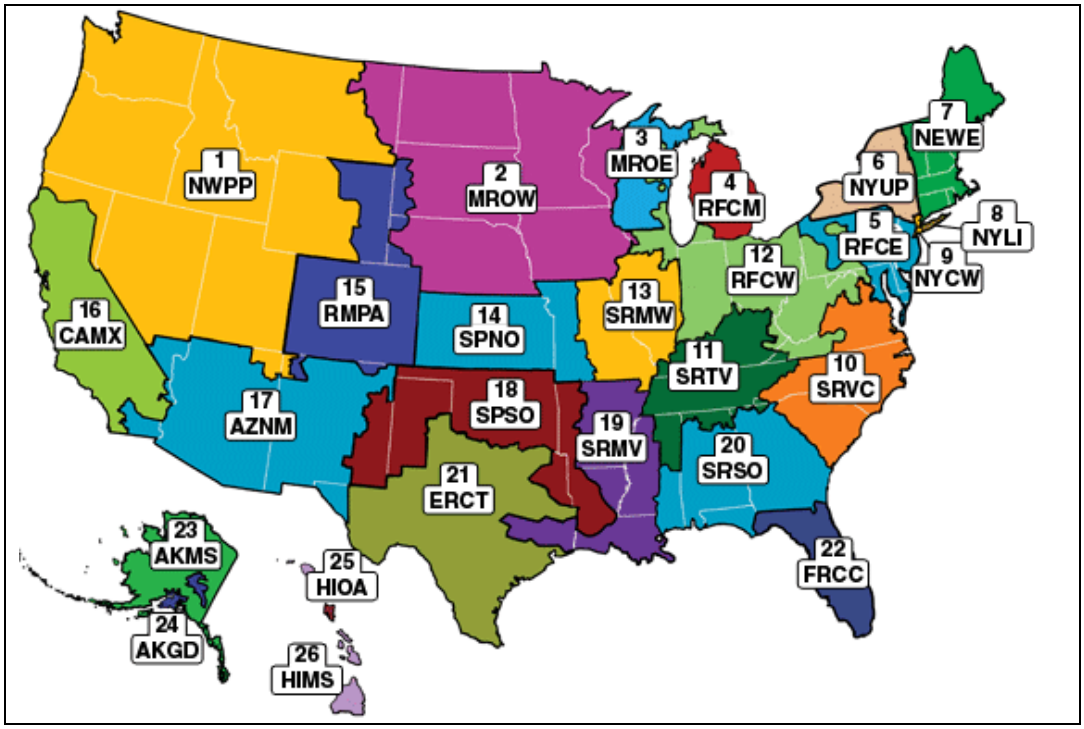


Figure 3. eGRID subregions, from http://www.epa.gov/grnpower/pubs/calculator.htm. Hourly marginal emission rates were calculated for each subregion (excluding Alaska and Hawaii.)

In addition to the RTO aggregations, we present results for the contiguous United States as a whole, and, for some data, on a state level. Individual U.S. states generally do not represent well-defined electricity markets, so impacts on consumers at the state level cannot be calculated directly from impacts on generators. Alaska and Hawaii are not

[12] This is an approximation. There are, of course, important transactions across RTO boundaries that are not accounted for in this analysis.

included in this analysis because they do not have connected electric grids or electricity markets that are amenable to our analytical approach.

Generator Costs and Revenues

Generating plant owners will be affected in a number of ways by federal CO_2 cap-and-trade regulation.

First, generators will face compliance costs. These costs include the cost of abatement (actions taken to reduce or offset CO_2 emissions) and cost of allowances for remaining emissions. We include the price of all allowances even in cases where some or all are allocated for free, and then we consider separately the value of those allowances as an offsetting revenue stream. In theory, the allowance price reflects the marginal cost of abatement, after all lower-cost abatement strategies have been exhausted. Here we assume that the average cost of abatement is half of the cost of purchasing an emission allowance, for each ton of CO_2 emitted or avoided.[13]

Second, in unregulated electricity markets, generators will receive an increase in revenues from electricity sales as the cost of electricity increases to reflect the emissions costs of the marginal, price-setting generating unit. Here we apply a technique developed for an earlier study for the US EPA[14] to determine the hourly marginal emissions rate in each eGRID subregion. The hourly increase in market revenues for each generating plant will be the regional marginal emission rate for that hour, times the output sold in the spot market, times the allowance price. We assume that all power produced by unregulated generating companies is sold into the hourly spot market.

Third, generators may receive a free allocation of CO_2 emission allowances intended to offset costs associated with policy compliance. Some or all of these allowances may be retired to account for CO_2 emissions from the plant, or else they may be sold on a national allowance market. Thus an allocation of allowances may be seen as an allocation of monetary value from the government, equal to the allowance price times the number of allowances allocated for free. The initial allocation of allowances is not expected to affect generator operating decisions, as generators will include the price of allowances in their energy offer prices regardless of the initial allocation.

Finally, cost-regulated generators will pass on to customers all compliance costs, as well as the benefit of all freely allocated allowances. In an idealized cost-of-service environment, generation owners should neither earn money nor lose money purchasing allowances or receiving valuable allowances for free. The return on equity generation owners may earn for capital investments to reduce carbon emissions is not considered

[13] This assumption is predicated on the notion of a well-behaved supply curve of abatement options starting at zero and progressing in a linear fashion until the emissions cap is reached at an allowance price of $20/ton. The same assumption has been made, for example, in the April, 2009 "EPA preliminary Analysis of the Waxman-Markey Discussion Draft". Available at http://www.epa.gov/climatechange/economics/economicanalyses.html#wax.

[14] Ezra D. Hausman, Jeremy Fisher, and Bruce Biewald, 2008, "Analysis of Indirect Emissions Benefits of Wind, Landfill Gas, and Municipal Solid Waste Generation", submitted to EPA in fulfillment of Order Number EP07C000079. Available at http://www.epa.gov/ord/NRMRL/pubs/600r08087/600r08087.htm.

in this analysis, nor is any loss of revenues associated with decreased energy use. These will probably become more important factors in later years, as utilities invest in low-carbon energy sources and implement greater levels of energy efficiency to meet increasingly stringent emission limits.

Consumer Costs

Costs for consumers are calculated only on a regional basis, because it is not reasonable to assume that consumers are served from in-state resources. In this analysis, we identify costs for consumers who are served by market-based generation and for those who are served by cost-based generation. In reality, most consumers are served by some combination of the two.[15] Thus, we also provide an average impact on consumers, by region, weighted by the regulatory status of the generation output in the region.

Individual states or utilities in any region may have a different weighting of regulated vs. unregulated generation serving their customers. Thus, for example, a state in which the utilities continue to self-provide most of their energy needs is likely to experience cost impacts closer to the "cost-based" results of this analysis, while a state in which all former utility-owned generation has been divested to unregulated owners will face impacts that are much closer to the "market-based" number. The impacts on any group of consumers should be understood in the context of the regulatory status of their utilities' sources of energy.

3. Results

Detailed results for each region, for each type of generator (by fuel), and for each allowance allocation scenario considered are shown in Appendix A. The scenarios differ only by the allocation scheme for emissions allowances.

For each scenario, the total number of allowances allocated to entities in the electric sector is 1,950 million. This is roughly consistent with the allocation for the early years under Waxman-Markey, without consideration of the set-aside for generators selling under long-term contracts or the special provision for "small" LDCs.

The scenarios are defined as follows:

Scenario 1: All allowances allocated for free to generators in proportion to 2005 emissions.

Scenario 2: All allowances allocated for free to LDCs,[16] 50% in proportion to historic emissions and 50% in proportion to historic sales.

---

[15] For example, a regulated utility may generate its own electricity (which would not be subjected to market forces), and purchase some on the wholesale market. Regulated utilities may also sell excess generation on an open market, and thus receive additional revenues.

[16] Individual LDCs are not represented in this analysis. In Scenarios 2 and 3, we assume that the value of free allowances is returned to market-based customers through their LDCs.

Scenario 3: Allocation of 200 million allowances allocated to merchant coal generators, with 1,750 million allocated to LDCs as in scenario 2, above.

In addition, we have analyzed a scenario ("Scenario 0") in which no allowances are allocated for free. This scenario is included in the data tables and charts in the Appendix. Under this scenario, all allowances are sold at auction, and the proceeds do not directly benefit electricity consumers.

For Scenarios 2 and 3, the allowances are first distributed among the regions in proportion to both emissions and energy output.

Figure 4 shows the average cost impact of each scenario on customers in each market region. Figure 5 shows the impact separated into customers of (a) cost-based and (b) market-based generation. Customers served by individual utilities will generally fall somewhere between the impacts shown in these figures, depending on the extent to which their distribution utility generates its own energy.

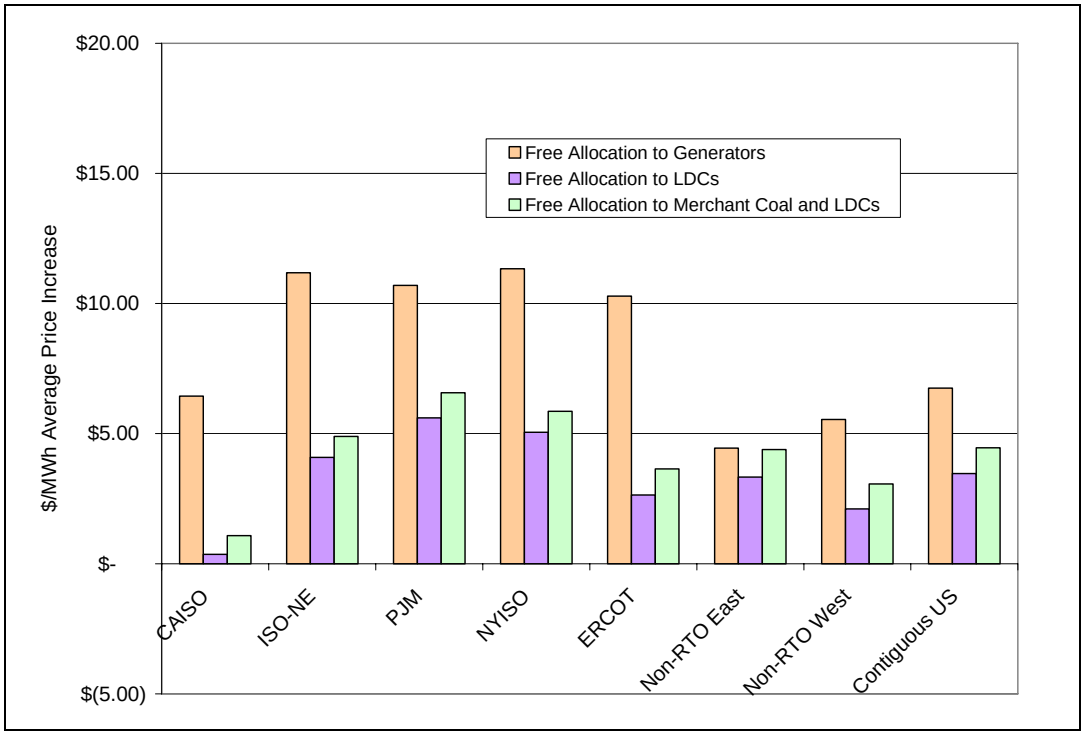


Figure 4. Weighted average energy price change by region for a $20/ton emissions allowance price under three allocation scenarios.

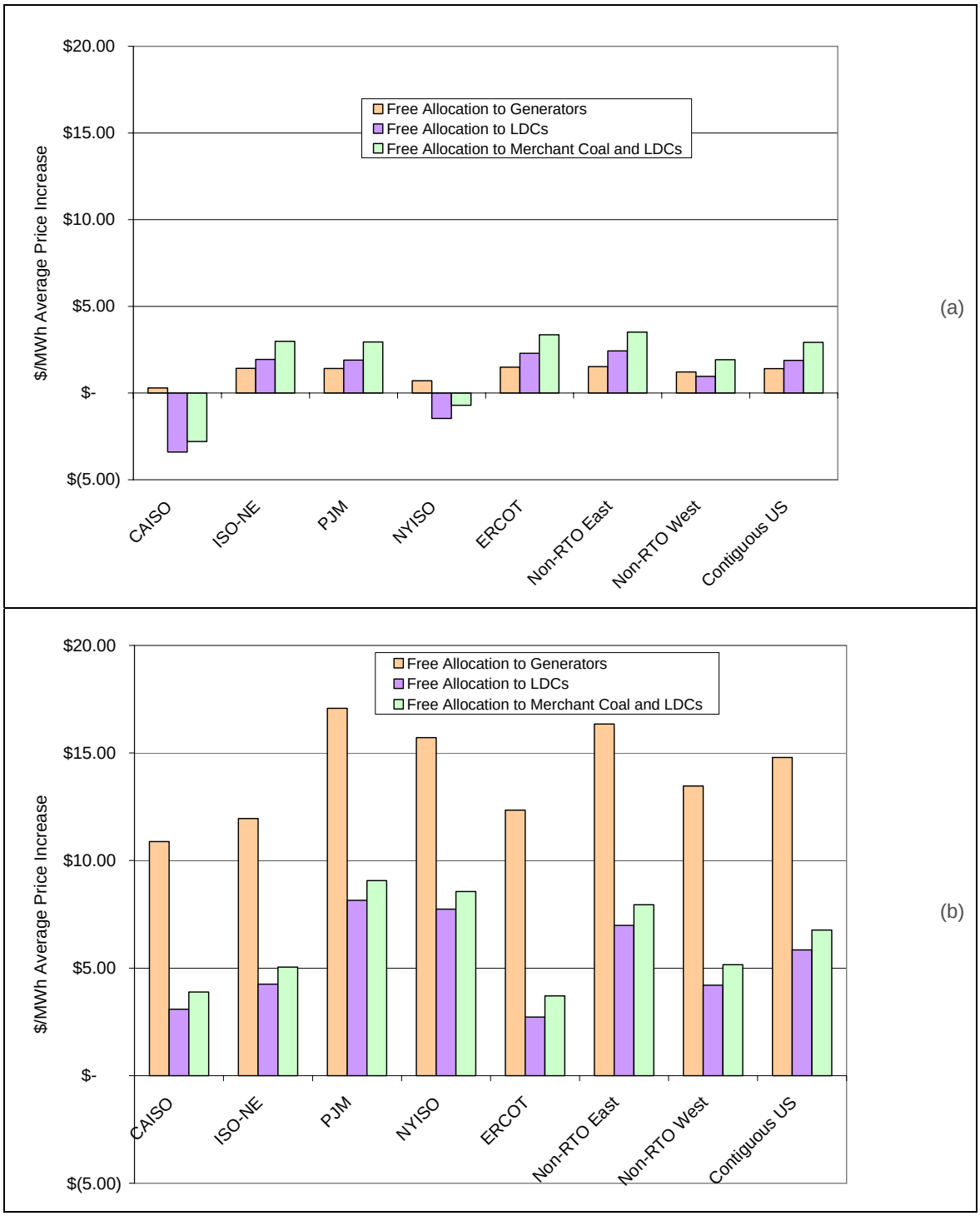


Figure 5. Energy price change by region for (a) cost-regulated and (b) market-based generation from a $20/ton emissions allowance price under three allocation scenarios.

Scenario 3 highlights the impact of allocating a 10% share of emissions allowances for free to merchant coal generation. As shown in the figures, this approach increases costs

to consumers in every region relative to the case in which all allocations are made to LDCs. It even increases costs for customers of regulated utilities, because the free allowances for merchant generators are diverted from the allowances that would otherwise go to regulated LDCs for the benefit of customers. Our analysis has shown that the allocation to merchant coal is unnecessary in most cases, because most of these generators will largely make up their compliance costs through higher electricity prices.

The charts and tables in the Appendix show changes in generator profitability by region and fuel type throughout the contiguous United States. In general, cap-and-trade regulation will have either no impact or a positive impact on generator profits throughout the United States. Owners of cost-regulated generation will experience no change in profitability, as costs and benefits of carbon regulations will be passed through to ratepayers. Owners of some market-based generation will gain windfall profits from the increase in price for the energy they produce. The only case in which market-based generators will see a reduction in profits is if their emission rate is consistently higher than that of the unit on the margin—for example, when natural gas is setting the marginal price, coal units are likely to become less profitable as carbon emission prices are imposed on the system.

One reason that most merchant coal and gas-fired generators will make increased profits much of the time, even without free allowances, is that it is the *least efficient* generating unit using any fuel is on the margin that sets the market price of energy. Assuming emission rates are higher for more expensive generators, all other operating units burning the same fuel experience increased profits because they have a lower emission rate per MWh produced than the unit on the margin. In addition, in regions of the country that have substantial merchant coal generation, it is coal, not natural gas, that often sets the market clearing price. For example, coal sets the market clearing price in PJM more than 70% of the time.[17] Under these conditions most operating merchant coal plants would experience increased profits under cap-and-trade.

Figure 6 shows the increase in profits for market-based generators by state; Figure 7 shows the weighted average (by output) increase in profits for all generators, both market-based and cost-based, in each state. Figure 8 shows the national average increase in net revenue for each MWh sold by market-based generators, by fuel type, under each scenario.

[17] As reported in annual PJM State of the Market Reports. See http://www2.pjm.com/markets/market-monitor/som.html.

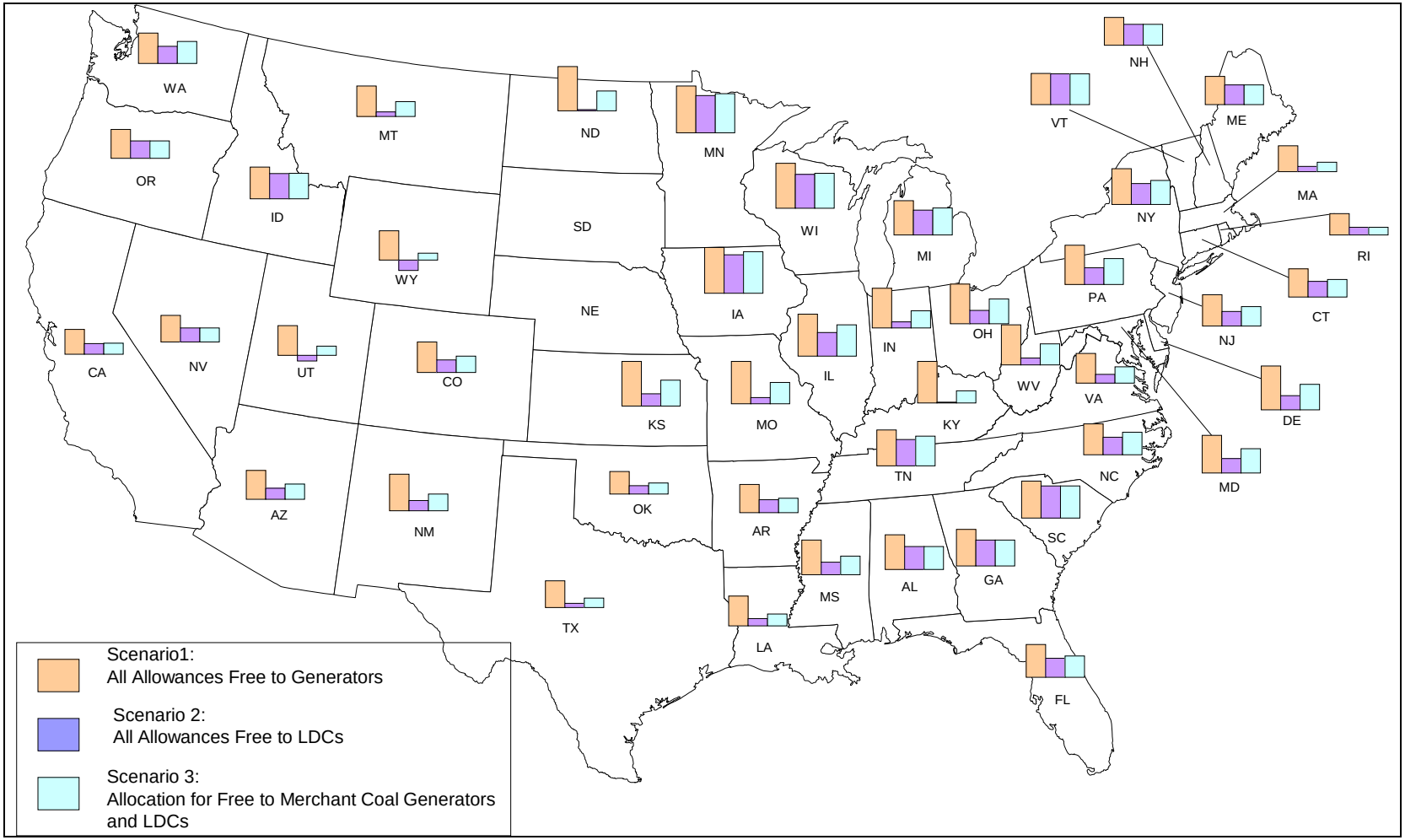


Figure 6. Average increase in market-based generator net revenues by state in $/MWh. For perspective, net revenues in Texas increase by $11.02/MWh in Scenario 1, while under Scenario 2 they increase by $1.78/MWh. States with an insufficient amount of merchant generation for analysis are omitted.

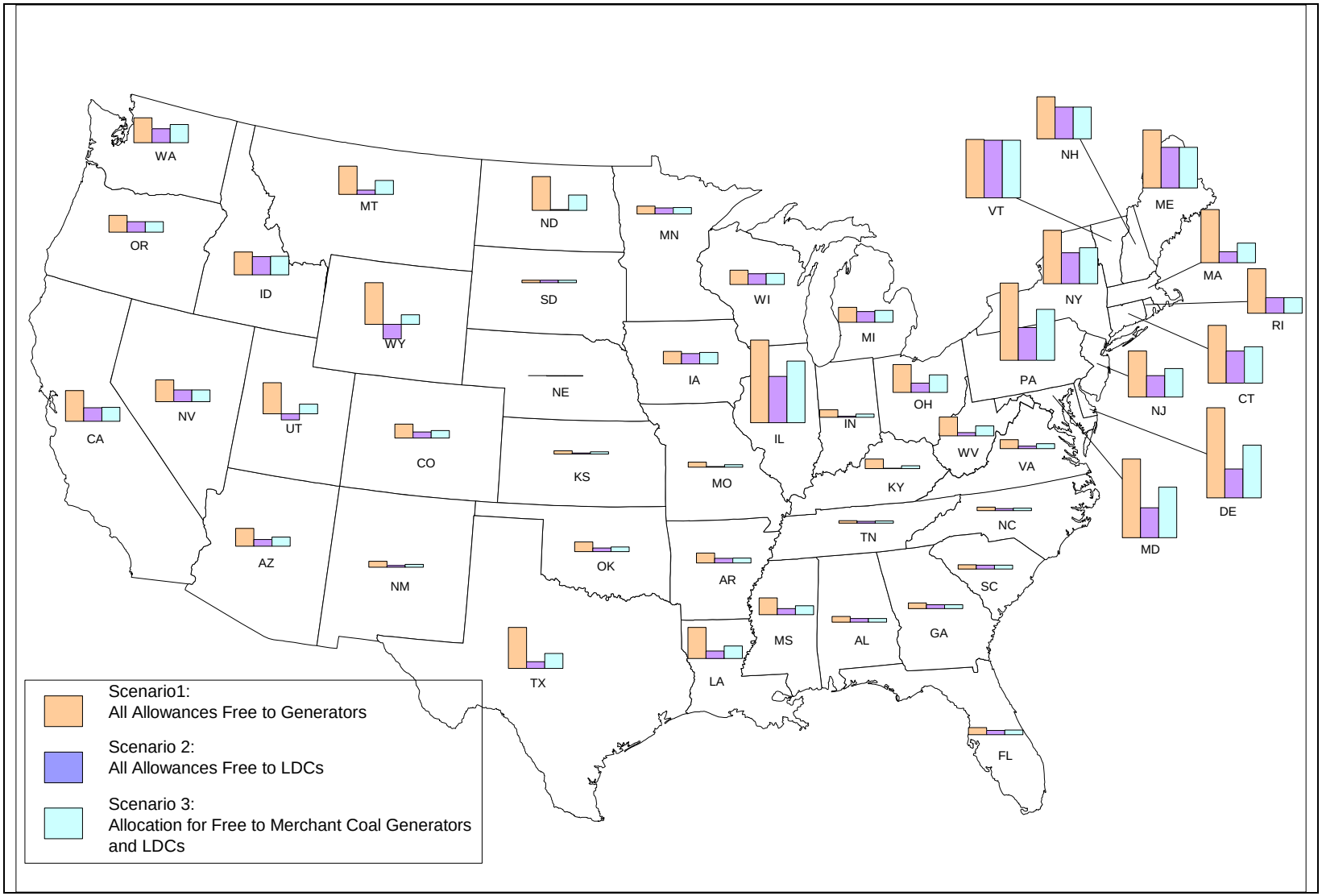


Figure 7. Average increase in weighted average net revenues for *all* generators by state in $/MWh. For perspective, net revenues in Illinois increase by $16.22/MWh in Scenario 1, while under Scenario 2 they increase by $9.11/MWh.

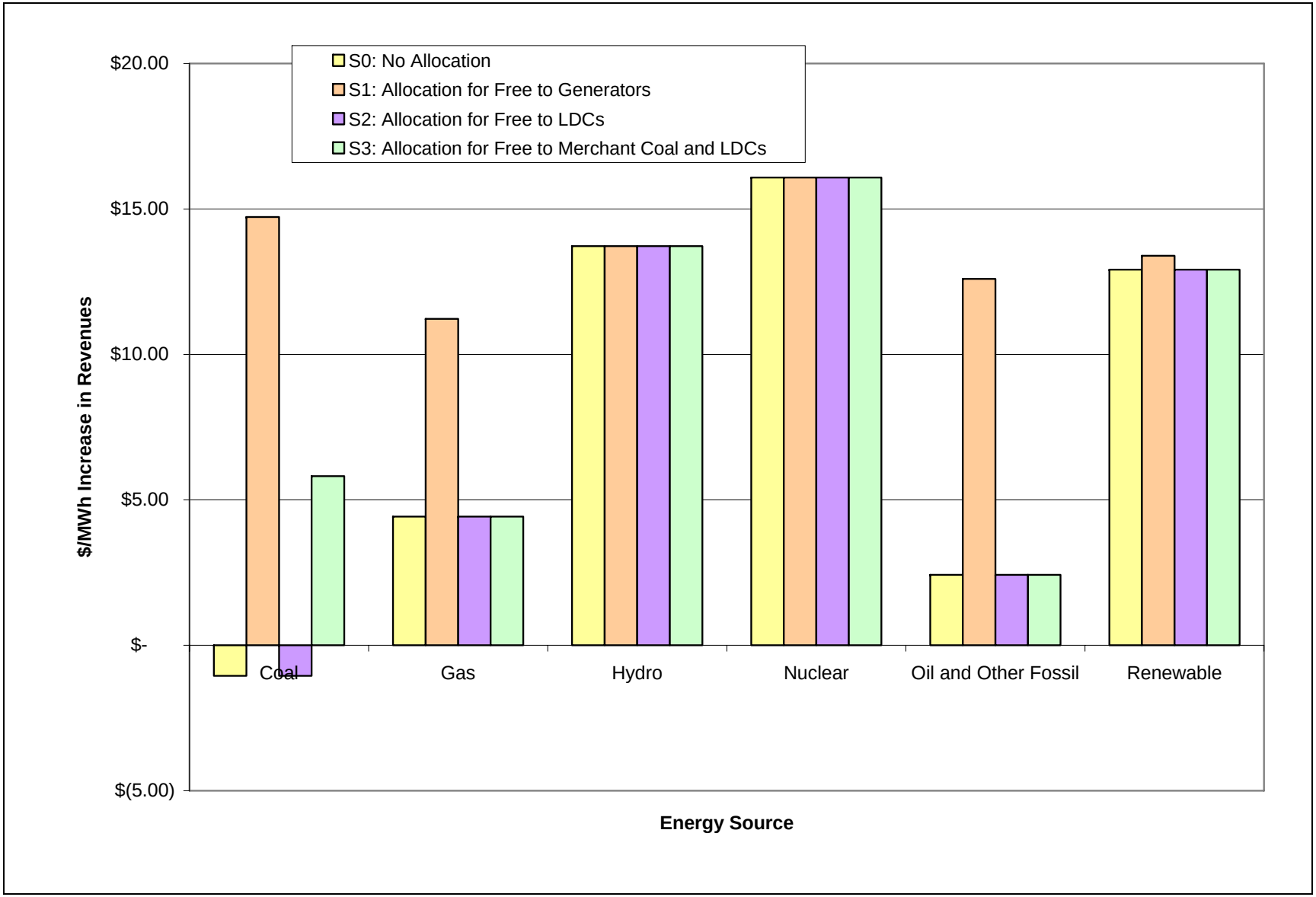


Figure 8. Nationwide average increase in net revenues for market-based generators of each type shown under each scenario.

4. Discussion

We have highlighted two factors that can lead to high unproductive costs for consumers under cap-and-trade climate legislation: the effect of single-price auctions in deregulated electricity markets, and the allocation of emission allowances for free to generators.

Even with 100% allocation of allowances for free to LDCs (Scenario 2), customers served by cost-regulated plants will pay an incremental $1.88 per MWh on average nationally, while customers served by market-based plants will pay an incremental $5.85 per MWh on average, or more than three times as much. Looked at another way, cost-based customers would pay $4.6 billion to cover $2.5 billion of productive abatement costs (a ratio of less than 2 to 1); while the market-based customers pay $9.4 billion to cover $1.3 billion of productive abatement costs (a ratio of more than 7 to 1).

Allocating 10% of electric sector allowances for free to merchant coal plants (Scenario 3) causes the incremental cost for regulated customers to increase from $1.88 per MWh to $2.92 per MWh, or more than 50%. That is because $2.5 billion of the $4 billion allowance value that is allocated to merchant coal is being paid by customers who get their power from regulated generators. Allocating all allowances for free to generators (Scenario 1) instead of to LDCs increases the cost to consumers in deregulated markets from $9.4 billion to $23.8 billion, to cover the same $1.3 billion of productive costs.

The analysis reported here requires a number of caveats due to limitations on available data. For example, all of the underlying generation and emissions data are from 2005, while the likely start date for federal carbon regulation is likely to be 2012 or later. We have used an innovative, data-based approach to determining the marginal emission rate in each eGRID region, which is reliable to the extent that the data come from a year that is sufficiently similar to the future year being modeled. We are unable to model the existing long-term contracts that may provide some mitigation of consumer costs in some areas, and we have not considered the impact of power transactions across regional boundaries, or with Canada and Mexico.

This analysis has been limited to the effects of market structure and allocation scenarios on consumer costs and generator revenues on a regional basis. We have not considered in our model any future actions that states, utilities, or other entities may take to more directly reduce carbon emissions from the electric sector. If states actively pursue demand reduction strategies and aggressively develop renewable energy sources, the cost of emission allowances could be lower. The specific provisions to fund and mandate energy efficiency and renewable energy in the Waxman-Markey bill, for example, will be important elements to help reduce carbon emissions and to lessen impact on consumers. A fuller analysis of impacts on consumers would take these important considerations into account.

One way to accommodate such actions would be to model a scenario in which allowance value is recycled to fund initiatives that reduce the use of fossil fuel resources. Such an approach would be likely to lower wholesale clearing prices (by eliminating the need for the most expensive generators during many hours), and lower allowance

prices; demand-side resources also help to lower average per-customer bills. These effects would go far to mitigate the impact on consumers throughout the United States. Integrating cap-and-trade policy with demand reduction programs may be a crucial consideration for effective and affordable carbon regulation at the federal, state, and individual utility levels.

All of the analysis in this report has been based on an allowance price of $20 per ton of CO_2. While we believe that this is a reasonable estimate, there is in fact a wide range of possibility, and the price could be as high as $50 per ton. This would lead to impacts that are 2.5 times higher than those we have estimated here. Factors which could lead to higher or lower emission allowance price are discussed in the Synapse carbon emissions report referenced earlier.

Finally, we have not attempted to quantify the many likely benefits of federal greenhouse gas regulation, including reduced dependence on fossil fuels, cleaner air and other environmental and health benefits, technological and market innovation, and reducing the risks and costs associated with climate change. Nothing in this analysis is intended to imply that carbon regulation is too expensive or that the costs would exceed the benefits—only that the specific policy details have important implications for consumer welfare.

All of these caveats aside, this analysis has shown how carbon regulations are likely to affect consumer and producer welfare in different regions of the country, with different generation mixes and different regulatory structures. Allocating allowances for free to LDCs results in the lowest cost for consumers, while allocating allowances for free to generators results in the highest consumer cost. Allocating a portion of allowances for free to merchant generators adds to consumer costs throughout the country relative to allocation solely to LDCs, and this strategy does not appear to be necessary to mitigate cost impacts on merchant coal generators.

As Congress continues its work on climate legislation, we anticipate that costs and benefits to consumers and society will continue to be assessed. We have highlighted one important category of impacts often overlooked in such economic studies: unproductive transfer payments from consumers to generators that do not contribute to mitigating CO_2 emissions. The Energy Information Administration's (EIA) energy forecasting model, among others, has the capacity to explicitly consider market mechanisms such as those explored here. We believe that such analyses should include a focus on consumer welfare, and the degree to which consumer costs are effectively tied to policy goals.

Appendix

The following pages present summary impact tables for each of the electricity market regions considered in this analysis, and for the lower 48 United States combined. The results of these analyses are presented in graphical form after the tables.

The tables are divided vertically into the impact on market-based generators and their customers on the left, and impact on cost-based generators and their customers on the right. As discussed in the text, most customers in each market will fall somewhere between these two extremes.

The top (unshaded) rows of each table are identical among the scenarios for each region. The shaded rows are scenario-specific. A guide to the rows (corresponding to the “notes” column) may be found below.

Guide to Table Rows in This Appendix

Rows for All Scenarios		
Note	**Row Heading**	**Explanation**
a	Energy Output (GWh)	Total energy output by plant in 2005, aggregated by primary fuel type, as reported in EPA's eGRID database. Data are divided into "market-based" and "cost-based" plants based on ownership shares of each plant.
b	Percent of Region Energy	Total energy output in 2005 by fuel type and market type, as a percent of total energy in the region in 2005.
c	CO_2 Emissions (Mton)	Total CO_2 emissions by plant in 2005, aggregated by primary fuel type, as reported in the eGRID database. Data divided into "market-based" and "cost-based" plants based on ownership shares of each plant.
d	Percent of Region Emissions	Total CO_2 emissions in 2005 by fuel type and market type, as a percent of total CO_2 emissions in the region in 2005.
e	Generation (% of US)	Total energy output in 2005 by fuel type and market type, as a percent of total energy produced in the 48 contiguous US states in 2005.
f	Emissions (% of US)	Total CO_2 output in 2005 by fuel type and market type, as a percent of total CO_2 produced in the 48 contiguous US states in 2005.
g	W-M Million Free Coal Allowances	Under the Waxman-Markey legislation, estimated share of allowances allocated for free to merchant coal generators in the region. Assumes allowances for 200 million metric tons (~10% of electric sector allocation) will be allocated to for free to merchant coal plants (or unregulated shares of joint-owner coal plants) in proportion to 2005 emissions. Combined with (h), gives total number of allowances allocated for free under each allocation scenario.
h	W-M Million Free LDC Allowances	Under the Waxman-Markey legislation, estimated share of allowances allocated for free to local distribution companies in the region. Assumes allowances for 1,750 million metric tons will be allocated for free to distribution utilities 50% in proportion to 2005 emissions and 50% in proportion to 2005 energy output. Combined with (g), gives total number of allowances allocated for free under each allocation scenario.
i	Increase in Market Revenue per \$/Ton CO_2 Emissions Allowance Price (\$M)	Assumes that, in single-clearing-price electricity markets, the hourly wholesale market price of power will increase by an amount equal to the emission rate of the price-setting generating unit times the market price for carbon emissions allowances. To calculate this component of the price, the hourly marginal emission rate affecting each unit was multiplied by its hourly output to yield its hypothetical increase in annual revenue for each dollar of the allowance price.
j	Increase in Market Revenue at \$20/Ton CO_2 Allowance Price (\$M)	Total increase in annual electricity market revenues for market-based generation of each fuel type assuming a \$20/ton allowance price.
k	Cost of 15.8% Abatement @ \$10 per ton (\$M)	Total cost of abatement, assuming average abatement cost is 1/2 the allowance cost, and that these abatement opportunities are available to and taken by all generation owners in proportion to the overall reduction in CO_2 emissions. 15.8% abatement based on analysis of H.R. 2452 allowance allocations to electric sector.
l	Cost Associated with \$20/ton CO_2 Allowance Price (\$M) for 84.2% of Emissions	Total cost of allowances to cover unabated emissions at a \$20/ton allowance price. Value of 84.2% based on analysis of H.R. 2452 allowance allocations to electric sector.

Guide to Table Rows in This Appendix (Continued)

Scenario-Specific Rows		
Note	**Row Heading**	**Explanation**
m	Million Tons Allowances Allocated for Free	Total number of free allowances allocated to any entities under this scenario.
n	Value of Free Allocation to Generators ($M)	Total number of allowances allocated for free to each generator type under this scenario. Allowances are allocated in proportion to 2005 emissions either to all generators or, under Scenario 3, to merchant coal.
o	Value of Free Allocation to LDCs ($M)	Total number of allowances allocated for free to LDCs under this scenario; not defined by generator type. Allowances are allocated 50% based on 2005 CO_2 emissions and 50% based on 2005 energy output.
p	Pass-Through of Benefits and Costs to Ratepayers ($M)	For cost-based markets, all compliance costs (abatements and allowance purchases), as well as the value of all freely allocated allowances, are assumed to be passed through to ratepayers.
q	Net Impact on Generation Owners ($M)	For market-based generators, incremental energy revenues, plus the value of free allowances received, net of compliance costs (abatements and allowance purchases). For regulated LDCs (including cost-based utilities,) value of free allowance allocations net of compliance costs and pass-through to ratepayers.
r	Net Impact on Generation Owners ($/MWh)	(q) divided by total energy produced by each generator type.
s	Net Impact on Electric Customers ($M)	Sum of all additional energy costs, either from higher market prices or pass-throughs from LDCs.
t	Net Impact on Electric Customers ($/MWh)	(s) divided by total energy produced by each generator type.
u	Weighted Average Impact on Consumers ($/MWh)	Overall average impact on electricity prices in the region.
v	Incremental Cost to Consumers ($M)	Sum of incremental costs in market-based (q) and cost-regulated (s) parts of the region.
w	$M Spent on Abatement	Millions of dollars spent on emissions abatement, equal to the total of (k) above
x	Unproductive Cost for Consumers ($M)	Millions of dollars of consumer cost that is not spent on abatement, but only increases generator profits.

PJM Interconnection	MARKET-BASED PLANTS							COST-REGULATED PLANTS								Notes
	Coal	Gas	Hydro	Nuclear	Oil and Other Fossil	Renewable	Total for Market-Based Plants	Coal	Gas	Hydro	Nuclear	Oil and Other Fossil	Renewable	Total for Cost-Based Plants	Total for All Plants	
Energy Output (GWh)	210,704	35,064	3,937	155,945	14,812	8,452	428,915	209,236	4,580	1,467	64,091	14,333	1,285	294,993	723,908	a
Percent of Region Energy	29.1%	4.8%	0.5%	21.5%	2.0%	1.2%	59.2%	28.9%	0.6%	0.2%	8.9%	2.0%	0.2%	40.8%	100%	b
CO_2 Emissions (Mton)	198	13.10	0.00	0.00	5.06	0.20	216	188.09	2.39	0.00	0.00	2.27	0.10	193	409	c
Percent of Region Emissions	48.3%	3.2%	0.0%	0.0%	1.2%	0.0%	52.8%	46.0%	0.6%	0.0%	0.0%	0.6%	0.0%	47.2%	100%	d
Generation (% of US)	5.2%	0.9%	0.1%	3.9%	0.4%	0.2%	10.6%	5.2%	0.1%	0.0%	1.6%	0.4%	0.0%	7.3%	17.9%	e
Emissions (% of US)	8.2%	0.5%	0.0%	0.0%	0.2%	0.0%	9.0%	7.8%	0.1%	0.0%	0.0%	0.1%	0.0%	8.0%	17.0%	f
W-M Million Free Coal Allowances	69.9						69.9								69.9	g
W-M Million Free LDC Allowances							171.7							134.3	306.0	h
Increase in Market Revenue per $/Ton CO_2 Emissions Allowance Price ($M)	$ 186.6	$ 27.6	$ 3.3	$ 133.1	$ 9.2	$ 6.4	$ 366	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 366	i
Increase in Market Revenue at $20/Ton CO2 Allowance Price ($M)	$ 3,732	$ 552	$ 67	$ 2,661	$ 184	$ 127	$ 7,323	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 7,323	j
Cost of 15.8% Abatement @ $10 per ton ($M)	$ 312	$ 21	$ -	$ -	$ 8	$ 0	$ 341	$ 297	$ 4	$ -	$ -	$ 3.58	$ 0.16	$ 304	$ 645	k
Cost Associated with $20/ton CO2 Allowance Price ($M) for 84.2% of Emissions	$ 3,328	$ 221	$ -	$ -	$ 85	$ 3	$ 3,637	$ 3,168	$ 40	$ -	$ -	$ 38	$ 2	$ 3,249	$ 6,886	l
Scenario 0: No Free Allocation of Allowances																
Million Tons Allowances Allocated for Free																m
Value of Free Allocation to Generators ($M)																n
Value of Free Allocation to LDCs ($M)																o
Pass-Through of Benefits and Costs to Ratepayers ($M)							$ -							$ (3,553)	$ (3,553)	p
Net Impact on Generation Owners ($M)	$ 92	$ 311	$ 67	$ 2,661	$ 90.73	$ 124	$ 3,346	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 3,346	q
Net Impact on Generation Owners ($/MWh)	$ 0.44	$ 8.87	$ 16.91	$ 17.07	$ 6.13	$ 14.65		$ -	$ -	$ -	$ -	$ -	$ -			r
Net Impact on Electric Customers ($M)							***$ (7,323)***							***$ (3,553)***	***$ (10,876)***	s
Net Impact on Electric Customers ($/MWh)							***$ 17.07***							***$ 12.04***		t
Weighted Average Impact on Consumers ($/MWh)							***$ 15.02***									u
Incremental Cost to Consumers ($M)							***$ 10,876***									v
$M Spent on Abatement							***$ 645***									w
Unproductive Cost for Consumers ($M)							***$ 10,231***									x

PJM Interconnection	MARKET-BASED PLANTS							COST-REGULATED PLANTS								Notes
	Coal	Gas	Hydro	Nuclear	Oil and Other Fossil	Renewable	Total for Market-Based Plants	Coal	Gas	Hydro	Nuclear	Oil and Other Fossil	Renewable	Total for Cost-Based Plants	Total for All Plants	
Energy Output (GWh)	210,704	35,064	3,937	155,945	14,812	8,452	428,915	209,236	4,580	1,467	64,091	14,333	1,285	294,993	723,908	a
Percent of Region Energy	29.1%	4.8%	0.5%	21.5%	2.0%	1.2%	59.2%	28.9%	0.6%	0.2%	8.9%	2.0%	0.2%	40.8%	100%	b
CO_2 Emissions (Mton)	198	13.10	0.00	0.00	5.06	0.20	216	188.09	2.39	0.00	0.00	2.27	0.10	193	409	c
Percent of Region Emissions	48.3%	3.2%	0.0%	0.0%	1.2%	0.0%	52.8%	46.0%	0.6%	0.0%	0.0%	0.6%	0.0%	47.2%	100%	d
Generation (% of US)	5.2%	0.9%	0.1%	3.9%	0.4%	0.2%	10.6%	5.2%	0.1%	0.0%	1.6%	0.4%	0.0%	7.3%	17.9%	e
Emissions (% of US)	8.2%	0.5%	0.0%	0.0%	0.2%	0.0%	9.0%	7.8%	0.1%	0.0%	0.0%	0.1%	0.0%	8.0%	17.0%	f
W-M Million Free Coal Allowances	69.9						69.9								69.9	g
W-M Million Free LDC Allowances							171.7							134.3	306.0	h
Increase in Market Revenue per $/Ton CO_2 Emissions Allowance Price ($M)	$ 186.6	$ 27.6	$ 3.3	$ 133.1	$ 9.2	$ 6.4	$ 366	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 366	i
Increase in Market Revenue at $20/Ton CO2 Allowance Price ($M)	$ 3,732	$ 552	$ 67	$ 2,661	$ 184	$ 127	$ 7,323	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 7,323	j
Cost of 15.8% Abatement @ $10 per ton ($M)	$ 312	$ 21	$ -	$ -	$ 8	$ 0	$ 341	$ 297	$ 4	$ -	$ -	$ 3.58	$ 0.16	$ 304	$ 645	k
Cost Associated with $20/ton CO2 Allowance Price ($M) for 84.2% of Emissions	$ 3,328	$ 221	$ -	$ -	$ 85	$ 3	$ 3,637	$ 3,168	$ 40	$ -	$ -	$ 38	$ 2	$ 3,249	$ 6,886	l
Scenario 1: All Allowances Allocated for Free to Generators																
Million Tons Allowances Allocated for Free	160.6	10.6	-	-	4.1	0.2	175.5	152.9	1.9	-	-	1.8	0.1	156.8	332.3	m
Value of Free Allocation to Generators ($M)	$ 3,212	$ 213	$ -	$ -	$ 82	$ 3	$ 3,511	$ 3,059	$ 39	$ -	$ -	$ 37	$ 2	$ 3,136	$ 6,647	n
Value of Free Allocation to LDCs ($M)							$ -									o
Pass-Through of Benefits and Costs to Ratepayers ($M)							$ -	$ (406)	$ (5)	$ -	$ -	$ (5)	$ (0)	$ (416.8)	$ (416.8)	p
Net Impact on Generation Owners ($M)	$ 3,305	$ 524	$ 67	$ 2,661	$ 173	$ 127	$ 6,857	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 6,857	q
Net Impact on Generation Owners ($/MWh)	$ 15.68	$ 14.94	$ 16.91	$ 17.07	$ 11.68	$ 15.03		$ -	$ -	$ -	$ -	$ -	$ -			r
Net Impact on Electric Customers ($M)							***$ (7,323)***							***$ (417)***	***$ (7,740)***	s
Net Impact on Electric Customers ($/MWh)							***$ 17.07***							***$ 1.41***		t
Weighted Average Impact on Consumers ($/MWh)							***$ 10.69***									u
Incremental Cost to Consumers ($M)							***$ 7,740***									v
$M Spent on Abatement							***$ 645***									w
Unproductive Cost for Consumers ($M)							***$ 7,095***									x

PJM Interconnection	MARKET-BASED PLANTS							COST-REGULATED PLANTS								Notes
	Coal	Gas	Hydro	Nuclear	Oil and Other Fossil	Renewable	Total for Market-Based Plants	Coal	Gas	Hydro	Nuclear	Oil and Other Fossil	Renewable	Total for Cost-Based Plants	Total for All Plants	
Energy Output (GWh)	210,704	35,064	3,937	155,945	14,812	8,452	428,915	209,236	4,580	1,467	64,091	14,333	1,285	294,993	723,908	a
Percent of Region Energy	29.1%	4.8%	0.5%	21.5%	2.0%	1.2%	59.2%	28.9%	0.6%	0.2%	8.9%	2.0%	0.2%	40.8%	100%	b
CO_2 Emissions (Mton)	198	13.10	0.00	0.00	5.06	0.20	216	188.09	2.39	0.00	0.00	2.27	0.10	193	409	c
Percent of Region Emissions	48.3%	3.2%	0.0%	0.0%	1.2%	0.0%	52.8%	46.0%	0.6%	0.0%	0.0%	0.6%	0.0%	47.2%	100%	d
Generation (% of US)	5.2%	0.9%	0.1%	3.9%	0.4%	0.2%	10.6%	5.2%	0.1%	0.0%	1.6%	0.4%	0.0%	7.3%	17.9%	e
Emissions (% of US)	8.2%	0.5%	0.0%	0.0%	0.2%	0.0%	9.0%	7.8%	0.1%	0.0%	0.0%	0.1%	0.0%	8.0%	17.0%	f
W-M Million Free Coal Allowances	69.9						69.9								69.9	g
W-M Million Free LDC Allowances							171.7							134.3	306.0	h
Increase in Market Revenue per $/Ton CO_2 Emissions Allowance Price ($M)	$ 186.6	$ 27.6	$ 3.3	$ 133.1	$ 9.2	$ 6.4	$ 366	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 366	i
Increase in Market Revenue at $20/Ton CO2 Allowance Price ($M)	$ 3,732	$ 552	$ 67	$ 2,661	$ 184	$ 127	$ 7,323	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 7,323	j
Cost of 15.8% Abatement @ $10 per ton ($M)	$ 312	$ 21	$ -	$ -	$ 8	$ 0	$ 341	$ 297	$ 4	$ -	$ -	$ 3.58	$ 0.16	$ 304	$ 645	k
Cost Associated with $20/ton CO2 Allowance Price ($M) for 84.2% of Emissions	$ 3,328	$ 221	$ -	$ -	$ 85	$ 3	$ 3,637	$ 3,168	$ 40	$ -	$ -	$ 38	$ 2	$ 3,249	$ 6,886	l
Scenario 2: All Allowances Allocated for Free to LDCs																
Million Tons Allowances Allocated for Free							191.3							149.6	$ 340.9	m
Value of Free Allocation to Generators ($M)							$ -							$ -	$ -	n
Value of Free Allocation to LDCs ($M)							$ 3,827							$ 2,992	$ 6,819	o
Pass-Through of Benefits and Costs to Ratepayers ($M)							$ 3,827							$ (560)	$ 3,266	p
Net Impact on Generation Owners ($M)	$ 92	$ 311	$ 67	$ 2,661	$ 90.73	$ 124	$ 3,346	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 3,346	q
Net Impact on Generation Owners ($/MWh)	$ 0.4	$ 8.9	$ 16.9	$ 17.1	$ 6.1	$ 14.6		$ -	$ -	$ -	$ -	$ -	$ -			r
Net Impact on Electric Customers ($M)							***$ (3,497)***							***$ (560)***	***$ (4,057)***	s
Net Impact on Electric Customers ($/MWh)							***$ 8.15***							***$ 1.90***		t
Weighted Average Impact on Consumers ($/MWh)							***$ 5.60***									u
Incremental Cost to Consumers ($M)							***$ 4,057***									v
$M Spent on Abatement							***$ 645***									w
Unproductive Cost for Consumers ($M)							***$ 3,412***									x

PJM Interconnection	MARKET-BASED PLANTS							COST-REGULATED PLANTS								Notes
	Coal	Gas	Hydro	Nuclear	Oil and Other Fossil	Renewable	Total for Market-Based Plants	Coal	Gas	Hydro	Nuclear	Oil and Other Fossil	Renewable	Total for Cost-Based Plants	Total for All Plants	
Energy Output (GWh)	210,704	35,064	3,937	155,945	14,812	8,452	428,915	209,236	4,580	1,467	64,091	14,333	1,285	294,993	723,908	a
Percent of Region Energy	29.1%	4.8%	0.5%	21.5%	2.0%	1.2%	59.2%	28.9%	0.6%	0.2%	8.9%	2.0%	0.2%	40.8%	100%	b
CO_2 Emissions (Mton)	198	13.10	0.00	0.00	5.06	0.20	216	188.09	2.39	0.00	0.00	2.27	0.10	193	409	c
Percent of Region Emissions	48.3%	3.2%	0.0%	0.0%	1.2%	0.0%	52.8%	46.0%	0.6%	0.0%	0.0%	0.6%	0.0%	47.2%	100%	d
Generation (% of US)	5.2%	0.9%	0.1%	3.9%	0.4%	0.2%	10.6%	5.2%	0.1%	0.0%	1.6%	0.4%	0.0%	7.3%	17.9%	e
Emissions (% of US)	8.2%	0.5%	0.0%	0.0%	0.2%	0.0%	9.0%	7.8%	0.1%	0.0%	0.0%	0.1%	0.0%	8.0%	17.0%	f
W-M Million Free Coal Allowances	69.9						69.9								69.9	g
W-M Million Free LDC Allowances							171.7							134.3	306.0	h
Increase in Market Revenue per $/Ton CO_2 Emissions Allowance Price ($M)	$ 186.6	$ 27.6	$ 3.3	$ 133.1	$ 9.2	$ 6.4	$ 366	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 366	i
Increase in Market Revenue at $20/Ton CO2 Allowance Price ($M)	$ 3,732	$ 552	$ 67	$ 2,661	$ 184	$ 127	$ 7,323	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 7,323	j
Cost of 15.8% Abatement @ $10 per ton ($M)	$ 312	$ 21	$ -	$ -	$ 8	$ 0	$ 341	$ 297	$ 4	$ -	$ -	$ 3.58	$ 0.16	$ 304	$ 645	k
Cost Associated with $20/ton CO2 Allowance Price ($M) for 84.2% of Emissions	$ 3,328	$ 221	$ -	$ -	$ 85	$ 3	$ 3,637	$ 3,168	$ 40	$ -	$ -	$ 38	$ 2	$ 3,249	$ 6,886	l
Scenario 3: Allocation 200 million tons to merchant coal, 1750 million to LDCs																
Million Tons Allowances Allocated for Free	69.9						241.6							134.3	375.9	m
Value of Free Allocation to Generators ($M)	$ 1,398						$ 1,398							$ -	$ -	n
Value of Free Allocation to LDCs ($M)							$ 3,434							$ 2,686	$ 6,120	o
Pass-Through of Benefits and Costs to Ratepayers ($M)							$ 3,434							$ (867)	$ (1,411)	p
Net Impact on Generation Owners ($M)	$ 1,490	$ 311	$ 67	$ 2,661	$ 90.73	$ 124	$ 4,744	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	q
Net Impact on Generation Owners ($/MWh)	$ 7.1	$ 8.9	$ 16.9	$ 17.1	$ 6.1	$ 14.6		$ -	$ -	$ -	$ -	$ -	$ -			r
Net Impact on Electric Customers ($M)							***$ (3,889)***							***$ (867)***	***$ (4,756)***	s
Net Impact on Electric Customers ($/MWh)							***$ 9.07***							***$ 2.94***		t
Weighted Average Impact on Consumers ($/MWh)							***$ 6.57***									u
Incremental Cost to Consumers ($M)							***$ 4,756***									v
$M Spent on Abatement							***$ 645***									w
Unproductive Cost for Consumers ($M)							***$ 4,112***									x

ISO New England Inc	MARKET-BASED PLANTS							COST-REGULATED PLANTS								Notes
	Coal	Gas	Hydro	Nuclear	Oil and Other Fossil	Renewable	Total for Market-Based Plants	Coal	Gas	Hydro	Nuclear	Oil and Other Fossil	Renewable	Total for Cost-Based Plants	Total for All Plants	
Energy Output (GWh)	17,687	49,388	6,683	32,863	9,610	7,842	124,072	4,316	715	1,032	1,702	1,683	338	9,786	133,858	a
Percent of Region Energy	13.2%	36.9%	5.0%	24.6%	7.2%	5.9%	92.7%	3.2%	0.5%	0.8%	1.3%	1.3%	0.3%	7.3%	100%	b
CO_2 Emissions (Mton)	16	19.82	0.00	0.00	7.63	0.51	44	4.32	0.30	0.00	0.00	1.54	0.27	6	50	c
Percent of Region Emissions	31.4%	39.5%	0.0%	0.0%	15.2%	1.0%	87.2%	8.6%	0.6%	0.0%	0.0%	3.1%	0.5%	12.8%	100%	d
Generation (% of US)	0.4%	1.2%	0.2%	0.8%	0.2%	0.2%	3.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	3.3%	e
Emissions (% of US)	0.7%	0.8%	0.0%	0.0%	0.3%	0.0%	1.8%	0.2%	0.0%	0.0%	0.0%	0.1%	0.0%	0.3%	2.1%	f
W-M Million Free Coal Allowances	5.6						5.6								5.6	g
W-M Million Free LDC Allowances							42.8							4.5	47.3	h
Increase in Market Revenue per $/Ton CO_2 Emissions Allowance Price ($M)	$ 11.9	$ 25.0	$ 4.3	$ 21.3	$ 6.7	$ 5.1	$ 74	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 74	i
Increase in Market Revenue at $20/Ton CO2 Allowance Price ($M)	$ 237	$ 500	$ 86	$ 425	$ 133	$ 101	$ 1,483	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,483	j
Cost of 15.8% Abatement @ $10 per ton ($M)	$ 25	$ 31	$ -	$ -	$ 12	$ 1	$ 69	$ 7	$ 0	$ -	$ -	$ 2.43	$ 0.43	$ 10	$ 79	k
Cost Associated with $20/ton CO2 Allowance Price ($M) for 84.2% of Emissions	$ 265	$ 334	$ -	$ -	$ 129	$ 9	$ 736	$ 73	$ 5	$ -	$ -	$ 26	$ 5	$ 108	$ 845	l
Scenario 0: No Free Allocation of Allowances																
Million Tons Allowances Allocated for Free																m
Value of Free Allocation to Generators ($M)																n
Value of Free Allocation to LDCs ($M)																o
Pass-Through of Benefits and Costs to Ratepayers ($M)							$ -							$ (119)	$ (119)	p
Net Impact on Generation Owners ($M)	$ (53)	$ 134	$ 86	$ 425	$ (7.61)	$ 92	$ 677	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 677	q
Net Impact on Generation Owners ($/MWh)	$ (2.98)	$ 2.72	$ 12.94	$ 12.94	$ (0.79)	$ 11.68		$ -	$ -	$ -	$ -	$ -	$ -			r
Net Impact on Electric Customers ($M)							***$ (1,483)***							***$ (119)***	***$ (1,601)***	s
Net Impact on Electric Customers ($/MWh)							***$ 11.95***							***$ 12.12***		t
Weighted Average Impact on Consumers ($/MWh)							***$ 11.96***									u
Incremental Cost to Consumers ($M)							***$ 1,601***									v
$M Spent on Abatement							***$ 79***									w
Unproductive Cost for Consumers ($M)							***$ 1,522***									x

ISO New England Inc	MARKET-BASED PLANTS							COST-REGULATED PLANTS								Notes
	Coal	Gas	Hydro	Nuclear	Oil and Other Fossil	Renewable	Total for Market-Based Plants	Coal	Gas	Hydro	Nuclear	Oil and Other Fossil	Renewable	Total for Cost-Based Plants	Total for All Plants	
Energy Output (GWh)	17,687	49,388	6,683	32,863	9,610	7,842	124,072	4,316	715	1,032	1,702	1,683	338	9,786	133,858	a
Percent of Region Energy	13.2%	36.9%	5.0%	24.6%	7.2%	5.9%	92.7%	3.2%	0.5%	0.8%	1.3%	1.3%	0.3%	7.3%	100%	b
CO_2 Emissions (Mton)	16	19.82	0.00	0.00	7.63	0.51	44	4.32	0.30	0.00	0.00	1.54	0.27	6	50	c
Percent of Region Emissions	31.4%	39.5%	0.0%	0.0%	15.2%	1.0%	87.2%	8.6%	0.6%	0.0%	0.0%	3.1%	0.5%	12.8%	100%	d
Generation (% of US)	0.4%	1.2%	0.2%	0.8%	0.2%	0.2%	3.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	3.3%	e
Emissions (% of US)	0.7%	0.8%	0.0%	0.0%	0.3%	0.0%	1.8%	0.2%	0.0%	0.0%	0.0%	0.1%	0.0%	0.3%	2.1%	f
W-M Million Free Coal Allowances	5.6						5.6								5.6	g
W-M Million Free LDC Allowances							42.8							4.5	47.3	h
Increase in Market Revenue per $/Ton CO_2 Emissions Allowance Price ($M)	$ 11.9	$ 25.0	$ 4.3	$ 21.3	$ 6.7	$ 5.1	$ 74	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 74	i
Increase in Market Revenue at $20/Ton CO2 Allowance Price ($M)	$ 237	$ 500	$ 86	$ 425	$ 133	$ 101	$ 1,483	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,483	j
Cost of 15.8% Abatement @ $10 per ton ($M)	$ 25	$ 31	$ -	$ -	$ 12	$ 1	$ 69	$ 7	$ 0	$ -	$ -	$ 2.43	$ 0.43	$ 10	$ 79	k
Cost Associated with $20/ton CO2 Allowance Price ($M) for 84.2% of Emissions	$ 265	$ 334	$ -	$ -	$ 129	$ 9	$ 736	$ 73	$ 5	$ -	$ -	$ 26	$ 5	$ 108	$ 845	l
Scenario 1: All Allowances Allocated for Free to Generators																
Million Tons Allowances Allocated for Free	12.8	16.1	-	-	6.2	0.4	35.5	3.5	0.2	-	-	1.3	0.2	5.2	40.8	m
Value of Free Allocation to Generators ($M)	$ 256	$ 322	$ -	$ -	$ 124	$ 8	$ 711	$ 70	$ 5	$ -	$ -	$ 25	$ 4	$ 105	$ 816	n
Value of Free Allocation to LDCs ($M)							$ -									o
Pass-Through of Benefits and Costs to Ratepayers ($M)							$ -	$ (9)	$ (1)	$ -	$ -	$ (3)	$ (1)	$ (14)	$ (14)	p
Net Impact on Generation Owners ($M)	$ 203	$ 457	$ 86	$ 425	$ 117	$ 100	$ 1,388	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,388	q
Net Impact on Generation Owners ($/MWh)	$ 11.5	$ 9.2	$ 12.9	$ 12.9	$ 12.1	$ 12.7		$ -	$ -	$ -	$ -	$ -	$ -			r
Net Impact on Electric Customers ($M)							***$ (1,483)***							***$ (14)***	***$ (1,496)***	s
Net Impact on Electric Customers ($/MWh)							***$ 11.95***							***$ 1.42***		t
Weighted Average Impact on Consumers ($/MWh)							***$ 11.18***									u
Incremental Cost to Consumers ($M)							***$ 1,496***									v
$M Spent on Abatement							***$ 79***									w
Unproductive Cost for Consumers ($M)							***$ 1,417***									x

ISO New England Inc	MARKET-BASED PLANTS							COST-REGULATED PLANTS								Notes
	Coal	Gas	Hydro	Nuclear	Oil and Other Fossil	Renewable	Total for Market-Based Plants	Coal	Gas	Hydro	Nuclear	Oil and Other Fossil	Renewable	Total for Cost-Based Plants	Total for All Plants	
Energy Output (GWh)	17,687	49,388	6,683	32,863	9,610	7,842	124,072	4,316	715	1,032	1,702	1,683	338	9,786	133,858	a
Percent of Region Energy	13.2%	36.9%	5.0%	24.6%	7.2%	5.9%	92.7%	3.2%	0.5%	0.8%	1.3%	1.3%	0.3%	7.3%	100%	b
CO_2 Emissions (Mton)	16	19.82	0.00	0.00	7.63	0.51	44	4.32	0.30	0.00	0.00	1.54	0.27	6	50	c
Percent of Region Emissions	31.4%	39.5%	0.0%	0.0%	15.2%	1.0%	87.2%	8.6%	0.6%	0.0%	0.0%	3.1%	0.5%	12.8%	100%	d
Generation (% of US)	0.4%	1.2%	0.2%	0.8%	0.2%	0.2%	3.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	3.3%	e
Emissions (% of US)	0.7%	0.8%	0.0%	0.0%	0.3%	0.0%	1.8%	0.2%	0.0%	0.0%	0.0%	0.1%	0.0%	0.3%	2.1%	f
W-M Million Free Coal Allowances	5.6						5.6								5.6	g
W-M Million Free LDC Allowances							42.8							4.5	47.3	h
Increase in Market Revenue per $/Ton CO_2 Emissions Allowance Price ($M)	$ 11.9	$ 25.0	$ 4.3	$ 21.3	$ 6.7	$ 5.1	$ 74	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 74	i
Increase in Market Revenue at $20/Ton CO2 Allowance Price ($M)	$ 237	$ 500	$ 86	$ 425	$ 133	$ 101	$ 1,483	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,483	j
Cost of 15.8% Abatement @ $10 per ton ($M)	$ 25	$ 31	$ -	$ -	$ 12	$ 1	$ 69	$ 7	$ 0	$ -	$ -	$ 2.43	$ 0.43	$ 10	$ 79	k
Cost Associated with $20/ton CO2 Allowance Price ($M) for 84.2% of Emissions	$ 265	$ 334	$ -	$ -	$ 129	$ 9	$ 736	$ 73	$ 5	$ -	$ -	$ 26	$ 5	$ 108	$ 845	l
Scenario 2: All Allowances Allocated for Free to LDCs																
Million Tons Allowances Allocated for Free							47.7							5.0	$ 52.7	m
Value of Free Allocation to Generators ($M)							$ -							$ -	$ -	n
Value of Free Allocation to LDCs ($M)							$ 955							$ 100	$ 1,054	o
Pass-Through of Benefits and Costs to Ratepayers ($M)							$ 955							$ (19)	$ 936	p
Net Impact on Generation Owners ($M)	$ (53)	$ 134	$ 86	$ 425	$ (7.61)	$ 92	$ 677	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 677	q
Net Impact on Generation Owners ($/MWh)	$ (3.0)	$ 2.7	$ 12.9	$ 12.9	$ (0.8)	$ 11.7		$ -	$ -	$ -	$ -	$ -	$ -			r
Net Impact on Electric Customers ($M)							***$ (528)***							***$ (19)***	***$ (547)***	s
Net Impact on Electric Customers ($/MWh)							***$ 4.26***							***$ 1.94***		t
Weighted Average Impact on Consumers ($/MWh)							***$ 4.09***									u
Incremental Cost to Consumers ($M)							***$ 547***									v
$M Spent on Abatement							***$ 79***									w
Unproductive Cost for Consumers ($M)							***$ 468***									x

ISO New England Inc	MARKET-BASED PLANTS							COST-REGULATED PLANTS								Notes
	Coal	Gas	Hydro	Nuclear	Oil and Other Fossil	Renewable	Total for Market-Based Plants	Coal	Gas	Hydro	Nuclear	Oil and Other Fossil	Renewable	Total for Cost-Based Plants	Total for All Plants	
Energy Output (GWh)	17,687	49,388	6,683	32,863	9,610	7,842	124,072	4,316	715	1,032	1,702	1,683	338	9,786	133,858	a
Percent of Region Energy	13.2%	36.9%	5.0%	24.6%	7.2%	5.9%	92.7%	3.2%	0.5%	0.8%	1.3%	1.3%	0.3%	7.3%	100%	b
CO_2 Emissions (Mton)	16	19.82	0.00	0.00	7.63	0.51	44	4.32	0.30	0.00	0.00	1.54	0.27	6	50	c
Percent of Region Emissions	31.4%	39.5%	0.0%	0.0%	15.2%	1.0%	87.2%	8.6%	0.6%	0.0%	0.0%	3.1%	0.5%	12.8%	100%	d
Generation (% of US)	0.4%	1.2%	0.2%	0.8%	0.2%	0.2%	3.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	3.3%	e
Emissions (% of US)	0.7%	0.8%	0.0%	0.0%	0.3%	0.0%	1.8%	0.2%	0.0%	0.0%	0.0%	0.1%	0.0%	0.3%	2.1%	f
W-M Million Free Coal Allowances	5.6						5.6								5.6	g
W-M Million Free LDC Allowances							42.8							4.5	47.3	h
Increase in Market Revenue per $/Ton CO_2 Emissions Allowance Price ($M)	$ 11.9	$ 25.0	$ 4.3	$ 21.3	$ 6.7	$ 5.1	$ 74	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 74	i
Increase in Market Revenue at $20/Ton CO2 Allowance Price ($M)	$ 237	$ 500	$ 86	$ 425	$ 133	$ 101	$ 1,483	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,483	j
Cost of 15.8% Abatement @ $10 per ton ($M)	$ 25	$ 31	$ -	$ -	$ 12	$ 1	$ 69	$ 7	$ 0	$ -	$ -	$ 2.43	$ 0.43	$ 10	$ 79	k
Cost Associated with $20/ton CO2 Allowance Price ($M) for 84.2% of Emissions	$ 265	$ 334	$ -	$ -	$ 129	$ 9	$ 736	$ 73	$ 5	$ -	$ -	$ 26	$ 5	$ 108	$ 845	l
Scenario 3: Allocation 200 million tons to merchant coal, 1750 million to LDCs																
Million Tons Allowances Allocated for Free	5.6						48.4							4.5	52.9	m
Value of Free Allocation to Generators ($M)	$ 111						$ 111							$ -	$ -	n
Value of Free Allocation to LDCs ($M)							$ 857							$ 89	$ 946	o
Pass-Through of Benefits and Costs to Ratepayers ($M)							$ 857							$ (29)	$ 22	p
Net Impact on Generation Owners ($M)	$ 59	$ 134	$ 86	$ 425	$ (7.61)	$ 92	$ 789	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	q
Net Impact on Generation Owners ($/MWh)	$ 3.3	$ 2.7	$ 12.9	$ 12.9	$ (0.8)	$ 11.7		$ -	$ -	$ -	$ -	$ -	$ -			r
Net Impact on Electric Customers ($M)							***$ (626)***							***$ (29)***	***$ (655)***	s
Net Impact on Electric Customers ($/MWh)							***$ 5.04***							***$ 2.99***		t
Weighted Average Impact on Consumers ($/MWh)							***$ 4.89***									u
Incremental Cost to Consumers ($M)							***$ 655***									v
$M Spent on Abatement							***$ 79***									w
Unproductive Cost for Consumers ($M)							***$ 576***									x

ERCOT ISO	MARKET-BASED PLANTS							COST-REGULATED PLANTS								Notes
	Coal	Gas	Hydro	Nuclear	Oil and Other Fossil	Renewable	Total for Market-Based Plants	Coal	Gas	Hydro	Nuclear	Oil and Other Fossil	Renewable	Total for Cost-Based Plants	Total for All Plants	
Energy Output (GWh)	88,507	132,920	0	27,150	7,450	4,194	260,221	31,958	16,552	1,008	11,082	0	255	60,855	321,076	a
Percent of Region Energy	27.6%	41.4%	0.0%	8.5%	2.3%	1.3%	81.0%	10.0%	5.2%	0.3%	3.5%	0.0%	0.1%	19.0%	100%	b
CO_2 Emissions (Mton)	91	59.99	0.00	0.00	1.89	0.00	153	32.94	9.14	0.00	0.00	0.00	0.00	42	195	c
Percent of Region Emissions	46.8%	30.7%	0.0%	0.0%	1.0%	0.0%	78.4%	16.9%	4.7%	0.0%	0.0%	0.0%	0.0%	21.6%	100%	d
Generation (% of US)	2.2%	3.3%	0.0%	0.7%	0.2%	0.1%	6.4%	0.8%	0.4%	0.0%	0.3%	0.0%	0.0%	1.5%	8.0%	e
Emissions (% of US)	3.8%	2.5%	0.0%	0.0%	0.1%	0.0%	6.4%	1.4%	0.4%	0.0%	0.0%	0.0%	0.0%	1.8%	8.1%	f
W-M Million Free Coal Allowances	32.3						32.3								32.3	g
W-M Million Free LDC Allowances							112.3							28.5	140.8	h
Increase in Market Revenue per $/Ton CO_2 Emissions Allowance Price ($M)	$ 59.2	$ 76.9	$ -	$ 17.0	$ 4.7	$ 2.6	$ 161	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 161	i
Increase in Market Revenue at $20/Ton CO2 Allowance Price ($M)	$ 1,185	$ 1,538	$ -	$ 341	$ 95	$ 53	$ 3,211	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 3,211	j
Cost of 15.8% Abatement @ $10 per ton ($M)	$ 144	$ 95	$ -	$ -	$ 3	$ 0	$ 242	$ 52	$ 14	$ -	$ -	$ 0.00	$ -	$ 66	$ 308	k
Cost Associated with $20/ton CO2 Allowance Price ($M) for 84.2% of Emissions	$ 1,538	$ 1,010	$ -	$ -	$ 32	$ 0	$ 2,580	$ 555	$ 154	$ -	$ -	$ 0	$ -	$ 709	$ 3,289	l
Scenario 0: No Free Allocation of Allowances																
Million Tons Allowances Allocated for Free																m
Value of Free Allocation to Generators ($M)																n
Value of Free Allocation to LDCs ($M)																o
Pass-Through of Benefits and Costs to Ratepayers ($M)							$ -							$ (775)	$ (775)	p
Net Impact on Generation Owners ($M)	$ (497)	$ 433	$ -	$ 341	$ 59.78	$ 53	$ 389	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 389	q
Net Impact on Generation Owners ($/MWh)	$ (5.62)	$ 3.26	$ -	$ 12.55	$ 8.02	$ 12.55		$ -	$ -	$ -	$ -	$ -	$ -			r
Net Impact on Electric Customers ($M)							***$ (3,211)***							***$ (775)***	***$ (3,986)***	s
Net Impact on Electric Customers ($/MWh)							***$ 12.34***							***$ 12.74***		t
Weighted Average Impact on Consumers ($/MWh)							***$ 12.41***									u
Incremental Cost to Consumers ($M)							***$ 3,986***									v
$M Spent on Abatement							***$ 308***									w
Unproductive Cost for Consumers ($M)							***$ 3,678***									x

ERCOT ISO	MARKET-BASED PLANTS							COST-REGULATED PLANTS								Notes
	Coal	Gas	Hydro	Nuclear	Oil and Other Fossil	Renewable	Total for Market-Based Plants	Coal	Gas	Hydro	Nuclear	Oil and Other Fossil	Renewable	Total for Cost-Based Plants	Total for All Plants	
Energy Output (GWh)	88,507	132,920	0	27,150	7,450	4,194	260,221	31,958	16,552	1,008	11,082	0	255	60,855	321,076	a
Percent of Region Energy	27.6%	41.4%	0.0%	8.5%	2.3%	1.3%	81.0%	10.0%	5.2%	0.3%	3.5%	0.0%	0.1%	19.0%	100%	b
CO_2 Emissions (Mton)	91	59.99	0.00	0.00	1.89	0.00	153	32.94	9.14	0.00	0.00	0.00	0.00	42	195	c
Percent of Region Emissions	46.8%	30.7%	0.0%	0.0%	1.0%	0.0%	78.4%	16.9%	4.7%	0.0%	0.0%	0.0%	0.0%	21.6%	100%	d
Generation (% of US)	2.2%	3.3%	0.0%	0.7%	0.2%	0.1%	6.4%	0.8%	0.4%	0.0%	0.3%	0.0%	0.0%	1.5%	8.0%	e
Emissions (% of US)	3.8%	2.5%	0.0%	0.0%	0.1%	0.0%	6.4%	1.4%	0.4%	0.0%	0.0%	0.0%	0.0%	1.8%	8.1%	f
W-M Million Free Coal Allowances	32.3						32.3								32.3	g
W-M Million Free LDC Allowances							112.3							28.5	140.8	h
Increase in Market Revenue per $/Ton CO_2 Emissions Allowance Price ($M)	$ 59.2	$ 76.9	$ -	$ 17.0	$ 4.7	$ 2.6	$ 161	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 161	i
Increase in Market Revenue at $20/Ton CO2 Allowance Price ($M)	$ 1,185	$ 1,538	$ -	$ 341	$ 95	$ 53	$ 3,211	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 3,211	j
Cost of 15.8% Abatement @ $10 per ton ($M)	$ 144	$ 95	$ -	$ -	$ 3	$ 0	$ 242	$ 52	$ 14	$ -	$ -	$ 0.00	$ -	$ 66	$ 308	k
Cost Associated with $20/ton CO2 Allowance Price ($M) for 84.2% of Emissions	$ 1,538	$ 1,010	$ -	$ -	$ 32	$ 0	$ 2,580	$ 555	$ 154	$ -	$ -	$ 0	$ -	$ 709	$ 3,289	l
Scenario 1: All Allowances Allocated for Free to Generators																
Million Tons Allowances Allocated for Free	74.2	48.8	-	-	1.5	0.0	124.5	26.8	7.4	-	-	0.0	-	34.2	158.8	m
Value of Free Allocation to Generators ($M)	$ 1,485	$ 975	$ -	$ -	$ 31	$ 0	$ 2,491	$ 536	$ 149	$ -	$ -	$ 0	$ -	$ 684	$ 3,175	n
Value of Free Allocation to LDCs ($M)							$ -									o
Pass-Through of Benefits and Costs to Ratepayers ($M)							$ -	$ (71)	$ (20)	$ -	$ -	$ (0)	$ -	$ (90.9)	$ (90.9)	p
Net Impact on Generation Owners ($M)	$ 987	$ 1,408	$ -	$ 341	$ 90	$ 53	$ 2,880	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 2,880	q
Net Impact on Generation Owners ($/MWh)	$ 11.16	$ 10.60	$ -	$ 12.55	$ 12.14	$ 12.55		$ -	$ -	$ -	$ -	$ -	$ -			r
Net Impact on Electric Customers ($M)							***$ (3,211)***							***$ (91)***	***$ (3,302)***	s
Net Impact on Electric Customers ($/MWh)							***$ 12.34***							***$ 1.49***		t
Weighted Average Impact on Consumers ($/MWh)							***$ 10.28***									u
Incremental Cost to Consumers ($M)							***$ 3,302***									v
$M Spent on Abatement							***$ 308***									w
Unproductive Cost for Consumers ($M)							***$ 2,994***									x

ERCOT ISO	MARKET-BASED PLANTS							COST-REGULATED PLANTS								Notes
	Coal	Gas	Hydro	Nuclear	Oil and Other Fossil	Renewable	Total for Market-Based Plants	Coal	Gas	Hydro	Nuclear	Oil and Other Fossil	Renewable	Total for Cost-Based Plants	Total for All Plants	
Energy Output (GWh)	88,507	132,920	0	27,150	7,450	4,194	260,221	31,958	16,552	1,008	11,082	0	255	60,855	321,076	a
Percent of Region Energy	27.6%	41.4%	0.0%	8.5%	2.3%	1.3%	81.0%	10.0%	5.2%	0.3%	3.5%	0.0%	0.1%	19.0%	100%	b
CO_2 Emissions (Mton)	91	59.99	0.00	0.00	1.89	0.00	153	32.94	9.14	0.00	0.00	0.00	0.00	42	195	c
Percent of Region Emissions	46.8%	30.7%	0.0%	0.0%	1.0%	0.0%	78.4%	16.9%	4.7%	0.0%	0.0%	0.0%	0.0%	21.6%	100%	d
Generation (% of US)	2.2%	3.3%	0.0%	0.7%	0.2%	0.1%	6.4%	0.8%	0.4%	0.0%	0.3%	0.0%	0.0%	1.5%	8.0%	e
Emissions (% of US)	3.8%	2.5%	0.0%	0.0%	0.1%	0.0%	6.4%	1.4%	0.4%	0.0%	0.0%	0.0%	0.0%	1.8%	8.1%	f
W-M Million Free Coal Allowances	32.3						32.3								32.3	g
W-M Million Free LDC Allowances							112.3							28.5	140.8	h
Increase in Market Revenue per $/Ton CO_2 Emissions Allowance Price ($M)	$ 59.2	$ 76.9	$ -	$ 17.0	$ 4.7	$ 2.6	$ 161	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 161	i
Increase in Market Revenue at $20/Ton CO2 Allowance Price ($M)	$ 1,185	$ 1,538	$ -	$ 341	$ 95	$ 53	$ 3,211	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 3,211	j
Cost of 15.8% Abatement @ $10 per ton ($M)	$ 144	$ 95	$ -	$ -	$ 3	$ 0	$ 242	$ 52	$ 14	$ -	$ -	$ 0.00	$ -	$ 66	$ 308	k
Cost Associated with $20/ton CO2 Allowance Price ($M) for 84.2% of Emissions	$ 1,538	$ 1,010	$ -	$ -	$ 32	$ 0	$ 2,580	$ 555	$ 154	$ -	$ -	$ 0	$ -	$ 709	$ 3,289	l
Scenario 2: All Allowances Allocated for Free to LDCs																
Million Tons Allowances Allocated for Free							125.1							31.8	$ 156.9	m
Value of Free Allocation to Generators ($M)							$ -							$ -	$ -	n
Value of Free Allocation to LDCs ($M)							$ 2,502							$ 636	$ 3,138	o
Pass-Through of Benefits and Costs to Ratepayers ($M)							$ 2,502							$ (139)	$ 2,363	p
Net Impact on Generation Owners ($M)	$ (497)	$ 433	$ -	$ 341	$ 59.78	$ 53	$ 389	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 389	q
Net Impact on Generation Owners ($/MWh)	$ (5.6)	$ 3.3	$ -	$ 12.6	$ 8.0	$ 12.6		$ -	$ -	$ -	$ -	$ -	$ -			r
Net Impact on Electric Customers ($M)							***$ (709)***							***$ (139)***	***$ (848)***	s
Net Impact on Electric Customers ($/MWh)							***$ 2.72***							***$ 2.29***		t
Weighted Average Impact on Consumers ($/MWh)							***$ 2.64***									u
Incremental Cost to Consumers ($M)							***$ 848***									v
$M Spent on Abatement							***$ 308***									w
Unproductive Cost for Consumers ($M)							***$ 540***									x

ERCOT ISO	MARKET-BASED PLANTS							COST-REGULATED PLANTS								Notes
	Coal	Gas	Hydro	Nuclear	Oil and Other Fossil	Renewable	Total for Market-Based Plants	Coal	Gas	Hydro	Nuclear	Oil and Other Fossil	Renewable	Total for Cost-Based Plants	Total for All Plants	
Energy Output (GWh)	88,507	132,920	0	27,150	7,450	4,194	260,221	31,958	16,552	1,008	11,082	0	255	60,855	321,076	a
Percent of Region Energy	27.6%	41.4%	0.0%	8.5%	2.3%	1.3%	81.0%	10.0%	5.2%	0.3%	3.5%	0.0%	0.1%	19.0%	100%	b
CO_2 Emissions (Mton)	91	59.99	0.00	0.00	1.89	0.00	153	32.94	9.14	0.00	0.00	0.00	0.00	42	195	c
Percent of Region Emissions	46.8%	30.7%	0.0%	0.0%	1.0%	0.0%	78.4%	16.9%	4.7%	0.0%	0.0%	0.0%	0.0%	21.6%	100%	d
Generation (% of US)	2.2%	3.3%	0.0%	0.7%	0.2%	0.1%	6.4%	0.8%	0.4%	0.0%	0.3%	0.0%	0.0%	1.5%	8.0%	e
Emissions (% of US)	3.8%	2.5%	0.0%	0.0%	0.1%	0.0%	6.4%	1.4%	0.4%	0.0%	0.0%	0.0%	0.0%	1.8%	8.1%	f
W-M Million Free Coal Allowances	32.3						32.3								32.3	g
W-M Million Free LDC Allowances							112.3							28.5	140.8	h
Increase in Market Revenue per $/Ton CO_2 Emissions Allowance Price ($M)	$ 59.2	$ 76.9	$ -	$ 17.0	$ 4.7	$ 2.6	$ 161	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 161	i
Increase in Market Revenue at $20/Ton CO2 Allowance Price ($M)	$ 1,185	$ 1,538	$ -	$ 341	$ 95	$ 53	$ 3,211	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 3,211	j
Cost of 15.8% Abatement @ $10 per ton ($M)	$ 144	$ 95	$ -	$ -	$ 3	$ 0	$ 242	$ 52	$ 14	$ -	$ -	$ 0.00	$ -	$ 66	$ 308	k
Cost Associated with $20/ton CO2 Allowance Price ($M) for 84.2% of Emissions	$ 1,538	$ 1,010	$ -	$ -	$ 32	$ 0	$ 2,580	$ 555	$ 154	$ -	$ -	$ 0	$ -	$ 709	$ 3,289	l
Scenario 3: Allocation 200 million tons to merchant coal, 1750 million to LDCs																
Million Tons Allowances Allocated for Free	32.3						144.6							28.5	173.1	m
Value of Free Allocation to Generators ($M)	$ 646						$ 646							$ -	$ -	n
Value of Free Allocation to LDCs ($M)							$ 2,245							$ 571	$ 2,816	o
Pass-Through of Benefits and Costs to Ratepayers ($M)							$ 2,245							$ (204)	$ (781)	p
Net Impact on Generation Owners ($M)	$ 149	$ 433	$ -	$ 341	$ 59.78	$ 53	$ 1,035	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	q
Net Impact on Generation Owners ($/MWh)	$ 1.7	$ 3.3	$ -	$ 12.6	$ 8.0	$ 12.6		$ -	$ -	$ -	$ -	$ -	$ -			r
Net Impact on Electric Customers ($M)							***$ (965)***							***$ (204)***	***$ (1,170)***	s
Net Impact on Electric Customers ($/MWh)							***$ 3.71***							***$ 3.36***		t
Weighted Average Impact on Consumers ($/MWh)							***$ 3.64***									u
Incremental Cost to Consumers ($M)							***$ 1,170***									v
$M Spent on Abatement							***$ 308***									w
Unproductive Cost for Consumers ($M)							***$ 862***									x

New York Independent System Operator	MARKET-BASED PLANTS							COST-REGULATED PLANTS								Notes
	Coal	Gas	Hydro	Nuclear	Oil and Other Fossil	Renewable	Total for Market-Based Plants	Coal	Gas	Hydro	Nuclear	Oil and Other Fossil	Renewable	Total for Cost-Based Plants	Total for All Plants	
Energy Output (GWh)	21,036	20,791	3,995	40,713	15,581	2,787	104,903	1,119	10,041	20,941	1,730	9,382	16	43,229	148,132	a
Percent of Region Energy	14.2%	14.0%	2.7%	27.5%	10.5%	1.9%	70.8%	0.8%	6.8%	14.1%	1.2%	6.3%	0.0%	29.2%	100%	b
CO_2 Emissions (Mton)	20	8.12	0.00	0.00	12.22	0.07	41	1.24	5.67	0.00	0.00	7.19	0.00	14	55	c
Percent of Region Emissions	36.8%	14.9%	0.0%	0.0%	22.4%	0.1%	74.2%	2.3%	10.4%	0.0%	0.0%	13.2%	0.0%	25.8%	100%	d
Generation (% of US)	0.5%	0.5%	0.1%	1.0%	0.4%	0.1%	2.6%	0.0%	0.2%	0.5%	0.0%	0.2%	0.0%	1.1%	3.7%	e
Emissions (% of US)	0.8%	0.3%	0.0%	0.0%	0.5%	0.0%	1.7%	0.1%	0.2%	0.0%	0.0%	0.3%	0.0%	0.6%	2.3%	f
W-M Million Free Coal Allowances	7.1						7.1								7.1	g
W-M Million Free LDC Allowances							37.5							14.5	52.0	h
Increase in Market Revenue per $/Ton CO_2 Emissions Allowance Price ($M)	$ 20.4	$ 14.7	$ 3.2	$ 30.1	$ 12.0	$ 2.0	$ 82	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 82	i
Increase in Market Revenue at $20/Ton CO2 Allowance Price ($M)	$ 408	$ 294	$ 64	$ 602	$ 240	$ 40	$ 1,648	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,648	j
Cost of 15.8% Abatement @ $10 per ton ($M)	$ 32	$ 13	$ -	$ -	$ 19	$ 0	$ 64	$ 2	$ 9	$ -	$ -	$ 11.34	$ -	$ 22	$ 86	k
Cost Associated with $20/ton CO2 Allowance Price ($M) for 84.2% of Emissions	$ 339	$ 137	$ -	$ -	$ 206	$ 1	$ 683	$ 21	$ 96	$ -	$ -	$ 121	$ -	$ 238	$ 920	l
Scenario 0: No Free Allocation of Allowances																
Million Tons Allowances Allocated for Free																m
Value of Free Allocation to Generators ($M)																n
Value of Free Allocation to LDCs ($M)																o
Pass-Through of Benefits and Costs to Ratepayers ($M)							$ -							$ (260)	$ (260)	p
Net Impact on Generation Owners ($M)	$ 38	$ 144	$ 64	$ 602	$ 15.20	$ 39	$ 902	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 902	q
Net Impact on Generation Owners ($/MWh)	$ 1.80	$ 6.95	$ 15.92	$ 14.78	$ 0.98	$ 13.92		$ -	$ -	$ -	$ -	$ -	$ -			r
Net Impact on Electric Customers ($M)							***$ (1,648)***							***$ (260)***	***$ (1,908)***	s
Net Impact on Electric Customers ($/MWh)							***$ 15.71***							***$ 6.01***		t
Weighted Average Impact on Consumers ($/MWh)							***$ 12.88***									u
Incremental Cost to Consumers ($M)							***$ 1,908***									v
$M Spent on Abatement							***$ 86***									w
Unproductive Cost for Consumers ($M)							***$ 1,822***									x

New York Independent System Operator	MARKET-BASED PLANTS							COST-REGULATED PLANTS								Notes
	Coal	Gas	Hydro	Nuclear	Oil and Other Fossil	Renewable	Total for Market-Based Plants	Coal	Gas	Hydro	Nuclear	Oil and Other Fossil	Renewable	Total for Cost-Based Plants	Total for All Plants	
Energy Output (GWh)	21,036	20,791	3,995	40,713	15,581	2,787	104,903	1,119	10,041	20,941	1,730	9,382	16	43,229	148,132	a
Percent of Region Energy	14.2%	14.0%	2.7%	27.5%	10.5%	1.9%	70.8%	0.8%	6.8%	14.1%	1.2%	6.3%	0.0%	29.2%	100%	b
CO_2 Emissions (Mton)	20	8.12	0.00	0.00	12.22	0.07	41	1.24	5.67	0.00	0.00	7.19	0.00	14	55	c
Percent of Region Emissions	36.8%	14.9%	0.0%	0.0%	22.4%	0.1%	74.2%	2.3%	10.4%	0.0%	0.0%	13.2%	0.0%	25.8%	100%	d
Generation (% of US)	0.5%	0.5%	0.1%	1.0%	0.4%	0.1%	2.6%	0.0%	0.2%	0.5%	0.0%	0.2%	0.0%	1.1%	3.7%	e
Emissions (% of US)	0.8%	0.3%	0.0%	0.0%	0.5%	0.0%	1.7%	0.1%	0.2%	0.0%	0.0%	0.3%	0.0%	0.6%	2.3%	f
W-M Million Free Coal Allowances	7.1						7.1								7.1	g
W-M Million Free LDC Allowances							37.5							14.5	52.0	h
Increase in Market Revenue per $/Ton CO_2 Emissions Allowance Price ($M)	$ 20.4	$ 14.7	$ 3.2	$ 30.1	$ 12.0	$ 2.0	$ 82	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 82	i
Increase in Market Revenue at $20/Ton CO2 Allowance Price ($M)	$ 408	$ 294	$ 64	$ 602	$ 240	$ 40	$ 1,648	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,648	j
Cost of 15.8% Abatement @ $10 per ton ($M)	$ 32	$ 13	$ -	$ -	$ 19	$ 0	$ 64	$ 2	$ 9	$ -	$ -	$ 11.34	$ -	$ 22	$ 86	k
Cost Associated with $20/ton CO2 Allowance Price ($M) for 84.2% of Emissions	$ 339	$ 137	$ -	$ -	$ 206	$ 1	$ 683	$ 21	$ 96	$ -	$ -	$ 121	$ -	$ 238	$ 920	l
Scenario 1: All Allowances Allocated for Free to Generators																
Million Tons Allowances Allocated for Free	16.3	6.6	-	-	9.9	0.1	32.9	1.0	4.6	-	-	5.8	-	11.5	44.4	m
Value of Free Allocation to Generators ($M)	$ 327	$ 132	$ -	$ -	$ 199	$ 1	$ 659	$ 20	$ 92	$ -	$ -	$ 117	$ -	$ 229	$ 888	n
Value of Free Allocation to LDCs ($M)							$ -									o
Pass-Through of Benefits and Costs to Ratepayers ($M)							$ -	$ (3)	$ (12)	$ -	$ -	$ (16)	$ -	$ (30.5)	$ (30.5)	p
Net Impact on Generation Owners ($M)	$ 365	$ 277	$ 64	$ 602	$ 214	$ 40	$ 1,561	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,561	q
Net Impact on Generation Owners ($/MWh)	$ 17.35	$ 13.30	$ 15.92	$ 14.78	$ 13.73	$ 14.32		$ -	$ -	$ -	$ -	$ -	$ -			r
Net Impact on Electric Customers ($M)							***$ (1,648)***							***$ (30)***	***$ (1,679)***	s
Net Impact on Electric Customers ($/MWh)							***$ 15.71***							***$ 0.71***		t
Weighted Average Impact on Consumers ($/MWh)					***$***	***11.33***										u
Incremental Cost to Consumers ($M)					***$***	***1,679***										v
$M Spent on Abatement					***$***	***86***										w
Unproductive Cost for Consumers ($M)					***$***	***1,593***										x

New York Independent System Operator	MARKET-BASED PLANTS							COST-REGULATED PLANTS								Notes
	Coal	Gas	Hydro	Nuclear	Oil and Other Fossil	Renewable	Total for Market-Based Plants	Coal	Gas	Hydro	Nuclear	Oil and Other Fossil	Renewable	Total for Cost-Based Plants	Total for All Plants	
Energy Output (GWh)	21,036	20,791	3,995	40,713	15,581	2,787	104,903	1,119	10,041	20,941	1,730	9,382	16	43,229	148,132	a
Percent of Region Energy	14.2%	14.0%	2.7%	27.5%	10.5%	1.9%	70.8%	0.8%	6.8%	14.1%	1.2%	6.3%	0.0%	29.2%	100%	b
CO_2 Emissions (Mton)	20	8.12	0.00	0.00	12.22	0.07	41	1.24	5.67	0.00	0.00	7.19	0.00	14	55	c
Percent of Region Emissions	36.8%	14.9%	0.0%	0.0%	22.4%	0.1%	74.2%	2.3%	10.4%	0.0%	0.0%	13.2%	0.0%	25.8%	100%	d
Generation (% of US)	0.5%	0.5%	0.1%	1.0%	0.4%	0.1%	2.6%	0.0%	0.2%	0.5%	0.0%	0.2%	0.0%	1.1%	3.7%	e
Emissions (% of US)	0.8%	0.3%	0.0%	0.0%	0.5%	0.0%	1.7%	0.1%	0.2%	0.0%	0.0%	0.3%	0.0%	0.6%	2.3%	f
W-M Million Free Coal Allowances	7.1						7.1								7.1	g
W-M Million Free LDC Allowances							37.5							14.5	52.0	h
Increase in Market Revenue per $/Ton CO_2 Emissions Allowance Price ($M)	$ 20.4	$ 14.7	$ 3.2	$ 30.1	$ 12.0	$ 2.0	$ 82	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 82	i
Increase in Market Revenue at $20/Ton CO2 Allowance Price ($M)	$ 408	$ 294	$ 64	$ 602	$ 240	$ 40	$ 1,648	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,648	j
Cost of 15.8% Abatement @ $10 per ton ($M)	$ 32	$ 13	$ -	$ -	$ 19	$ 0	$ 64	$ 2	$ 9	$ -	$ -	$ 11.34	$ -	$ 22	$ 86	k
Cost Associated with $20/ton CO2 Allowance Price ($M) for 84.2% of Emissions	$ 339	$ 137	$ -	$ -	$ 206	$ 1	$ 683	$ 21	$ 96	$ -	$ -	$ 121	$ -	$ 238	$ 920	l
Scenario 2: All Allowances Allocated for Free to LDCs																
Million Tons Allowances Allocated for Free							41.8							16.2	$ 58.0	m
Value of Free Allocation to Generators ($M)							$ -							$ -	$ -	n
Value of Free Allocation to LDCs ($M)							$ 836							$ 323	$ 1,159	o
Pass-Through of Benefits and Costs to Ratepayers ($M)							$ 836							$ 64	$ 900	p
Net Impact on Generation Owners ($M)	$ 38	$ 144	$ 64	$ 602	$ 15.20	$ 39	$ 902	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 902	q
Net Impact on Generation Owners ($/MWh)	$ 1.8	$ 6.9	$ 15.9	$ 14.8	$ 1.0	$ 13.9		$ -	$ -	$ -	$ -	$ -	$ -			r
Net Impact on Electric Customers ($M)							***$ (812)***							***$ 64***	***$ (749)***	s
Net Impact on Electric Customers ($/MWh)							***$ 7.74***							***$ (1.47)***		t
Weighted Average Impact on Consumers ($/MWh)							***$ 5.05***									u
Incremental Cost to Consumers ($M)							***$ 749***									v
$M Spent on Abatement							***$ 86***									w
Unproductive Cost for Consumers ($M)							***$ 663***									x

New York Independent System Operator	MARKET-BASED PLANTS							COST-REGULATED PLANTS								Notes
	Coal	Gas	Hydro	Nuclear	Oil and Other Fossil	Renewable	Total for Market-Based Plants	Coal	Gas	Hydro	Nuclear	Oil and Other Fossil	Renewable	Total for Cost-Based Plants	Total for All Plants	
Energy Output (GWh)	21,036	20,791	3,995	40,713	15,581	2,787	104,903	1,119	10,041	20,941	1,730	9,382	16	43,229	148,132	a
Percent of Region Energy	14.2%	14.0%	2.7%	27.5%	10.5%	1.9%	70.8%	0.8%	6.8%	14.1%	1.2%	6.3%	0.0%	29.2%	100%	b
CO_2 Emissions (Mton)	20	8.12	0.00	0.00	12.22	0.07	41	1.24	5.67	0.00	0.00	7.19	0.00	14	55	c
Percent of Region Emissions	36.8%	14.9%	0.0%	0.0%	22.4%	0.1%	74.2%	2.3%	10.4%	0.0%	0.0%	13.2%	0.0%	25.8%	100%	d
Generation (% of US)	0.5%	0.5%	0.1%	1.0%	0.4%	0.1%	2.6%	0.0%	0.2%	0.5%	0.0%	0.2%	0.0%	1.1%	3.7%	e
Emissions (% of US)	0.8%	0.3%	0.0%	0.0%	0.5%	0.0%	1.7%	0.1%	0.2%	0.0%	0.0%	0.3%	0.0%	0.6%	2.3%	f
W-M Million Free Coal Allowances	7.1						7.1								7.1	g
W-M Million Free LDC Allowances							37.5							14.5	52.0	h
Increase in Market Revenue per $/Ton CO_2 Emissions Allowance Price ($M)	$ 20.4	$ 14.7	$ 3.2	$ 30.1	$ 12.0	$ 2.0	$ 82	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 82	i
Increase in Market Revenue at $20/Ton CO2 Allowance Price ($M)	$ 408	$ 294	$ 64	$ 602	$ 240	$ 40	$ 1,648	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,648	j
Cost of 15.8% Abatement @ $10 per ton ($M)	$ 32	$ 13	$ -	$ -	$ 19	$ 0	$ 64	$ 2	$ 9	$ -	$ -	$ 11.34	$ -	$ 22	$ 86	k
Cost Associated with $20/ton CO2 Allowance Price ($M) for 84.2% of Emissions	$ 339	$ 137	$ -	$ -	$ 206	$ 1	$ 683	$ 21	$ 96	$ -	$ -	$ 121	$ -	$ 238	$ 920	l
Scenario 3: Allocation 200 million tons to merchant coal, 1750 million to LDCs																
Million Tons Allowances Allocated for Free	7.1						44.6							14.5	59.1	m
Value of Free Allocation to Generators ($M)	$ 142						$ 142							$ -	$ -	n
Value of Free Allocation to LDCs ($M)							$ 750							$ 290	$ 1,041	o
Pass-Through of Benefits and Costs to Ratepayers ($M)							$ 750							$ 30	$ 34	p
Net Impact on Generation Owners ($M)	$ 180	$ 144	$ 64	$ 602	$ 15.20	$ 39	$ 1,044	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	q
Net Impact on Generation Owners ($/MWh)	$ 8.6	$ 6.9	$ 15.9	$ 14.8	$ 1.0	$ 13.9		$ -	$ -	$ -	$ -	$ -	$ -			r
Net Impact on Electric Customers ($M)							***$ (898)***							***$ 30***	***$ (868)***	s
Net Impact on Electric Customers ($/MWh)							***$ 8.56***							***$ (0.70)***		t
Weighted Average Impact on Consumers ($/MWh)							***$ 5.86***									u
Incremental Cost to Consumers ($M)							***$ 868***									v
$M Spent on Abatement							***$ 86***									w
Unproductive Cost for Consumers ($M)							***$ 781***									x

California Independent System Operator	MARKET-BASED PLANTS							COST-REGULATED PLANTS								Notes
	Coal	Gas	Hydro	Nuclear	Oil and Other Fossil	Renewable	Total for Market-Based Plants	Coal	Gas	Hydro	Nuclear	Oil and Other Fossil	Renewable	Total for Cost-Based Plants	Total for All Plants	
Energy Output (GWh)	2,306	82,973	5,952	0	2,929	18,756	112,915	10,536	2,656	30,888	36,155	31	1,428	81,694	194,609	a
Percent of Region Energy	1.2%	42.6%	3.1%	0.0%	1.5%	9.6%	58.0%	5.4%	1.4%	15.9%	18.6%	0.0%	0.7%	42.0%	100%	b
CO_2 Emissions (Mton)	2	35.78	0.00	0.00	2.63	0.33	41	9.77	1.43	0.00	0.00	0.02	0.04	11	52	c
Percent of Region Emissions	4.6%	68.3%	0.0%	0.0%	5.0%	0.6%	78.5%	18.6%	2.7%	0.0%	0.0%	0.0%	0.1%	21.5%	100%	d
Generation (% of US)	0.1%	2.1%	0.1%	0.0%	0.1%	0.5%	2.8%	0.3%	0.1%	0.8%	0.9%	0.0%	0.0%	2.0%	4.8%	e
Emissions (% of US)	0.1%	1.5%	0.0%	0.0%	0.1%	0.0%	1.7%	0.4%	0.1%	0.0%	0.0%	0.0%	0.0%	0.5%	2.2%	f
W-M Million Free Coal Allowances	0.9						0.9								0.9	g
W-M Million Free LDC Allowances							39.5							21.8	61.3	h
Increase in Market Revenue per $/Ton CO_2 Emissions Allowance Price ($M)	$ 1.3	$ 44.8	$ 3.3	$ -	$ 1.6	$ 10.4	$ 61	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 61	i
Increase in Market Revenue at $20/Ton CO2 Allowance Price ($M)	$ 26	$ 895	$ 66	$ -	$ 33	$ 209	$ 1,229	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,229	j
Cost of 15.8% Abatement @ $10 per ton ($M)	$ 4	$ 56	$ -	$ -	$ 4	$ 1	$ 65	$ 15	$ 2	$ -	$ -	$ 0.04	$ 0.06	$ 18	$ 83	k
Cost Associated with $20/ton CO2 Allowance Price ($M) for 84.2% of Emissions	$ 41	$ 603	$ -	$ -	$ 44	$ 6	$ 693	$ 165	$ 24	$ -	$ -	$ 0	$ 1	$ 190	$ 883	l
Scenario 0: No Free Allocation of Allowances																
Million Tons Allowances Allocated for Free																m
Value of Free Allocation to Generators ($M)																n
Value of Free Allocation to LDCs ($M)																o
Pass-Through of Benefits and Costs to Ratepayers ($M)							$ -							$ (208)	$ (208)	p
Net Impact on Generation Owners ($M)	$ (19)	$ 236	$ 66	$ -	$ (15.86)	$ 203	$ 470	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 470	q
Net Impact on Generation Owners ($/MWh)	$ (8.21)	$ 2.85	$ 11.13	$ -	$ (5.41)	$ 10.80		$ -	$ -	$ -	$ -	$ -	$ -			r
Net Impact on Electric Customers ($M)							***$ (1,229)***							***$ (208)***	***$ (1,436)***	s
Net Impact on Electric Customers ($/MWh)							***$ 10.88***							***$ 2.54***		t
Weighted Average Impact on Consumers ($/MWh)							***$ 7.38***									u
Incremental Cost to Consumers ($M)							***$ 1,436***									v
$M Spent on Abatement							***$ 83***									w
Unproductive Cost for Consumers ($M)							***$ 1,353***									x

California Independent System Operator	MARKET-BASED PLANTS							COST-REGULATED PLANTS								Notes
	Coal	Gas	Hydro	Nuclear	Oil and Other Fossil	Renewable	Total for Market-Based Plants	Coal	Gas	Hydro	Nuclear	Oil and Other Fossil	Renewable	Total for Cost-Based Plants	Total for All Plants	
Energy Output (GWh)	2,306	82,973	5,952	0	2,929	18,756	112,915	10,536	2,656	30,888	36,155	31	1,428	81,694	194,609	a
Percent of Region Energy	1.2%	42.6%	3.1%	0.0%	1.5%	9.6%	58.0%	5.4%	1.4%	15.9%	18.6%	0.0%	0.7%	42.0%	100%	b
CO_2 Emissions (Mton)	2	35.78	0.00	0.00	2.63	0.33	41	9.77	1.43	0.00	0.00	0.02	0.04	11	52	c
Percent of Region Emissions	4.6%	68.3%	0.0%	0.0%	5.0%	0.6%	78.5%	18.6%	2.7%	0.0%	0.0%	0.0%	0.1%	21.5%	100%	d
Generation (% of US)	0.1%	2.1%	0.1%	0.0%	0.1%	0.5%	2.8%	0.3%	0.1%	0.8%	0.9%	0.0%	0.0%	2.0%	4.8%	e
Emissions (% of US)	0.1%	1.5%	0.0%	0.0%	0.1%	0.0%	1.7%	0.4%	0.1%	0.0%	0.0%	0.0%	0.0%	0.5%	2.2%	f
W-M Million Free Coal Allowances	0.9						0.9								0.9	g
W-M Million Free LDC Allowances							39.5							21.8	61.3	h
Increase in Market Revenue per $/Ton CO_2 Emissions Allowance Price ($M)	$ 1.3	$ 44.8	$ 3.3	$ -	$ 1.6	$ 10.4	$ 61	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 61	i
Increase in Market Revenue at $20/Ton CO2 Allowance Price ($M)	$ 26	$ 895	$ 66	$ -	$ 33	$ 209	$ 1,229	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,229	j
Cost of 15.8% Abatement @ $10 per ton ($M)	$ 4	$ 56	$ -	$ -	$ 4	$ 1	$ 65	$ 15	$ 2	$ -	$ -	$ 0.04	$ 0.06	$ 18	$ 83	k
Cost Associated with $20/ton CO2 Allowance Price ($M) for 84.2% of Emissions	$ 41	$ 603	$ -	$ -	$ 44	$ 6	$ 693	$ 165	$ 24	$ -	$ -	$ 0	$ 1	$ 190	$ 883	l
Scenario 1: All Allowances Allocated for Free to Generators																
Million Tons Allowances Allocated for Free	2.0	29.1	-	-	2.1	0.3	33.5	7.9	1.2	-	-	0.0	0.0	9.2	42.6	m
Value of Free Allocation to Generators ($M)	$ 39	$ 582	$ -	$ -	$ 43	$ 5	$ 669	$ 159	$ 23	$ -	$ -	$ 0	$ 1	$ 183	$ 853	n
Value of Free Allocation to LDCs ($M)							$ -									o
Pass-Through of Benefits and Costs to Ratepayers ($M)							$ -	$ (21)	$ (3)	$ -	$ -	$ (0)	$ (0)	$ (24)	$ (24)	p
Net Impact on Generation Owners ($M)	$ 20	$ 818	$ 66	$ -	$ 27	$ 208	$ 1,140	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,140	q
Net Impact on Generation Owners ($/MWh)	$ 8.9	$ 9.9	$ 11.1	$ -	$ 9.2	$ 11.1		$ -	$ -	$ -	$ -	$ -	$ -			r
Net Impact on Electric Customers ($M)							***$ (1,229)***							***$ (24)***	***$ (1,253)***	s
Net Impact on Electric Customers ($/MWh)							***$ 10.88***							***$ 0.30***		t
Weighted Average Impact on Consumers ($/MWh)							***$ 6.44***									u
Incremental Cost to Consumers ($M)							***$ 1,253***									v
$M Spent on Abatement							***$ 83***									w
Unproductive Cost for Consumers ($M)							***$ 1,170***									x

California Independent System Operator	MARKET-BASED PLANTS							COST-REGULATED PLANTS								Notes
	Coal	Gas	Hydro	Nuclear	Oil and Other Fossil	Renewable	Total for Market-Based Plants	Coal	Gas	Hydro	Nuclear	Oil and Other Fossil	Renewable	Total for Cost-Based Plants	Total for All Plants	
Energy Output (GWh)	2,306	82,973	5,952	0	2,929	18,756	112,915	10,536	2,656	30,888	36,155	31	1,428	81,694	194,609	a
Percent of Region Energy	1.2%	42.6%	3.1%	0.0%	1.5%	9.6%	58.0%	5.4%	1.4%	15.9%	18.6%	0.0%	0.7%	42.0%	100%	b
CO_2 Emissions (Mton)	2	35.78	0.00	0.00	2.63	0.33	41	9.77	1.43	0.00	0.00	0.02	0.04	11	52	c
Percent of Region Emissions	4.6%	68.3%	0.0%	0.0%	5.0%	0.6%	78.5%	18.6%	2.7%	0.0%	0.0%	0.0%	0.1%	21.5%	100%	d
Generation (% of US)	0.1%	2.1%	0.1%	0.0%	0.1%	0.5%	2.8%	0.3%	0.1%	0.8%	0.9%	0.0%	0.0%	2.0%	4.8%	e
Emissions (% of US)	0.1%	1.5%	0.0%	0.0%	0.1%	0.0%	1.7%	0.4%	0.1%	0.0%	0.0%	0.0%	0.0%	0.5%	2.2%	f
W-M Million Free Coal Allowances	0.9						0.9								0.9	g
W-M Million Free LDC Allowances							39.5							21.8	61.3	h
Increase in Market Revenue per $/Ton CO_2 Emissions Allowance Price ($M)	$ 1.3	$ 44.8	$ 3.3	$ -	$ 1.6	$ 10.4	$ 61	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 61	i
Increase in Market Revenue at $20/Ton CO2 Allowance Price ($M)	$ 26	$ 895	$ 66	$ -	$ 33	$ 209	$ 1,229	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,229	j
Cost of 15.8% Abatement @ $10 per ton ($M)	$ 4	$ 56	$ -	$ -	$ 4	$ 1	$ 65	$ 15	$ 2	$ -	$ -	$ 0.04	$ 0.06	$ 18	$ 83	k
Cost Associated with $20/ton CO2 Allowance Price ($M) for 84.2% of Emissions	$ 41	$ 603	$ -	$ -	$ 44	$ 6	$ 693	$ 165	$ 24	$ -	$ -	$ 0	$ 1	$ 190	$ 883	l
Scenario 2: All Allowances Allocated for Free to LDCs																
Million Tons Allowances Allocated for Free							44.0							24.3	$ 68.3	m
Value of Free Allocation to Generators ($M)							$ -							$ -	$ -	n
Value of Free Allocation to LDCs ($M)							$ 880							$ 486	$ 1,366	o
Pass-Through of Benefits and Costs to Ratepayers ($M)							$ 880							$ 279	$ 1,158	p
Net Impact on Generation Owners ($M)	$ (19)	$ 236	$ 66	$ -	$ (15.86)	$ 203	$ 470	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 470	q
Net Impact on Generation Owners ($/MWh)	$ (8.2)	$ 2.8	$ 11.1	$ -	$ (5.4)	$ 10.8		$ -	$ -	$ -	$ -	$ -	$ -			r
Net Impact on Electric Customers ($M)							***$ (349)***							***$ 279***	***$ (70)***	s
Net Impact on Electric Customers ($/MWh)							***$ 3.09***							***$ (3.41)***		t
Weighted Average Impact on Consumers ($/MWh)							***$ 0.36***									u
Incremental Cost to Consumers ($M)							***$ 70***									v
$M Spent on Abatement							***$ 83***									w
Unproductive Cost for Consumers ($M)							***$ (13)***									x

California Independent System Operator	MARKET-BASED PLANTS							COST-REGULATED PLANTS								Notes
	Coal	Gas	Hydro	Nuclear	Oil and Other Fossil	Renewable	Total for Market-Based Plants	Coal	Gas	Hydro	Nuclear	Oil and Other Fossil	Renewable	Total for Cost-Based Plants	Total for All Plants	
Energy Output (GWh)	2,306	82,973	5,952	0	2,929	18,756	112,915	10,536	2,656	30,888	36,155	31	1,428	81,694	194,609	a
Percent of Region Energy	1.2%	42.6%	3.1%	0.0%	1.5%	9.6%	58.0%	5.4%	1.4%	15.9%	18.6%	0.0%	0.7%	42.0%	100%	b
CO_2 Emissions (Mton)	2	35.78	0.00	0.00	2.63	0.33	41	9.77	1.43	0.00	0.00	0.02	0.04	11	52	c
Percent of Region Emissions	4.6%	68.3%	0.0%	0.0%	5.0%	0.6%	78.5%	18.6%	2.7%	0.0%	0.0%	0.0%	0.1%	21.5%	100%	d
Generation (% of US)	0.1%	2.1%	0.1%	0.0%	0.1%	0.5%	2.8%	0.3%	0.1%	0.8%	0.9%	0.0%	0.0%	2.0%	4.8%	e
Emissions (% of US)	0.1%	1.5%	0.0%	0.0%	0.1%	0.0%	1.7%	0.4%	0.1%	0.0%	0.0%	0.0%	0.0%	0.5%	2.2%	f
W-M Million Free Coal Allowances	0.9						0.9								0.9	g
W-M Million Free LDC Allowances							39.5							21.8	61.3	h
Increase in Market Revenue per $/Ton CO_2 Emissions Allowance Price ($M)	$ 1.3	$ 44.8	$ 3.3	$ -	$ 1.6	$ 10.4	$ 61	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 61	i
Increase in Market Revenue at $20/Ton CO2 Allowance Price ($M)	$ 26	$ 895	$ 66	$ -	$ 33	$ 209	$ 1,229	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,229	j
Cost of 15.8% Abatement @ $10 per ton ($M)	$ 4	$ 56	$ -	$ -	$ 4	$ 1	$ 65	$ 15	$ 2	$ -	$ -	$ 0.04	$ 0.06	$ 18	$ 83	k
Cost Associated with $20/ton CO2 Allowance Price ($M) for 84.2% of Emissions	$ 41	$ 603	$ -	$ -	$ 44	$ 6	$ 693	$ 165	$ 24	$ -	$ -	$ 0	$ 1	$ 190	$ 883	l
Scenario 3: Allocation 200 million tons to merchant coal, 1750 million to LDCs																
Million Tons Allowances Allocated for Free	0.9						40.3							21.8	62.2	m
Value of Free Allocation to Generators ($M)	$ 17						$ 17							$ -	$ -	n
Value of Free Allocation to LDCs ($M)							$ 790							$ 436	$ 1,226	o
Pass-Through of Benefits and Costs to Ratepayers ($M)							$ 790							$ 229	$ 260	p
Net Impact on Generation Owners ($M)	$ (2)	$ 236	$ 66	$ -	$ (15.86)	$ 203	$ 487	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	q
Net Impact on Generation Owners ($/MWh)	$ (0.8)	$ 2.8	$ 11.1	$ -	$ (5.4)	$ 10.8		$ -	$ -	$ -	$ -	$ -	$ -			r
Net Impact on Electric Customers ($M)							***$ (439)***							***$ 229***	***$ (210)***	s
Net Impact on Electric Customers ($/MWh)							***$ 3.89***							***$ (2.80)***		t
Weighted Average Impact on Consumers ($/MWh)							***$ 1.08***									u
Incremental Cost to Consumers ($M)							***$ 210***									v
$M Spent on Abatement							***$ 83***									w
Unproductive Cost for Consumers ($M)							***$ 128***									x

Non-RTO East	MARKET-BASED PLANTS							COST-REGULATED PLANTS								Notes
	Coal	Gas	Hydro	Nuclear	Oil and Other Fossil	Renewable	Total for Market-Based Plants	Coal	Gas	Hydro	Nuclear	Oil and Other Fossil	Renewable	Total for Cost-Based Plants	Total for All Plants	
Energy Output (GWh)	167,999	121,870	3,743	52,742	7,382	37,207	390,943	1,065,745	141,342	46,494	267,634	67,353	4,078	1,592,646	1,983,589	a
Percent of Region Energy	8.5%	6.1%	0.2%	2.7%	0.4%	1.9%	19.7%	53.7%	7.1%	2.3%	13.5%	3.4%	0.2%	80.3%	100%	b
CO_2 Emissions (Mton)	161	48.29	0.00	0.00	6.69	1.38	218	1,022.31	68.14	0.00	0.00	32.27	0.06	1,123	1,340	c
Percent of Region Emissions	12.0%	3.6%	0.0%	0.0%	0.5%	0.1%	16.2%	76.3%	5.1%	0.0%	0.0%	2.4%	0.0%	83.8%	100%	d
Generation (% of US)	4.2%	3.0%	0.1%	1.3%	0.2%	0.9%	9.7%	26.4%	3.5%	1.2%	6.6%	1.7%	0.1%	39.4%	49.1%	e
Emissions (% of US)	6.7%	2.0%	0.0%	0.0%	0.3%	0.1%	9.1%	42.6%	2.8%	0.0%	0.0%	1.3%	0.0%	46.8%	55.9%	f
W-M Million Free Coal Allowances	57.1						57.1								57.1	g
W-M Million Free LDC Allowances							164.1							754.7	918.8	h
Increase in Market Revenue per $/Ton CO_2 Emissions Allowance Price ($M)	$ 157.2	$ 78.8	$ 3.1	$ 47.3	$ 6.1	$ 26.9	$ 319	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 319	i
Increase in Market Revenue at $20/Ton CO2 Allowance Price ($M)	$ 3,144	$ 1,576	$ 62	$ 947	$ 123	$ 537	$ 6,389	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 6,389	j
Cost of 15.8% Abatement @ $10 per ton ($M)	$ 254	$ 76	$ -	$ -	$ 11	$ 2	$ 343	$ 1,612	$ 107	$ -	$ -	$ 50.91	$ 0.09	$ 1,771	$ 2,114	k
Cost Associated with $20/ton CO2 Allowance Price ($M) for 84.2% of Emissions	$ 2,717	$ 814	$ -	$ -	$ 113	$ 23	$ 3,667	$ 17,221	$ 1,148	$ -	$ -	$ 544	$ 1	$ 18,914	$ 22,581	l
Scenario 0: No Free Allocation of Allowances																
Million Tons Allowances Allocated for Free																m
Value of Free Allocation to Generators ($M)																n
Value of Free Allocation to LDCs ($M)																o
Pass-Through of Benefits and Costs to Ratepayers ($M)							$ -							$ (20,685)	$ (20,685)	p
Net Impact on Generation Owners ($M)	$ 172	$ 686	$ 62	$ 947	$ (0.34)	$ 512	$ 2,379	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 2,379	q
Net Impact on Generation Owners ($/MWh)	$ 1.02	$ 5.63	$ 16.48	$ 17.95	$ (0.05)	$ 13.76		$ -	$ -	$ -	$ -	$ -	$ -			r
Net Impact on Electric Customers ($M)							***$ (6,389)***							***$ (20,685)***	***$ (27,073)***	s
Net Impact on Electric Customers ($/MWh)							***$ 16.34***							***$ 12.99***		t
Weighted Average Impact on Consumers ($/MWh)							***$ 13.65***									u
Incremental Cost to Consumers ($M)							***$ 27,073***									v
$M Spent on Abatement							***$ 2,114***									w
Unproductive Cost for Consumers ($M)							***$ 24,959***									x

Non-RTO East	MARKET-BASED PLANTS							COST-REGULATED PLANTS								Notes
	Coal	Gas	Hydro	Nuclear	Oil and Other Fossil	Renewable	Total for Market-Based Plants	Coal	Gas	Hydro	Nuclear	Oil and Other Fossil	Renewable	Total for Cost-Based Plants	Total for All Plants	
Energy Output (GWh)	167,999	121,870	3,743	52,742	7,382	37,207	390,943	1,065,745	141,342	46,494	267,634	67,353	4,078	1,592,646	1,983,589	a
Percent of Region Energy	8.5%	6.1%	0.2%	2.7%	0.4%	1.9%	19.7%	53.7%	7.1%	2.3%	13.5%	3.4%	0.2%	80.3%	100%	b
CO_2 Emissions (Mton)	161	48.29	0.00	0.00	6.69	1.38	218	1,022.31	68.14	0.00	0.00	32.27	0.06	1,123	1,340	c
Percent of Region Emissions	12.0%	3.6%	0.0%	0.0%	0.5%	0.1%	16.2%	76.3%	5.1%	0.0%	0.0%	2.4%	0.0%	83.8%	100%	d
Generation (% of US)	4.2%	3.0%	0.1%	1.3%	0.2%	0.9%	9.7%	26.4%	3.5%	1.2%	6.6%	1.7%	0.1%	39.4%	49.1%	e
Emissions (% of US)	6.7%	2.0%	0.0%	0.0%	0.3%	0.1%	9.1%	42.6%	2.8%	0.0%	0.0%	1.3%	0.0%	46.8%	55.9%	f
W-M Million Free Coal Allowances	57.1						57.1								57.1	g
W-M Million Free LDC Allowances							164.1							754.7	918.8	h
Increase in Market Revenue per $/Ton CO_2 Emissions Allowance Price ($M)	$ 157.2	$ 78.8	$ 3.1	$ 47.3	$ 6.1	$ 26.9	$ 319	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 319	i
Increase in Market Revenue at $20/Ton CO2 Allowance Price ($M)	$ 3,144	$ 1,576	$ 62	$ 947	$ 123	$ 537	$ 6,389	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 6,389	j
Cost of 15.8% Abatement @ $10 per ton ($M)	$ 254	$ 76	$ -	$ -	$ 11	$ 2	$ 343	$ 1,612	$ 107	$ -	$ -	$ 50.91	$ 0.09	$ 1,771	$ 2,114	k
Cost Associated with $20/ton CO2 Allowance Price ($M) for 84.2% of Emissions	$ 2,717	$ 814	$ -	$ -	$ 113	$ 23	$ 3,667	$ 17,221	$ 1,148	$ -	$ -	$ 544	$ 1	$ 18,914	$ 22,581	l
Scenario 1: All Allowances Allocated for Free to Generators																
Million Tons Allowances Allocated for Free	131.2	39.3	-	-	5.4	1.1	177.0	831.2	55.4	-	-	26.2	0.0	912.9	1,089.9	m
Value of Free Allocation to Generators ($M)	$ 2,623	$ 785	$ -	$ -	$ 109	$ 22	$ 3,540	$ 16,625	$ 1,108	$ -	$ -	$ 525	$ 1	$ 18,258	$ 21,798	n
Value of Free Allocation to LDCs ($M)							$ -									o
Pass-Through of Benefits and Costs to Ratepayers ($M)							$ -	$ (2,209)	$ (147)	$ -	$ -	$ (70)	$ (0)	$ (2,426.4)	$ (2,426.4)	p
Net Impact on Generation Owners ($M)	$ 2,795	$ 1,472	$ 62	$ 947	$ 108	$ 534	$ 5,918	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 5,918	q
Net Impact on Generation Owners ($/MWh)	$ 16.64	$ 12.08	$ 16.48	$ 17.95	$ 14.70	$ 14.36		$ -	$ -	$ -	$ -	$ -	$ -			r
Net Impact on Electric Customers ($M)							***$ (6,389)***							***$ (2,426)***	***$ (8,815)***	s
Net Impact on Electric Customers ($/MWh)							***$ 16.34***							***$ 1.52***		t
Weighted Average Impact on Consumers ($/MWh)							***$ 4.44***									u
Incremental Cost to Consumers ($M)							***$ 8,815***									v
$M Spent on Abatement							***$ 2,114***									w
Unproductive Cost for Consumers ($M)							***$ 6,701***									x

Non-RTO East	MARKET-BASED PLANTS							COST-REGULATED PLANTS								Notes
	Coal	Gas	Hydro	Nuclear	Oil and Other Fossil	Renewable	Total for Market-Based Plants	Coal	Gas	Hydro	Nuclear	Oil and Other Fossil	Renewable	Total for Cost-Based Plants	Total for All Plants	
Energy Output (GWh)	167,999	121,870	3,743	52,742	7,382	37,207	390,943	1,065,745	141,342	46,494	267,634	67,353	4,078	1,592,646	1,983,589	a
Percent of Region Energy	8.5%	6.1%	0.2%	2.7%	0.4%	1.9%	19.7%	53.7%	7.1%	2.3%	13.5%	3.4%	0.2%	80.3%	100%	b
CO_2 Emissions (Mton)	161	48.29	0.00	0.00	6.69	1.38	218	1,022.31	68.14	0.00	0.00	32.27	0.06	1,123	1,340	c
Percent of Region Emissions	12.0%	3.6%	0.0%	0.0%	0.5%	0.1%	16.2%	76.3%	5.1%	0.0%	0.0%	2.4%	0.0%	83.8%	100%	d
Generation (% of US)	4.2%	3.0%	0.1%	1.3%	0.2%	0.9%	9.7%	26.4%	3.5%	1.2%	6.6%	1.7%	0.1%	39.4%	49.1%	e
Emissions (% of US)	6.7%	2.0%	0.0%	0.0%	0.3%	0.1%	9.1%	42.6%	2.8%	0.0%	0.0%	1.3%	0.0%	46.8%	55.9%	f
W-M Million Free Coal Allowances	57.1						57.1								57.1	g
W-M Million Free LDC Allowances							164.1							754.7	918.8	h
Increase in Market Revenue per $/Ton CO_2 Emissions Allowance Price ($M)	$ 157.2	$ 78.8	$ 3.1	$ 47.3	$ 6.1	$ 26.9	$ 319	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 319	i
Increase in Market Revenue at $20/Ton CO2 Allowance Price ($M)	$ 3,144	$ 1,576	$ 62	$ 947	$ 123	$ 537	$ 6,389	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 6,389	j
Cost of 15.8% Abatement @ $10 per ton ($M)	$ 254	$ 76	$ -	$ -	$ 11	$ 2	$ 343	$ 1,612	$ 107	$ -	$ -	$ 50.91	$ 0.09	$ 1,771	$ 2,114	k
Cost Associated with $20/ton CO2 Allowance Price ($M) for 84.2% of Emissions	$ 2,717	$ 814	$ -	$ -	$ 113	$ 23	$ 3,667	$ 17,221	$ 1,148	$ -	$ -	$ 544	$ 1	$ 18,914	$ 22,581	l
Scenario 2: All Allowances Allocated for Free to LDCs																
Million Tons Allowances Allocated for Free							182.9							841.0	$ 1,023.9	m
Value of Free Allocation to Generators ($M)							$ -							$ -	$ -	n
Value of Free Allocation to LDCs ($M)							$ 3,658							$ 16,820	$ 20,477	o
Pass-Through of Benefits and Costs to Ratepayers ($M)							$ 3,658							$ (3,865)	$ (208)	p
Net Impact on Generation Owners ($M)	$ 172	$ 686	$ 62	$ 947	$ (0.34)	$ 512	$ 2,379	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 2,379	q
Net Impact on Generation Owners ($/MWh)	$ 1.0	$ 5.6	$ 16.5	$ 18.0	$ (0.0)	$ 13.8		$ -	$ -	$ -	$ -	$ -	$ -			r
Net Impact on Electric Customers ($M)							***$ (2,731)***							***$ (3,865)***	***$ (6,596)***	s
Net Impact on Electric Customers ($/MWh)							***$ 6.99***							***$ 2.43***		t
Weighted Average Impact on Consumers ($/MWh)							***$ 3.33***									u
Incremental Cost to Consumers ($M)							***$ 6,596***									v
$M Spent on Abatement							***$ 2,114***									w
Unproductive Cost for Consumers ($M)							***$ 4,482***									x

Non-RTO East	MARKET-BASED PLANTS							COST-REGULATED PLANTS								Notes
	Coal	Gas	Hydro	Nuclear	Oil and Other Fossil	Renewable	Total for Market-Based Plants	Coal	Gas	Hydro	Nuclear	Oil and Other Fossil	Renewable	Total for Cost-Based Plants	Total for All Plants	
Energy Output (GWh)	167,999	121,870	3,743	52,742	7,382	37,207	390,943	1,065,745	141,342	46,494	267,634	67,353	4,078	1,592,646	1,983,589	a
Percent of Region Energy	8.5%	6.1%	0.2%	2.7%	0.4%	1.9%	19.7%	53.7%	7.1%	2.3%	13.5%	3.4%	0.2%	80.3%	100%	b
CO_2 Emissions (Mton)	161	48.29	0.00	0.00	6.69	1.38	218	1,022.31	68.14	0.00	0.00	32.27	0.06	1,123	1,340	c
Percent of Region Emissions	12.0%	3.6%	0.0%	0.0%	0.5%	0.1%	16.2%	76.3%	5.1%	0.0%	0.0%	2.4%	0.0%	83.8%	100%	d
Generation (% of US)	4.2%	3.0%	0.1%	1.3%	0.2%	0.9%	9.7%	26.4%	3.5%	1.2%	6.6%	1.7%	0.1%	39.4%	49.1%	e
Emissions (% of US)	6.7%	2.0%	0.0%	0.0%	0.3%	0.1%	9.1%	42.6%	2.8%	0.0%	0.0%	1.3%	0.0%	46.8%	55.9%	f
W-M Million Free Coal Allowances	57.1						57.1								57.1	g
W-M Million Free LDC Allowances							164.1							754.7	918.8	h
Increase in Market Revenue per $/Ton CO_2 Emissions Allowance Price ($M)	$ 157.2	$ 78.8	$ 3.1	$ 47.3	$ 6.1	$ 26.9	$ 319	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 319	i
Increase in Market Revenue at $20/Ton CO2 Allowance Price ($M)	$ 3,144	$ 1,576	$ 62	$ 947	$ 123	$ 537	$ 6,389	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 6,389	j
Cost of 15.8% Abatement @ $10 per ton ($M)	$ 254	$ 76	$ -	$ -	$ 11	$ 2	$ 343	$ 1,612	$ 107	$ -	$ -	$ 50.91	$ 0.09	$ 1,771	$ 2,114	k
Cost Associated with $20/ton CO2 Allowance Price ($M) for 84.2% of Emissions	$ 2,717	$ 814	$ -	$ -	$ 113	$ 23	$ 3,667	$ 17,221	$ 1,148	$ -	$ -	$ 544	$ 1	$ 18,914	$ 22,581	l
Scenario 3: Allocation 200 million tons to merchant coal, 1750 million to LDCs																
Million Tons Allowances Allocated for Free	57.1						221.2							754.7	975.9	m
Value of Free Allocation to Generators ($M)	$ 1,142						$ 1,142							$ -	$ -	n
Value of Free Allocation to LDCs ($M)							$ 3,282							$ 15,094	$ 18,377	o
Pass-Through of Benefits and Costs to Ratepayers ($M)							$ 3,282							$ (5,590)	$ (6,318)	p
Net Impact on Generation Owners ($M)	$ 1,314	$ 686	$ 62	$ 947	$ (0.34)	$ 512	$ 3,520	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	q
Net Impact on Generation Owners ($/MWh)	$ 7.8	$ 5.6	$ 16.5	$ 18.0	$ (0.0)	$ 13.8		$ -	$ -	$ -	$ -	$ -	$ -			r
Net Impact on Electric Customers ($M)							***$ (3,106)***							***$ (5,590)***	***$ (8,697)***	s
Net Impact on Electric Customers ($/MWh)							***$ 7.95***							***$ 3.51***		t
Weighted Average Impact on Consumers ($/MWh)							***$ 4.38***									u
Incremental Cost to Consumers ($M)							***$ 8,697***									v
$M Spent on Abatement							***$ 2,114***									w
Unproductive Cost for Consumers ($M)							***$ 6,582***									x

Non-RTO West	MARKET-BASED PLANTS							COST-REGULATED PLANTS								Notes
	Coal	Gas	Hydro	Nuclear	Oil and Other Fossil	Renewable	Total for Market-Based Plants	Coal	Gas	Hydro	Nuclear	Oil and Other Fossil	Renewable	Total for Cost-Based Plants	Total for All Plants	
Energy Output (GWh)	74,631	59,293	42,075	0	1,368	10,988	188,356	165,984	49,998	92,684	34,050	383	1,751	344,850	533,205	a
Percent of Region Energy	14.0%	11.1%	7.9%	0.0%	0.3%	2.1%	35.3%	31.1%	9.4%	17.4%	6.4%	0.1%	0.3%	64.7%	100%	b
CO_2 Emissions (Mton)	77	24.79	0.00	0.00	0.88	0.16	103	170.95	22.65	0.00	0.00	0.21	0.17	194	297	c
Percent of Region Emissions	25.9%	8.4%	0.0%	0.0%	0.3%	0.1%	34.6%	57.6%	7.6%	0.0%	0.0%	0.1%	0.1%	65.4%	100%	d
Generation (% of US)	1.8%	1.5%	1.0%	0.0%	0.0%	0.3%	4.7%	4.1%	1.2%	2.3%	0.8%	0.0%	0.0%	8.5%	13.2%	e
Emissions (% of US)	3.2%	1.0%	0.0%	0.0%	0.0%	0.0%	4.3%	7.1%	0.9%	0.0%	0.0%	0.0%	0.0%	8.1%	12.4%	f
W-M Million Free Coal Allowances	27.2						27.2								27.2	g
W-M Million Free LDC Allowances							78.3							145.5	223.7	h
Increase in Market Revenue per $/Ton CO_2 Emissions Allowance Price ($M)	$ 53.6	$ 36.7	$ 28.3	$ -	$ 0.9	$ 7.3	$ 127	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 127	i
Increase in Market Revenue at $20/Ton CO2 Allowance Price ($M)	$ 1,071	$ 735	$ 566	$ -	$ 18	$ 147	$ 2,536	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 2,536	j
Cost of 15.8% Abatement @ $10 per ton ($M)	$ 121	$ 39	$ -	$ -	$ 1	$ 0	$ 162	$ 270	$ 36	$ -	$ -	$ 0.33	$ 0.26	$ 306	$ 468	k
Cost Associated with $20/ton CO2 Allowance Price ($M) for 84.2% of Emissions	$ 1,294	$ 418	$ -	$ -	$ 15	$ 3	$ 1,729	$ 2,880	$ 381	$ -	$ -	$ 3	$ 3	$ 3,267	$ 4,997	l
Scenario 0: No Free Allocation of Allowances																
Million Tons Allowances Allocated for Free																m
Value of Free Allocation to Generators ($M)																n
Value of Free Allocation to LDCs ($M)																o
Pass-Through of Benefits and Costs to Ratepayers ($M)							$ -							$ (3,573)	$ (3,573)	p
Net Impact on Generation Owners ($M)	$ (344)	$ 278	$ 566	$ -	$ 1.38	$ 144	$ 645	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 645	q
Net Impact on Generation Owners ($/MWh)	$ (4.61)	$ 4.69	$ 13.46	$ -	$ 1.01	$ 13.10		$ -	$ -	$ -	$ -	$ -	$ -			r
Net Impact on Electric Customers ($M)							***$ (2,536)***							***$ (3,573)***	***$ (6,110)***	s
Net Impact on Electric Customers ($/MWh)							***$ 13.47***							***$ 10.36***		t
Weighted Average Impact on Consumers ($/MWh)							***$ 11.46***									u
Incremental Cost to Consumers ($M)							***$ 6,110***									v
$M Spent on Abatement							***$ 468***									w
Unproductive Cost for Consumers ($M)							***$ 5,642***									x

Non-RTO West	MARKET-BASED PLANTS							COST-REGULATED PLANTS								Notes
	Coal	Gas	Hydro	Nuclear	Oil and Other Fossil	Renewable	Total for Market-Based Plants	Coal	Gas	Hydro	Nuclear	Oil and Other Fossil	Renewable	Total for Cost-Based Plants	Total for All Plants	
Energy Output (GWh)	74,631	59,293	42,075	0	1,368	10,988	188,356	165,984	49,998	92,684	34,050	383	1,751	344,850	533,205	a
Percent of Region Energy	14.0%	11.1%	7.9%	0.0%	0.3%	2.1%	35.3%	31.1%	9.4%	17.4%	6.4%	0.1%	0.3%	64.7%	100%	b
CO_2 Emissions (Mton)	77	24.79	0.00	0.00	0.88	0.16	103	170.95	22.65	0.00	0.00	0.21	0.17	194	297	c
Percent of Region Emissions	25.9%	8.4%	0.0%	0.0%	0.3%	0.1%	34.6%	57.6%	7.6%	0.0%	0.0%	0.1%	0.1%	65.4%	100%	d
Generation (% of US)	1.8%	1.5%	1.0%	0.0%	0.0%	0.3%	4.7%	4.1%	1.2%	2.3%	0.8%	0.0%	0.0%	8.5%	13.2%	e
Emissions (% of US)	3.2%	1.0%	0.0%	0.0%	0.0%	0.0%	4.3%	7.1%	0.9%	0.0%	0.0%	0.0%	0.0%	8.1%	12.4%	f
W-M Million Free Coal Allowances	27.2						27.2								27.2	g
W-M Million Free LDC Allowances							78.3							145.5	223.7	h
Increase in Market Revenue per $/Ton CO_2 Emissions Allowance Price ($M)	$ 53.6	$ 36.7	$ 28.3	$ -	$ 0.9	$ 7.3	$ 127	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 127	i
Increase in Market Revenue at $20/Ton CO2 Allowance Price ($M)	$ 1,071	$ 735	$ 566	$ -	$ 18	$ 147	$ 2,536	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 2,536	j
Cost of 15.8% Abatement @ $10 per ton ($M)	$ 121	$ 39	$ -	$ -	$ 1	$ 0	$ 162	$ 270	$ 36	$ -	$ -	$ 0.33	$ 0.26	$ 306	$ 468	k
Cost Associated with $20/ton CO2 Allowance Price ($M) for 84.2% of Emissions	$ 1,294	$ 418	$ -	$ -	$ 15	$ 3	$ 1,729	$ 2,880	$ 381	$ -	$ -	$ 3	$ 3	$ 3,267	$ 4,997	l
Scenario 1: All Allowances Allocated for Free to Generators																
Million Tons Allowances Allocated for Free	62.5	20.2	-	-	0.7	0.1	83.5	139.0	18.4	-	-	0.2	0.1	157.7	241.2	m
Value of Free Allocation to Generators ($M)	$ 1,249	$ 403	$ -	$ -	$ 14	$ 3	$ 1,669	$ 2,780	$ 368	$ -	$ -	$ 3	$ 3	$ 3,154	$ 4,823	n
Value of Free Allocation to LDCs ($M)							$ -									o
Pass-Through of Benefits and Costs to Ratepayers ($M)							$ -	$ (369)	$ (49)	$ -	$ -	$ (0)	$ (0)	$ (419)	$ (419)	p
Net Impact on Generation Owners ($M)	$ 905	$ 681	$ 566	$ -	$ 16	$ 147	$ 2,315	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 2,315	q
Net Impact on Generation Owners ($/MWh)	$ 12.1	$ 11.5	$ 13.5	$ -	$ 11.4	$ 13.3		$ -	$ -	$ -	$ -	$ -	$ -			r
Net Impact on Electric Customers ($M)							***$ (2,536)***							***$ (419)***	***$ (2,956)***	s
Net Impact on Electric Customers ($/MWh)							***$ 13.47***							***$ 1.22***		t
Weighted Average Impact on Consumers ($/MWh)							***$ 5.54***									u
Incremental Cost to Consumers ($M)							***$ 2,956***									v
$M Spent on Abatement							***$ 468***									w
Unproductive Cost for Consumers ($M)							***$ 2,488***									x

Non-RTO West	MARKET-BASED PLANTS							COST-REGULATED PLANTS								Notes
	Coal	Gas	Hydro	Nuclear	Oil and Other Fossil	Renewable	Total for Market-Based Plants	Coal	Gas	Hydro	Nuclear	Oil and Other Fossil	Renewable	Total for Cost-Based Plants	Total for All Plants	
Energy Output (GWh)	74,631	59,293	42,075	0	1,368	10,988	188,356	165,984	49,998	92,684	34,050	383	1,751	344,850	533,205	a
Percent of Region Energy	14.0%	11.1%	7.9%	0.0%	0.3%	2.1%	35.3%	31.1%	9.4%	17.4%	6.4%	0.1%	0.3%	64.7%	100%	b
CO_2 Emissions (Mton)	77	24.79	0.00	0.00	0.88	0.16	103	170.95	22.65	0.00	0.00	0.21	0.17	194	297	c
Percent of Region Emissions	25.9%	8.4%	0.0%	0.0%	0.3%	0.1%	34.6%	57.6%	7.6%	0.0%	0.0%	0.1%	0.1%	65.4%	100%	d
Generation (% of US)	1.8%	1.5%	1.0%	0.0%	0.0%	0.3%	4.7%	4.1%	1.2%	2.3%	0.8%	0.0%	0.0%	8.5%	13.2%	e
Emissions (% of US)	3.2%	1.0%	0.0%	0.0%	0.0%	0.0%	4.3%	7.1%	0.9%	0.0%	0.0%	0.0%	0.0%	8.1%	12.4%	f
W-M Million Free Coal Allowances	27.2						27.2								27.2	g
W-M Million Free LDC Allowances							78.3							145.5	223.7	h
Increase in Market Revenue per $/Ton CO_2 Emissions Allowance Price ($M)	$ 53.6	$ 36.7	$ 28.3	$ -	$ 0.9	$ 7.3	$ 127	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 127	i
Increase in Market Revenue at $20/Ton CO2 Allowance Price ($M)	$ 1,071	$ 735	$ 566	$ -	$ 18	$ 147	$ 2,536	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 2,536	j
Cost of 15.8% Abatement @ $10 per ton ($M)	$ 121	$ 39	$ -	$ -	$ 1	$ 0	$ 162	$ 270	$ 36	$ -	$ -	$ 0.33	$ 0.26	$ 306	$ 468	k
Cost Associated with $20/ton CO2 Allowance Price ($M) for 84.2% of Emissions	$ 1,294	$ 418	$ -	$ -	$ 15	$ 3	$ 1,729	$ 2,880	$ 381	$ -	$ -	$ 3	$ 3	$ 3,267	$ 4,997	l
Scenario 2: All Allowances Allocated for Free to LDCs																
Million Tons Allowances Allocated for Free							87.2							162.1	$ 249.3	m
Value of Free Allocation to Generators ($M)							$ -							$ -	$ -	n
Value of Free Allocation to LDCs ($M)							$ 1,744							$ 3,242	$ 4,986	o
Pass-Through of Benefits and Costs to Ratepayers ($M)							$ 1,744							$ (331)	$ 1,413	p
Net Impact on Generation Owners ($M)	$ (344)	$ 278	$ 566	$ -	$ 1.38	$ 144	$ 645	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 645	q
Net Impact on Generation Owners ($/MWh)	$ (4.6)	$ 4.7	$ 13.5	$ -	$ 1.0	$ 13.1		$ -	$ -	$ -	$ -	$ -	$ -			r
Net Impact on Electric Customers ($M)							***$ (792)***							***$ (331)***	***$ (1,123)***	s
Net Impact on Electric Customers ($/MWh)							***$ 4.21***							***$ 0.96***		t
Weighted Average Impact on Consumers ($/MWh)							***$ 2.11***									u
Incremental Cost to Consumers ($M)							***$ 1,123***									v
$M Spent on Abatement							***$ 468***									w
Unproductive Cost for Consumers ($M)							***$ 655***									x

Non-RTO West	MARKET-BASED PLANTS							COST-REGULATED PLANTS								Notes
	Coal	Gas	Hydro	Nuclear	Oil and Other Fossil	Renewable	Total for Market-Based Plants	Coal	Gas	Hydro	Nuclear	Oil and Other Fossil	Renewable	Total for Cost-Based Plants	Total for All Plants	
Energy Output (GWh)	74,631	59,293	42,075	0	1,368	10,988	188,356	165,984	49,998	92,684	34,050	383	1,751	344,850	533,205	a
Percent of Region Energy	14.0%	11.1%	7.9%	0.0%	0.3%	2.1%	35.3%	31.1%	9.4%	17.4%	6.4%	0.1%	0.3%	64.7%	100%	b
CO_2 Emissions (Mton)	77	24.79	0.00	0.00	0.88	0.16	103	170.95	22.65	0.00	0.00	0.21	0.17	194	297	c
Percent of Region Emissions	25.9%	8.4%	0.0%	0.0%	0.3%	0.1%	34.6%	57.6%	7.6%	0.0%	0.0%	0.1%	0.1%	65.4%	100%	d
Generation (% of US)	1.8%	1.5%	1.0%	0.0%	0.0%	0.3%	4.7%	4.1%	1.2%	2.3%	0.8%	0.0%	0.0%	8.5%	13.2%	e
Emissions (% of US)	3.2%	1.0%	0.0%	0.0%	0.0%	0.0%	4.3%	7.1%	0.9%	0.0%	0.0%	0.0%	0.0%	8.1%	12.4%	f
W-M Million Free Coal Allowances	27.2						27.2								27.2	g
W-M Million Free LDC Allowances							78.3							145.5	223.7	h
Increase in Market Revenue per $/Ton CO_2 Emissions Allowance Price ($M)	$ 53.6	$ 36.7	$ 28.3	$ -	$ 0.9	$ 7.3	$ 127	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 127	i
Increase in Market Revenue at $20/Ton CO2 Allowance Price ($M)	$ 1,071	$ 735	$ 566	$ -	$ 18	$ 147	$ 2,536	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 2,536	j
Cost of 15.8% Abatement @ $10 per ton ($M)	$ 121	$ 39	$ -	$ -	$ 1	$ 0	$ 162	$ 270	$ 36	$ -	$ -	$ 0.33	$ 0.26	$ 306	$ 468	k
Cost Associated with $20/ton CO2 Allowance Price ($M) for 84.2% of Emissions	$ 1,294	$ 418	$ -	$ -	$ 15	$ 3	$ 1,729	$ 2,880	$ 381	$ -	$ -	$ 3	$ 3	$ 3,267	$ 4,997	l
Scenario 3: Allocation 200 million tons to merchant coal, 1750 million to LDCs																
Million Tons Allowances Allocated for Free	27.2						105.4							145.5	250.9	m
Value of Free Allocation to Generators ($M)	$ 544						$ 544							$ -	$ -	n
Value of Free Allocation to LDCs ($M)							$ 1,565							$ 2,910	$ 4,475	o
Pass-Through of Benefits and Costs to Ratepayers ($M)							$ 1,565							$ (664)	$ (990)	p
Net Impact on Generation Owners ($M)	$ 199	$ 278	$ 566	$ -	$ 1.38	$ 144	$ 1,189	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	q
Net Impact on Generation Owners ($/MWh)	$ 2.7	$ 4.7	$ 13.5	$ -	$ 1.0	$ 13.1		$ -	$ -	$ -	$ -	$ -	$ -			r
Net Impact on Electric Customers ($M)							***$ (971)***							***$ (664)***	***$ (1,635)***	s
Net Impact on Electric Customers ($/MWh)							***$ 5.16***							***$ 1.92***		t
Weighted Average Impact on Consumers ($/MWh)							***$ 3.07***									u
Incremental Cost to Consumers ($M)							***$ 1,635***									v
$M Spent on Abatement							***$ 468***									w
Unproductive Cost for Consumers ($M)							***$ 1,167***									x

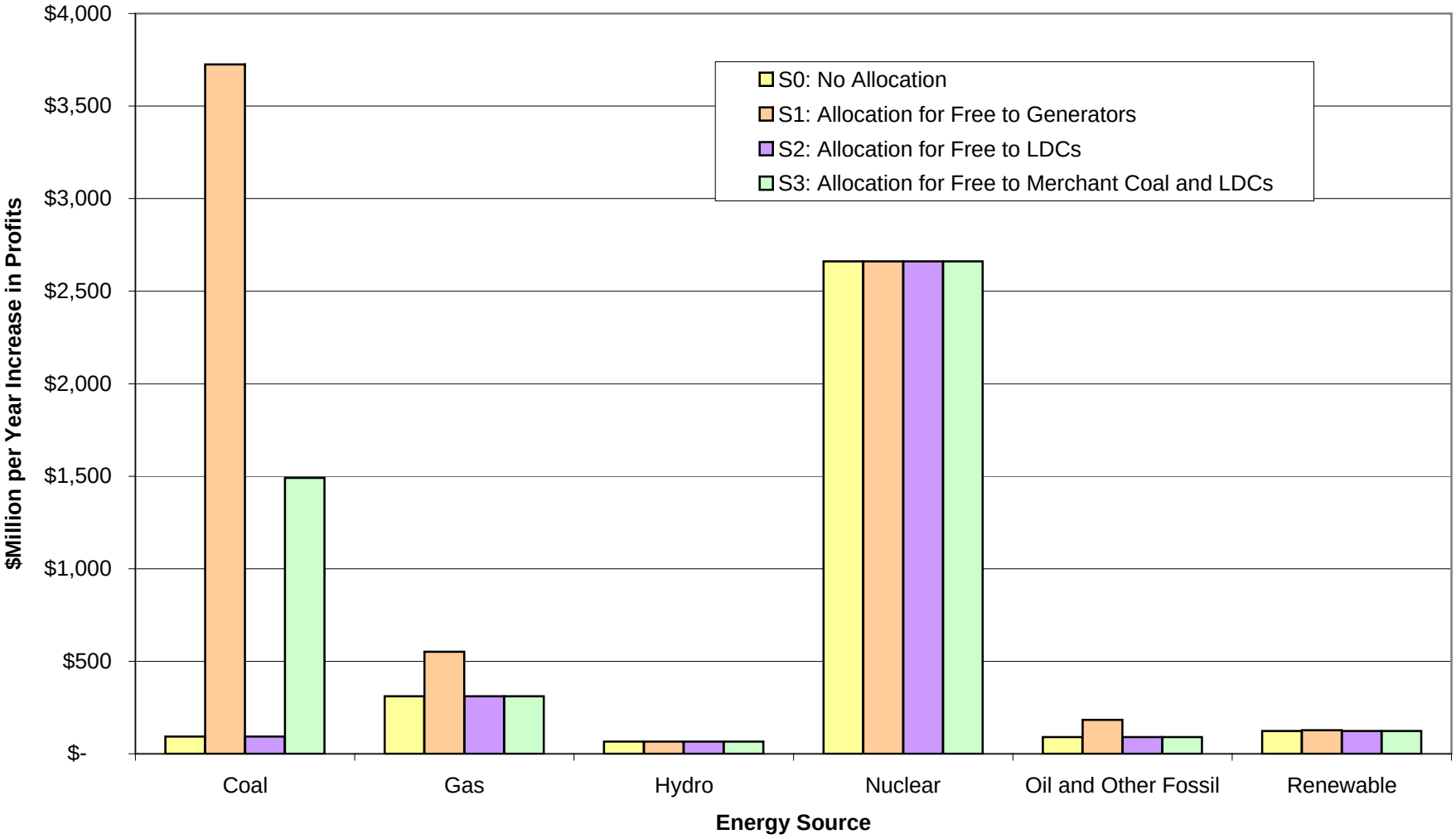
National	MARKET-BASED PLANTS							COST-REGULATED PLANTS							Total for All Plants	Notes
	Coal	Gas	Hydro	Nuclear	Oil and Other Fossil	Renewable	Total for Market-Based Plants	Coal	Gas	Hydro	Nuclear	Oil and Other Fossil	Renewable	Total for Cost-Based Plants		
Energy Output (GWh)	582,870	502,300	66,385	309,414	59,132	90,225	1,610,325	1,488,895	225,883	194,515	416,444	93,165	9,151	2,428,052	4,038,377	a
Percent of Region Energy	14.4%	12.4%	1.6%	7.7%	1.5%	2.2%	39.9%	36.9%	5.6%	4.8%	10.3%	2.3%	0.2%	60.1%	100%	b
CO_2 Emissions (Mton)	565	209.89	0.00	0.00	37.00	2.65	815	1,429.62	109.72	0.00	0.00	43.51	0.64	1,583	2,398	c
Percent of Region Emissions	23.6%	8.8%	0.0%	0.0%	1.5%	0.1%	34.0%	59.6%	4.6%	0.0%	0.0%	1.8%	0.0%	66.0%	100%	d
Generation (% of US)	14.4%	12.4%	1.6%	7.7%	1.5%	2.2%	39.9%	36.9%	5.6%	4.8%	10.3%	2.3%	0.2%	60.1%	100.0%	e
Emissions (% of US)	23.6%	8.8%	0.0%	0.0%	1.5%	0.1%	34.0%	59.6%	4.6%	0.0%	0.0%	1.8%	0.0%	66.0%	100.0%	f
W-M Million Free Coal Allowances	200.0						200.0								200.0	g
W-M Million Free LDC Allowances							646.2							1,103.8	1,750.0	h
Increase in Market Revenue per $/Ton CO_2 Emissions Allowance Price ($M)	$ 490.1	$ 304.5	$ 45.5	$ 248.8	$ 41.2	$ 60.7	$ 1,191	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,191	i
Increase in Market Revenue at $20/Ton CO2 Allowance Price ($M)	$ 9,803	$ 6,090	$ 911	$ 4,976	$ 825	$ 1,214	$ 23,818	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 23,818	j
Cost of 15.8% Abatement @ $10 per ton ($M)	$ 892	$ 331	$ -	$ -	$ 58	$ 4	$ 1,285	$ 2,255	$ 173	$ -	$ -	$ 68.62	$ 1.01	$ 2,498	$ 3,783	k
Cost Associated with $20/ton CO2 Allowance Price ($M) for 84.2% of Emissions	$ 9,522	$ 3,536	$ -	$ -	$ 623	$ 45	$ 13,725	$ 24,083	$ 1,848	$ -	$ -	$ 733	$ 11	$ 26,675	$ 40,400	l
Scenario 0: No Free Allocation of Allowances																
Million Tons Allowances Allocated for Free																m
Value of Free Allocation to Generators ($M)																n
Value of Free Allocation to LDCs ($M)																o
Pass-Through of Benefits and Costs to Ratepayers ($M)							$ -							$ (29,172)	$ (29,172)	p
Net Impact on Generation Owners ($M)	$ (611)	$ 2,223	$ 911	$ 4,976	$ 143.29	$ 1,165	$ 8,808	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 8,808	q
Net Impact on Generation Owners ($/MWh)	$ (1.05)	$ 4.43	$ 13.72	$ 16.08	$ 2.42	$ 12.91		$ -	$ -	$ -	$ -	$ -	$ -			r
Net Impact on Electric Customers ($M)							***$ (23,818)***							***$ (29,172)***	***$ (52,991)***	s
Net Impact on Electric Customers ($/MWh)							***$ 14.79***							***$ 12.01***		t
Weighted Average Impact on Consumers ($/MWh)							***$ 13.12***									u
Incremental Cost to Consumers ($M)							***$ 52,991***									v
$M Spent on Abatement							***$ 3,783***									w
Unproductive Cost for Consumers ($M)							***$ 49,208***									x

National	MARKET-BASED PLANTS							COST-REGULATED PLANTS								Notes
	Coal	Gas	Hydro	Nuclear	Oil and Other Fossil	Renewable	Total for Market-Based Plants	Coal	Gas	Hydro	Nuclear	Oil and Other Fossil	Renewable	Total for Cost-Based Plants	Total for All Plants	
Energy Output (GWh)	582,870	502,300	66,385	309,414	59,132	90,225	1,610,325	1,488,895	225,883	194,515	416,444	93,165	9,151	2,428,052	4,038,377	a
Percent of Region Energy	14.4%	12.4%	1.6%	7.7%	1.5%	2.2%	39.9%	36.9%	5.6%	4.8%	10.3%	2.3%	0.2%	60.1%	100%	b
CO_2 Emissions (Mton)	565	209.89	0.00	0.00	37.00	2.65	815	1,429.62	109.72	0.00	0.00	43.51	0.64	1,583	2,398	c
Percent of Region Emissions	23.6%	8.8%	0.0%	0.0%	1.5%	0.1%	34.0%	59.6%	4.6%	0.0%	0.0%	1.8%	0.0%	66.0%	100%	d
Generation (% of US)	14.4%	12.4%	1.6%	7.7%	1.5%	2.2%	39.9%	36.9%	5.6%	4.8%	10.3%	2.3%	0.2%	60.1%	100.0%	e
Emissions (% of US)	23.6%	8.8%	0.0%	0.0%	1.5%	0.1%	34.0%	59.6%	4.6%	0.0%	0.0%	1.8%	0.0%	66.0%	100.0%	f
W-M Million Free Coal Allowances	200.0						200.0								200.0	g
W-M Million Free LDC Allowances							646.2							1,103.8	1,750.0	h
Increase in Market Revenue per $/Ton CO_2 Emissions Allowance Price ($M)	$ 490.1	$ 304.5	$ 45.5	$ 248.8	$ 41.2	$ 60.7	$ 1,191	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,191	i
Increase in Market Revenue at $20/Ton CO2 Allowance Price ($M)	$ 9,803	$ 6,090	$ 911	$ 4,976	$ 825	$ 1,214	$ 23,818	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 23,818	j
Cost of 15.8% Abatement @ $10 per ton ($M)	$ 892	$ 331	$ -	$ -	$ 58	$ 4	$ 1,285	$ 2,255	$ 173	$ -	$ -	$ 68.62	$ 1.01	$ 2,498	$ 3,783	k
Cost Associated with $20/ton CO2 Allowance Price ($M) for 84.2% of Emissions	$ 9,522	$ 3,536	$ -	$ -	$ 623	$ 45	$ 13,725	$ 24,083	$ 1,848	$ -	$ -	$ 733	$ 11	$ 26,675	$ 40,400	l
Scenario 1: All Allowances Allocated for Free to Generators																
Million Tons Allowances Allocated for Free	459.6	170.7	-	-	30.1	2.2	662.5	1,162.4	89.2	-	-	35.4	0.5	1,287.5	1,950.0	m
Value of Free Allocation to Generators ($M)	$ 9,192	$ 3,413	$ -	$ -	$ 602	$ 43	$ 13,250	$ 23,248	$ 1,784	$ -	$ -	$ 707	$ 10	$ 25,750	$ 39,000	n
Value of Free Allocation to LDCs ($M)							$ -									o
Pass-Through of Benefits and Costs to Ratepayers ($M)							$ -	$ (3,089)	$ (237)	$ -	$ -	$ (94)	$ (1)	$ (3,422)	$ (3,422)	p
Net Impact on Generation Owners ($M)	$ 8,581	$ 5,636	$ 911	$ 4,976	$ 745	$ 1,208	$ 22,058	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 22,058	q
Net Impact on Generation Owners ($/MWh)	$ 14.7	$ 11.2	$ 13.7	$ 16.1	$ 12.6	$ 13.4		$ -	$ -	$ -	$ -	$ -	$ -			r
Net Impact on Electric Customers ($M)							***$ (23,818)***							***$ (3,422)***	***$ (27,240)***	s
Net Impact on Electric Customers ($/MWh)							***$ 14.79***							***$ 1.41***		t
Weighted Average Impact on Consumers ($/MWh)							***$ 6.75***									u
Incremental Cost to Consumers ($M)							***$ 27,240***									v
$M Spent on Abatement							***$ 3,783***									w
Unproductive Cost for Consumers ($M)							***$ 23,458***									x

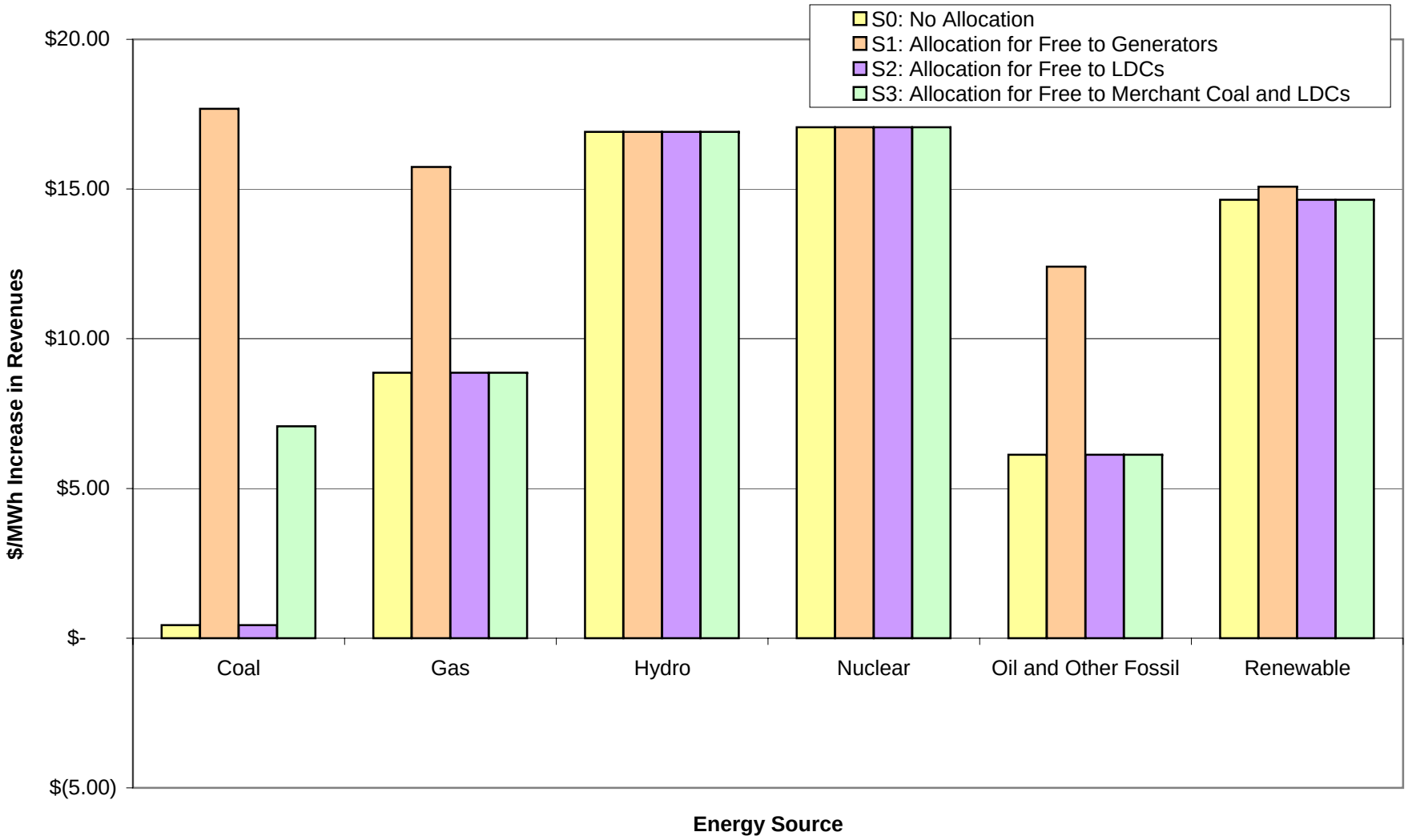
National	MARKET-BASED PLANTS							COST-REGULATED PLANTS								Notes
	Coal	Gas	Hydro	Nuclear	Oil and Other Fossil	Renewable	Total for Market-Based Plants	Coal	Gas	Hydro	Nuclear	Oil and Other Fossil	Renewable	Total for Cost-Based Plants	Total for All Plants	
Energy Output (GWh)	582,870	502,300	66,385	309,414	59,132	90,225	1,610,325	1,488,895	225,883	194,515	416,444	93,165	9,151	2,428,052	4,038,377	a
Percent of Region Energy	14.4%	12.4%	1.6%	7.7%	1.5%	2.2%	39.9%	36.9%	5.6%	4.8%	10.3%	2.3%	0.2%	60.1%	100%	b
CO_2 Emissions (Mton)	565	209.89	0.00	0.00	37.00	2.65	815	1,429.62	109.72	0.00	0.00	43.51	0.64	1,583	2,398	c
Percent of Region Emissions	23.6%	8.8%	0.0%	0.0%	1.5%	0.1%	34.0%	59.6%	4.6%	0.0%	0.0%	1.8%	0.0%	66.0%	100%	d
Generation (% of US)	14.4%	12.4%	1.6%	7.7%	1.5%	2.2%	39.9%	36.9%	5.6%	4.8%	10.3%	2.3%	0.2%	60.1%	100.0%	e
Emissions (% of US)	23.6%	8.8%	0.0%	0.0%	1.5%	0.1%	34.0%	59.6%	4.6%	0.0%	0.0%	1.8%	0.0%	66.0%	100.0%	f
W-M Million Free Coal Allowances	200.0						200.0								200.0	g
W-M Million Free LDC Allowances							646.2							1,103.8	1,750.0	h
Increase in Market Revenue per $/Ton CO_2 Emissions Allowance Price ($M)	$ 490.1	$ 304.5	$ 45.5	$ 248.8	$ 41.2	$ 60.7	$ 1,191	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,191	i
Increase in Market Revenue at $20/Ton CO2 Allowance Price ($M)	$ 9,803	$ 6,090	$ 911	$ 4,976	$ 825	$ 1,214	$ 23,818	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 23,818	j
Cost of 15.8% Abatement @ $10 per ton ($M)	$ 892	$ 331	$ -	$ -	$ 58	$ 4	$ 1,285	$ 2,255	$ 173	$ -	$ -	$ 68.62	$ 1.01	$ 2,498	$ 3,783	k
Cost Associated with $20/ton CO2 Allowance Price ($M) for 84.2% of Emissions	$ 9,522	$ 3,536	$ -	$ -	$ 623	$ 45	$ 13,725	$ 24,083	$ 1,848	$ -	$ -	$ 733	$ 11	$ 26,675	$ 40,400	l
Scenario 2: All Allowances Allocated for Free to LDCs																
Million Tons Allowances Allocated for Free							720.0							1,230.0	$ 1,950.0	m
Value of Free Allocation to Generators ($M)							$ -							$ -	$ -	n
Value of Free Allocation to LDCs ($M)							$ 14,401							$ 24,599	$ 39,000	o
Pass-Through of Benefits and Costs to Ratepayers ($M)							$ 14,401							$ (4,573)	$ 9,828	p
Net Impact on Generation Owners ($M)	$ (611)	$ 2,223	$ 911	$ 4,976	$ 143.29	$ 1,165	$ 8,808	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 8,808	q
Net Impact on Generation Owners ($/MWh)	$ (1.0)	$ 4.4	$ 13.7	$ 16.1	$ 2.4	$ 12.9		$ -	$ -	$ -	$ -	$ -	$ -			r
Net Impact on Electric Customers ($M)							***$ (9,418)***							***$ (4,573)***	***$ (13,991)***	s
Net Impact on Electric Customers ($/MWh)							***$ 5.85***							***$ 1.88***		t
Weighted Average Impact on Consumers ($/MWh)							***$ 3.46***									u
Incremental Cost to Consumers ($M)							***$ 13,991***									v
$M Spent on Abatement							***$ 3,783***									w
Unproductive Cost for Consumers ($M)							***$ 10,208***									x

National	MARKET-BASED PLANTS							COST-REGULATED PLANTS							Total for All Plants	Notes
	Coal	Gas	Hydro	Nuclear	Oil and Other Fossil	Renewable	Total for Market-Based Plants	Coal	Gas	Hydro	Nuclear	Oil and Other Fossil	Renewable	Total for Cost-Based Plants		
Energy Output (GWh)	582,870	502,300	66,385	309,414	59,132	90,225	1,610,325	1,488,895	225,883	194,515	416,444	93,165	9,151	2,428,052	4,038,377	a
Percent of Region Energy	14.4%	12.4%	1.6%	7.7%	1.5%	2.2%	39.9%	36.9%	5.6%	4.8%	10.3%	2.3%	0.2%	60.1%	100%	b
CO_2 Emissions (Mton)	565	209.89	0.00	0.00	37.00	2.65	815	1,429.62	109.72	0.00	0.00	43.51	0.64	1,583	2,398	c
Percent of Region Emissions	23.6%	8.8%	0.0%	0.0%	1.5%	0.1%	34.0%	59.6%	4.6%	0.0%	0.0%	1.8%	0.0%	66.0%	100%	d
Generation (% of US)	14.4%	12.4%	1.6%	7.7%	1.5%	2.2%	39.9%	36.9%	5.6%	4.8%	10.3%	2.3%	0.2%	60.1%	100.0%	e
Emissions (% of US)	23.6%	8.8%	0.0%	0.0%	1.5%	0.1%	34.0%	59.6%	4.6%	0.0%	0.0%	1.8%	0.0%	66.0%	100.0%	f
W-M Million Free Coal Allowances	200.0						200.0								200.0	g
W-M Million Free LDC Allowances							646.2							1,103.8	1,750.0	h
Increase in Market Revenue per $/Ton CO_2 Emissions Allowance Price ($M)	$ 490.1	$ 304.5	$ 45.5	$ 248.8	$ 41.2	$ 60.7	$ 1,191	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,191	i
Increase in Market Revenue at $20/Ton CO2 Allowance Price ($M)	$ 9,803	$ 6,090	$ 911	$ 4,976	$ 825	$ 1,214	$ 23,818	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 23,818	j
Cost of 15.8% Abatement @ $10 per ton ($M)	$ 892	$ 331	$ -	$ -	$ 58	$ 4	$ 1,285	$ 2,255	$ 173	$ -	$ -	$ 68.62	$ 1.01	$ 2,498	$ 3,783	k
Cost Associated with $20/ton CO2 Allowance Price ($M) for 84.2% of Emissions	$ 9,522	$ 3,536	$ -	$ -	$ 623	$ 45	$ 13,725	$ 24,083	$ 1,848	$ -	$ -	$ 733	$ 11	$ 26,675	$ 40,400	l
Scenario 3: Allocation 200 million tons to merchant coal, 1750 million to LDCs																
Million Tons Allowances Allocated for Free	200.0						846.2							1,103.8	1,950.0	m
Value of Free Allocation to Generators ($M)	$ 4,000						$ 4,000							$ -	$ -	n
Value of Free Allocation to LDCs ($M)							$ 12,924							$ 22,076	$ 35,000	o
Pass-Through of Benefits and Costs to Ratepayers ($M)							$ 12,924							$ (7,096)	$ (9,183)	p
Net Impact on Generation Owners ($M)	$ 3,389	$ 2,223	$ 911	$ 4,976	$ 143.29	$ 1,165	$ 12,808	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	q
Net Impact on Generation Owners ($/MWh)	$ 5.8	$ 4.4	$ 13.7	$ 16.1	$ 2.4	$ 12.9		$ -	$ -	$ -	$ -	$ -	$ -			r
Net Impact on Electric Customers ($M)							***$ (10,895)***							***$ (7,096)***	***$ (17,991)***	s
Net Impact on Electric Customers ($/MWh)							***$ 6.77***							***$ 2.92***		t
Weighted Average Impact on Consumers ($/MWh)							***$ 4.45***									u
Incremental Cost to Consumers ($M)							***$ 17,991***									v
$M Spent on Abatement							***$ 3,783***									w
Unproductive Cost for Consumers ($M)							***$ 14,208***									x

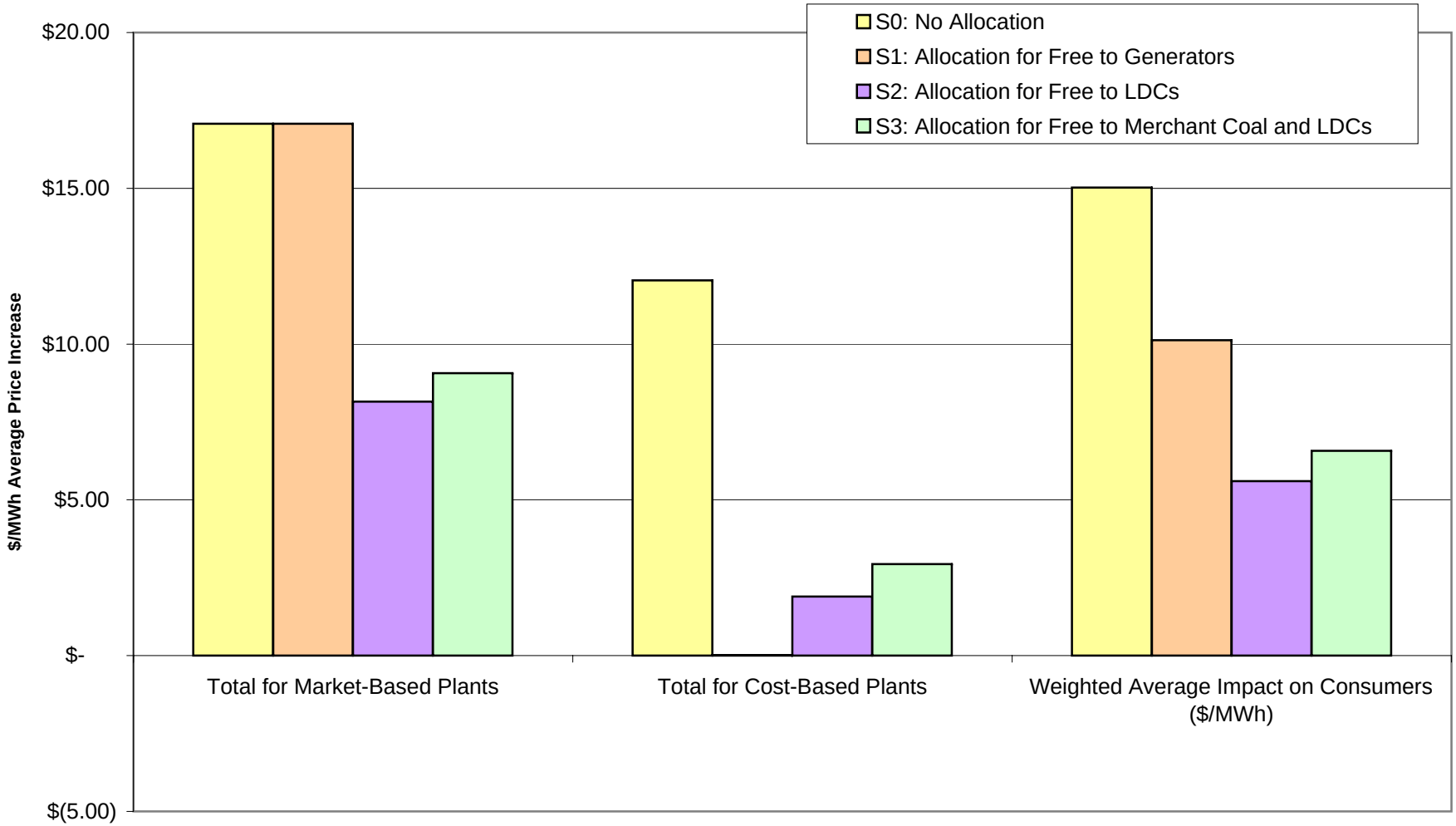
Impact on Market-Based Generation Owners
PJM Interconnection



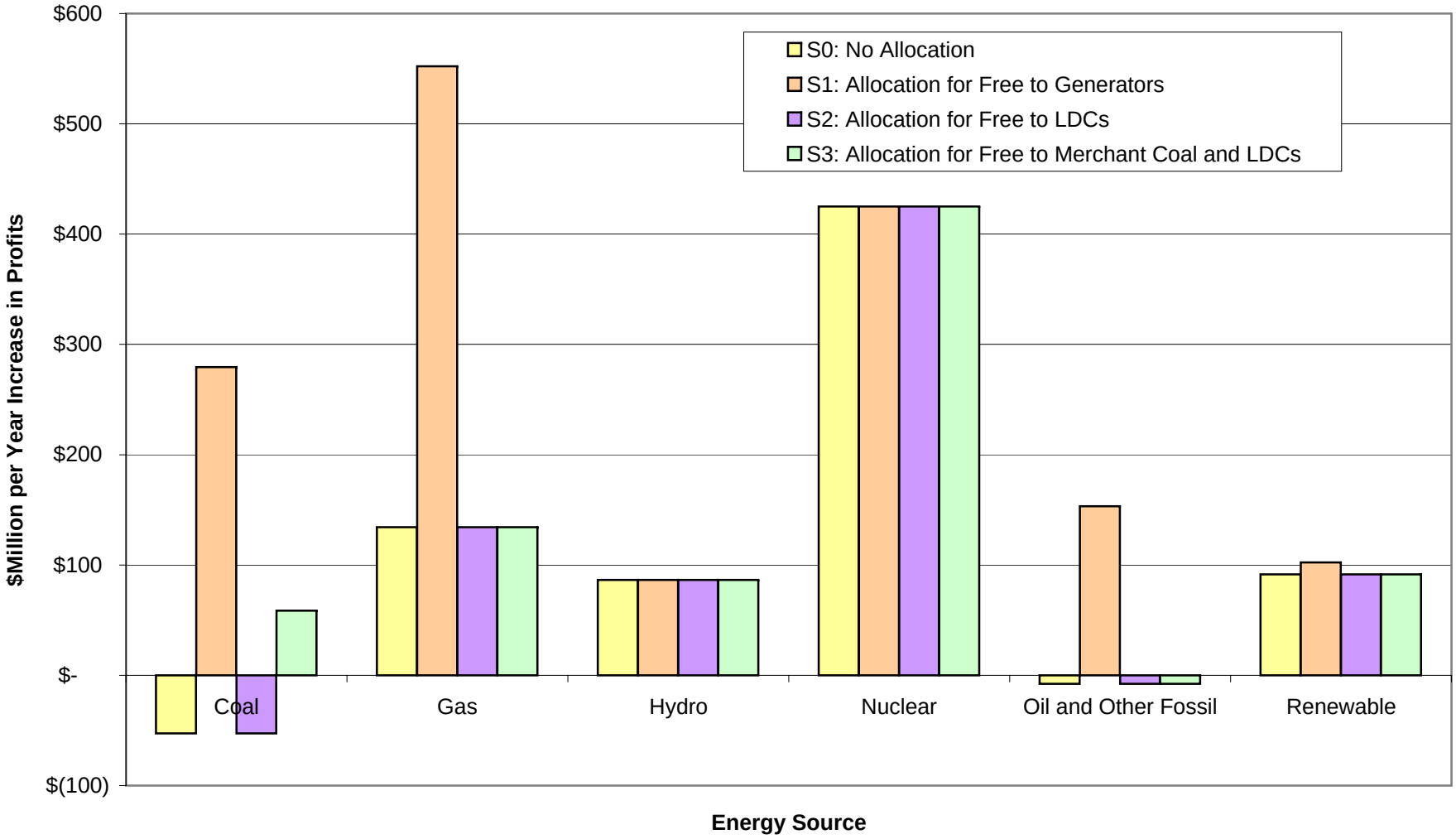
Per-MWh Impact on Market-Based Generation Owners
PJM Interconnection



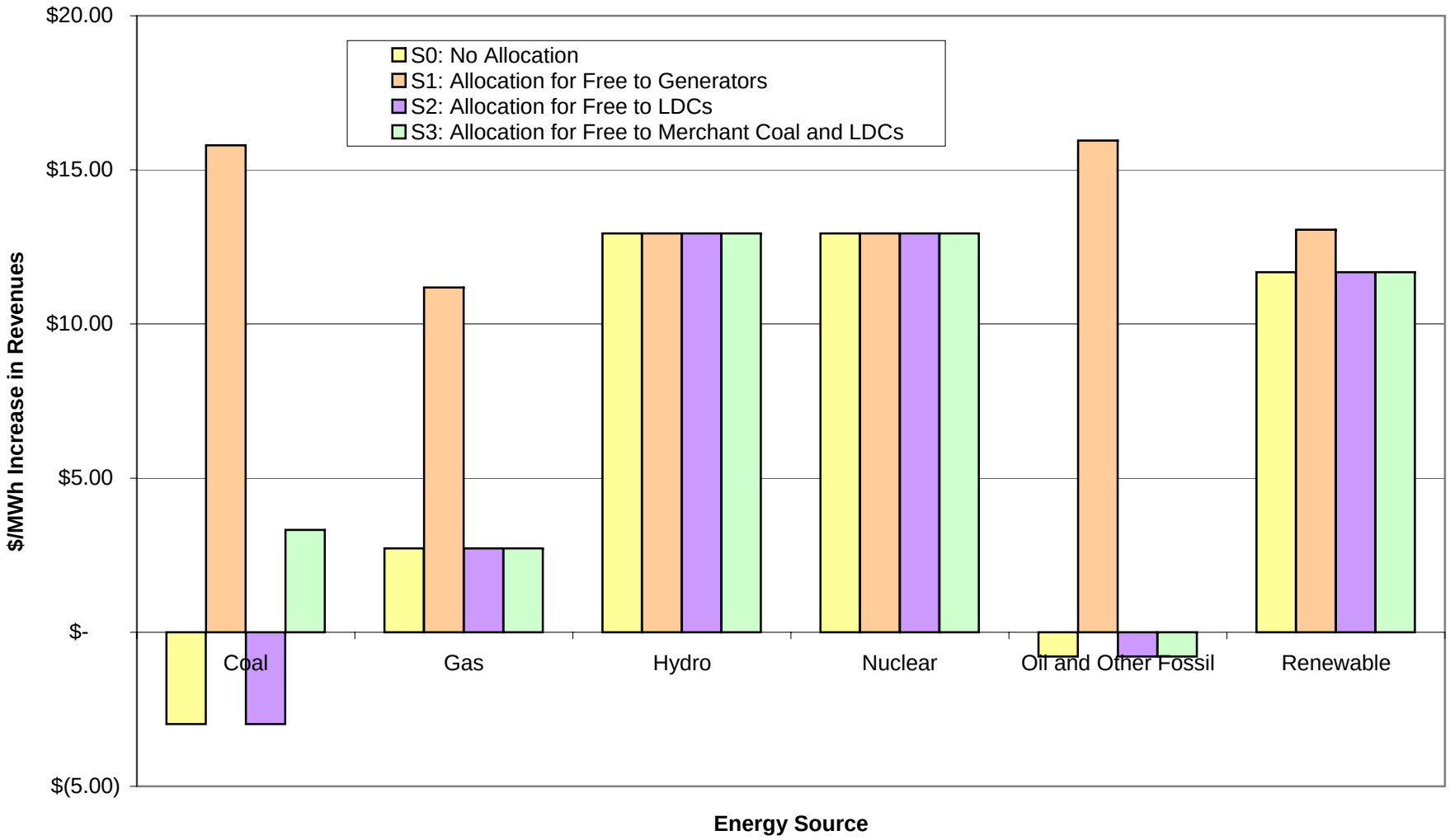
Per-MWh Impact on Consumers: Market vs. Cost-Based
PJM Interconnection



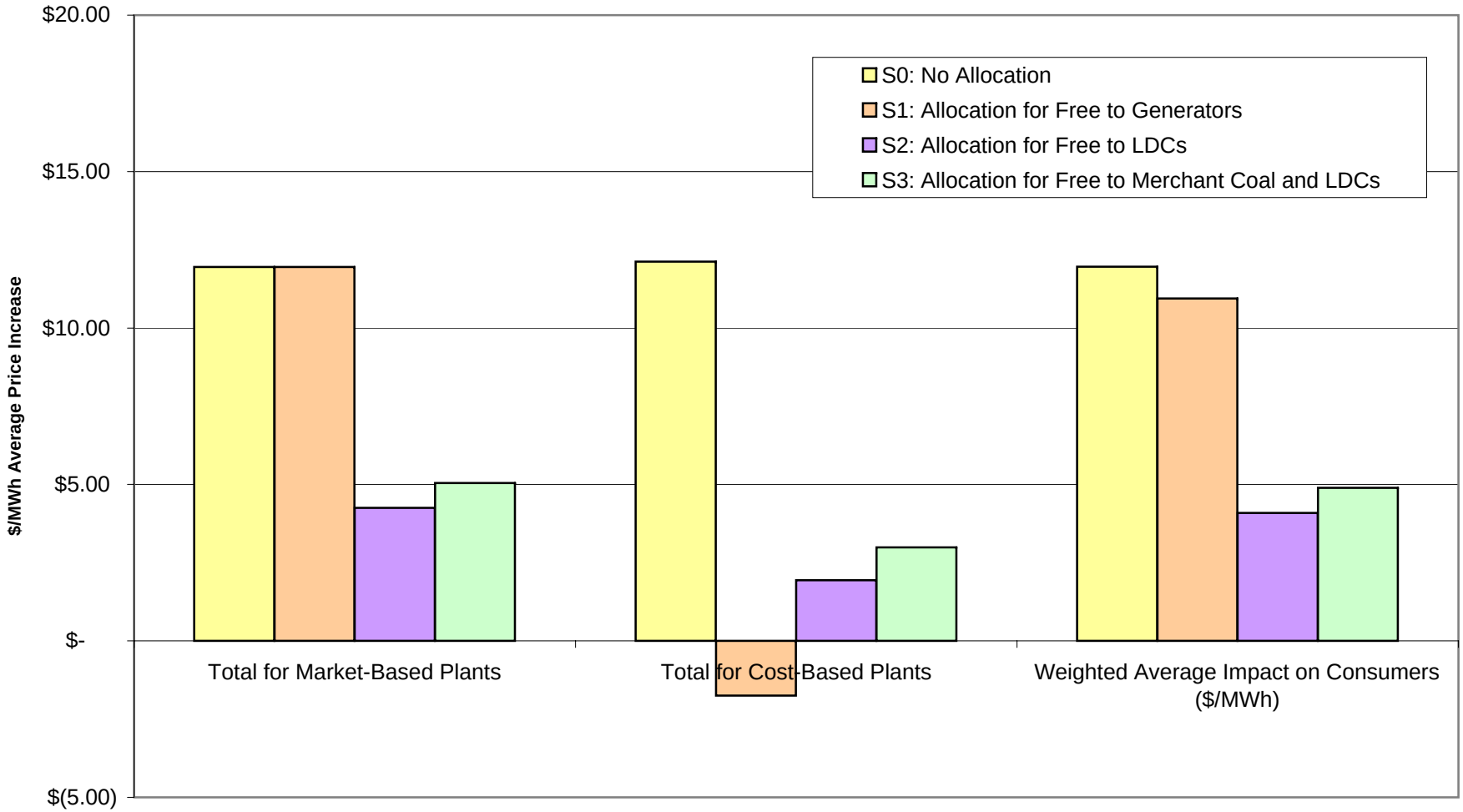
Impact on Market-Based Generation Owners
ISO New England Inc



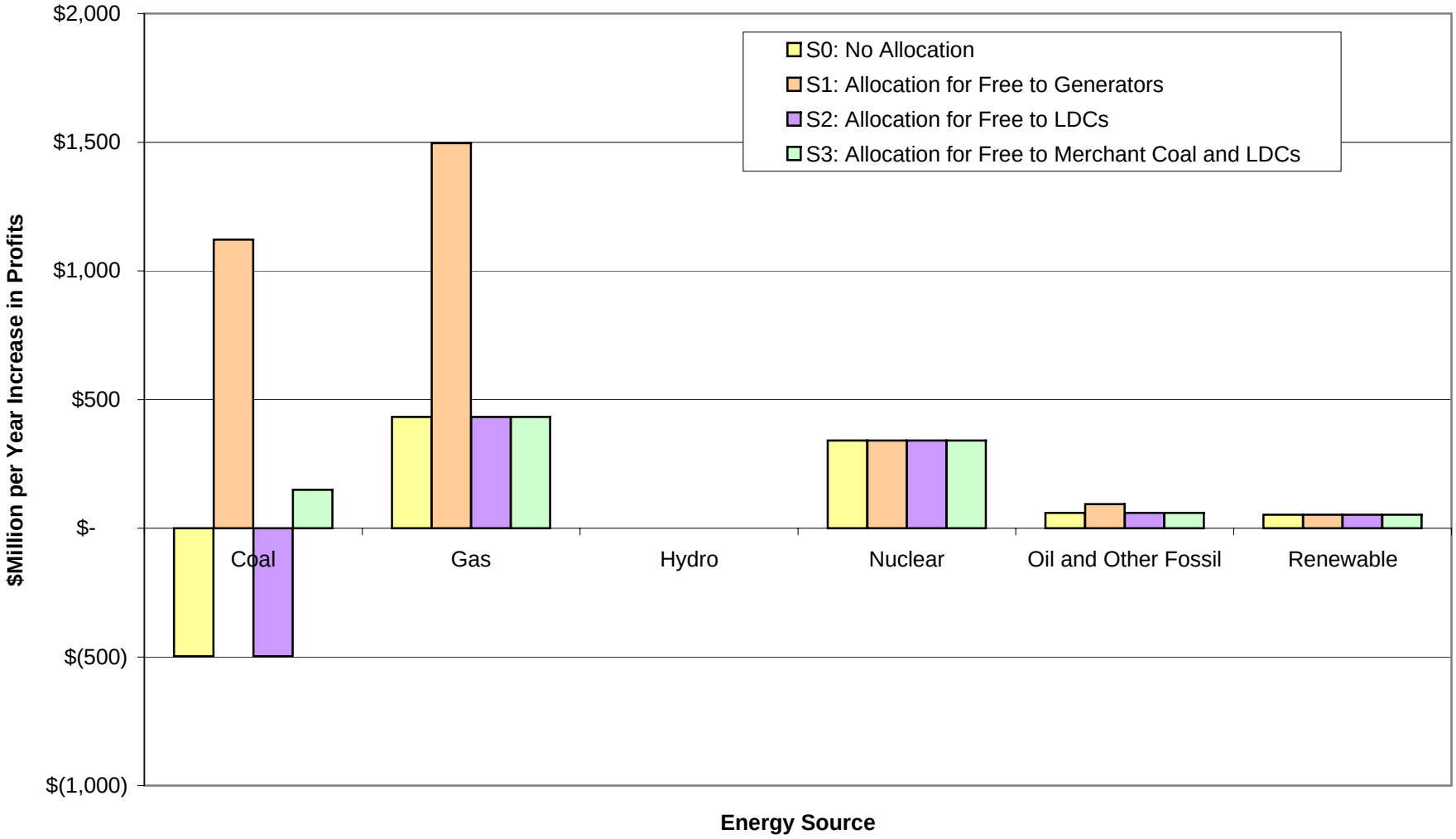
Per-MWh Impact on Market-Based Generation Owners
ISO New England Inc



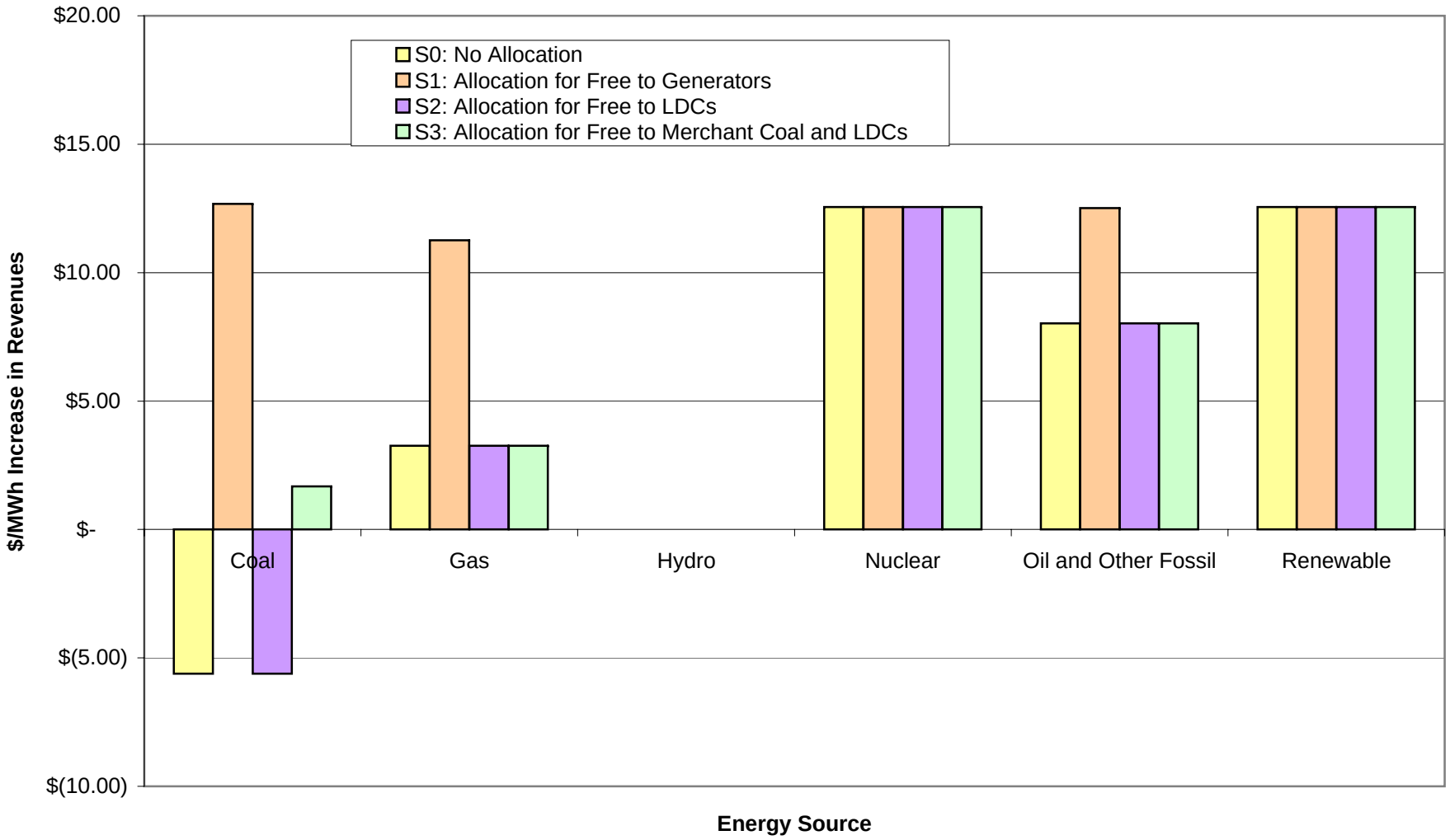
Per-MWh Impact on Consumers: Market vs. Cost-Based
ISO New England Inc



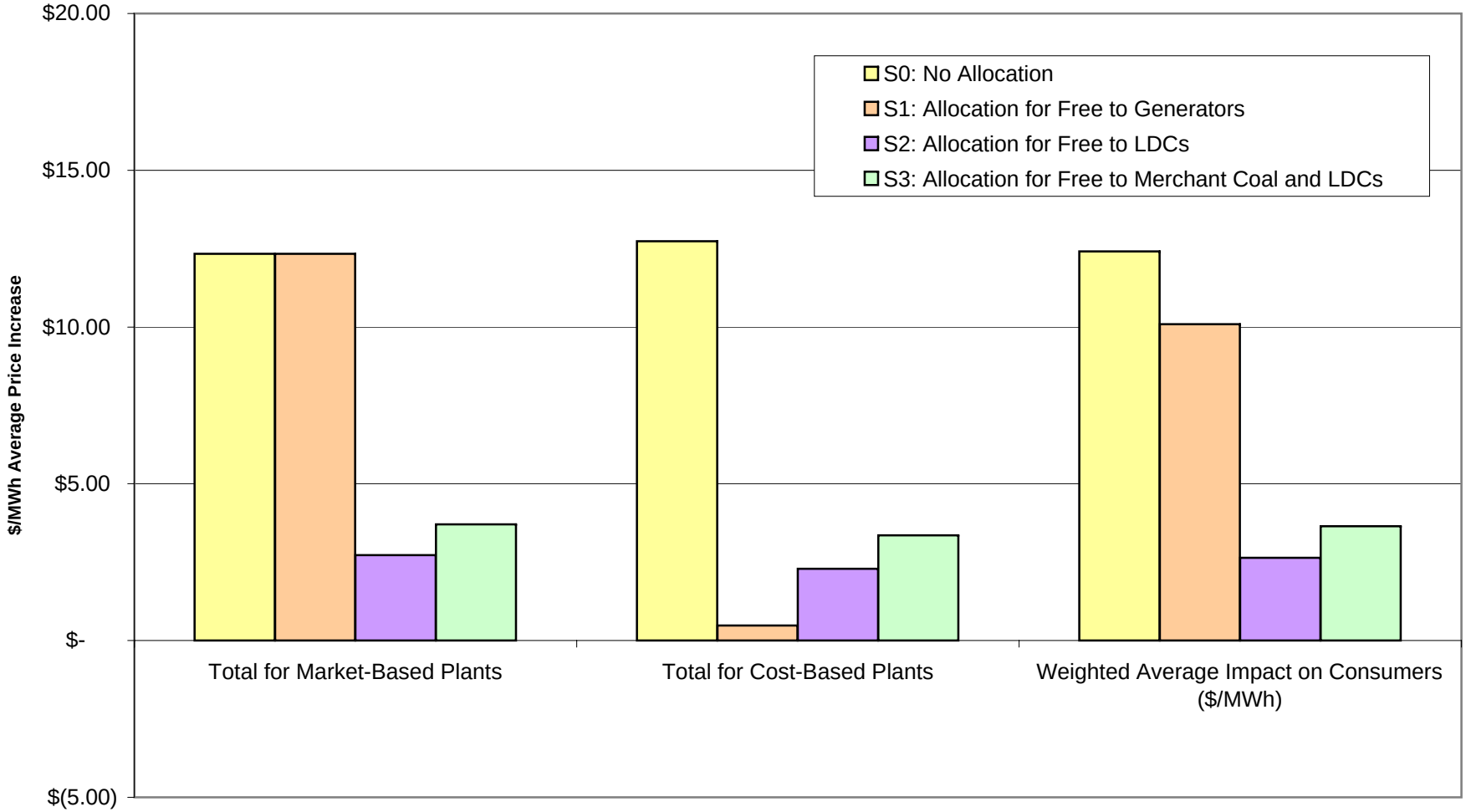
Impact on Market-Based Generation Owners
ERCOT ISO



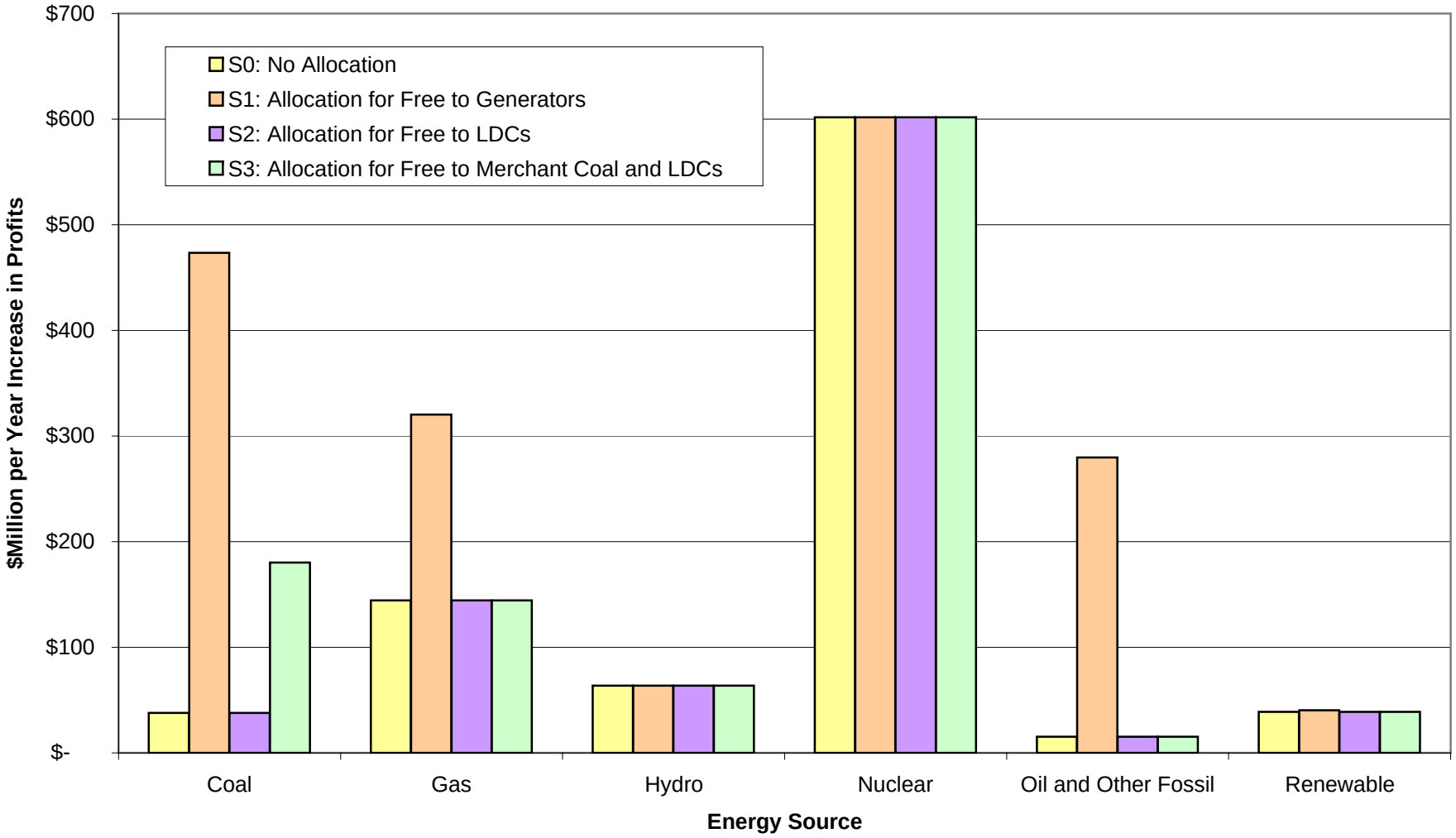
Per-MWh Impact on Market-Based Generation Owners
ERCOT ISO



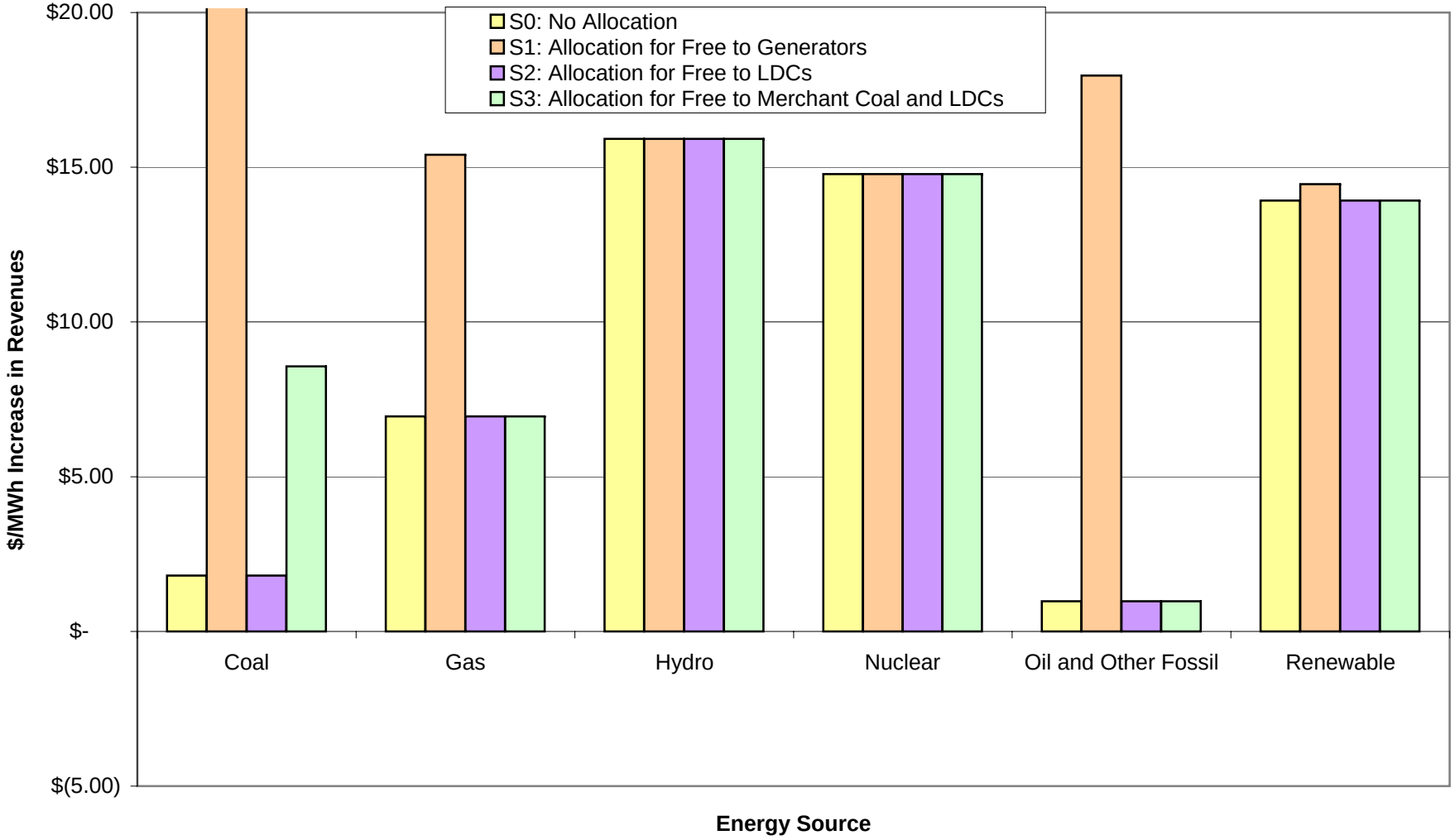
Per-MWh Impact on Consumers: Market vs. Cost-Based
ERCOT ISO



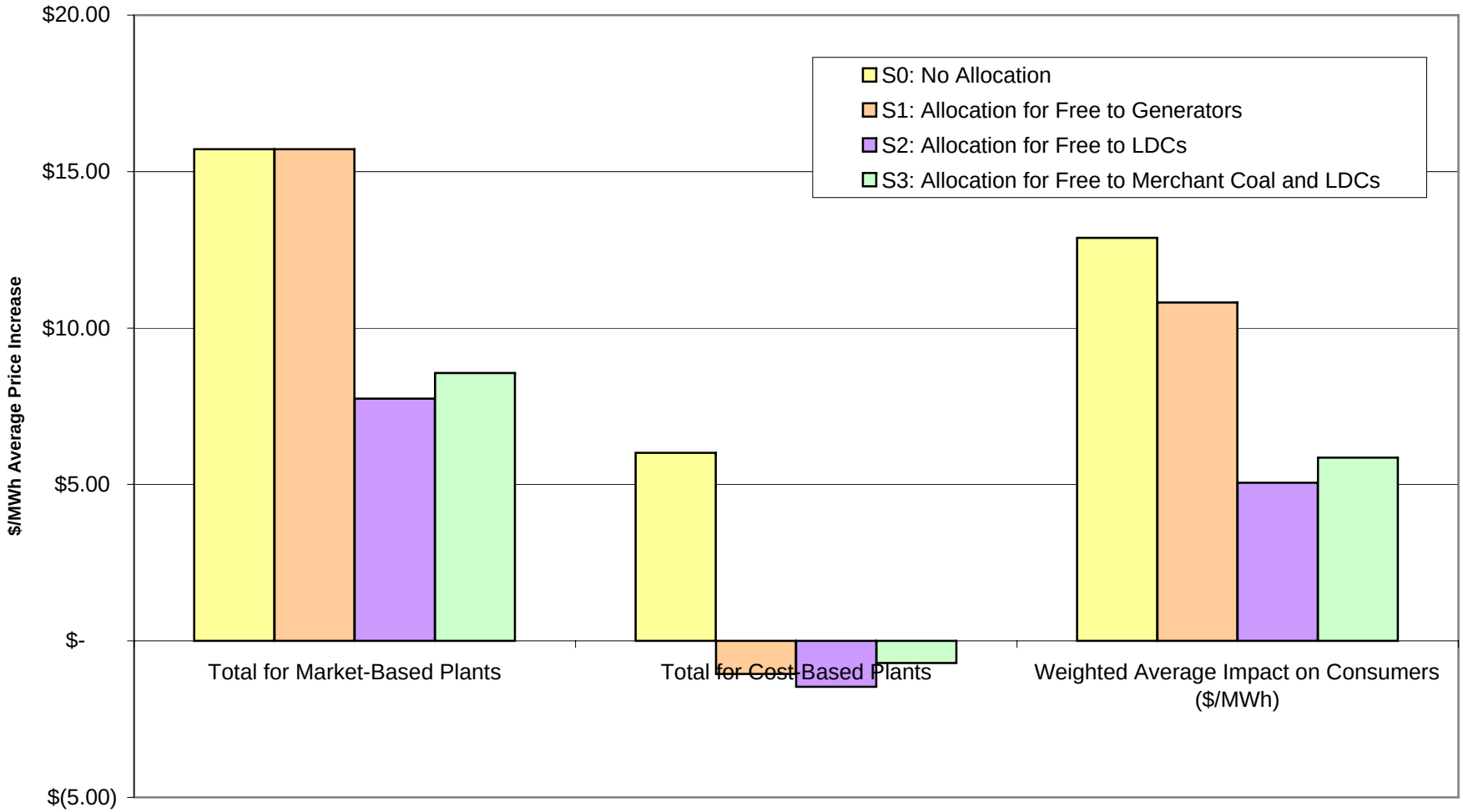
Impact on Market-Based Generation Owners
New York Independent System Operator



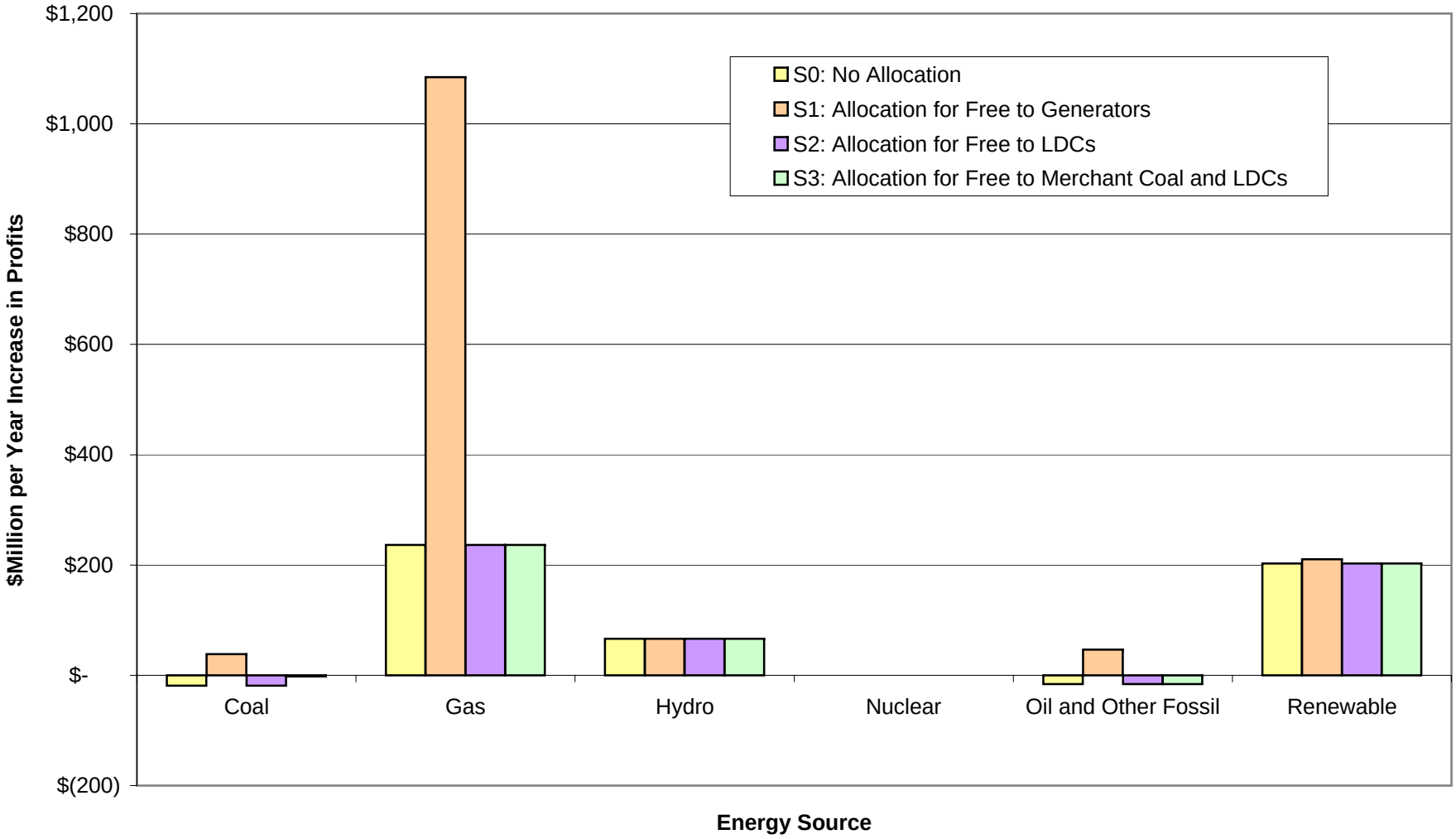
Per-MWh Impact on Market-Based Generation Owners
New York Independent System Operator



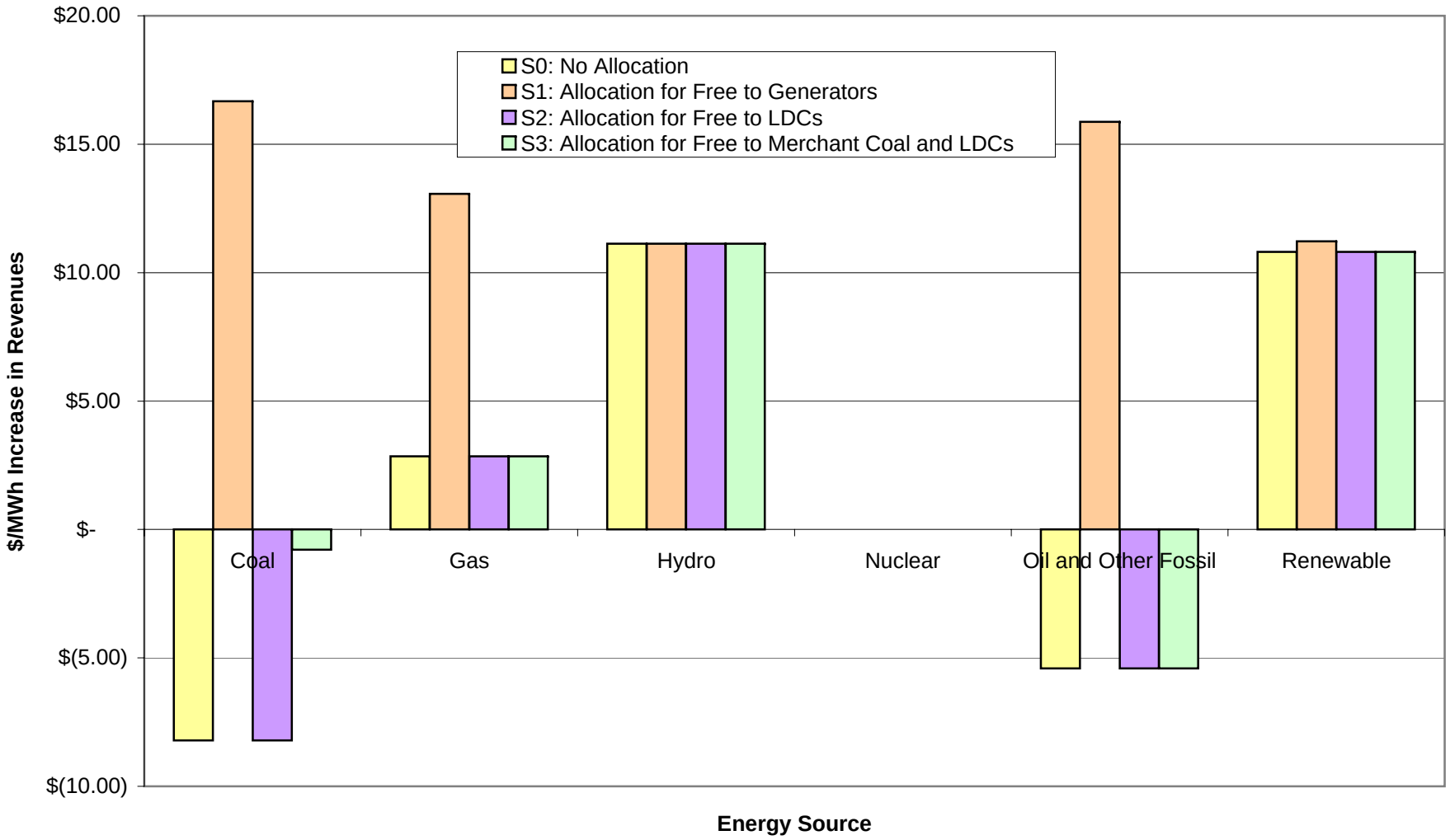
Per-MWh Impact on Consumers: Market vs. Cost-Based
New York Independent System Operator



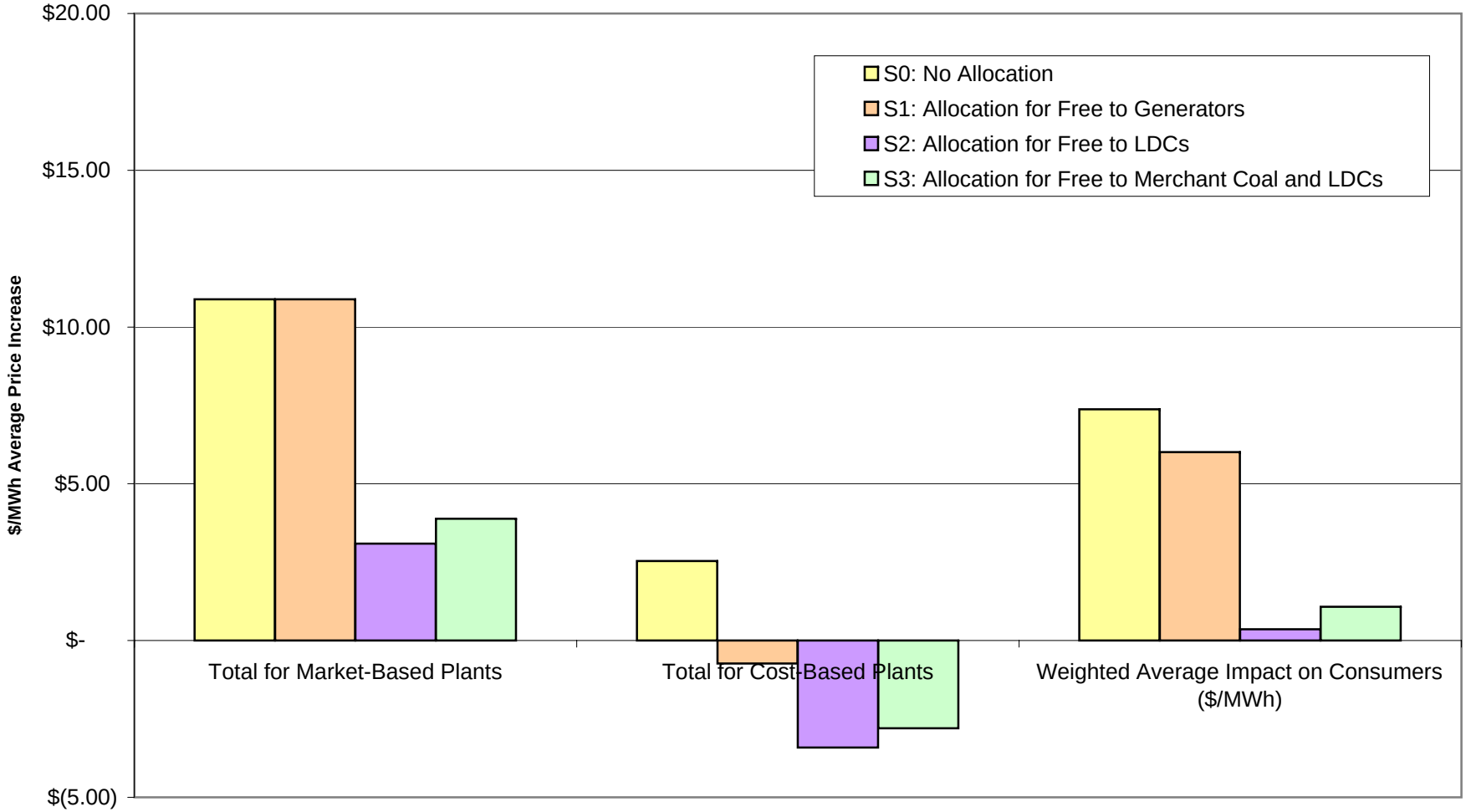
Impact on Market-Based Generation Owners
California Independent System Operator



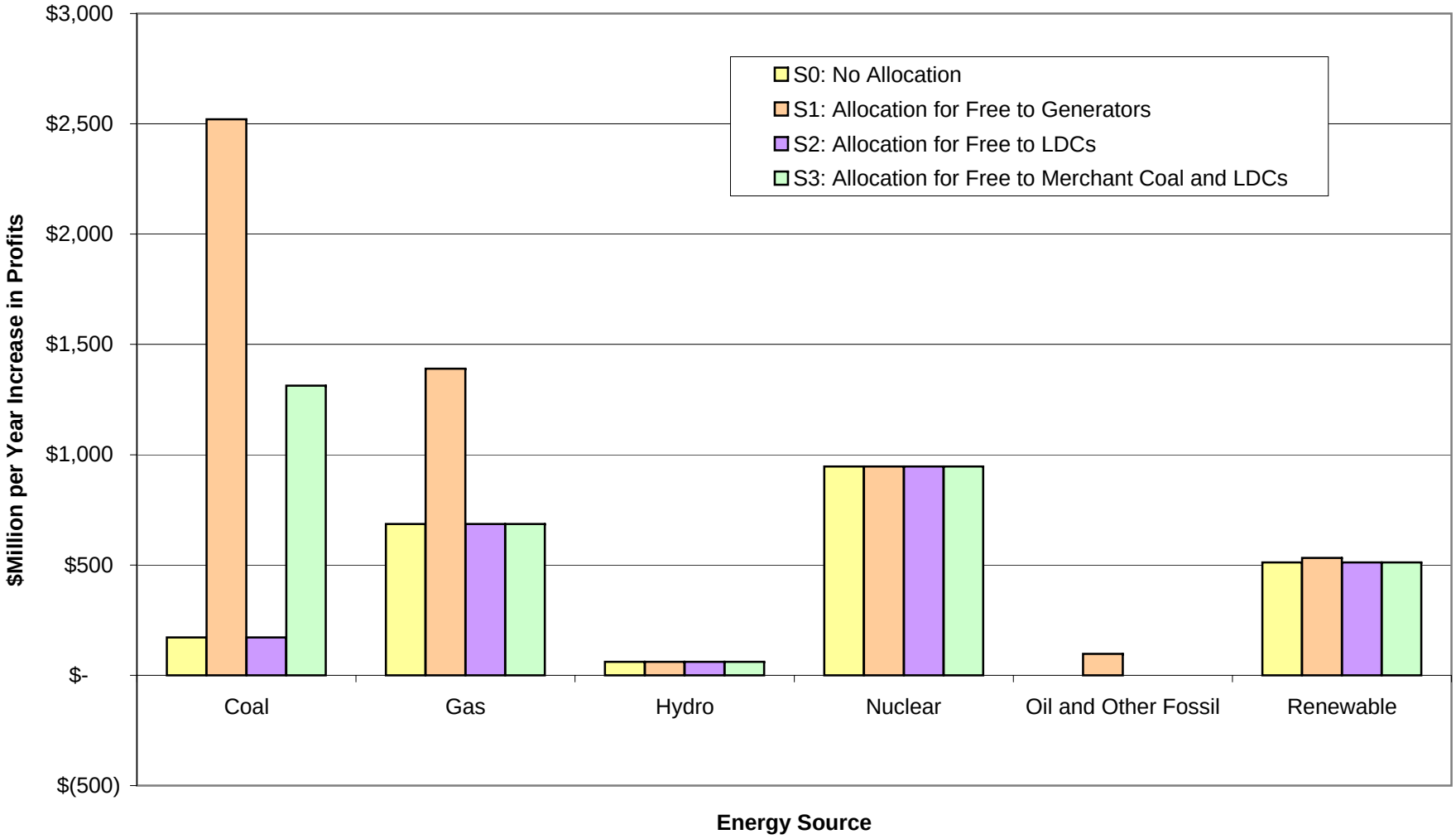
Per-MWh Impact on Market-Based Generation Owners
California Independent System Operator



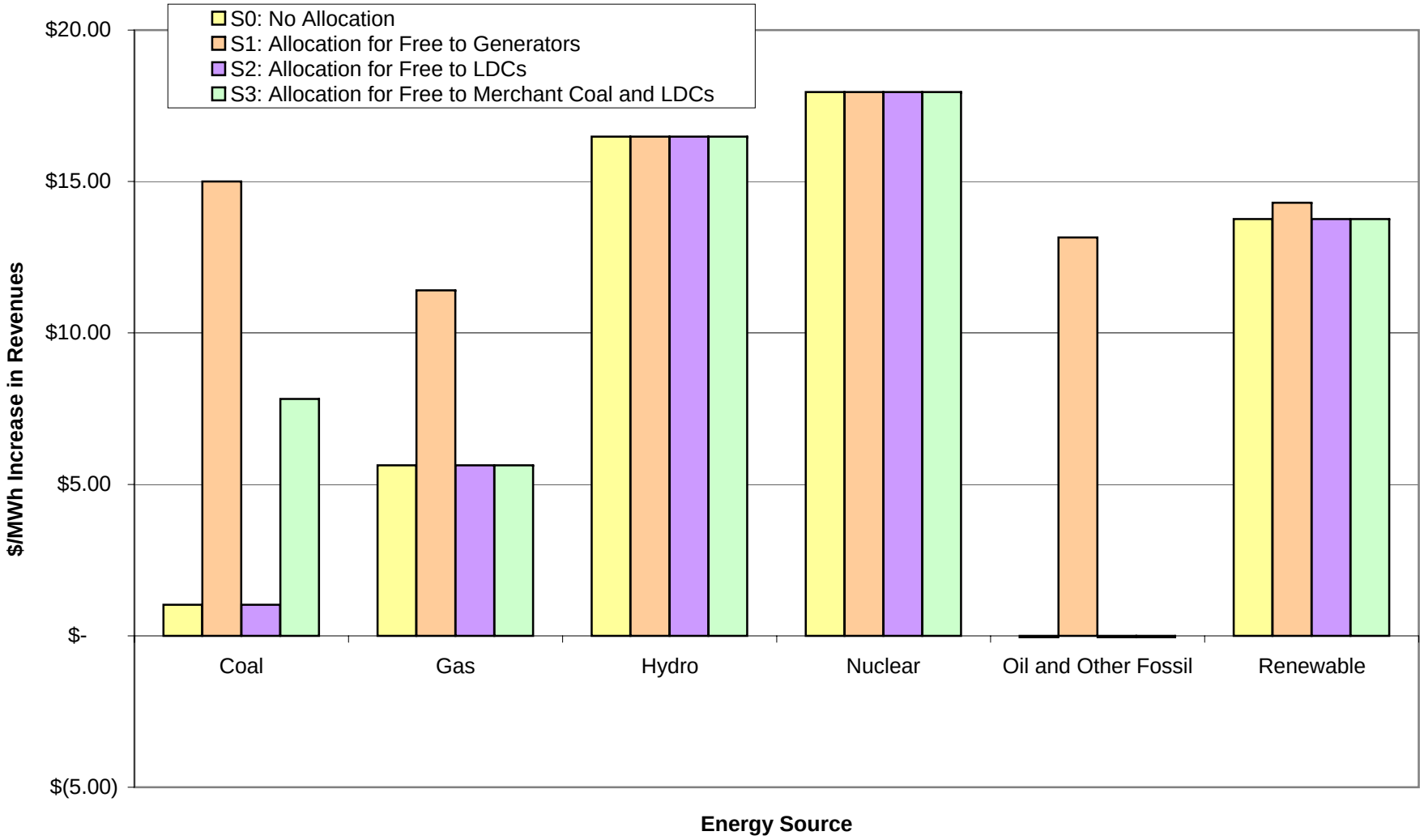
Per-MWh Impact on Consumers: Market vs. Cost-Based
California Independent System Operator



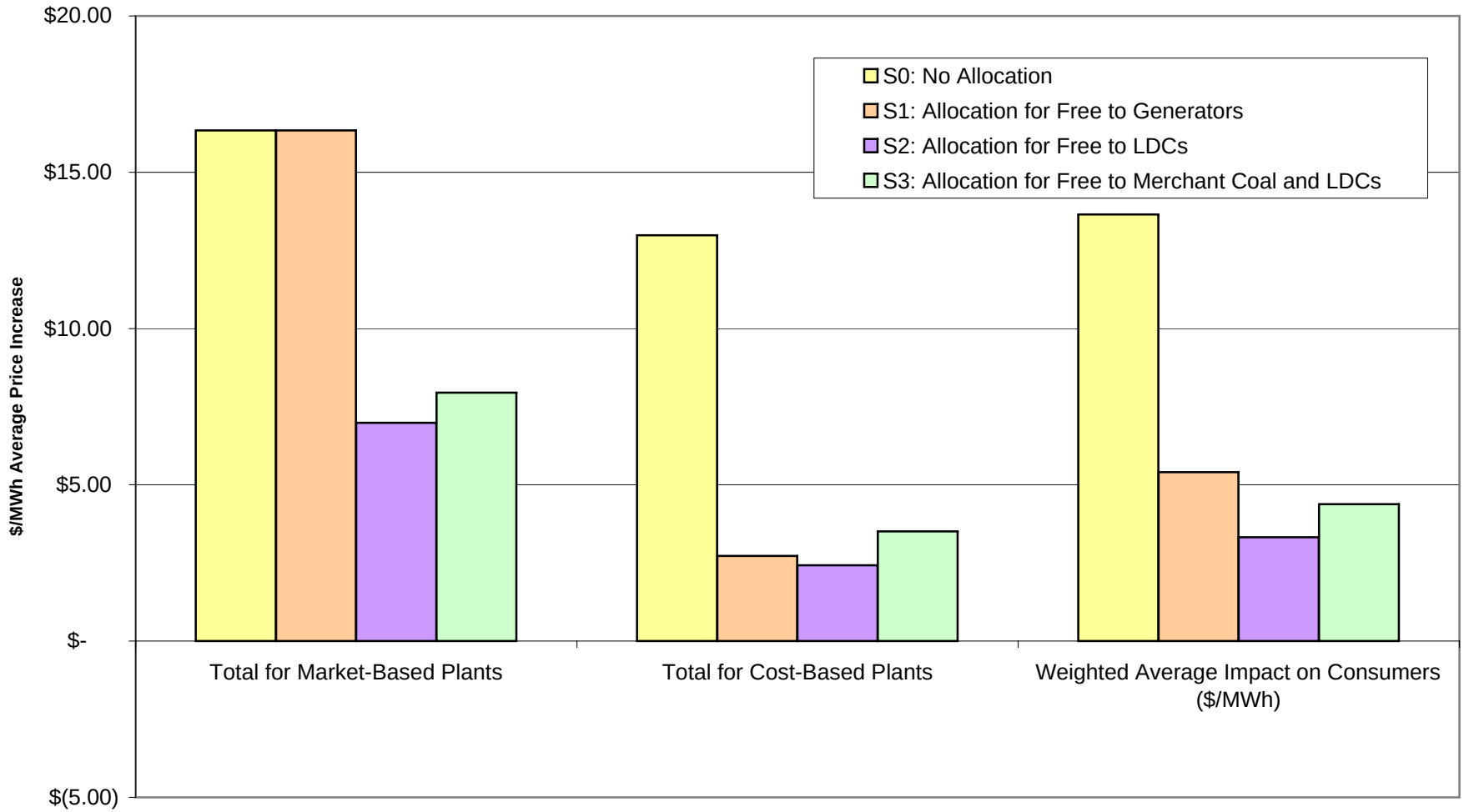
Impact on Market-Based Generation Owners
Non-RTO East



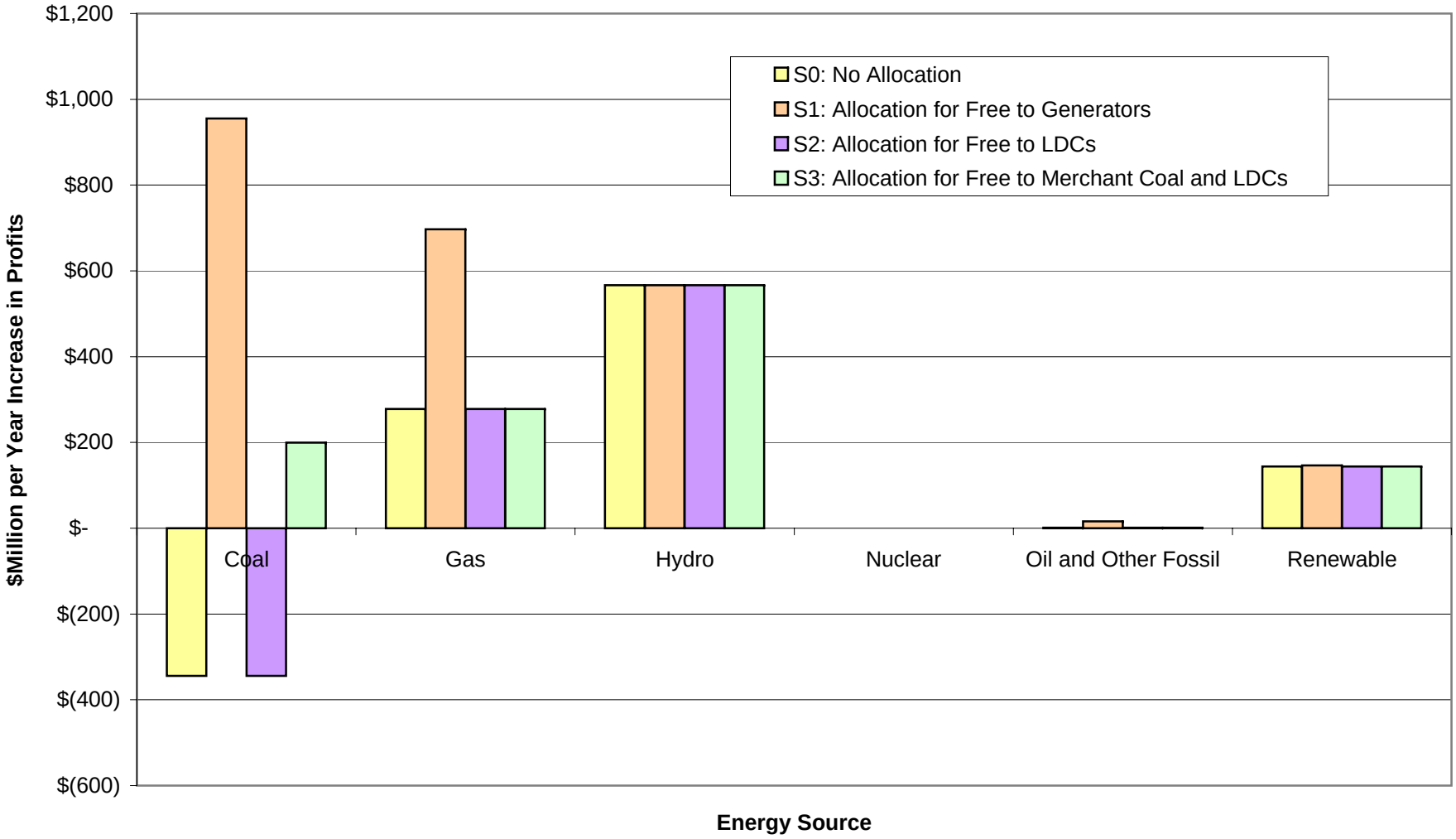
Per-MWh Impact on Market-Based Generation Owners
Non-RTO East



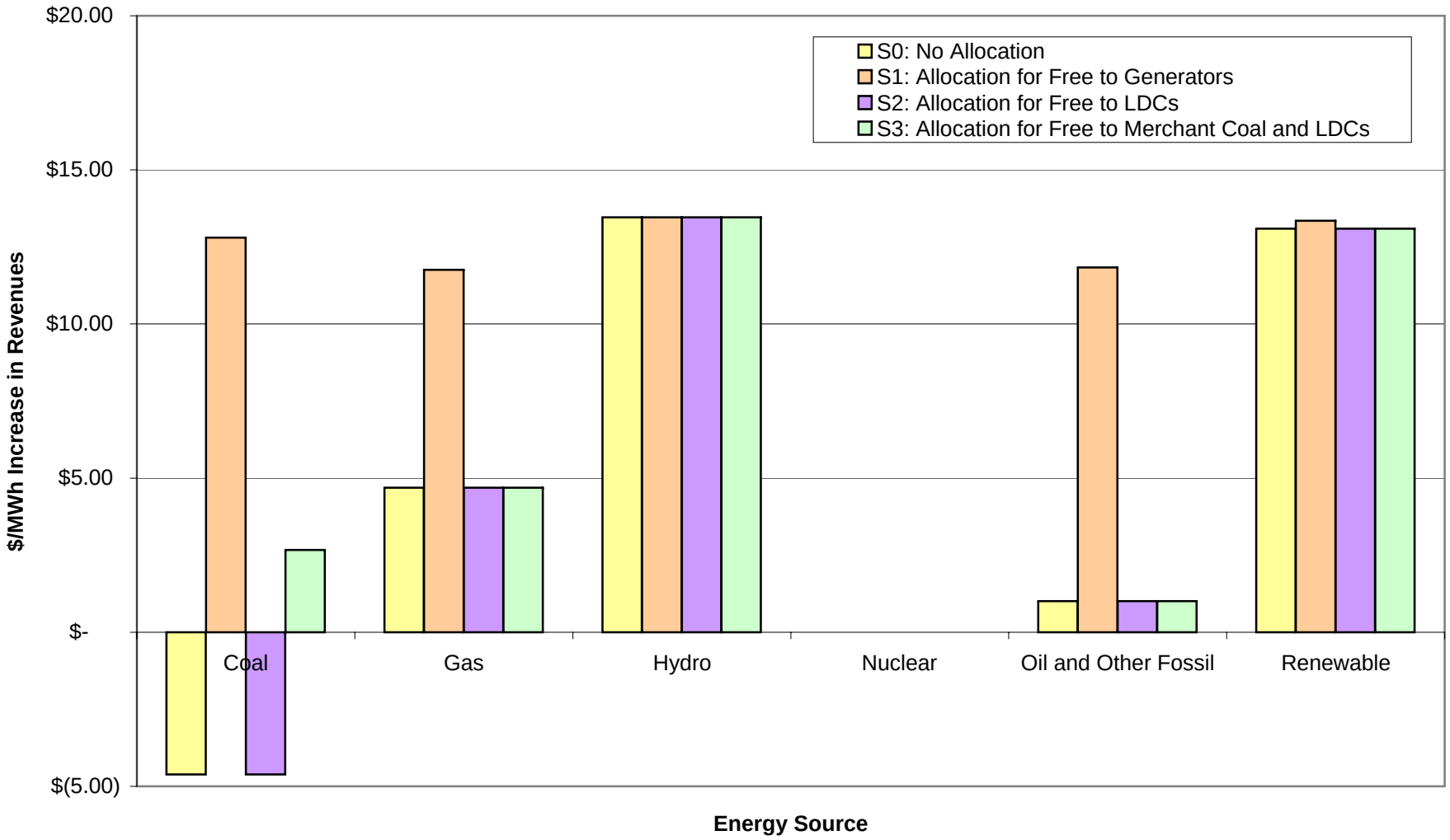
Per-MWh Impact on Consumers: Market vs. Cost-Based
Non-RTO East



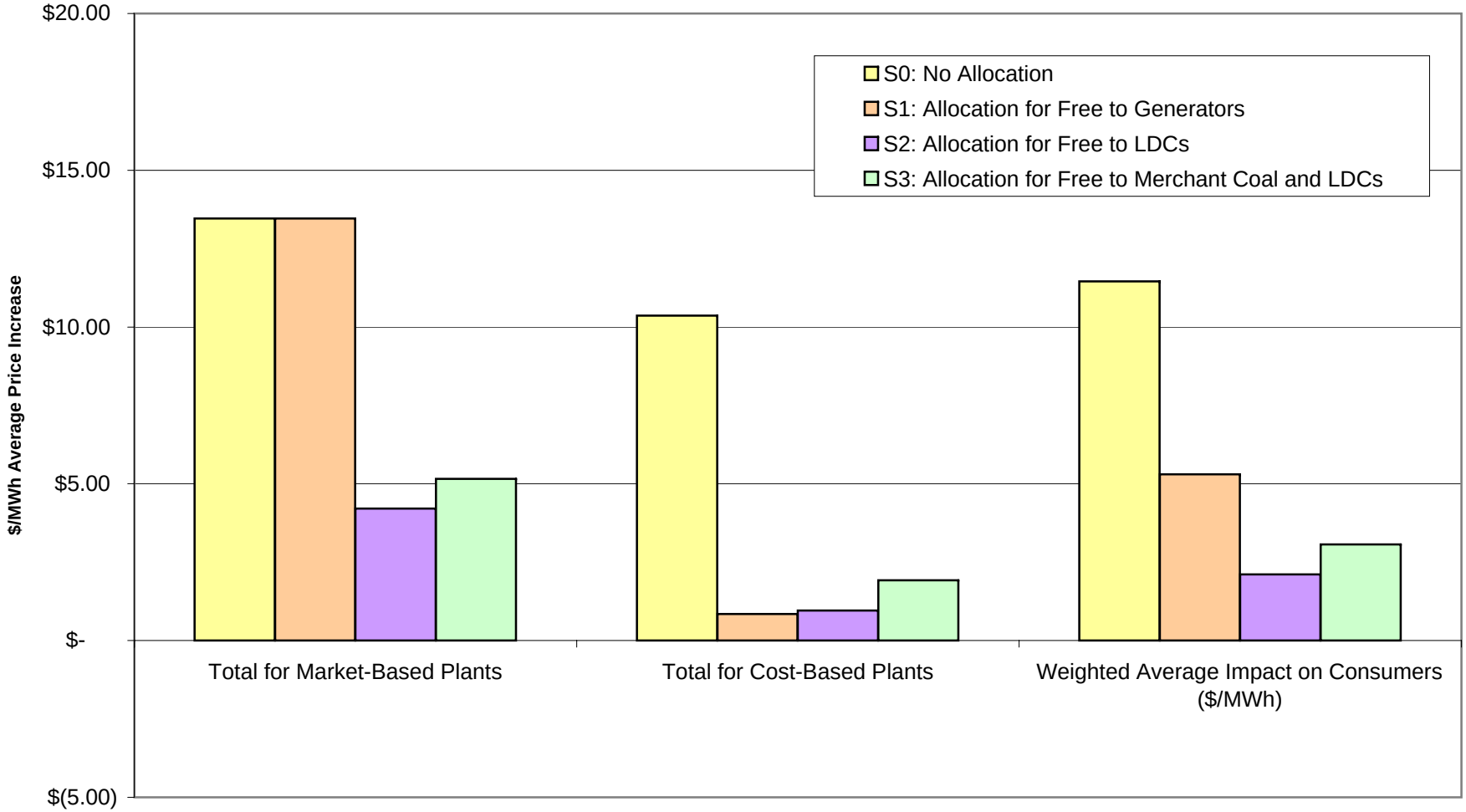
Impact on Market-Based Generation Owners
Non-RTO West



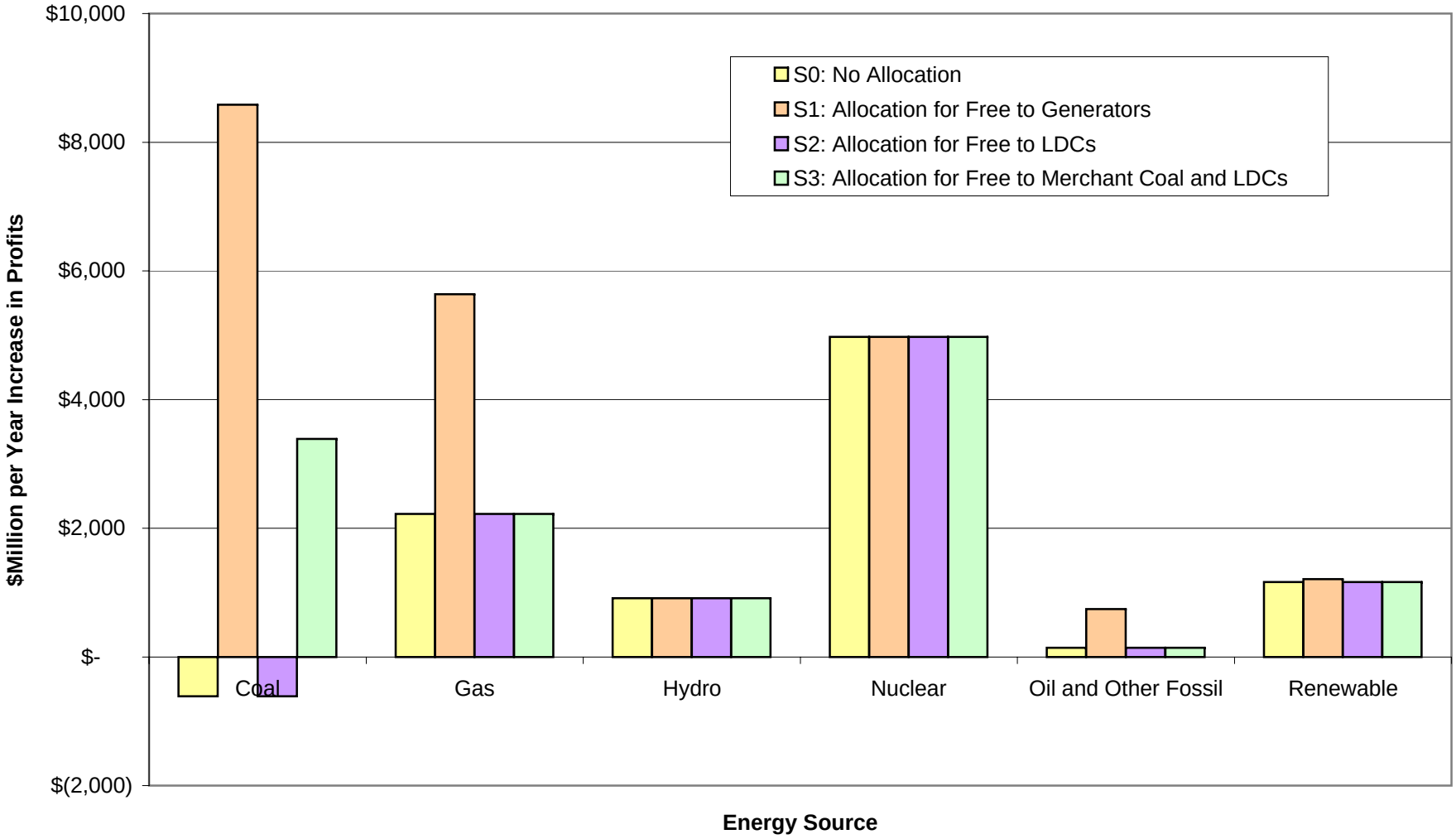
Per-MWh Impact on Market-Based Generation Owners
Non-RTO West



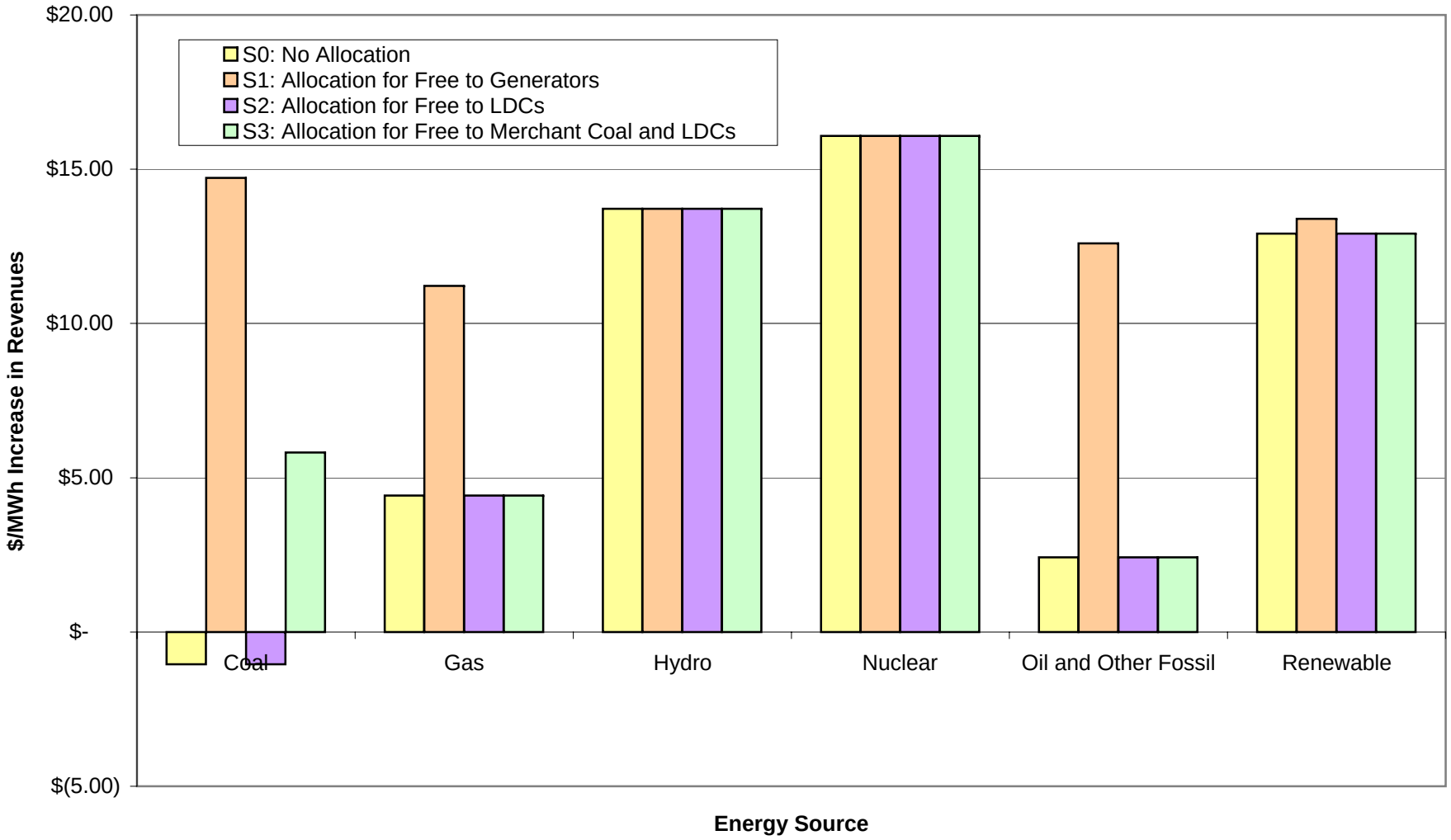
Per-MWh Impact on Consumers: Market vs. Cost-Based
Non-RTO West



Impact on Market-Based Generation Owners
National



Per-MWh Impact on Market-Based Generation Owners
National



Per-MWh Impact on Consumers: Market vs. Cost-Based
National