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## **ISSUE BRIEF**

### **Why New CO<sub>2</sub> Regulations Could Produce Windfall Profits and Unproductive Costs for Consumers**

#### **Overview**

This issue brief describes how the layering of a problematic wholesale market structure on top of the implementation of EPA’s New Source Performance Standards (NSPS) for carbon dioxide (CO<sub>2</sub>) will produce excess costs for consumers and windfall profits for owners of merchant electric generation units. These “unproductive costs” represent a diversion of funds that would be better spent on environmental improvements or on reducing costs to already overburdened consumers.

These profits are in fact a central driver in the position taken by owners of power plants for a more stringent NSPS that attended the EPA listening session on February 4, 2011. Those voicing support for stricter NSPS standards for CO<sub>2</sub> largely overlap with those entities identified by financial analysts as beneficiaries of greater EPA regulation.<sup>1</sup> The reason that a handful of large power plant owners will boost their already lucrative earnings as an outcome of these regulations is the highly problematic wholesale electricity market structure in many parts of the country.

In these parts of the country, including the mid-Atlantic, Northeast, Midwest, California and Texas, wholesale electricity markets are operated by large bureaucratic entities, known as Regional Transmission Organizations (RTOs). While the markets operated by RTOs are highly complex, their central features have allowed owners of unregulated generation – known as “merchant power plants” – to earn excessive profits. For a more detailed description of these markets, see *A Primer on Electricity Markets* at the end of this Issue Brief. The remainder of this

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<sup>1</sup> These companies include Exelon, FirstEnergy, Dominion Power, and Constellation.

document explains how the pending EPA regulations will exacerbate these windfall profits and costs to consumers.

### **What companies are the likely recipients of these windfall profits?**

Owners of large nuclear power plants located within RTO regions will be the largest beneficiaries – and these extra earnings will result from no changes in their operations or additional investments. An analysis by Credit Suisse projects that the market value of Allegheny, Exelon, and FirstEnergy would all increase between 20 and 25 percent, and their earnings would increase by almost 40 percent by 2015 under a 60 gigawatt<sup>2</sup> (GW) coal plant retirement scenario.<sup>3</sup> An analysis by FBR Capital found that the tightening of power supply resulting from the retirement of 45 GW of coal capacity would greatly increase the earnings of FirstEnergy and PPL.<sup>4</sup>

These earnings potentials are the reason behind the merchant power plant owners' simultaneous support for stricter environmental regulations, alongside inadequate consumer safeguards in the RTO-operated wholesale electricity markets. As the Wall Street Journal noted:

Eight leading utility CEOs responded recently to one of our editorials with a letter defending the EPA, claiming that the coal retirements are "long overdue" and that the regulations will "yield important economic benefits." *What they didn't mention is that those benefits will mostly accrue to the businesses they happen to head.*<sup>5</sup> (Emphasis added)

### **What are the primary EPA regulations that will impact the costs of electricity?**

In addition to an NSPS for CO<sub>2</sub>, the major EPA regulations affecting the utility industry that have been the subject of recent studies projecting future coal plant closures are:

- Cooling Water Intake Structures, Section 316(b) of the Clean Water Act
- Maximum Achievable Control Technology Standards for Hazardous Air Pollutants
- Regional Transport Rule
- Coal Combustion Residuals (CCR) Disposal Rule

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<sup>2</sup> One gigawatt is equal to 1,000 megawatts or one million watts. There are about 300 GW of coal capacity in the United States (US Energy Information Administration, [http://www.eia.gov/emeu/aer/pdf/pages/sec8\\_42.pdf](http://www.eia.gov/emeu/aer/pdf/pages/sec8_42.pdf))

<sup>3</sup> *Growth From Subtraction: Impact of EPA Rules on Power Markets*, Credit Suisse Equity Research, September 23, 2010, [http://op.bna.com/env.nsf/id/jstn-8actja/\\$File/suisse.pdf](http://op.bna.com/env.nsf/id/jstn-8actja/$File/suisse.pdf), Exhibit 106, p. 53 and Exhibit 111, 55

<sup>4</sup> *EPA regs may shut 70,000 MW of U.S. coal plants: FBR*, Reuters, December 13, 2010, <http://www.reuters.com/article/2010/12/13/us-utilities-epa-coal-idUSTRE6BC3JN20101213>

<sup>5</sup> *The EPA's Utility Men; Anticarbon regulations and the corporate rent-seekers who love them*, The Wall Street Journal, December 23, 2010, <http://online.wsj.com/article/SB10001424052748704694004576019730082447432.html>

**How will these new Clean Air Act regulations impact the supply of power?**

A number of recent studies analyze the likelihood that owners of coal plants will make the decision to shut down a facility rather than incur the costs of retrofitting to comply with EPA regulations currently under development.<sup>6</sup> Most of these studies found the reduction in coal plant capacity to be significant, equal to about 20 percent of all coal capacity, as summarized in the following table. **These projections do not include the proposal of NSPS standards for CO<sub>2</sub>.**

<p><i>2010 Special Reliability Scenario Assessment</i>, North American Electric Reliability Corporation, October, 2010, Table IV-6, <a href="http://www.nerc.com/files/EPA_Scenario_Final.pdf">http://www.nerc.com/files/EPA_Scenario_Final.pdf</a></p>	<p>10-35 GW of coal, and 40-70 GW of all generation by 2018</p>
<p><i>Growth From Subtraction: Impact of EPA Rules on Power Markets</i>, Credit Suisse Equity Research, September 23, 2010, <a href="http://op.bna.com/env.nsf/id/jstn-8actja/\$File/suisse.pdf">http://op.bna.com/env.nsf/id/jstn-8actja/\$File/suisse.pdf</a></p>	<p>60 GW of coal capacity between 2013 and 2017</p>
<p><i>Potential Coal Plant Retirements Under Emerging Environmental Regulations</i>, The Brattle Group, December 8, 2010, <a href="http://www.brattle.com/documents/UploadLibrary/Upload898.pdf">http://www.brattle.com/documents/UploadLibrary/Upload898.pdf</a></p>	<p>50–66 GW of coal by 2020</p>
<p>FBR Capital, <i>EPA regs may shut 70,000 MW of U.S. coal plants</i>: FBR, Reuters, December 13, 2010, <a href="http://www.reuters.com/article/2010/12/13/us-utilities-epa-coal-idUSTRE6BC3JN20101213">http://www.reuters.com/article/2010/12/13/us-utilities-epa-coal-idUSTRE6BC3JN20101213</a></p>	<p>45 GW likely, with a range of 30 to 70 GW, over the next several years</p>

**How will these coal plant closures produced by the new Clean Air Act regulations increase electricity costs paid by consumers and excess profits of merchant generators?**

The costs to consumers from these coal plant closures and retrofits will fall into two categories: direct and indirect (or unproductive) costs. *Direct costs* cover the construction of new cleaner plants to replace the mothballed coal plants and retrofitting those plants that remain in operation. *Indirect costs* are the increase in energy and capacity market prices resulting from the constrained supply of power, and increases in the price of natural gas resulting from the increased demand for this fuel. As explained later, increases in natural gas costs within RTO – operated markets will be paid for all energy produced, regardless of the source, and are therefore subject to a significant multiplier effect in these markets. These indirect costs are not direct expenditures on actions that will improve the environment, and instead are “unproductive costs” that will simply burden consumers.

**But aren’t natural gas costs expected to remain low?**

Despite the conventional wisdom that natural gas prices are likely to remain low, there are several reasons why this is unlikely. First, a number of the closed coal plants will inevitably need to be replaced with natural-gas or renewable energy sources. Second, because wind and solar

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<sup>6</sup> These analyses look at the impact from regulations listed above for cooling water intake structures, Maximum Available Control Technology, Regional Transport Rule, and coal-ash disposal.

power are variable sources of energy and cannot be called upon to deliver power at the exact moment when needed, a significant amount of backup power will be required to integrate these renewable sources, and will most likely come from natural gas facilities.<sup>7</sup> These two developments, will likely drive up the demand for natural gas significantly. The potential for shale gas supplies to maintain natural gas prices at current low levels in the face of increased demand is highly unlikely given the uncertainty about the technologically achievable quantities and environmental costs of shale gas extraction.<sup>8</sup>

### **How does the market structure affect the amount of these unproductive costs?**

For generation owned by a vertically-integrated regulated utility, the decision to retrofit or close a coal plant would be based on an assessment of the costs of replacing that power source as compared to retrofitting the plant. Because the utility is under the obligation to provide a reliable supply of power to their customers, if it were to close the coal plant, it would need to invest in new generation (either through construction or contracts) and energy efficiency to make up for the reduction in supply. Following a review and approval of such expenses by the relevant regulatory bodies, the direct costs would be passed on to customers through rates. Any increases in the cost of natural gas would be passed on to consumers through the fuel adjustment clause, but only for the energy actually generated by those plants.

For merchant power plants in regional transmission organization (RTO)-operated markets, the indirect or unproductive costs would be greatly exacerbated. Owners of these plants would decide to retrofit a coal plant only if they expect their future market earnings will exceed such expenses, with no consideration of the impact on reliability. Merchant power plants sell power into RTO-operated energy markets using the single-clearing price model, where the plant with the highest offer to sell power required to meet demand sets the price for all power used in each hour. Plants with the highest operating costs, largely determined by the price of fuel, are generally the marginal plants. Nuclear power plants, which have the lowest operating costs, are almost never the marginal plant, and sell their power at prices that exceed their operating costs in all hours. Some RTOs also operate capacity markets that provide large sums of revenue to cover the generators' fixed costs for keeping plants ready to provide power. Capacity markets also use a single-clearing price model, and greatly benefit older, largely depreciated plants that have paid off the bulk of their fixed costs – including many nuclear plants.

Unlike generation owned by a vertically-integrated utility, the future earnings of merchant generation owners would be higher for their remaining existing plants if a portion of generation is shut down and the supply of power becomes constrained. One likely scenario is for merchant

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<sup>7</sup> The Department of Energy's 20% Wind Scenario projects an additional 70 GW of natural gas-fired combustion turbine capacity. See 20% Wind Energy by 2030 Report, Appendix A, Figure A-6, p.153, [http://www.20percentwind.org/report/Appendix\\_A\\_20PercentWindScenarioImpacts.pdf](http://www.20percentwind.org/report/Appendix_A_20PercentWindScenarioImpacts.pdf)

<sup>8</sup> For a discussion on the uncertainties surrounding future shale gas production, see *Implications of Greater Reliance on Natural Gas for Electricity Generation*, Prepared by Aspen Environmental Group for APPA, July 2010, p. 28-38, <https://appanet.cms-plus.com/files/PDFs/ImplicationsOfGreaterRelianceOnNGforElectricityGeneration.pdf>.

generators to strategically close the plants that are the most costly to retrofit while allowing the remaining plants, especially nuclear and lower emission coal plants, to benefit from the resulting higher prices.<sup>9</sup> Several recent analyses have found that the closure of coal plants is in fact likely to be greater for merchant units. The Brattle Group found that most of the coal plants likely to retire will be merchant units, accounting for 64 to 76 percent of merchant coal capacity compared to 1 to 4 percent of regulated coal, who would be much more likely to retrofit the plants.<sup>10</sup>

Credit Suisse projects that the likely supply constraints resulting from the coal plant closures would increase power prices by \$5 to \$10 per mwh – equal to a 10 to 20 percent increase from the 2010 average energy prices for PJM.<sup>11</sup> This same analysis predicts a dramatic increase in the capacity price in the non-transmission constrained region of the RTO, from \$27 to \$100 per MW/day.

As the supply becomes more constrained, less efficient and higher operating cost plants will set the clearing price.<sup>12</sup> In addition to the impact of supply constraints, natural gas costs will significantly influence the electricity prices in RTO markets. Because the RTO markets use a single-clearing price model, any price increases for the highest-cost units that set the clearing price are multiplied by all the electricity used in that time period. For example, in the PJM Interconnection, the largest RTO, covering the Mid-Atlantic States, natural gas accounts for just one-tenth of the electricity generation but typically sets the clearing price in one-fourth of the hours.<sup>13</sup> Because the hours when a natural gas-fired plant is the clearing unit are during “peak”

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<sup>9</sup> For example, Credit Suisse notes that “the retrofit / closure decision will not occur in a vacuum such that plants ‘on the bubble’ for investment could be attractively economic as other plants are pulled from the market.” *Growth From Subtraction: Impact of EPA Rules on Power Markets*, Credit Suisse Equity Research, September 23, 2010, [http://op.bna.com/env.nsf/id/jstn-8actja/\\$File/suisse.pdf](http://op.bna.com/env.nsf/id/jstn-8actja/$File/suisse.pdf), p. 36. Similarly, Fitch Ratings concluded that: “Merchant generation that does not rely on coal (or coal-fired generation that is already highly controlled) could increase its profitability if a significant portion of coal-fired generation in the same region is retired and heat rates rise in the region due to stringent enforcement of new EPA rules.” *Time to Retire? US Coal Plants in Environmental Crosshairs*, FitchRatings, February 2011, p. 2 [http://www.fitchratings.com/creditedesk/reports/report\\_frame.cfm?rpt\\_id=604365](http://www.fitchratings.com/creditedesk/reports/report_frame.cfm?rpt_id=604365)

<sup>10</sup> *Potential Coal Plant Retirements Under Emerging Environmental Regulations*, The Brattle Group, December 8, 2010, p. 6 <http://www.brattle.com/documents/UploadLibrary/Upload898.pdf>,

<sup>11</sup> The load-weighted real-time and day-ahead locational marginal prices for 2010 were \$48.35 and \$47.65 per megawatt-hour, respectively. *2010 State of the Market Report for PJM*, Section 2, p. 24-25, Monitoring Analytics, March 10, 2011, [http://www.monitoringanalytics.com/reports/PJM\\_State\\_of\\_the\\_Market/2010/2010-som-pjm-volume2-sec2.pdf](http://www.monitoringanalytics.com/reports/PJM_State_of_the_Market/2010/2010-som-pjm-volume2-sec2.pdf)

<sup>12</sup> FitchRatings, for example, notes that “the retirement of a large number of coal-fired power plants in a region could result in less efficient gas-fired power plants becoming the marginal dispatch units.” FitchRatings, February 2011, p. 7.

<sup>13</sup> *2010 State of the Market Report for PJM*, Section 2, Table 2-14, p.47 and Section 3, Table 3-43, p.204, Monitoring Analytics, March 10, 2011, [http://www.monitoringanalytics.com/reports/PJM\\_State\\_of\\_the\\_Market/2010.shtml](http://www.monitoringanalytics.com/reports/PJM_State_of_the_Market/2010.shtml)

periods of higher electricity use, these hours can account for a much greater amount of energy consumption. The closure of coal plants combined with an increase in natural gas costs will mean that both the number of hours when natural gas-fired units clear the market and the price in those hours will rise significantly. The result will be greater revenues for all existing power plants with lower operating costs than the marginal natural gas plants – especially the nuclear power plants that have been largely paid off by ratepayers while regulated.

This assessment of the potential profit increases is confirmed by a number of recent statements by large merchant generation owners regarding new EPA rules. A few examples are:

- As reported by The Wall Street Journal, John Rowe, the CEO of Exelon, the owner of a large fleet of nuclear power plants stated on a conference call with financial analysts last summer that pending EPA rules "increase operating costs for the coal-fired generators...and ultimately increase the clearing price for energy." Mr. Rowe also stated that "the upside to Exelon is unmistakable" and that every \$5 increase per megawatt-hour translates into \$700 million to \$800 million in new annual revenue.<sup>14</sup>
- Constellation Energy is looking to the capacity markets to generate additional revenue, and projects such revenue to increase by \$60 million between 2011 and 2014.<sup>15</sup>
- PPL Corporation lists pending coal plant closures as one of the "catalysts for growth" in its earnings in a February 2011 presentation to financial analysts, stating that the "[p]roposed EPA regulations are expected to be a net benefit given our mix of generation."<sup>16</sup>

One of the greatest beneficiaries of the coal plant closures in RTO-operated markets will be the owners of merchant nuclear power plants, who will see dramatic increases in earnings – for doing absolutely nothing. Those coal plants that can comply with EPA regulations at minimal costs will likely see increases in their earnings as well, for little or no changes in their operations. As a result, consumers will pay higher costs even where no money is spent on the development of cleaner energy supply or energy efficiency measures, making these costs truly unproductive.

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<sup>14</sup> From statements made during Exelon's second-quarter earnings call in July 2010, quoted in *The EPA's Utility Men - Anticarbon regulations and the corporate rent-seekers who love them*, the Wall Street Journal, December 23, 2010.

<sup>15</sup> Constellation Energy, 2010 Year-End Earnings Presentation, February 4, 2011, Slide 12, <http://files.shareholder.com/downloads/CEG/1147753753x0x439125/6a8484c5-8fd6-4f4d-b0df-cd19a99f6d36/2010%20Year-End%20Earnings%20Presentation%20-%20SUPPORTING%20MATERIALS.pdf>

<sup>16</sup> PPL Corporation, Credit Suisse Global Energy Summit, February 8-11, 2011, Slide 12, [http://files.shareholder.com/downloads/PPL/1184323975x0x439853/e3b801ef-3a55-42c8-9c6f-52bce977d833/PPL\\_IP\\_2.8.11.pdf](http://files.shareholder.com/downloads/PPL/1184323975x0x439853/e3b801ef-3a55-42c8-9c6f-52bce977d833/PPL_IP_2.8.11.pdf)

## **A Primer on Electricity Markets**

### **How are electricity markets regulated?**

There are two types of electricity markets; retail and wholesale. Retail sales cover the purchase of electricity by homeowners, businesses, and factories from the local utility, which is one of three types:

Investor-owned utilities (often called “IOUs”) are for-profit companies owned by shareholders and regulated by state commissions;

Public power utilities are not-for-profit electric utilities that are owned and operated by states or political subdivisions of a state (cities, public utility districts, and utility boards), and are typically regulated either by an elected or appointed governing board or a city council.

Rural electric cooperatives are private not-for-profit entities owned by the customers they serve, and are usually governed by a board of directors, elected by the members of the cooperative, although they are also subject to state commission oversight in some states.

All of these retail utilities obtain power from two sources; electricity generating plants that they own, or purchases of power from other utilities or independent owners of generating plants. The second source, power purchased from other sources, is as a wholesale purchase. Wholesale markets are regulated by the Federal Energy Regulatory Commission (FERC). The local utility’s rates are based on a formula that reflects their costs of producing, purchasing and distributing power, and for the IOU’s, a return to shareholders. Wholesale electricity costs therefore impact the customers’ bills in proportion to the amount of power that the utility does not generate on its own and must purchase from other generators.

### **What is meant by the restructuring of electricity markets?**

The terms restructuring refers to a series of changes implemented in both the retail and wholesale electricity markets over the past 20 years intended to introduce greater competition into these markets – a goal that has not been obtained.<sup>17</sup>

On the retail level, a number of states, including California, New York, Illinois, Maryland, New Jersey, Pennsylvania and several New England states, implemented “retail choice” in the 1990s. Individual households, businesses and factories were all given the right to purchase power from non-utility providers. (In most states that implemented retail choice, public power utilities were allowed to “opt out”, and almost all of them did so.) As a common component of retail choice, the IOUs were required to sell their generating plants and to purchase power from the wholesale markets. The result was that a large pool of merchant power plants now sells power at unregulated prices and no longer has an obligation to serve customers. Moreover, the impact of

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<sup>17</sup> For more information and detailed studies of the restructured wholesale electricity market, see APPA’s Electric Market Reform Initiative, at [www.publicpower.org/emri.cfm](http://www.publicpower.org/emri.cfm).

the wholesale markets was expanded – customers of these restructured IOUs now pay retail rates that are a reflection of the wholesale power markets rather than the costs of their utilities generation. Most public power utilities also rely on purchases from the wholesale markets for the energy they supply to their customers, and many rely almost exclusively on such purchases.

Meanwhile, the wholesale markets underwent a problematic restructuring during this time period. FERC formerly required the prices for the sale of wholesale power to be determined by the cost of producing that power. But since the early 1990s, FERC has increasingly relied on highly elusive “competition” in wholesale power markets to set prices, and has granted “market-based rate authority” to many sellers of wholesale electric power, subject only to reporting and limited oversight requirements. This allows electric generators to sell power at market prices, which frequently exceed the actual costs of generating the power.

FERC also encouraged the creation of entities called regional transmission organizations (RTOs). One function of these RTOs is the operation of wholesale markets, featuring short-term spot energy markets setting hourly rates in “single-clearing price auctions.” All generators whose electricity is purchased in a given hour receive the highest price bid to supply electricity in that hour. Many RTOs have also created complex “capacity markets” that also operate on single-clearing price basis, and provide large sums of revenue to generators simply for keeping plants ready to provide power if needed, or to customers who agree to cut back their power when supplies are short.

The RTOs cover the mid-Atlantic, New England, New York, California, the Midwest and Texas. Almost all of the states that have implemented retail access and are located within these RTOs.

These changes in the wholesale and retail markets were predicated on assertions by federal and state officials and other RTO proponents that they would promote competition, spur efficiencies and innovation, and lower rates for consumers—assertions that, for the most part, have not come to fruition. In fact, the greatest beneficiaries have been the merchant power plant owners, especially the owners of older power plants (many of them nuclear) that have been largely depreciated. These owners have earned profits that greatly exceed what they had previously earned under regulation – profits that are funded by higher prices for consumers in retail access states located in RTO markets.