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CAN GRID BE DESIGNED BY DEMOCRACY?

THE POLITICAL COMPLEXITY OF REGIONAL ELECTRICITY POLICY FORMATION

A Dissertation in

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ABSTRACT

Regional Transmission Organizations are tasked with a primary goal of providing non-discriminatory access to transmission, ensuring grid reliability (Federal Energy Regulatory Commission 1996, 1999) and facilitating the integration of new technologies and market participants, including renewable power generation, energy storage and demand response. Given the clear necessity of power grid operators to develop planning and operational rules to handle the increased penetration of renewable energy and/or other technologies in the electric power system, the environment in which rules and policies are made is important because market rules have a critical impact on the value of technology (Paine et al. 2014). The process of integrating new technology is not simply a problem of engineering and technology but is a complex *socio-technical process* (Johnson et al. 2015; Lenhart et al. 2016; Paine et al. 2014; Stafford and Wilson 2016; Welton 2018). Although questions have been raised about the outcomes of such stakeholder-driven decision processes, the analysis of how regional power grid operators make decisions has emerged only recently.

My overall research agenda is in continuation of the existing literature although its approach is more quantitative which involves modeling and providing mathematical evidence. Also, the analysis focuses on a specific topic of the RTO governance—voting rules—which has never been analyzed in a systematic way. I capture how the decision rules of highly participatory processes affect the performance of physical networks and systems by modeling voters' decision behavior, analyze complex voting networks of policy-making processes, and develop tools to evaluate socio-technical systems more holistically.

The contributions of my work are:

- As the first attempt to model RTO decision-making process, I argue that we can systematically model the stakeholder process to understand the process itself and further to predict the voting outcome.
- By identifying pivotal voters, this study provides an explanation of recent failures to pass proposals through the existing stakeholder process as well as insights of voting power dynamics among stakeholders.
- Novel approach using network science to analyze voting network of the PJM's top-level committee, this thesis provides scientific evidence on the voting power distribution in the decision processes of RTOs.
- By connecting different voting rules and market outcomes, this thesis proves an importance of RTO governance and urges further development in RTO governance study.
- Ultimately, I hope that this research would yield better understanding of diverse interests of stakeholders in RTOs and consequently on how RTOs ought to collect stakeholders' opinion and to make decisions on behalf of the people

In the second chapter, I develop a predictive model of voting outcome especially focusing on one of the 28 voting issues, the capacity market review. After comparing predicted outcomes and actual voting records, I quantify political power of the critical voters which plays a critical role in settlement of voting outcomes. The analysis suggests two findings: first, due to coalition formation, there may be limits to the stakeholder-driven decision model causing frequent deadlock for contentious issues; second, divisive issues like capacity markets can shift political power in ways that, for certain circumstances, a few voters—or as defined in this study, *swing voters*, who are primarily financial players—can sway a voting outcome. In a study of the voting network of the PJM stakeholders in the third chapter, I empirically proved an existence of a strong consumer-side *coalition*, using community detection method, and identified *swing voters*, using network measures, who can be pivotal in ensuring the passage or failure of highly contentious rule changes. The fourth chapter shows that governance of RTO is not just an administrative or supportive system but has a measurable impact on the electricity markets. I

explore various voting rules that could be applied to the PJM MC and analyze whether changes in voting rules influence market outcomes.

Most importantly, this study provides evidence that voting rule has an impact on market outcomes which would affect two-thirds of the U.S. electricity consumption. The results show that a slight change in passage threshold makes difference in voting outcome and so in market outcome. Even though the difference might look small, considering that this study accounts only one issue that has a time horizon for a year, and that there are numerous other tariffs or market rule related issues, the impact of RTO governance is not negligible. This study also provides a good background to a comparison analysis across RTOs. Although I do not directly address difference in governance structures across RTOs and its consequences—except a comparison with PJM and NYISO—the result that shows changes in voting outcomes under different voting rules is sufficient to further develop a research what these differences mean. I am not arguing that RTO governing rules have to be the same across different RTOs. All RTOs have developed their own rules over time based on countless debate and discussion that reflect distinct regional characteristics. However, there are few studies on comparing rule differences even though it could make non-negligible impact on the markets.

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To my unintended, Antoine: thank you for being always there for me with stupid jokes and/or good martini. I love you.

Chapter 1

Introduction

What are the Regional Transmission Organizations?

The electric power system integrates a highly diverse set of technologies and organizations by means of regional high-voltage transmission grids that can span multiple political jurisdictions. Most of North America, for example, is served through large-scale power grids that cross state and national boundaries. Many parts of the electric power industry have undergone a process of restructuring and deregulation over the past two decades, involving the unbundling of electric utilities into separate companies for power generation, transmission and distribution; the creation of competitive markets for power generation (effectively replacing the function of the electric utility or state-owned electricity authority with competitive market signals for power system planning and investment); and in North America specifically, the increased regionalization of power grid operations through the creation of Regional Transmission Organizations (RTOs) [1] (Joskow 1997). Currently, approximately 70% of all electricity demand in the United States, along with some Canadian provinces and portions of Mexico, is served through RTOs. A map of those areas in North America that lie within RTO footprints is shown in Figure 1-1.

[1] While I recognize the differences between RTOs and Independent System Operators (ISOs), for simplicity, I use RTOs to refer to both organizations.

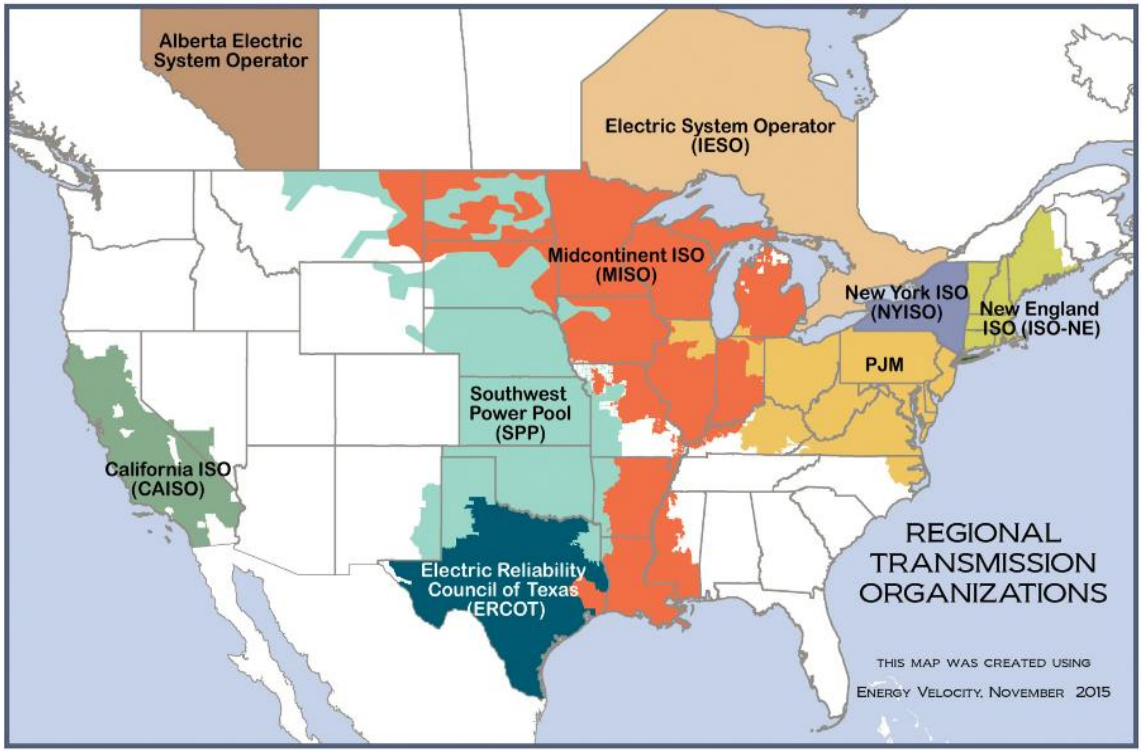


Figure 1-1: Regional Transmission Organization of North America (source: FERC, 2015).

Stakeholder process in RTOs

RTOs are tasked with a primary goal of providing non-discriminatory access to transmission and ensuring grid reliability (Federal Energy Regulatory Commission 1996, 1999) and facilitate the integration of new technologies and market participants, including renewable power generation, energy storage and demand response. Given the clear necessity of power grid operators to adapt planning and operational rules to handle the increased penetration of renewable energy or other technologies on the electric power system, the environment in which rules and policies are made is important because market rules have a critical impact on the value of technology (Paine et al. 2014). The process of integrating new technology is not simply a problem of engineering and technology but is a complex *socio-technical process* (Johnson et al.

2015; Lenhart et al. 2016; Paine et al. 2014; Stafford and Wilson 2016; Welton 2018). Organizational adaptation can be particularly complex in the power industry in the U.S., where transmission grids span multiple levels of political boundaries and decisions are made not by central authorities but through stakeholder driven decision-making processes of the RTOs. The preferences of different actors can impact the scale and scope of technology adoption (Fischlein et al. 2014; Wilson and Stephens 2009), and can even affect system reliability (Carreras et al. 2009). While the technical aspects of how power grids can successfully integrate these new technologies have been broadly studied, an under-appreciated aspect of this adaptation is that in many jurisdictions the market, planning and operational rules are made in a *collective decision process* requiring coordination and negotiation among multiple parties rather than by a government or other central authority (Paine et al. 2014).

RTOs hold section 205 and 206 rights under the Federal Power Act which enables them to propose market rule changes within their jurisdiction. The right is often shared with stakeholders; in NYISO and PJM, market rule changes require stakeholder approval before filings at Federal Energy Regulatory Commission (FERC); in some others, such as ISO-NE, MISO and SPP in which stakeholders' decisions remain as advisory, stakeholders could still protest or comment on the RTO board's final filings at FERC (James et al. 2017). While RTOs are supposed to be highly stakeholder-driven organizations, with rules and policies crafted through a highly participatory process (Federal Energy Regulatory Commission 1999, 2008), there has been tension at times between this performance goal and the design goal for RTOs of being stakeholder-driven organizations. One outgrowth of the stakeholder perceptions has been to question the extent to which the rules for highly reliable system operations and planning to support reliable operations can be well-designed through a highly participatory process with so many competing interests.

Although questions have been raised about the outcomes of such stakeholder-driven decision processes, the analysis of how regional power grid operators make decisions has emerged only recently—in contrast to the numerous literature that has used models of distributed decision-making or multi-agent models to analyze the impacts of consumer or distributed energy decisions on power grid operations (Alizadeh et al. 2014; Chassin et al. 2014; Jackson 2010; Jiménez-Bravo et al. 2018; Paine et al. 2014; Xue et al. 2017). (Dworkin and Goldwasser 2007) is one of the first few scientific papers that examined RTO governance. Using ISO New England as an example, the authors delineate limitations of the current RTO governance in protecting the public interest and propose potential improvements including urging FERC's more rigorous involvement in RTO management and the regions as well as establishing a regional public advocate program within the stakeholder process. (Cramton 2003) qualitatively examined electricity market design principles by defining the good market design as an ability to "identify the critical issues, and then address them as simply as possible, but not simpler." This principle requires good understanding of the preferences of market players so that the designer could keep essential design elements without oversimplifying the problem. The author suggested a possibility that if a group of market participants benefits from the design flaws and the group is large enough, they may block efforts to correct the problem. Hence, the author identified two reasons for the design flaws including the design process in which market participants with special interests decide the market design rules for themselves which eventually undermines efficient market operation. (Blumsack et al. 2014; Lenhart et al. 2016; Stafford and Wilson 2016) have studied qualitatively the functioning of the stakeholder process in various RTOs in the context of specific initiatives to integrate renewable power supplies and energy storage. (James et al. 2017) qualitatively evaluated a performance of RTOs stakeholder-governance process in their role of advocating competitive and efficient wholesale electricity market based on interviews of various stakeholders and literature reviews. Acknowledging the importance of the role of stakeholder

process in facilitating efficiency of a wholesale electricity market, the authors pointed out current problems including filing the non-optimal or *second-best proposals* with FERC when it is difficult to build a consensus among stakeholders for contentious issues; though, on regular bases, consensus is readily achievable. (Simeone 2017) recognize importance of stakeholder's decision and its decision-making process. The author analyzes extensively the evolution of the RTO governance, delineates some of the challenges that RTOs face—state involvement in the process, representativeness of the sectors given the explosive membership growth in the PJM, and incumbent bias—and recommends regular evaluation of governance processes and more direct involvement of FERC in that evaluation.

My overall research agenda is in continuation of the existing literature although its approach is more quantitative which involves modeling and providing mathematical evidence. Also, the analysis focuses on a specific topic of the RTO governance[2]—the voting rules—which has never been analyzed in any systematic way. I aim to capture how the decision rules of the highly participatory processes can affect the performance of physical networks and systems by modeling voter's decision behavior, analyzing complex voting networks in policy-making processes, and developing tools to treat socio-technical systems more holistically.

The contributions of my work are:

- As the first attempt to model RTO decision-making process, I argue that we can systematically model the stakeholder process to understand the process itself and further to predict the voting outcome.
- By identifying pivotal voters, this study provides an explanation of recent failures to pass proposals through the existing stakeholder process as well as insights of voting power dynamics among stakeholders.

[2] The term governance has ambiguity when it is used in most of administrative reforms; it may refer to organizational structures, administrative processes, managerial judgement, systems of incentives and rules, administrative philosophies, or any combination of these definitions (Heinrich and Lynn Jr 2000; Lee 2003). In this paper, our definition of governance is close to systems of rules of administrative processes.

- Novel approach using network science to analyze voting network of the PJM's top-level committee, this thesis provides scientific evidence on the voting power distribution in the decision processes of RTOs.
- By connecting different voting rules and market outcomes, this thesis proves an importance of RTO governance and urges further development in RTO governance study.
- Ultimately, I hope that this research would yield better understanding of diverse interests of stakeholders in RTOs and consequently on how RTOs ought to collect stakeholders' opinion and to make decisions on behalf of the people

This study focuses primarily on decision processes of the PJM, an RTO serving all or parts of thirteen states in the Mid-Atlantic U.S. plus the District of Columbia and rendering considerable authority to stakeholders through voting mechanisms that generally lead directly to FERC filings. All RTO decision processes vary in degrees of stakeholder involvement in that there are differences in degrees of authority of the stakeholder processes. PJM delegates the most powerful authority to the stakeholders and their process allowing them to bypass the PJM board and make filings directly to FERC (even though it rarely happens). Stakeholder voting outcomes in NYISO and ISO-NE also determines filings with FERC giving them more power to stakeholders compared to the Midcontinent ISO and California ISO in which the outcomes of stakeholder process are only advisory and final decisions on filings to FERC are made by the RTO staff and Boards. While I acknowledge that the RTOs have developed their own policies and rule changes through their own processes, I leave comparisons between the Northeastern RTOs for future work which I discuss qualitatively in the last chapter.

Throughout this thesis, I utilize voting records of PJM's top-level committee which is the only committee that publish firm-level voting data. I gathered voting records of 28 votes from 2011 to 2015; voting issues include the capacity market review, demand response, FTR revenue adequacy, etc. Over all the issues, 147 voters participated, some of which voted regularly while a few others voted on just one issue. Information in the data set includes company name, line of business, net seller/buyer, size of assets, and voting records (yes, no, or abstain). Based on this

detailed-voting data, in the second chapter, I develop a predictive model of voting outcome especially focusing on one of the 28 voting issues, the capacity market review. After comparing predicted outcomes and actual voting records, I quantify political power of the critical voters which plays a critical role in settlement of voting outcomes. The analysis suggests two findings: first, due to coalition formation, there may be limits to the stakeholder-driven decision model causing frequent deadlock for contentious issues; second, divisive issues like capacity markets can shift political power in ways that, for certain circumstances, a few voters—or as defined in this study, *swing voters*, who are primarily financial players—can sway a voting outcome. In a study of the voting network of the PJM stakeholders in the third chapter, I empirically proved an existence of a strong consumer-side *coalition*, using community detection method, and identified *swing voters*, using network measures, who can be pivotal in ensuring the passage or failure of highly contentious rule changes. The fourth chapter shows that governance of RTO is not just an administrative or supportive system but has a measurable impact on the electricity markets. I explore various voting rules that could be applied to the PJM MC and analyze whether changes in voting rules influence market outcomes.

Voting structure of PJM

The stakeholder process in PJM, as outlined in Figure 1-2, is complex and hierarchical. Figure 1-3 shows the committee structure of the PJM that has numerous task forces (in grey), subcommittees (in green), standing committees (in blue), senior standing committees (in orange), etc. Proposed changes to rules and practices are generally initiated by a stakeholder in one of many lower-level committees. Issues eventually move up to higher-level committees, the Markets and Reliability Committee (MRC) and then the Members Committee (MC), and then on to the PJM Board of Managers to approve a filing with the FERC. Although I acknowledge the

importance of decisions of lower-level committees and potential issues (Simeone 2017), the scope of this study is limited to the top-level committee, the MC. There are two reasons for this limitation. First, only the MC has detailed firm-level voting data. Second, the MC can bypass the PJM board and make filings directly with FERC by exercising its filing rights, although it seldom does so.

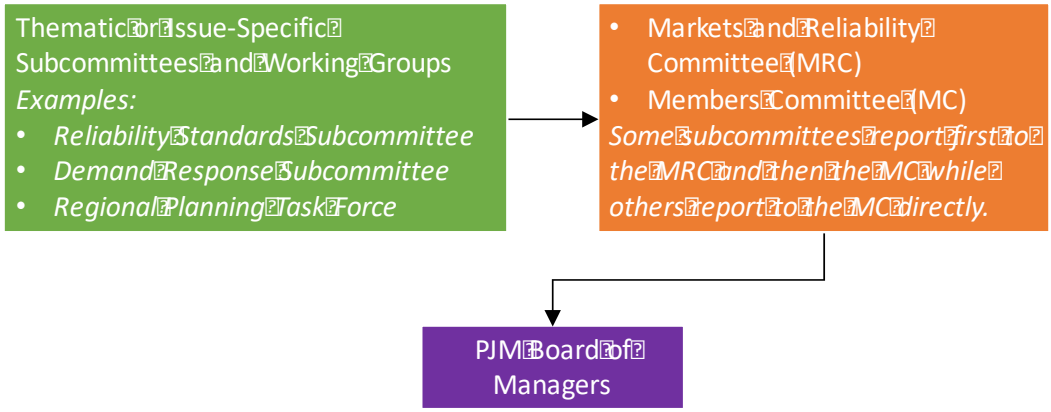


Figure 1-2: Structure of the PJM Stakeholder Process. (Blumsack et al. 2017; PJM 2015).

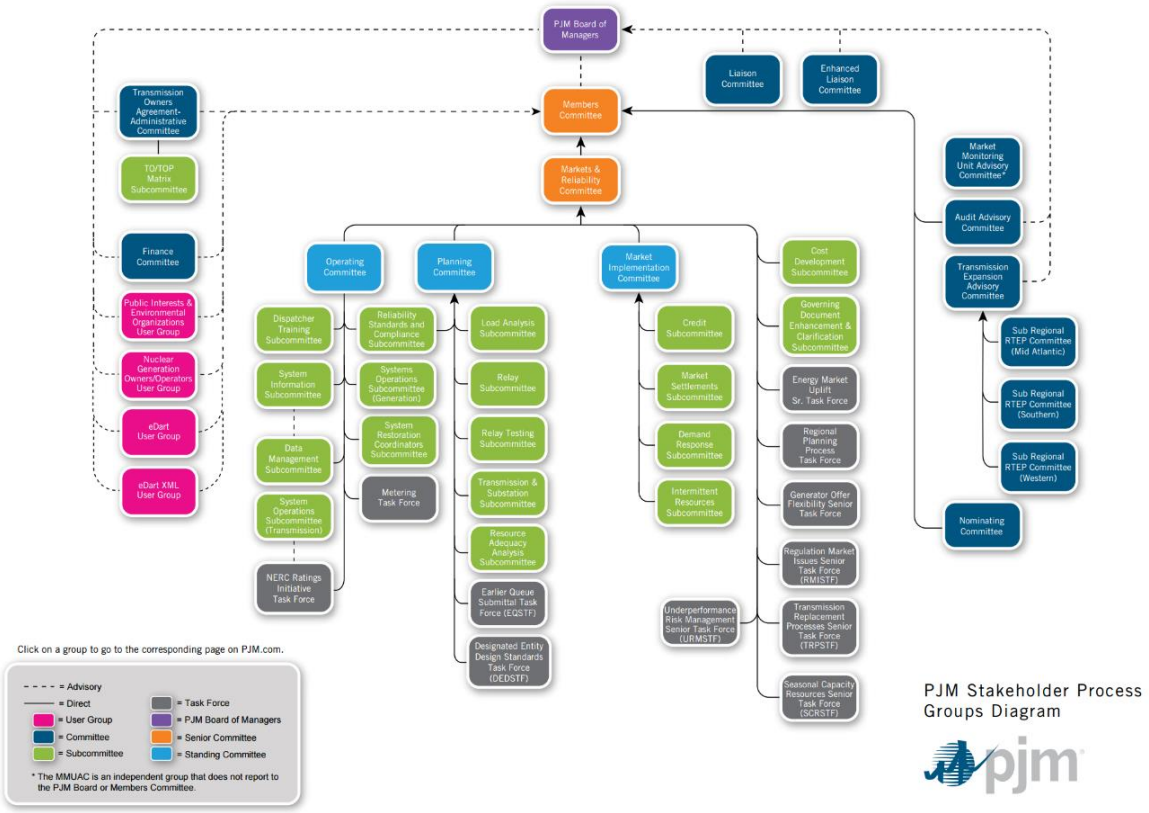


Figure 1-3: PJM committee structure diagram (retrieved from https://www.pjm.com/-/media/committees-groups/committee-structure-diagram.ashx)

The MC uses a voting procedure called *sector-weighted voting* in which participating stakeholders self-identify with one of five pre-determined sectors: Generation Owners (GO), Transmission Owners (TO), Electric Distributors (ED), End Use Customers (EUC), or Other Suppliers (OS). Table 1-1 shows the number of voting members in each sector and the shares of sectors among 530 members at the time of this writing, with examples of specific companies. The OS sector is the most diverse sector, consisting of financial institutions, marketers and traders, curtailment service providers, and municipal/co-op utilities. Stakeholders are permitted to change their sector affiliation, although there have been only 5 changes observed since 2011.

Table 1-1: Composition of PJM Voting Members

Sector	**Number of Firms (%)**	**Example Firms**
Generation Owners	107 (20%)	Calpine, NRG Power Marketing
Transmission Owners	15 (3%)	Duke Energy, Exelon, PSEG
Other Suppliers	345 (65%)	Direct Energy (CSP), Citigroup Energy (Financial), EDF Trading (Marketer)
Electric Distributors	41 (8%)	Allegheny Electric, American Municipal Power
End Use Customers	22 (4%)	Air Products & Chemicals, Arcelor Mittal

Each voting member in PJM MC can cast one vote per proposed alternative—*yes, no, or abstain*—and a proposed alternative is adopted if it receives two-thirds majority votes after applying sector weights. Sector-weighted voting bears similarities to the Electoral College used in U.S. presidential elections. It is a weighted voting system in which all five sectors are equally weighted. Votes are translated into score by sector as percentage of favoring votes in a sector excluding abstention votes. If a final voting score, a sum of each sector's percentage of yes votes, exceeds the threshold, then a voting issue would pass. Total voting score *V* is defined by an indicator variable δ_{jk} for a voter j from sector k to be equal to one for a yes vote and zero for a no vote. The final voting score *V* is calculated as:

$$\boldsymbol{V} = \sum_{k} \sum_{j=1}^{(n_k - a_k)} w_{jk} = \sum_{k} \sum_{j=1}^{(n_k - a_k)} \frac{\delta_{jk}}{n_k - a_k} \tag{1}$$

where n_k is the total number of voters in sector k, and a_k is the number of abstention votes in sector k. The passage threshold is two-thirds of the maximum possible voting score five, or 3.335, roughly an equivalent to four out of five sectors voting for passage, implying that any two sectors could jointly prevent passage regardless of votes from the other sectors. Note that, as shown in the equation 1, individual voter's weight is inversely proportional to the number of voters in its sector. Also, since abstention votes are excluded from the total number of votes, it

would increase the voting weight of an individual voter of that sector. Table 1-2 illustrates a hypothetical example of sector-weighted voting from PJM website. The column showing the sector voting score is calculated by taking the proportion of *For* votes relative to the (Total – Abstain) votes. As explained, abstentions are not counted at all in the voting process. For the OS sector as an example, among 25 OS participants, 5 abstained, 10 voted in favor and 10 voted against this hypothetical proposal. As a result, the total number of voters excluding abstentions is 20 which makes the OS sector's voting score 0.5, 10 divided by 20. Also, as in the GO sector, if 100% of the *valid* voters vote in favor, a voting score equals to one – the maximum voting score that one sector can achieve – even with an abstention vote. Since this total sum is 3.347 greater than 3.335, this issue would get an approval from the MC.

An important take away from the sector-weighted voting system is that any group of voters whose sum of voting weight is greater than 1/3 of the total voting score five which is 1.665—less than two sectors' voting score—can block an issue. In other words, the system allows two sectors, even with a few deviators, to have effective veto power if these two sectors have shared interests. Also, since it gives equal weights to each sector, the formation of coalitions would highly likely be affected by voter's sector affiliation.

Table 1-2 Sector-weighted voting example

Sector	For	Against	Abstain	Total	Total - Abstain	Sector voting score
Generation Owner	15	0	1	16	15	1
Transmission Owner	8	2	4	14	10	0.8
Other Supplier	10	10	5	25	20	0.5
Electric Distributor	3	7	15	25	10	0.3
End Use Customer	12	2	0	14	14	0.857
					Total score in favor	3.457

This example is extracted from the PJM learning center web page (https://learn.pjm.com/pjm-structure/member-org/committees-groups-faqs/sector-weighted-voting.aspx)

Chapter 2

Can Capacity Markets Be Designed by Democracy?

This chapter addresses the question of how reliable power grid operations, specifically generation resource adequacy, can be well-designed through a highly participatory process with many competing interests—*theoretically* and *empirically* using a highly-detailed data set from the stakeholder process of one of the RTOs called PJM. Specifically, this work bridges some of the seminal literature from political science and political economy on the theory of voting systems (Arrow 1950; Banzhaf 1964; Black 1986; Downs 1957; Plott 1967a, 1967b; Rubinstein 1980; Shapley and Shubik 1954) and integrates models of the stakeholder process and market rules within PJM. The model allows for the prediction of the formation of coalitions and voting outcomes given the current voting structure of the process which would provide insights behind a series of votes taken in the PJM stakeholder process in 2011 on capacity market review. First, I describe the PJM stakeholder process and the voting structure used in the top-level committee called Members Committee (MC), the construct on which this research primarily focuses. Then, I develop a theory of *passable proposals* that is used as a predictive model of voting outcomes in the PJM stakeholder process, and allows us to *a priori* anticipate coalitions forming around specific issues and voting outcomes.

Voting on the Capacity Market and Estimated Demand Curve

In 2011, PJM went through a periodic review of the Variable Resource Requirement Curve (VRR Curve) in its capacity market. The VRR Curve is the downward sloping demand curve used to clear the forward capacity auction (Pfeifenberger et al. 2014). While the VRR

Curve is often described as being administratively determined (Kiesling 2008), its parameters are, in fact, determined through negotiations and voting in the PJM stakeholder process. Six proposals for reshaping the VRR Curve were brought before the MC. One of these proposals was a *status quo* proposal which would have made no changes to the existing VRR Curve (Pfeifenberger et al. 2014; PJM 2011). I obtained firm-level voting data from the MC for the votes on all six VRR Curve proposals. Table 2-1 shows the voting results for each proposal. All six proposals failed to pass the MC, including the status quo proposal which, based on the total voting score of 0.336, was the least popular alternative. In fact, two subsequent votes held in 2014 and 2018 on the same issue – periodic review of the VRR curve – were also unable to pass the MC (see Appendix).

Table 2-1 Outcomes of RPM Redesign Votes

	Number of voters	Status Quo	Package 1	Package 10	Package 11	Package 12	Package 13
Generation Owner	15	0.071	0.833	0.714	0.077	0.231	0.267
Transmission Owner	12	0.083	0.8	0.75	0.167	0.167	0.333
Other Supplier	45	0.056	0.667	0.323	0.235	0.25	0.513
Electric Distributor	24	0.043	0	0	0.913	0.913	1
End Use Customer	12	0.083	0	0	0.909	1	1
Results		0.336	2.3	1.787	2.301	2.561	3.113
		Failed	Failed	Failed	Failed	Failed	Failed

The failure of the PJM MC to pass any of the VRR Curve proposals was alarming, and influenced the decision of PJM to trigger an alternative decision process in a subsequent review of the capacity market design. This alternative process, known as the Enhanced Liaison Committee, dispensed with voting at the MC altogether in favor of an advisory role for the stakeholders. Since I have access to only 2011 votes at the firm-level, I use 2011 vote to figure out how did this happen and is it even possible to produce a proposal that could be passed by MC?

Figure 2-1 illustrates a typical VRR curve and its critical parameters such as Gross Cost of New Entry (Gross CONE), Net Cost of New Entry (Net CONE) and the Installed Reserve Margin (IRM). These parameters are critical in setting three points of the VRR curve: point *a* (a price cap), point *b* (a joint point of two downward sloping lines) and point *c* (a point at which the second downward sloping line meets 5% beyond IRM and the VRR Curve becomes a vertical line). There are many parameters that determines the VRR curve and I observed that the critical parameters of these redesign proposals can be boiled down to the location of point *a* and *b*. Based on the parameter values in the proposals, I model the redesign proposals as these six different demand curves (Figure 2-2). Note that one of the proposed VRR Curve redesigns involved making no changes to the existing VRR Curve. The VRR Curve proposal labeled Package 1 reflected a proposal from PJM staff. The other VRR Curve proposals were submitted by various stakeholder constituencies. Other things being equal, Packages 11, 12 and 13 would have tended to depress capacity market prices as compared to the status quo VRR Curve, while Packages 1 and 10 would have tended to increase capacity market prices. Accordingly, as shown in the table 2-1, Packages 1 and 10 tended to have more support from the GO and TO sectors, while Packages 11, 12 and 13 tended to have more support from the ED and EUC sectors.

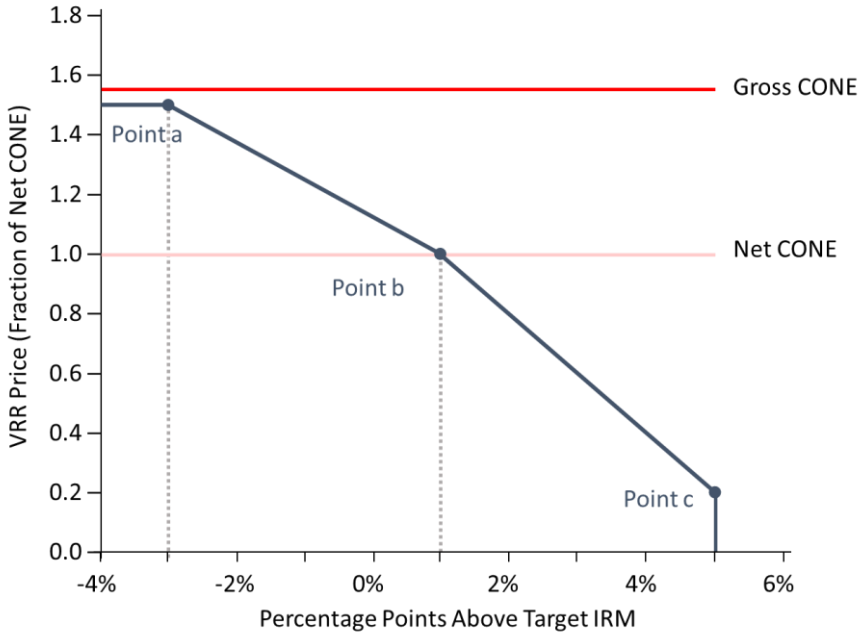


Figure 2-1 Example VRR Curve. Source: Author calculations based on (Pfeifenberger et al. 2014)

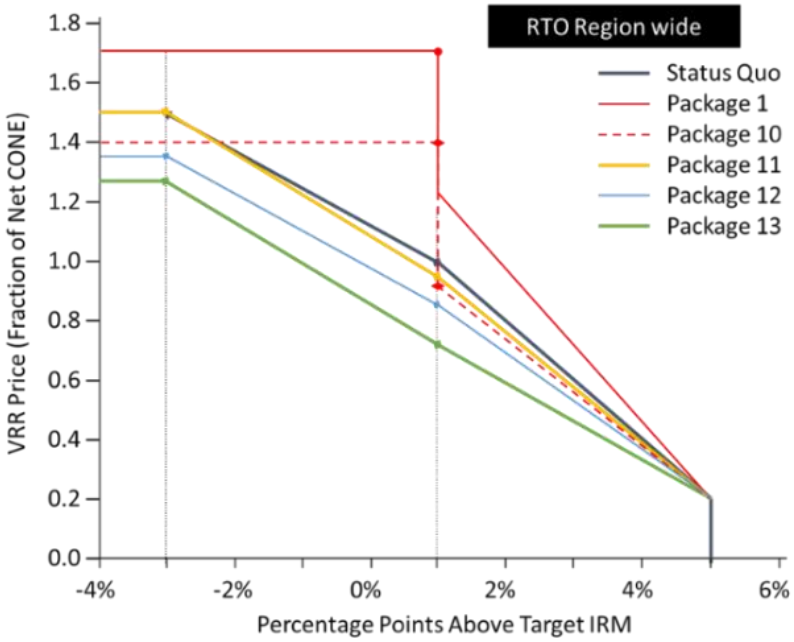


Figure 2-2 VRR Curves Considered by the MC. Source: Author calculations based on (Pfeifenberger et al. 2014)

In the remainder of this chapter, I develop the *passable proposal model* to illustrate that the failure to pass any redesign of the VRR Curve was predictable, in part because of the presence of strong coalitions that have opposite interests. Later, by comparing the prediction and votes in practice, I discover that these coalitions may not be sufficiently strong because of some defections and abstentions, which will be handled in more details at the end of this chapter.

A Passable Proposal Model

To model stakeholder process in systematic way, I adapt the *acceptable proposal* framework from the political economy literature (Plott 1967a,b) to the sector-weighted voting structure used in PJM. I refer to this adaptation as the *passable proposal* model for stakeholder-driven decision-making. Based on the passable proposal model, I identify utility functions of stakeholders in the capacity market.

Suppose there are *m* voting participants; a voter i (where $i = 1, \cdots, m$) has a utility function U^i that is a function of *n* relevant policy variables $\boldsymbol{X} = (x_1, \cdots, x_n)$; $\overline{\boldsymbol{X}} = (\overline{x_1}, \cdots, \overline{x_n})$ represents status quo. Now consider a proposal $\boldsymbol{y} = (dx_1, \cdots, dx_n)$, a set of marginal changes in $\boldsymbol{X}$ from $\overline{\boldsymbol{X}}$. A voter i would accept a proposal $\boldsymbol{y}$ if it satisfies:

$$\frac{\partial U^i}{\partial x_1} dx_1^* + \frac{\partial U^i}{\partial x_2} dx_2^* + \cdots + \frac{\partial U^i}{\partial x_n} dx_n^* > 0 \tag{2}$$

which requires positive marginal utility of an individual i by a proposal $\boldsymbol{y}^* = (dx_1^*, \cdots, dx_n^*)$. Unanimous approval, as in Plott (1967), requires:

$$\boldsymbol{A}\boldsymbol{y} > \boldsymbol{0} \tag{3}$$

$$\text{where } \boldsymbol{A} = \begin{bmatrix} \frac{\partial U^1}{\partial x_1} & \cdots & \frac{\partial U^1}{\partial x_n} \\ \vdots & \ddots & \vdots \\ \frac{\partial U^m}{\partial x_1} & \cdots & \frac{\partial U^m}{\partial x_n} \end{bmatrix} \text{ and } \boldsymbol{y} = \begin{bmatrix} y_1 \\ y_2 \\ \vdots \\ y_n \end{bmatrix}$$

The matrix **A** thus has dimensionality ($m \times n$). To model the sector-weighted voting system, I define a matrix $\boldsymbol{M}$ as a subset of $\boldsymbol{A}$ with dimensionality (m-$l \times n$) such that a positive marginal utility condition in is satisfied:

$$\boldsymbol{My} > 0$$

$$\text{where } \boldsymbol{M} = \begin{bmatrix} \vdots & \cdots & \vdots \\ \frac{\partial U^{\mathrm{i}}}{\partial x_1} & \ddots & \frac{\partial U^{\mathrm{i}}}{\partial x_{\mathrm{n}}} \\ \vdots & \cdots & \vdots \end{bmatrix} \tag{4}$$

Also, a matrix $\boldsymbol{M^c}$ is defined with dimension ($j \times n$) consisting of the subset of **A** such that $\boldsymbol{M^c y} < 0$. Note that $j \leq l$, meaning that there may be undecided voters for whose marginal utility has an ambiguous sign, or may be equal to zero, meaning indifference to the proposal. As the passage threshold is 3.335, a proposal would pass if voting weight sum of voters who have positive marginal utility is greater than the *passage threshold*, 3.335 or:

$$\sum_{i \in \boldsymbol{M}} w_i \geq 3.335 \tag{5}$$

where w_i is the voting weight of a voter i

That is, a proposal would be blocked if voting weight sum of voters who have negative marginal utility is greater than a *blocking threshold*, 1.665, the maximum voting score minus the passage threshold, or:

$$\sum_{i \in \boldsymbol{M^c}} w_i > 1.665 \tag{6}$$

where w_i is the voting weight of a voter i

For parameterizing utility functions for various types of stakeholders, I focus on two key variables from the analysis on the redesign proposals, the levels of points *a* and *b*. Hence, the proposal $\boldsymbol{y} = [da \quad db]$ is a set of proposed changes of the levels of the two points. I assume that firm level utility is proportional to profit in the capacity market and replace utility function with a payoff function. I also limit the scope of this study within the capacity market and assume firms make decisions on the proposals purely on the capacity market regardless of the energy or ancillary market outcomes.

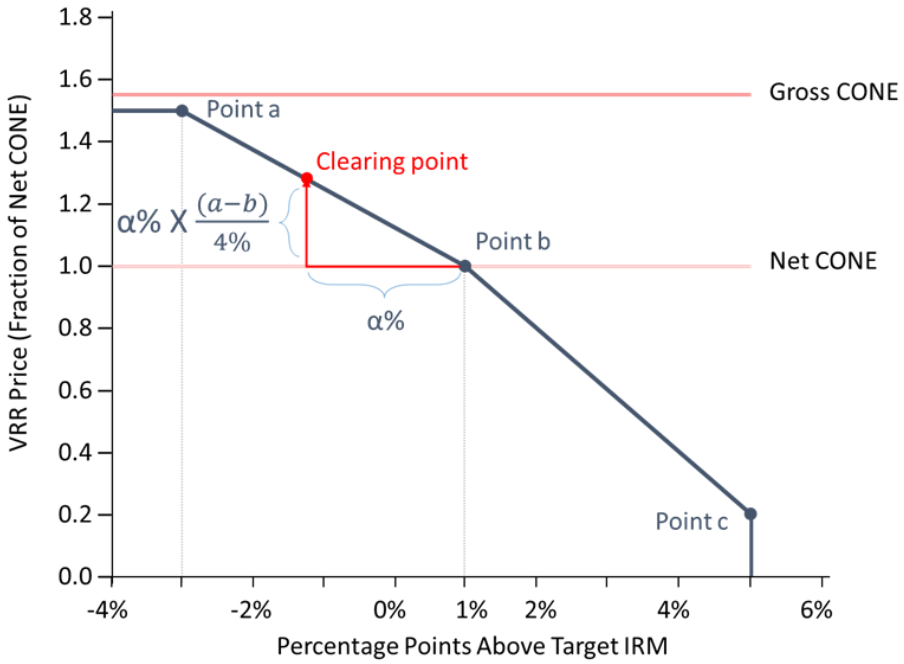


Figure 2-3 Capacity Market Price Sensitivity to a Deviation of α% from the IRM Target

Payoff functions for the GO sector are assumed to be proportional to capacity clearing prices while payoffs in the ED and EUC sectors are inversely proportional. When describing the ED and EUC sector payoffs I also include an apportionment variable $0 \leq \theta \leq 1$ which describes the allocation of capacity costs in the market to the ED sector (with the remaining share $(1-\theta)$ borne by the EUC sector). As described in figure 2-3, the clearing price is determined by the level

of supply offers (Q_C in equations) and can be represented by the two variables–the levels of point *a* and *b* (represented as *a* and *b* in equations). For example, if the supply offers are at α% below the target[3] then the clearing price would be $\left(\mathrm{b} + \alpha\% \times \frac{a-b}{4\%}\right)$. Accordingly, payoffs from the capacity market for GO is calculated as the clearing price times quantity Q_C; ED and EUC share the cost of the same amount (equation 7).

$$\pi_{GO}(Q_C, a, b) = \left(b + \alpha \times \frac{a-b}{4}\right) \times Q_C$$

$$\pi_{ED}(Q_C, a, b, \theta) = -\theta \left(b + \alpha \times \frac{a-b}{4}\right) \times Q_C \tag{7}$$

$$\pi_{EUC}(Q_C, a, b, \theta) = -(1-\theta) \left(b + \alpha \times \frac{a-b}{4}\right) \times Q_C$$

where Q_C is the cleared quantity in the capacity market, a is the level of point *a*, b is the level of point *b* and θ is the ED's share of capacity costs as described above. Marginal payoff of each sector is calculated from equation 7:

$$\frac{\partial \pi_{GO}}{\partial a} = \frac{\alpha}{4} Q_c \qquad \frac{\partial \pi_{GO}}{\partial b} = \left(1 - \frac{\alpha}{4}\right) Q_C$$

$$\frac{\partial \pi_{ED}}{\partial a} = -\theta \frac{\alpha}{4} Q_C \qquad \frac{\partial \pi_{ED}}{\partial b} = -\theta \left(1 - \frac{\alpha}{4}\right) Q_C \tag{8}$$

$$\frac{\partial \pi_{EUC}}{\partial a} = -(1-\theta) \frac{\alpha}{4} Q_C \qquad \frac{\partial \pi_{EUC}}{\partial b} = -(1-\theta) \left(1 - \frac{\alpha}{4}\right) Q_C$$

These marginal utilities tell us intuitive results that as *a* and *b* increases, in other words as the clearing price increases, GO's payoff increases and ED and EUC's utilities decrease since $0 \leq \alpha \leq 4$ and $Q_C,\ \theta > 0$.

[3] We consider only when the clearing price is settled between point *a* and *b* because it was the area of concern of the proposals at the moment of votes were taken. Therefore, $0 \leq \alpha \leq 4$.

Modeling the TO sector is more complicated since transmission owning firms tend also to have business units in the generation and load-serving sectors (or share a corporate parent with other subsidiary firms in those sectors). For each firm in the TO sector, I examine data to determine the shares of the firms' assets (or those of its parent firm) in generation (γ_1), transmission (γ_2) and load serving (γ_3) where $0 < \gamma_{\mathrm{i}} < 1, i = 1,2,3$ and $\gamma_1 + \gamma_2 + \gamma_3 = 1$. P_{T} represents the transmission fee.

$$\begin{aligned} &\pi_{TO}(P_T, Q_C, a, b, \theta) \\ &\quad = \gamma_1 \left\{ \left(b + \alpha \times \frac{a-b}{4} \right) \times Q_C \right\} + \gamma_2 \{ P_T \times Q_C \} \\ &\quad + \gamma_3 \left\{ -\theta \left(b + \alpha \times \frac{a-b}{4} \right) \times Q_C \right\} \end{aligned} \tag{9}$$

Thus, marginal payoffs for the TO sector are:

$$\frac{\partial \pi}{\partial a} = \frac{\alpha}{4} Q_C(\gamma_1 - \theta\gamma_3), \qquad \frac{\partial \pi}{\partial b} = \left(1 - \frac{\alpha}{4}\right) Q_C(\gamma_1 - \theta\gamma_3) \tag{10}$$

The sign of the marginal payoffs for firms in the TO sector not determined by the share of transmission business (γ_2) but by difference in the shares of the generation or load serving businesses ($\gamma_1 - \theta\gamma_3$). Equation 10 predicts if a firm in TO sector has more generators than load servers, that is $\gamma_1 - \theta\gamma_3 > 0$, it has aligned interest with the GO sector and would vote in favor of proposals that would increase the clearing price. A firm with greater load serving interest than generation assets, $\gamma_1 - \theta\gamma_3 < 0$, would vote against proposals for increasing the clearing price. In the data set, I find nine TO firms for which $\gamma_1 > \gamma_3$ and three for which $\gamma_3 > \gamma_1$. The model predicts nine among 12 TO voters would vote with the GO sector forming *supplier coalition* and three TO voters would vote with the ED and EUC sectors forming *consumer coalition* in the RPM voting. Note that generation business share (γ_1) has greater influence than load serving business (γ_3) as $0 < \theta < 1$.

The OS sector is highly heterogeneous, consisting of curtailment service providers (CSPs), municipal and cooperative utilities, marketers, and purely financial players (such as banks and hedge funds that participate in PJM primarily via virtual bidding). I model CSPs (which consist of nearly 18% of the firms in the OS sector in our data) as having payoff functions similar to generating firms, since CSPs tend to profit from selling demand response into capacity markets. Marketers and financial players make up over 55% of firms in the OS sector, and these firms appear to have no fundamental interest in capacity market outcomes. Therefore, I treat the voters in the OS sector except CSPs as undecided or swing voters in this model.

Passable Proposal Model results

From equation 4 combined with equations 8 and 10, I first integrate the parameterized payoffs of different types of voters in the capacity market with the acceptable proposal model (equation 3) and then use the passable proposal framework to generate voting outcome predictions. Note that I intentionally have left the marginal payoffs for the OS sector undefined except CSP since their incentives are unclear based on their voting pattern and characteristics. I assume CSP has the same payoff functions as firms in the GO sector.

$$\boldsymbol{Ay} = \begin{bmatrix} \frac{\partial U^{\mathrm{GO}}}{\partial a} & \frac{\partial U^{\mathrm{GO}}}{\partial b} \\ \frac{\partial U^{\mathrm{ED}}}{\partial a} & \frac{\partial U^{\mathrm{ED}}}{\partial b} \\ \frac{\partial U^{\mathrm{EUC}}}{\partial a} & \frac{\partial U^{\mathrm{EUC}}}{\partial b} \\ \frac{\partial U^{\mathrm{TO}}}{\partial a} & \frac{\partial U^{\mathrm{TO}}}{\partial b} \\ \frac{\partial U^{\mathrm{CSP}}}{\partial a} & \frac{\partial U^{\mathrm{CSP}}}{\partial b} \\ \frac{\partial U^{\mathrm{OS}}}{\partial a} & \frac{\partial U^{\mathrm{OS}}}{\partial b} \end{bmatrix} \begin{bmatrix} da \\ db \end{bmatrix} = \begin{bmatrix} \frac{\alpha}{4} Q_C & \left(1 - \frac{\alpha}{4}\right) Q_C \\ -\theta \frac{\alpha}{4} Q_C & -\theta \left(1 - \frac{\alpha}{4}\right) Q_C \\ -(1-\theta) \frac{\alpha}{4} Q_C & -(1-\theta) \left(1 - \frac{\alpha}{4}\right) Q_C \\ (\gamma_1 - \theta\gamma_3) \frac{\alpha}{4} Q_C & (\gamma_1 - \theta\gamma_3) \left(1 - \frac{\alpha}{4}\right) Q_C \\ \frac{\alpha}{4} Q_C & \left(1 - \frac{\alpha}{4}\right) Q_C \\ \frac{\partial \pi^{\mathrm{OS}}}{\partial a} & \frac{\partial \pi^{\mathrm{OS}}}{\partial b} \end{bmatrix} \begin{bmatrix} da \\ db \end{bmatrix} \tag{11}$$

Suppose a proposal that suggests higher clearing prices ($da,\ db > 0$). Then equation 4 would be:

$$\boldsymbol{My} = \begin{bmatrix} m_{GO,a} & m_{GO,b} \\ m_{TO^1,a} & m_{TO^1,b} \\ m_{CSP,a} & m_{CSP,b} \end{bmatrix} \begin{bmatrix} da \\ db \end{bmatrix} = \begin{bmatrix} \frac{\alpha}{4} Q_C & \left(1 - \frac{\alpha}{4}\right) Q_C \\ (\gamma_1 - \theta\gamma_3)\frac{\alpha}{4} Q_C & (\gamma_1 - \theta\gamma_3)\left(1 - \frac{\alpha}{4}\right) Q_C \\ \frac{\alpha}{4} Q_C & \left(1 - \frac{\alpha}{4}\right) Q_C \end{bmatrix} \begin{bmatrix} da \\ db \end{bmatrix} > 0 \qquad (12)$$

where $m_{i,a}$ and $m_{i,b}$ represent the marginal payoffs of voter i with respect to a and b, respectively. The subscript TO^1 indicates the subset of TO firms for which $\gamma_1 > \gamma_3$, indicating alignment with suppliers. Since $\gamma_1 - \theta\gamma_3 > 0$, $da > 0$ and $db > 0$ suggest that the entire system of equations is positive. Suppose another proposal that suggests lower clearing prices ($da,\ db < 0$). Then equation 4 would be:

$$\boldsymbol{M'y} = \begin{bmatrix} m_{ED,a} & m_{ED,b} \\ m_{TO^2,a} & m_{TO^2,b} \\ m_{EUC,a} & m_{EUC,b} \end{bmatrix} \begin{bmatrix} da \\ db \end{bmatrix} = \begin{bmatrix} -\theta\frac{\alpha}{4} Q_C & -\theta\left(1 - \frac{\alpha}{4}\right) Q_C \\ (\gamma_1 - \theta\gamma_3)\frac{\alpha}{4} Q_C & (\gamma_1 - \theta\gamma_3)\left(1 - \frac{\alpha}{4}\right) Q_C \\ -(1-\theta)\frac{\alpha}{4} Q_C & -(1-\theta)\left(1 - \frac{\alpha}{4}\right) Q_C \end{bmatrix} \begin{bmatrix} da \\ db \end{bmatrix} > 0 \qquad (13)$$

TO^2 indicates the subset of TO firms for whom $\gamma_1 < \gamma_3$ indicating alignment with the consumer coalition. Thus, $\gamma_1 - \theta\gamma_3 < 0$ and since $da < 0$ and $db < 0$ the entire system is positive. Disentangled from equation 12 and 13, I have one acceptability criterion for each coalition:

Supplier coalition $\boldsymbol{Z}$: $$\frac{\alpha}{4} Q_C \times da + \left(1 - \frac{\alpha}{4}\right) Q_C \times db > 0 \ \Rightarrow db > -\frac{\alpha}{4-\alpha} \times da \qquad (14)$$

Consumer coalition $\boldsymbol{Z^c}$: $$\frac{\alpha}{4} Q_C \times da + \left(1 - \frac{\alpha}{4}\right) Q_C \times db < 0 \ \Rightarrow db < -\frac{\alpha}{4-\alpha} \times da \qquad (15)$$

Note that I consider that OS firms other than CSPs are outside the two coalitions so I define a third set of swing voters $\boldsymbol{U^c} = \{OS \backslash CSP\}$. Figure 2-4 shows equation 14 and 15

graphically. The x-axis is the proposed change in the level of point *a* compared to the status quo and the y-axis is the proposed change in the level of point *b* compare to the status quo. Upper right area of the line ($db = -\frac{\alpha}{4-\alpha} \times da$) is the GO and supplier TO and CSP's preferred area of changes of the points a and b. Lower left area of the line represents the ED, EUC and consumer TO's preferred area of changes of the points *a* and *b*. Also, five lines represent what was proposed by the packages. This picture illustrates that the suppliers would prefer packages 1 and 10 since the two lines of the packages land in the supplier's preferred area and the consumers would prefer packages 11, 12 and 13 for the same reason. In theory, technically, both supplier and consumer coalition have an effective veto power and the two coalitions' preferred area of changes are mutually exclusive and collectively exhaustive. So, the model prediction is that there is no way to get a passable proposal because both coalitions that has mutually exclusive and collectively exhaustive interests have veto power. Also, in theory, the subset of other suppliers, whom I couldn't figure out their stake in this issue, their decision has no influence on voting results.

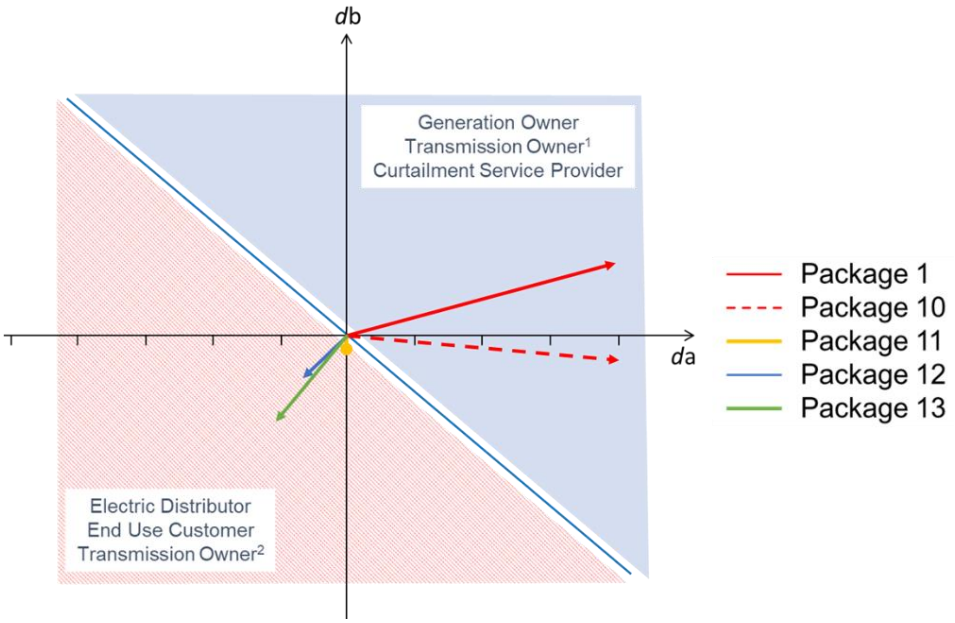


Figure 2-4 Prediction of VRR Curve review votes

As concrete examples, I apply equations 14 and 15 to two of the capacity market proposals for which *da > 0* and *db > 0* (Packages 1 and 10). The passable proposal framework would predict that the proposal would be supported by the supplier coalition with a total voting score of 1.928 ($\sum_{i \in \boldsymbol{Z}} w_i = 1.928$) and opposed by the consumer coalition with a total voting score of 2.25 ($\sum_{i \in \boldsymbol{Z^c}} w_i = 2.25$). Note that both coalitions have blocking power regardless of how the firms in the OS sector vote, since a total voting score of 1.665 is needed to have blocking power.

Theory vs. Reality

Compared to theoretical prediction, in practice, interestingly, I observe some *deviations* from our predictive model. For example, four voters in the GO sector voted against Package 10, which would have raised capacity clearing prices. One GO firm abstained while the other GO voters voted in favor of such proposals. Additionally, I observed six CSP voters abstained and two voted against the proposal among eight of them. These *defections* from the presumed coalition and *abstentions* caused a decline in the total voting score of the supplier coalition to $\sum_{i \in \boldsymbol{Z}} w_i = 1.464$ which is below 1.665, the blocking threshold. Consequently, the supplier coalition lost its veto power and would have needed one more vote to effectively block an issue. This one vote would have to come from the OS sector (besides CSPs) because the others are either consumers or suppliers who have clear and direct stake in the issue due to their physical assets or needs for those assets; there is little chance that they would vote against their financial interest as confirmed by the model and the voting records. For those in the OS sector, however, primarily due to the nature of the sector as a giant et cetera group, their interest could be aligned either way – with consumers or suppliers – depending on their contract or interest at the moment which is often unknown. Further, low and irregular participation of the sector adds to the uncertainty. Among over 300 voting members in the OS sector, only 45 members participated in

the 2011 capacity market review vote and a lot of them did not participate in votes on the other issues of the year. Because of these uncertainties, they are the only group that could be *swing voters* in the PJM MC. As a result, due to deviators, the formation of such pivotal coalitions might depend on convincing a small number of swing players, primarily financial organization such as hedge funds and banks in the OS sector. In other words, the defections and abstentions on Package 10 vote effectively transferred pivotal voting power to swing voters in the OS sector. Additionally, the consumer coalition had an increased total voting score of $\sum_{i \in \boldsymbol{Z}^c} w_i = 2.536$ showing strong ties among the members and possibility of forcing an issue to pass with large support from the other supplier sector (Blumsack et al. 2017; Yoo 2016).

The findings from the passable proposal model suggest that there may be limits to the degree to which organizations like RTOs can create mechanisms for heterogeneous stakeholders with opposing interests to develop passable market rules and protocols. In theory, either a coalition of end-use sectors (the ED, the EUC and part of the TO sectors), or a coalition of supply-side participants (the GO and part of the TO sectors) could keep any capacity market redesign proposal from passing. The reality of voting in the capacity market redesign case suggests that the formation of such *pivotal coalitions* is more complex than the model of passable proposals would suggest. While in theory clean-cut coalitions of end-use or supply-side interest could act to keep capacity market redesign proposals from passing, in practice the formation of these coalitions might depend on convincing a small number of swing players, primarily marketers and financial firms in the OS sector, to vote in alignment with the coalition. PJM and other RTOs have some protocols in place to permit bypassing the stakeholder process under certain circumstances, but an obvious implication of this analysis for regulation of RTOs is that there may be some advantage to more formal triggers for alternative decision-making processes that seek stakeholder input without formal voting.

Who has the Voting Power?

This section tries to identify circumstances where a small number of voters effectively have a large amount of political power. By providing a geometric interpretation of the voting system in the PJM stakeholder process, I analyze pivotal voting power within the stakeholder process and assess how deviations from expected coalitions through abstention and defection can shift political power in some unexpected ways. At the end of this chapter, I also provide an application of this framework to the capacity market redesign.

Two of the most widely used voting power indices are Shapley-Shubik (Shapley and Shubik 1954) and Banzhaf (Banzhaf 1964), and these voting power indices have been refined multiple times in the political economy literature (Coleman 1971; Deegan and Packel 1978; Holler 1982; Johnston 1977; Napel and Widgren 2004). An advantage of the Banzhaf type index over the Shapley-Shubik type index for this study's purposes is that the Banzhaf type index is independent of the order in which players vote. I adapt the Banzhaf index in a way that considers the utility of the voters – addressing a critique raised by (Garrett and Tsebelis 2001; Steunenberg et al. 1999; Tsebelis and Garrett 1996, 1997). I assume that voters can be categorized as *decided*, in which case their utility function is tractable to model within the passable proposal framework, and those who are *undecided*, in which case preferences are ambiguous and assembling a utility function is not tractable. I will also refer to undecided voters as *swing* voters, and it is the quantification of their voting power with which we will be primarily concerned. The voting power measure that I derive for swing voters, which I refer to as a *size of the group of critical voter* or *pivotal voter* who can change a voting outcome by switching their position.[4] I assume

[4] I use critical voter and pivotal voter interchangeably while acknowledging that Banzhaf used critical voter and Shapley-Shubik used pivotal voter in their work. The concept of the critical voter is similar to that of a *pivotal supplier* in electricity market power analysis (Blumsack et al. 2002; Brandts et al. 2014; Mayes et al. 2012). A power producer is considered as a pivotal supplier if the demand cannot be met without its capacity.

that there are some voters (not limited to one sector) that form a *coalition* – a group of decided voters with shared interest. In the language of the passable proposal analysis, the matrices **M** and $\mathbf{M}^c$ would represent coalitions. I assume that the composition of coalitions is given based on the predictions from the passable proposal model.

Measuring Voting Power of Swing Voters

In this section, I derive a measure of voting power of critical voters for undecided or swing voters. To begin, I consider only two voting sectors, both of which have some swing voters and assume votes of the other sectors are given. I will relax this assumption in subsequent sections. Also, without loss of generality, I will examine voting power in an effort to *block* a voting issue. I will refer to the coalition attempting to block a voting issue as the *blocking coalition*. Equation 16 describes a mathematical condition for blocking a vote in the PJM stakeholder process.

$$\frac{n_A}{TN_A} + \frac{n_B}{TN_B} \geq 1.665 - \sum_{i \in C \setminus A,B} w_i \qquad (16)$$

C represents a set of voters in the coalition, w_i is a voting weight of a voter i, n_A is the number of voters in the coalition in sector A, and n_B is those in sector B. TN_A and TN_B represent the total number of voters in sectors A and B, respectively. To be a successful blocking coalition, the total voting score sum of voters in the coalition needs to be at least as large as the difference between 1.665 (the blocking threshold in the PJM MC) and the voting score sum of all the others in the coalition besides sectors A and B. Figure 2-5 provides a geometric interpretation of Equation 16. The downward sloping line, which has a slope of $-TN_B/TN_A$, represents the

threshold condition for blocking an issue.[5] The shaded area above the threshold line represents possible combinations of n_A and n_B which would yield a successful block of a voting issue. The interior of the threshold line represents combinations of n_A and n_B which do not achieve a successful block. At point X, for example, just enough voters from A and B vote to block an issue that the issue fails. At point X' in the interior of the threshold line, either one voter from B or two voters from A are needed to successfully block an issue. In this case, either one voter from B or two voters jointly from A would be said to possess pivotal voting power in being able to effectively decide the outcome of the voting issue.

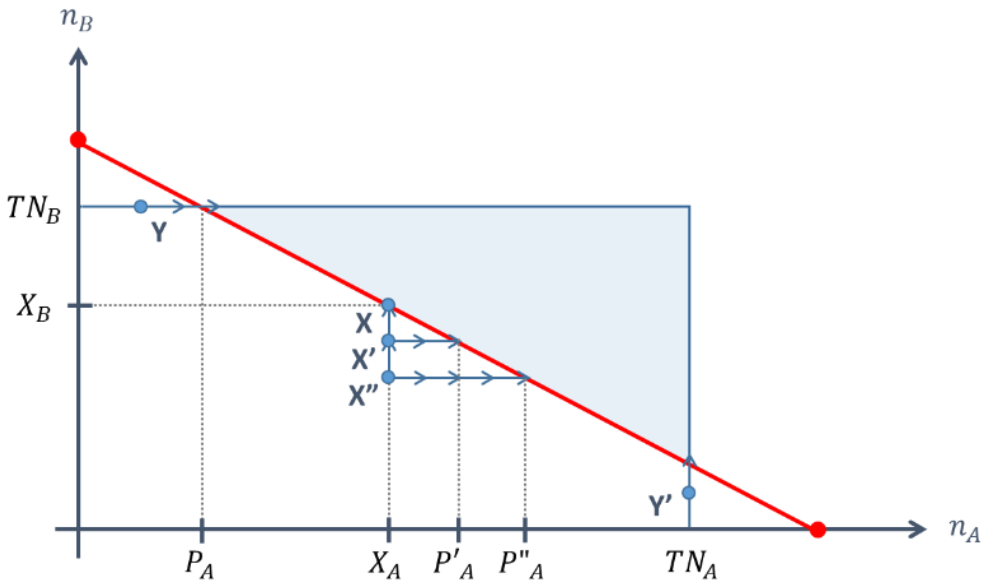


Figure 2-5 The numbers of swing voters required depending on decided voter points

I define P_A as the minimum critical voters required from sector A in order to successfully block a voting issue, and define P_B analogously. If P_A is not an integer, I define m_A as the smallest integer greater than or equal to P_A. Hence, subtracted by the number of firms already in the coalition, $m_A - X_A$ firms are critical voters who can change a losing coalition into a blocking

[5] The slope of the line in Figure 2-5 as drawn is -1/2.

coalition. Note that since all individual voters within a sector have the same voting weight, they have equal voting power. Likewise, $m_B - X_B$ firms are critical voters when no other voters in the coalition defect. Equation 17 and 18 calculate the value of $P_{A(B)}$ and $m_{A(B)}$, respectively, using equation 16.

$$P_{A(B)} = TN_{A(B)} \left\{ -\frac{n_B}{TN_B} + \left(1.665 - \sum_{i \in C \setminus A,B} w_i \right) \right\} \tag{17}$$

$$m_{A(B)} - 1 < TN_{A(B)} \left\{ -\frac{n_B}{TN_B} + \left(1.665 - \sum_{i \in C \setminus A,B} w_i \right) \right\} \leq m_{A(B)} \tag{18}$$

I can use equations 17 and 18 and the geometric interpretation in Figure 2-5 to measure the size of the group of critical voters. The points X, X' and $X^{"}$ represent interior combinations of voters from A and B, while Y and Y' represent corner-type groups of voters from a single sector. At the corner type point Y', a single swing voter could be a critical voter and have essentially monopoly power over the voting outcome. At point Y, two voters would jointly share this pivotal voting power. The point $X^{"}$ illustrates a situation where more swing voters from B would be needed to ensure blockage of a voting issue as compared to points X or X'. This shows geometrically that individual voting power is smaller at the decided voter point $X^{"}$ than at X'.

Impact of Defections and Abstentions on Voting Power

In this section, I want to illustrate how defection and abstention enhances or mitigates the voting power of swing voters. I will again draw heavily on a geometric interpretation like that in Figure 2-5.

Defections

I define a defector is a voter who votes in a different way than the passable proposal model would predict. An undecided voter cannot, by definition, be a defector in our modeling framework. Equation 19 modifies the blocking condition from Equation 16 in the presence of defection from sector A (d_A) and sector B (d_B) based on an initial voting prediction (X_A, X_B).

$$\frac{X_B - d_B}{TN_B} + \frac{X_A - d_A}{TN_A} \geq 1.665 - \sum_{i \in C \setminus A,B} w_i \tag{19}$$

Figure 2-6 geometrically shows the impacts of defection. Prior to considering any defection, consider a scenario when the utility voting model would predict a coalition to have enough voters to effectively block an issue, locating point X above the threshold line. Defection from sector A moves the point closer to the y-axis, while defection from sector B moves the point closer to the x-axis. From the point X, defection from sector A alone is not enough to make a successful blocking coalition fail to keep its veto power in this illustration (defectors in sector A would move the voting outcome from X to X^1, then eventually to the y-axis). Sufficient defection from sector B alone could, however, place the voting outcome in the interior, transferring some amount of voting power to swing voters (defections d_B, for example, would move the voting outcome from X to X^2 transferring voting power to $P_A^1 - X_A$ critical voters). Once the voting outcome point is placed in the interior, defections from both sectors decrease individual voting power by moving the point further from the threshold line (although $P_{A(B)}$ does not change, due to changes in $X_{A(B)}$, the number of critical voters, $m_A - X_A$, would change). Red dotted line illustrates the impacts of a decrease in the number of decided voters from sectors besides A and B. This moves the threshold line outwards, away from the origin. In this way, a decrease in decided voters in other sectors can have an equivalent effect as defection from A and B in shifting pivotal voting power by increasing P_A^1 to P_A^2.

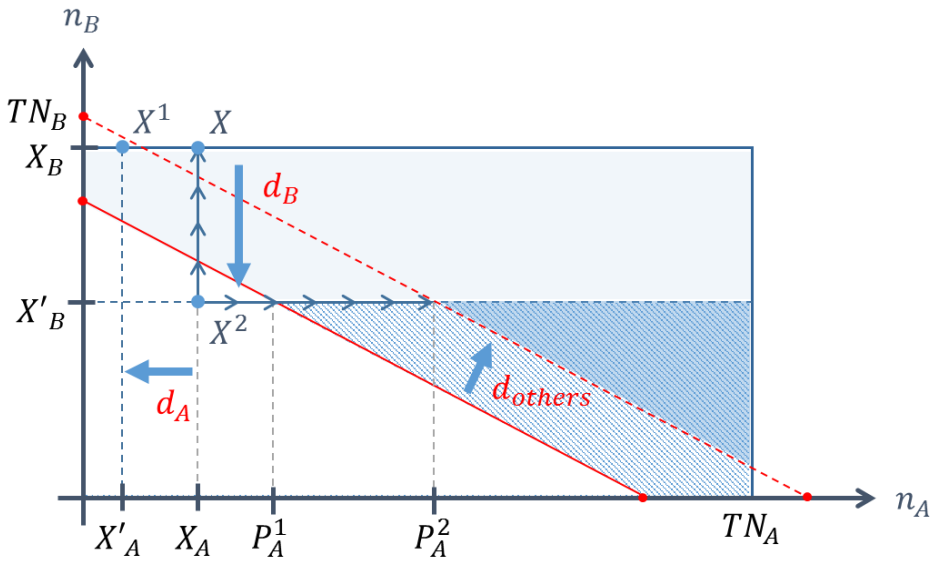


Figure 2-6 Impacts of defection on voting power by different scenarios

Abstentions

This section now modifies equation 16 to consider abstentions (a_A for sector A, a_B for sector B), as in equations 20 and illustrated geometrically in Figure 2-7. Abstention decreases the total number of voters in a given sector, thus increasing the voting weight of remaining voters in that sector. This decreases the denominator in equation 20 relative to equation 16. Geometrically, abstention in one sector has the effect of changing the slope of the threshold line, rotating it about one of the axis intercept points. In figure 2-7, because of abstention from sector B, the maximum voter line of sector B is dropped from TN_B to $TN_B - a_B$ by the number of abstainers and the threshold line is shifted from dotted-line to solid-line. Initially, our utility voting model predicts an outcome X and either two voters from B or four voters from A would acquire pivotal voting power. Abstentions from sector B (a_B), however, decreases the number of critical voters from *both* sectors for blockage (now the coalition demands either one or two from sector B or A, respectively) and thus increases individual voting power. Recall that in the same situation in

which the predicted voting outcome is in the interior of the threshold line, defection decreases individual voting power. For a case when the predicted outcome is on the other side of the threshold line in the shaded area, abstention would not change voting power. Since the voting weight of the coalition would increase due to abstention, there would still be no critical voters.

Equation 20 and figure 2-7 only consider abstentions *outside* the coalition because abstention *from* the coalition has a different impact in a sense that it is a combination of defection and abstention; in equation 21, abstentions from the coalition reduces not only the denominator (as in abstention outside the coalition) but also numerator (as in defection), decreasing the voting weight unlike abstention outside the coalition. For example, point X in figure 2-8 moves to point X' after abstention from the coalition. These abstentions increase the number of required critical voters by decreasing the voting weight of the coalition and ultimately decrease the individual voting power similar to defection, which implies that defection has greater impact on voting power than abstention. If the abstainer of the coalition, however, comes from a unified sector (in which voters all cast identical votes), the voting weight would remain the same as one because the rest of the voters of the sector would still unanimously agree with the coalition (point Y in figure 2-8).

$$\frac{X_B}{TN_B - a_B} + \frac{X_A}{TN_A - a_A} > 1.665 - \sum_{i \in C \setminus A,B} w_i \tag{20}$$

$$\frac{X_B - a_B}{TN_B - a_B} + \frac{X_A - a_A}{TN_A - a_A} > 1.665 - \sum_{i \in C \setminus A,B} w_i \tag{21}$$

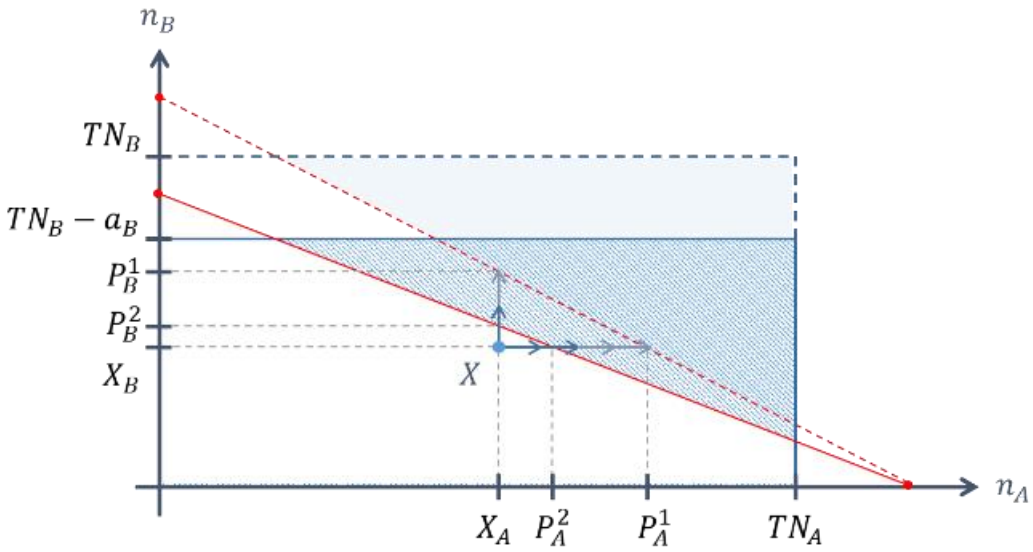


Figure 2-7 Impacts of abstention on voting power outside the coalition

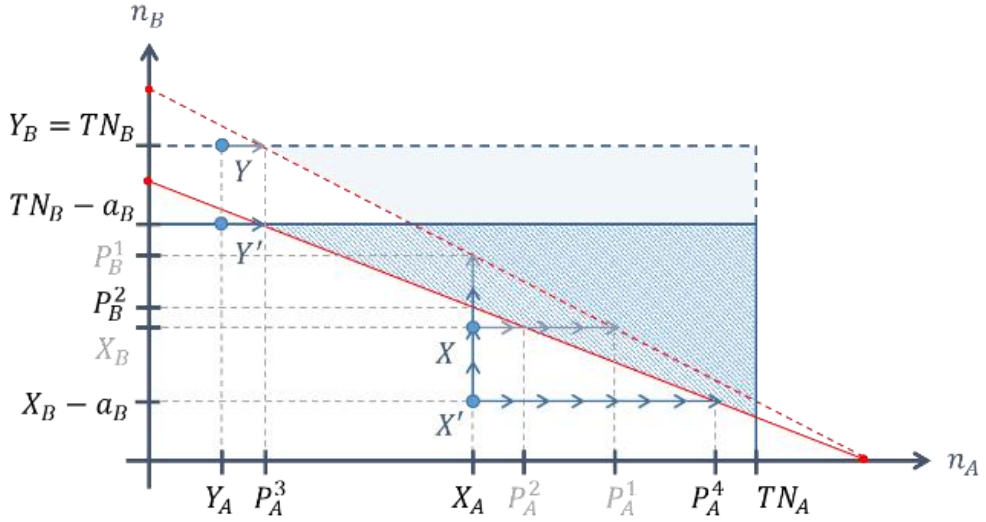


Figure 2-8 Impacts of abstention on voting power outside the coalition

Capacity Market example

This section illustrates the impact of abstentions and defections geometrically for the PJM capacity market case. As mentioned in the previous chapter, the supplier coalition and the

consumer coalition face different situation after abstentions and defections; the supplier coalition lost veto power while the consumer coalition gained greater voting weight. Thus, I explain the two different cases for each coalition. I take advantage of our detailed voting data by implementing a specific voting data of package 13 in the capacity market voting, decreasing the clearing price proposal. The supplier coalition including all voters in the GO sector, the supplier TOs and the CSPs were expected to vote against the proposal but four firms in the GO, one firm in the supplier TO and two firms among the CSPs defected–voted for–and one CSP voters and five undecided voters of the OS sector abstained. Also, since the GO sector had defection most frequently and the OS sector had the largest number of abstentions, the deviation analysis of this section focuses on those two sectors.

Supplier coalition

To clearly differentiate influence on the voting power from defection and abstention, I will first explain the two deviations separately assuming the other deviation does not happen and then explain the combination effects of the two.

Defection

Consider the supplier coalition aims to block a proposal and the GO and the OS sectors are the only two sectors that have possibilities of having defection and/or abstention and the other sectors including the supplier type of voters in the TO sector (TO^1) have no defection or abstention (equation 22 and point X in figure 2-9). In theory, the coalition is expected to satisfy the inequality condition and thus no voter has voting power. If enough defection occurs, however, the coalition might not be able to wield the veto power and as a result swing voter might acquire political power. According to sector-weighted voting system in the PJM MC, defection decreases

the numerator of the voting score (equation 19). Thus, even though the voting score sum of the initial decided voters satisfies the inequality condition, large enough defections can make the coalition fail to satisfy the inequality condition by reducing the voting score sum. For example, assuming no defection occurs from the CSP and the other sectors, four defectors from the GO sector could turn the successful blocking coalition into a losing coalition and transfer voting power to one swing voter in the OS (at X^1 in figure 2-9). Equation 23 calculates the number of voters needed from the OS sector referring to the equation 17 and 18. Considering 8 CSP firms in the OS sector have aligned interest with the suppliers, they need to persuade only one undecided voter (highly likely to be a financial player) to vote with them. In other words, other things being equal, four GO defectors can make one OS firm be able to swing the voting result by transferring voting power. Note that the other sectors have no available swing voters meaning all the others have strong incentives in the capacity market issue so that political power would not hold sway over their decisions. Defections from the CSP would not change the voting power distribution without defections from the GO and the TO sectors (at X^2 in figure 2-9). In fact, even without the CSPs, the supplier coalition can block an issue meaning without defections from the GO sector the CSPs do not have any voting power. In other words, it would matter if there are sufficient defectors from the GO, defectors from the CSP can make the coalition fail to satisfy the inequality condition of equation 22 (X^3 in figure 2-9). At X^3, one defection from the CSPs could make the coalition fail and transfer voting power to a single swing voter, resulting a gigantic leap of voting power of the OS sector's swing voter. After more defection occurs (regardless of which sector it appears), however, the voting power of individual swing voter would decrease because as more swing voters are required, they would share the voting power with multiple critical voters and so one's power could only be reduced (X^4 and X^5). Note that I do not consider defection from the other voters in the OS sector beside the CSPs because they are undecided swing voters.

$$\frac{n_{GO}-d_{GO}}{15}+\frac{n_{OS}-d_{OS}}{45}\geq 1.665-\left(\frac{n_{TO}-d_{OS}}{12}+\frac{n_{ED}}{24}+\frac{n_{EUC}}{12}\right)=0.915 \qquad (22)^{6}$$

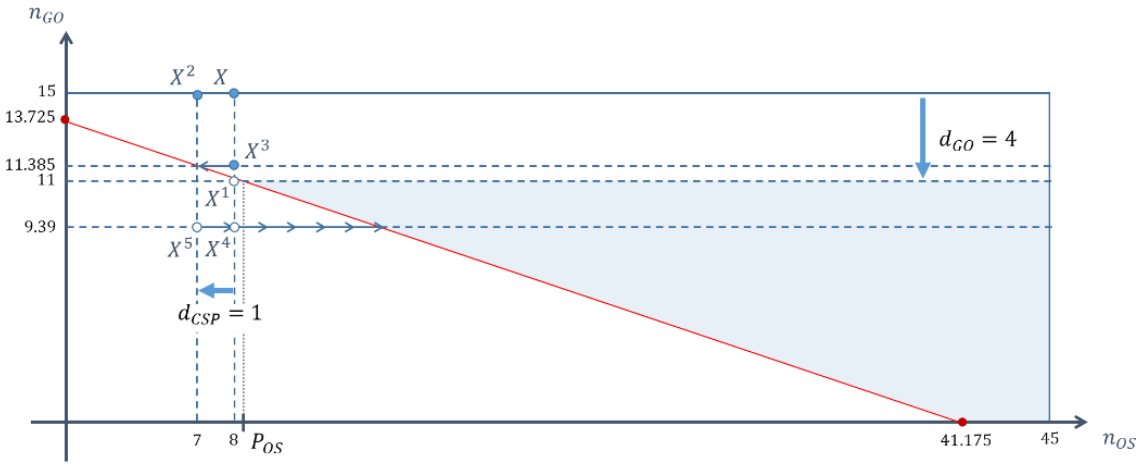


Figure 2-9 Impacts of defection of the GO and the OS sectors on voting power without deviation from TO (when the supplier coalition wants to block a proposal)

$$m_{OS}=\lceil P_{OS}\rceil=\left\lceil TN_{OS}\left(-\frac{n_{GO}}{TN_{GO}}+1.665-\sum_{i\in C\setminus GO,OS}w_{i,j}\right)\right\rceil \qquad (23)$$

$$=\left\lceil 45\left(-\frac{11}{15}+0.915\right)\right\rceil=\lceil 8.175\rceil=9$$

Now, relax the assumption on TOs that 9 of them would join the supplier coalition and there is no deviation. If less TOs join the coalition than expected, the supplier coalition needs more swing voters. Figure 2-10 shows different levels of inequality condition depending on the number of TOs in the coalition presented as colored bar on the right side of the graph. Red solid line represents the presumed level of inequality condition, assuming 9 TO voters joining the supplier coalition. If the supplier TO voters would defect from the coalition, the line would shift toward upward (arrow 1). If all supplier TO voters would defect (edge line colored in blue), it

[6] The ED and the EUC sectors are not in the supplier coalition so $n_{ED}=n_{EUC}=0$.

requires 15 GO firms and 30 OS firms or 10 GO firms and 45 OS firms. If the consumer TO voters would defect and join the supplier coalition, the coalition needs less voters from the two sectors moving the threshold line downward (arrow 2). With full engagement of TO voters including both the supplier and the consumer TO firms (edge line colored in yellow), 10 GOs and no OS or 30 OS's and no GO are required for the supplier coalition to block an issue. Similarly, if firms in the ED or the EUC sector defect and join the supplier coalition, the inequality threshold would also be reduced but their defection would be weighted with their voting weight. That is, firms in a sector with greater weight have greater influence on changing the threshold and so on transferring the voting power.

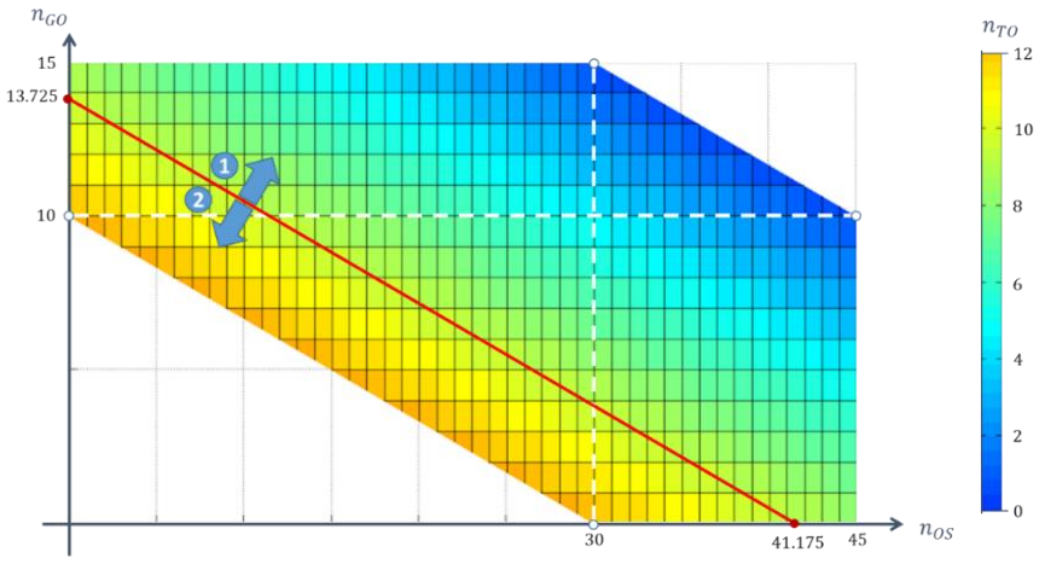


Figure 2-10 Impacts of defection of the TO sector on voting power (when the supplier coalition wants to block a proposal)

Abstention

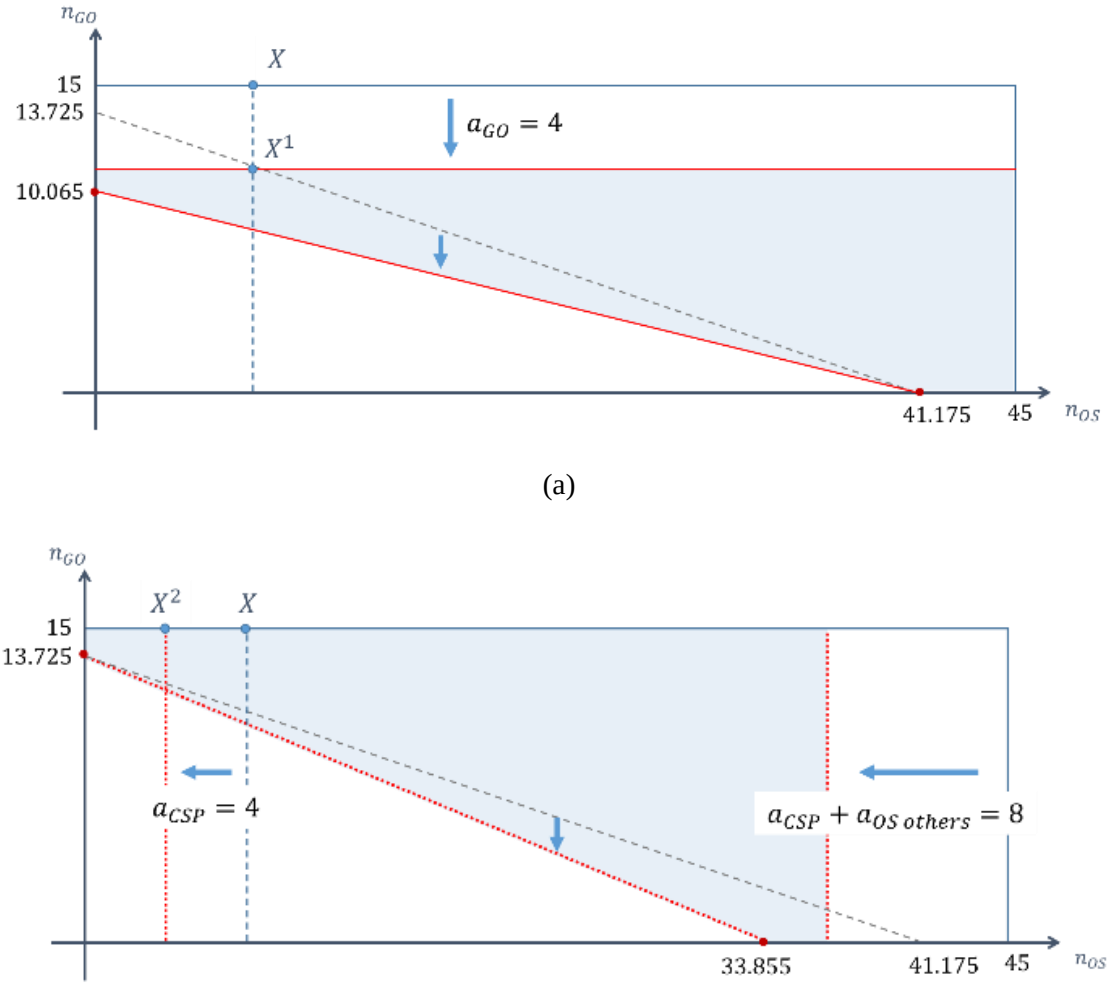
Assuming no defection from the GO and the OS sector and no deviation from the other sectors, abstention from the GO sector would not have any influence on the voting power. Since the GO sector is a unified sector, remaining voters (except the abstainers) are decided voters who would unanimously agree to vote together with the supplier coalition. That means, in equation 24,

the numerator and the denominator of the GO sector's voting weight have the same value which maintains the voting score sum as one regardless of the number of abstentions. Abstention from the OS sector can generate two different results depending on its coalition affiliation status. If one of the CSPs abstain, it would decrease both the numerator and the denominator of the voting score sum which would eventually decrease the score of the OS sector[7]. On the other hand, if one of the undecided voters of the OS sector abstain, it would only decrease the denominator which would increase the voting score sum of the OS.

$$\frac{n_{GO}}{15-a_{GO}}+\frac{n_{OS}-a_{CSP}}{45-a_{OS}}\geq 1.665-\left(\frac{n_{TO}-a_{TO^1}}{12-a_{TO}}+\frac{n_{ED}}{24}+\frac{n_{EUC}}{12}\right)=0.915 \quad (24)$$

For instance, in figure 2-11a, even if 4 GO firms abstain, moving from X to X^1, the decided voter point is still inside the blue box, satisfying the inequality condition. Because of abstention, the inequality line rotates counterclockwise, grey dotted line to red solid line, which makes the decided voter point stay inside the blue box. Note that four defection that located the point at X^1 makes the coalition be unable to satisfy the threshold condition so that it needs one more swing voter. Figure 2-11b illustrates a case when four voters of the CSPs and the other four from undecided voters of the OS sector abstain. Like the GO sector, abstain votes of the CSPs would not change the voting power distribution (X to X^2). Note that abstention of undecided voters in the OS sector (besides the CSPs) would not move the decided voter point while reducing the maximum available voter line and shifting the inequality line in a clockwise direction (grey dotted line to red dotted line).

[7] It is always true that $\frac{X_B}{TN_B}>\frac{X_B-a_B}{TN_B-a_B}$



(a)

(b)

Figure 2-11 Impacts of abstention of the GO and the OS sectors on voting power without deviation from TO (when the supplier coalition wants to block a proposal)

Abstain from the TO sector also can produce two different results analogous to abstention of the OS sector. Since it is a divided sector, if one of the TO suppliers abstain, it would decrease both the numerator and the denominator of the voting score sum and decrease the total value whereas abstainer from the consumer coalition would increase the voting score by only decreasing the denominator. As in figure 2-10 in the defection analysis, if the voting score of the TO sector decreases due to abstentions from the supplier TO, the inequality line moves upwards and abstain from the consumer TO shifts the line downwards.

Defection and abstention

This section shows a combination effects of defections and abstentions and transferred voting power to the swing voters with changes in the size of the pivotal swing voter block and ultimately, discuss what it means to the supplier coalition.

Figure 2-12 illustrates when defections and abstentions occurred in the GO sector and the OS sector without deviation from the TO. As explained in the defection analysis, the four defectors from the GO sector relocate the decided voter point X to X^1 in figure 2-12 and have one swing voter attain exclusive voting power.[8] In addition to the defectors from the GO sector, two CSP defections push the decided voter point further from the inequality line from X^1 to X^2, increasing the number of required swing voters from one to three[9] which decreases individual swing voter's voting power. Recall that without deviations from the GO sector, defection from the CSPs had no impact. Five abstentions from the undecided OS voters rotate the inequality line in a clockwise direction (from red dotted line to the first red solid line) and reduce the maximum voter line from 45 to 40. Additionally, abstentions from the CSPs decreases both the numerator and the denominator shifting both the decided voter point (from X^3 to X^4) as defections and the inequality line (from the first red solid line to the second red solid line) as abstentions outside the coalition. According to equation 25, the coalition is required to have eight voters from the OS. If all six abstention votes were of undecided voters, the supplier coalition needs two swing voters by keeping the decided voter point at X^2 having six CSPs already in the coalition. Indeed, abstention outside the coalition increases the voting power of individual swing voter as in this case the number of required swing voters is reduced from three to two. One of the abstentions, however, is the CSP and thus, by relocating the point to X^3 the coalition demands one more swing voter to be

[8] In figure 2-12, P_{OS} in equation 23 is indicated as P_{OS}^1.
[9] Nine OS voters are required and among eight CSPs, two of them defected leaving six CSPs in the coalition. Therefore, the coalition needs three more swing voters from the OS sector.

a successful coalition which leads decrease in the voting power of individual swing voters. Recall that abstain without defection cannot make any difference on the voting power distribution. Yet with defections, abstention outside the coalition increases individual swing voter's voting power while abstention inside the coalition decreases the voting power.

$$m_{OS}^2 = \lceil P_{OS}^2 \rceil = \left\lceil 39\left(-\frac{11}{15} + 0.915\right)\right\rceil = \lceil 7.085 \rceil = 8 \tag{25}$$

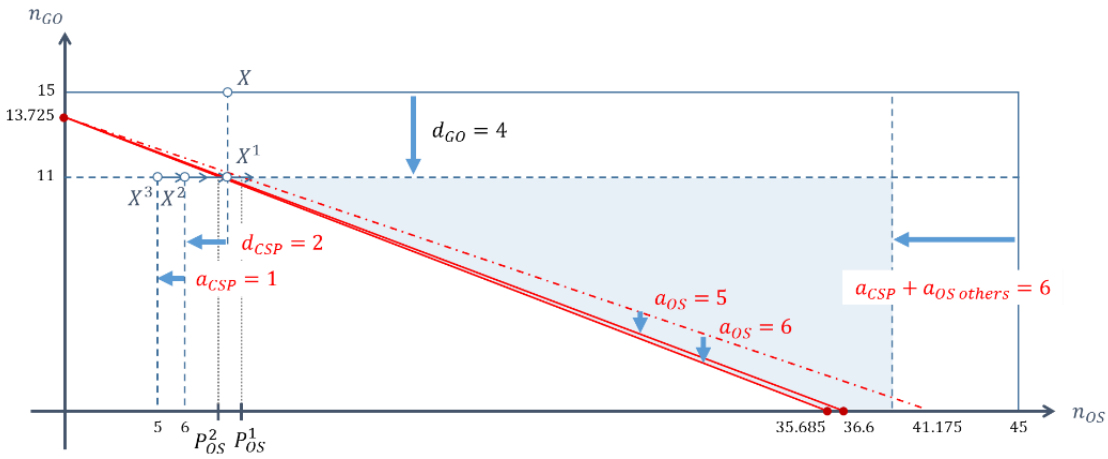


Figure 2-12 A combination of impacts of defection and abstention from the GO and the OS sectors on voting power (when the supplier coalition wants to block the package 13)

Defection from the supplier TO would move the inequality line upward. Therefore, one defection from the supplier TO shifts the line in the same manner, from red dotted line to red solid line in figure 2-13. Increase in the threshold sets the new number of voters required from the OS sector (equation 26). We can check that defection from the TO suppliers causes decrease in the voting power by making the supplier coalition demand more swing voters.

$$m_{OS}^3 = \lceil P_{OS}^3 \rceil = \left\lceil 39\left(-\frac{11}{15} + \left(1.665 - \frac{9-1}{12}\right)\right)\right\rceil = \lceil 10.322 \rceil = 11 \tag{26}$$

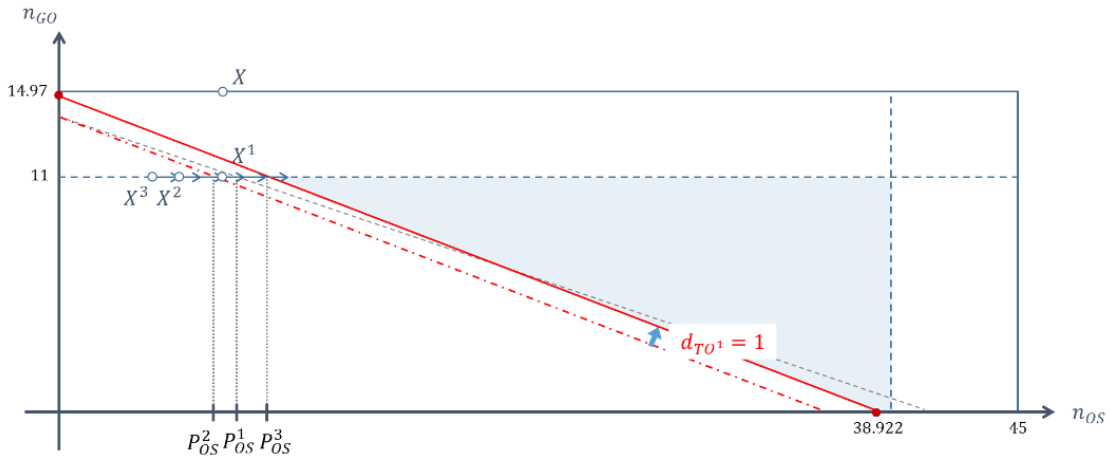


Figure 2-13 A combination of impacts of defection and abstention from the GO, the OS and the TO sectors on voting power (when the supplier coalition wants to block the package 13)

Consumer Coalition

Defection

For the consumer coalition, mainly the ED and the EUC sectors, (Blumsack et al. 2017; Yoo 2016) observed strong ties giving the two sectors coalition effective veto power without help of other sectors. To force an issue, however, it is harder because they need full support from more than three sectors because the maximum sum of three sectors is three while the threshold requires them to have at least 3.335. Even if the ED and the EUC sectors can persuade all voters in the OS (except CSP), they still need to persuade a few more swing voters. Equation 27 confirms that it is impossible to force an issue even with strong support from the OS sector[10] unless they get deviations from the GO and the supplier TO (TO^1). Therefore, this section focuses on transferred voting power by defections from GO, TO and OS.

[10] Maximum value that the consumer coalition can have (without deviations from the supplier coalition) is $1 + 1 + \frac{3}{12} + \frac{(45-8)}{45} = 3.072$

$$\frac{n_{ED}}{24}+\frac{n_{EUC}}{12}+\frac{n_{TO^2}}{12}+\frac{n_{OS}}{45}\geq 3.335-\left(\frac{d_{GO}}{15}+\frac{d_{TO^1}}{12}+\frac{d_{CSP}}{45}\right)$$

or (27)

$$\frac{d_{GO}}{15}+\frac{d_{CSP}}{45}\geq 3.335-\left(\frac{n_{ED}}{24}+\frac{n_{EUC}}{12}+\frac{n_{TO^2}}{12}+\frac{n_{OS}}{45}+\frac{d_{TO^1}}{12}\right)$$

As I did in the supplier coalition analysis, I take a specific example using the RPM voting data, package 13. There was no defection from the ED, the EUC and the consumer TO voters and as we checked that abstention of a unified sector would not have any influence on the voting power, one abstention from the EUC sector would not matter in this specific case. Accordingly, we can set the GO and the OS (the CSPs) sectors as the two sectors with defections and abstentions that have an impact on the voting power and then relax the assumption of no defection from the supplier TO as we did in the supplier coalition analysis.

Figure 2-14 displays changes when there are defections from the GO and the CSPs. The defections move the decided voter point of the GO and the OS sector from point X to X^1. Equation 28 calculates the number of the OS sector voters that the consumer coalition additionally persuades to vote against the proposal. Without defection from the GO sector, it is impossible for the consumer coalition to force an issue even with 100 percent *NO* vote from the OS sector. With four GO firms' defections, however, the coalition *can try*. Without defections from the CSPs, the coalition needs to convince 37 undecided OS voters. Undecided voters in the OS sector, even if it's shared by other 36 voters, have the voting power. With two CSP defectors, the number of required swing voters is reduced by two, moving the decided voter point from X^1 to X^2 implying that defection from the CSPs transferred voting power to swing voters in the OS.

$$m_{OS}^1=\lceil P_{OS}^1\rceil=\left\lceil 45\left(-\frac{4}{15}+1.085\right)\right\rceil=\lceil 36.835\rceil=37 \quad (28)$$

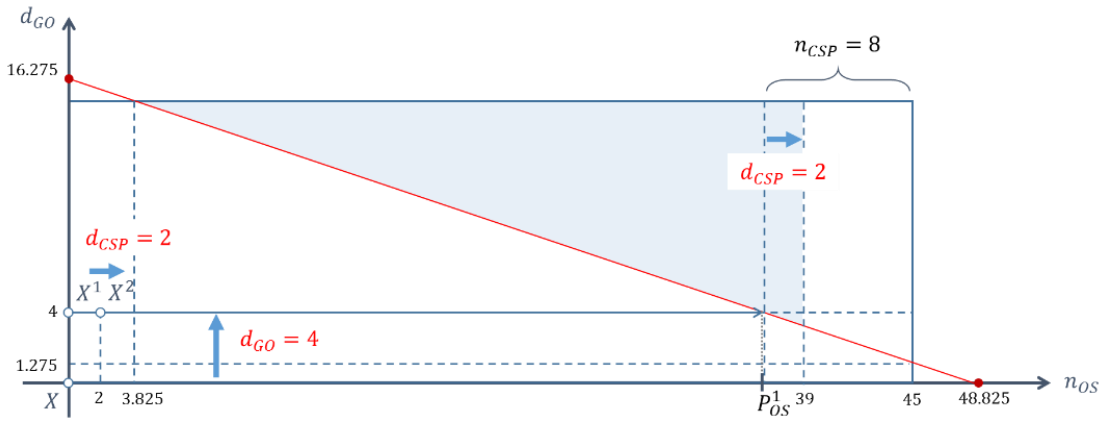


Figure 2-14 Impacts of defection of the GO and the OS sectors on voting power without deviation from TO (when the consumer coalition wants to force the package 13)

Defection from the supplier TO, who voted in favor of the package 13, would move the inequality line *downward* unlike the supplier coalition analysis since the defectors join the consumer coalition helping it to demand less swing voters. Figure 2-15 illustrates changes due to the defection of the supplier TO. The inequality line shifts from the red dotted line to red solid line decreasing the number of required swing voters from P_{OS}^1 to P_{OS}^3 (equation 29).

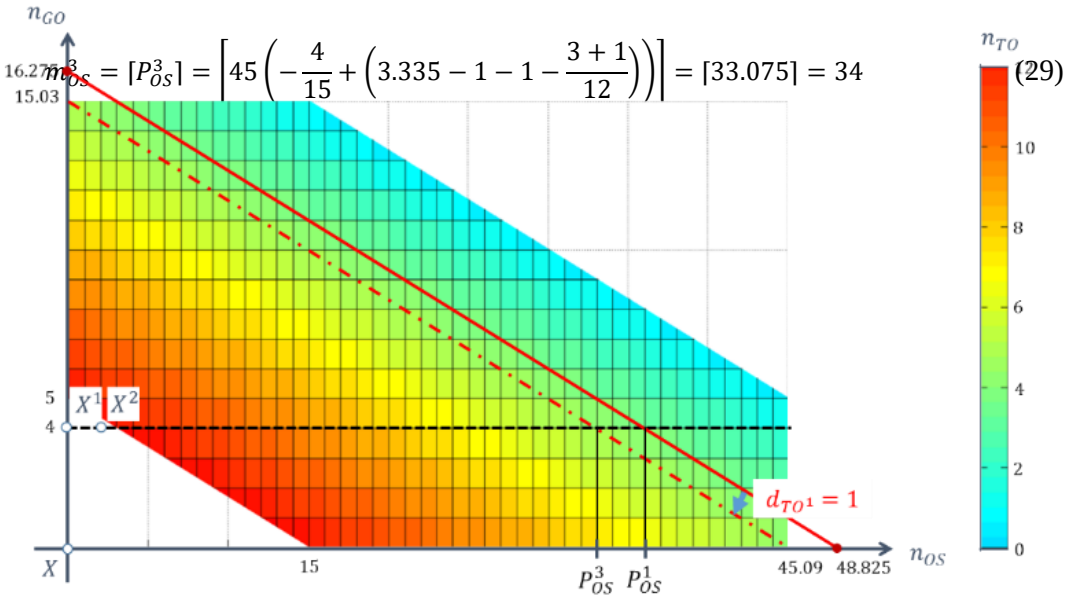


Figure 2-15 Impacts of defection of the TO sector on voting power assuming no abstention (when the consumer coalition wants to force the package 13)

Abstention

There were six abstentions from the OS sector including five abstentions from the undecided voters and one abstention of the CSPs. As in figure 2-16 (which assumes no defection from the supplier TO), abstention rotates the inequality line in a clockwise direction and reduces the maximum available voter line. Note that unlike in the supplier coalition analysis, abstention from the CSPs does not move the decided voter point because even though the CSP abstainers drop out from the supplier coalition (moving the point in the supplier coalition analysis), they do not join the consumer coalition. Thus, the decided voter point would remain at the same spot regardless of abstentions and CSP abstainers would act as same as the other abstainers.

Like in the defection analysis, due to the CSP's (expected) participation in the supplier coalition, 37 other supplier voters (forty-five total voters minus eight voters) are available to the consumer coalition and after six abstention votes, only 31 voters are available. Equation 30 calculates the number of required swing voters for the consumer coalition and it needs 43 swing voters from the OS sector. As mentioned, however, 43 voters are not available to the consumer coalition which implies that without defection, it is impossible for the consumer coalition to force an issue.

$$m_{OS} = \lceil P_{OS} \rceil = \lceil 39(1.085) \rceil = \lceil 42.315 \rceil = 43 \tag{30}$$

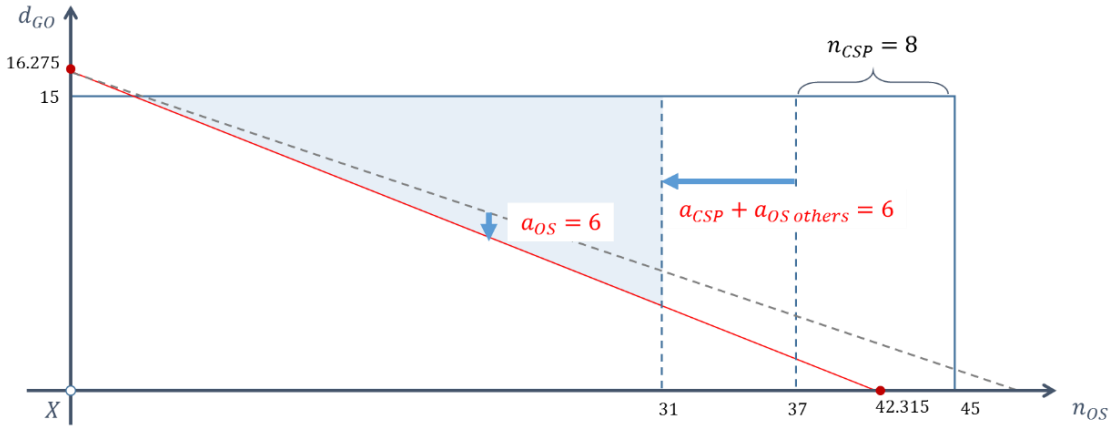


Figure 2-16 Impacts of abstention of the OS sectors on voting power without deviation from TO (when the consumer coalition wants to force the package 13)

Defection and Abstention

This section explains a combination effects of defections and abstentions with changes in the size of the pivotal swing voter block and discusses implications to the consumer coalition when it wants to force an issue.

Assuming no defection from the supplier TO sector, equation 31 calculates the number of swing voters required with four defections from the GO sector and six abstentions from the OS sector. Since 33 voters are available to the consumer coalition and the coalition needs 32 swing voters, it can force an issue. Also, since the number is reduced from 37 when there are only defections without abstention (equation 28), the abstentions increase the voting power of the swing voters. That is, the increase in the voting weight of the OS sector (shown as shift of the inequality line) enables the consumer coalition to be a successful coalition with the smaller number of swing voters.

$$m_{OS}^2 = \lceil P_{OS}^2 \rceil = \left\lceil 39\left(-\frac{4}{15} + 1.085\right)\right\rceil = \lceil 31.915 \rceil = 32 \tag{31}$$

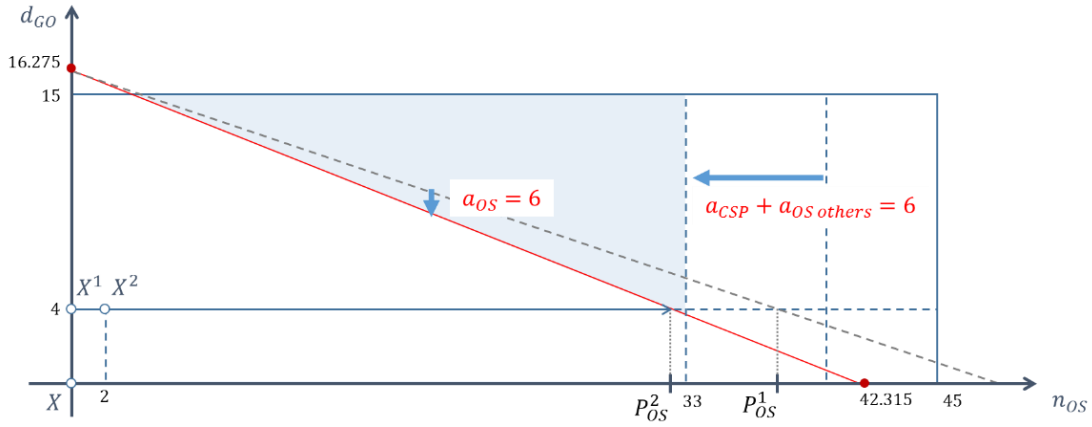


Figure 2-17 A combination of impacts of defection and abstention from the GO, the OS and the TO sectors on voting power (when the consumer coalition wants to force the package 13)

Defection from the supplier TO as explained in the previous section shifts the inequality line downward. Note that because of changes in the slope of the inequality line, level of changes depending on the number of TO firms is also adjusted accordingly. As in figure 2-18, the supplier TO's defection also increases the voting power of individual swing voters by reducing the number of required swing voters from P_{OS}^2 to P_{OS}^4 (equation 32).

$$m_{OS}^3 = \lceil P_{OS}^3 \rceil = \left\lceil 39\left(-\frac{4}{15} + \left(3.335 - 1 - 1 - \frac{3+1}{12}\right)\right)\right\rceil = \lceil 28.665 \rceil = 29 \quad (32)$$

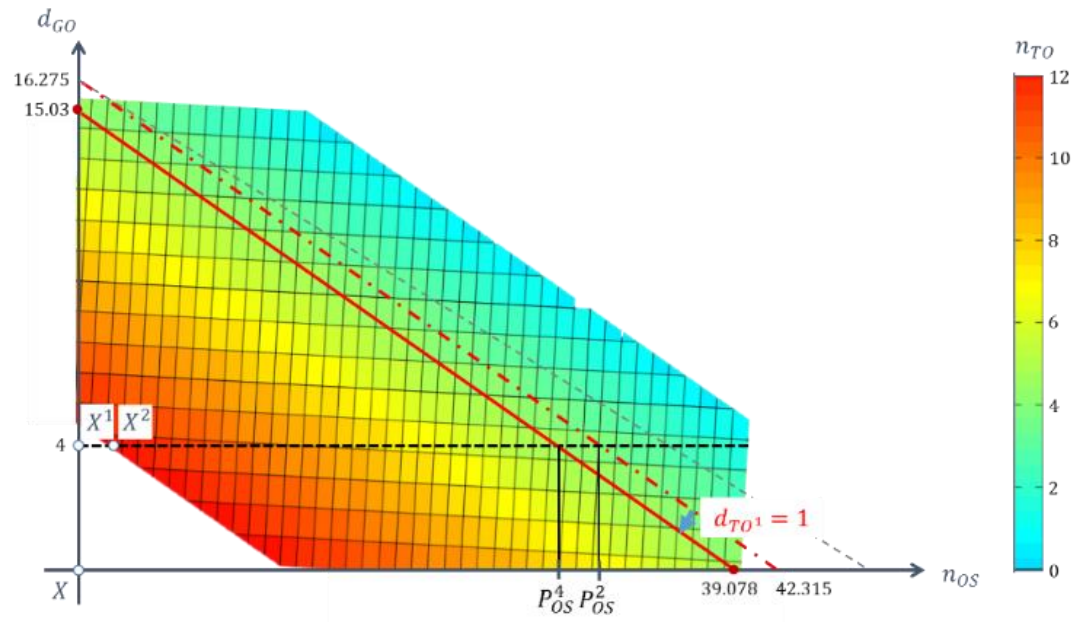


Figure 2-18 Impacts of defection of the TO sector on voting power with abstention (when the consumer coalition wants to force a proposal)

Conclusion

The results of the voting power analysis suggest a few swing voters from voters who do not have direct stake in the issue could be the critical voters, especially due to deviations – defections and abstentions – from the presumed coalition. I do find evidence in the capacity market example that defections from the supplier coalition could give exclusive voting power to swing voters in the OS sector, primarily financial players, and abstentions could increase their voting power. While this study does not explore the motivation behind deviations, it confirms that the deviations help the undecided swing voters to attain voting power which has not been well perceived among stakeholders (Yoo and Blumsack 2018a). I am not arguing that it is wrong for voters to deviate from the presumed coalition or it is wrong for financial players to have political power in the process; however, it is imperative to bring attention to these swing voters and investigate their motivations, given the magnitude of the decision's influence.

This analysis in this chapter is, to my knowledge, the first attempt to explicitly model the decision-making process within RTOs, and the scope of the thesis is limited to an issue known to be politically fraught. Avenues for future research with the framework in this study involve application to other market-rule issues and comparative analysis of voting structures between RTOs. One shortcoming of the present modeling approach is its treatment of votes as independent events. In reality, the stakeholder process is more like a repeated game, and such a lens would likely provide additional insights into coalition formation, not just the ex post identification of shifts in voting power. While this analysis suggests that market-driven constructs to ensure resource adequacy may not be amenable to design by stakeholder-driven processes, I would caution against more general conclusions about the stakeholder process itself. This modeling to date has been limited to an informative but very specific set of cases.

Chapter 3

Political Network Analysis in Regional Electricity Policy Formation

Prior analysis of some specific issues in the PJM stakeholder process in the second and the third chapter has found circumstances in which either a coalition or a few voters can sway a voting result. While this prior work showed the importance of such *critical voters* in determining the outcomes of highly contentious voting issues, this chapter uses the structure of the *voting network* to specifically identify these critical voters. This chapter provides and illustrates a network-based method for identifying political power structures in the stakeholder-driven organizations – Regional Transmission Organizations (RTOs) – using a detailed case study of one particular RTO in North America, PJM Interconnection, but the method itself is portable to other contexts. The issue of how RTOs engage in stakeholder-driven self-governance has been raised as an important energy policy issue in the academic literature and by policymakers (Blumsack et al. 2017; Dworkin and Goldwasser 2007; James et al. 2017; Simeone 2017; Yoo and Blumsack 2018b). In addition to the increasing volume of literature, the approach that I develop and implement in this chapter opens up the study of restructured electricity market processes to the use of network-based tools. While multiple organizational and political processes such as the U.S. congress have been represented using network-based tools (Campbell 2013; Fowler 2006; Ingold 2011; Lazer 2011; Mucha et al. 2010; Ward et al. 2011; Waugh et al. 2009), the present analysis is the first to do so in the context of regional electricity markets, and is motivated by the use of voting data to support or refute the stakeholder perceptions identified in (Kyungjin Yoo and Seth Blumsack 2018).

The analysis is comprised of three parts. First, based on stakeholders' perception on political power – specifically on coalition formation – I construct hypotheses and test them by

using network science measures. I utilize several years' worth of PJM Members Committee (MC) voting data from which I construct a *voting network*, and use a *community detection method* (Blondel et al. 2008) to identify political coalitions. The analysis provides quantitative information from the RTO voting histories in the PJM MC to evaluate these hypotheses. Second, I compare the PJM MC voting network with several canonical graph models of similar size to the PJM voting network to put the voting network in the context of existing social network literature. Similar properties are observed in the PJM voting network as would emerge from a model of preferential attachment (we would expect such *homophily* if stakeholders' perceptions of a strong voting bloc are correct), but it is also observed that a small number of stakeholders exhibiting a higher node degree than would be expected from a preferential attachment network. Third, based on the finding from the second step, I argue that these high-degree voters are swing voters who tend not to vote with any of the identified voting blocs on a consistent basis. I show that some simple properties of the voting network are sufficient to identify *swing voters* in RTO stakeholder networks. These swing voters have previously been shown (in chapter 2) to play an important role in enabling or thwarting the ability of the RTO to make changes to its market rules and procedures. I compare the performance of degree as an identifier for a swing voter with two other measures: betweenness centrality and mixing parameter. Betweenness centrality has been identified in the literature as an indicator of power within a social network (Ansell et al. 2009; Freeman 1978; Ingold 2011; Lienert et al. 2013; Yang et al. 2016); mixing parameter is calculated based on the detected community for each voter. I then examine the actual voting behavior for each stakeholder identified as a swing voter by each network structure measure, and calculate a false-positive rate for each measure.

This analysis utilizes firm-level voting data from the PJM MC since detailed voting data is only available for that specific stakeholder body. I am not able to quantitatively describe political power in any of the lower-level working groups or task forces, since data from those

proceedings are not made public. I gathered data from PJM that contains information on 26 voting items from 2011 to 2015, including the outcome of each vote and the way that each stakeholder voted. I note that by aggregating data across a five-year period any dynamic changes to the structure of the voting network are ignored. While this structure may change from year to year depending on the kinds of voting issues presented to the PJM MC, I observe that over this period there were very few changes in the composition of the stakeholder group in PJM. The data set also includes stakeholder information such as name, sector, sub-sector and other asset-related information about specific stakeholders.

Construction of the Voting Network for the PJM Members Committee and Evaluation of Stakeholders' Perceptions on Political Power

The perceptions about the PJM stakeholder process based on (Kyungjin Yoo and Seth Blumsack 2018) suggest two possible hypotheses about the balance of political power.

> *Hypothesis 1:* Supplier-side perceptions are correct, and consumer-side interests possess substantial political power in the Members Committee.
>
> *Hypothesis 2*: Consumer-side perceptions are correct, and supplier-side interests possess substantial political power in the Members Committee.

If the perceptions of supply-side interests are correct and consumer-side interests jointly possess a substantial amount of political power, we should observe a strong voting bloc among the two consumer-side sectors in the PJM stakeholder process (the ED and EUC voters). If the perceptions of consumer-side interests are correct, we should observe a strong voting bloc among generation firms in the PJM stakeholder process (principally those stakeholders in the GO and TO sectors).

I use the PJM MC voting data to construct an undirected voting network (Lazer 2011; Newman and Girvan 2003; Waugh et al. 2009), in which a vertex represents a single voter in the MC and is connected to another vertex when the two vertices (voters) vote on the same side – yes, no or abstain – on the same issue. A connection in the voting network thus represents ideological alignment between two voters on a specific issue. In this way the voting network has some commonalties with the similar-view networks constructed on social media platforms (Bu et al. 2013). The connections, or edges, are weighted by the frequency of the two connected voters voting together. Thus, a *degree* – one of the network-metrices – of each node measures the number of voters a voter had the same position on an issue (or, the number of nodes with which a node is connected); a *weighted degree* – another the network-metrices – measures a sum of frequency of having the same position on issues with connected nodes. Figure 3-1 shows the voting network in the PJM MC when connections represent two stakeholders voting *no* on a specific issue (the No network), while Figure 3-2 shows the voting network in the PJM MC when connections represent two stakeholders voting *yes* on a specific issue (the Yes network). I did construct a network for abstentions, but this network turns out to be quite sparse so it is not shown here. In Figures 3-1 and 3-2, vertices are located on one of the five axes representing each industry sector in an order of degree and the size of vertices is proportional to the weighted degree. Colors of the nodes represent different detected communities, as described further later in this chapter. Among 147 nodes in the network, there are 21 Generation Owners (GO), 18 Transmission Owners (TO), 61 Other Suppliers (OS), 30 Electric Distributors (ED), and 17 End Use Customers (EUC). The No network has 8,173 edges, an average degree of 111.2, and an average weighted degree of 284.83; the Yes network has 8,853 links with an average degree of 119.63 and average weighted degree of 505.54.

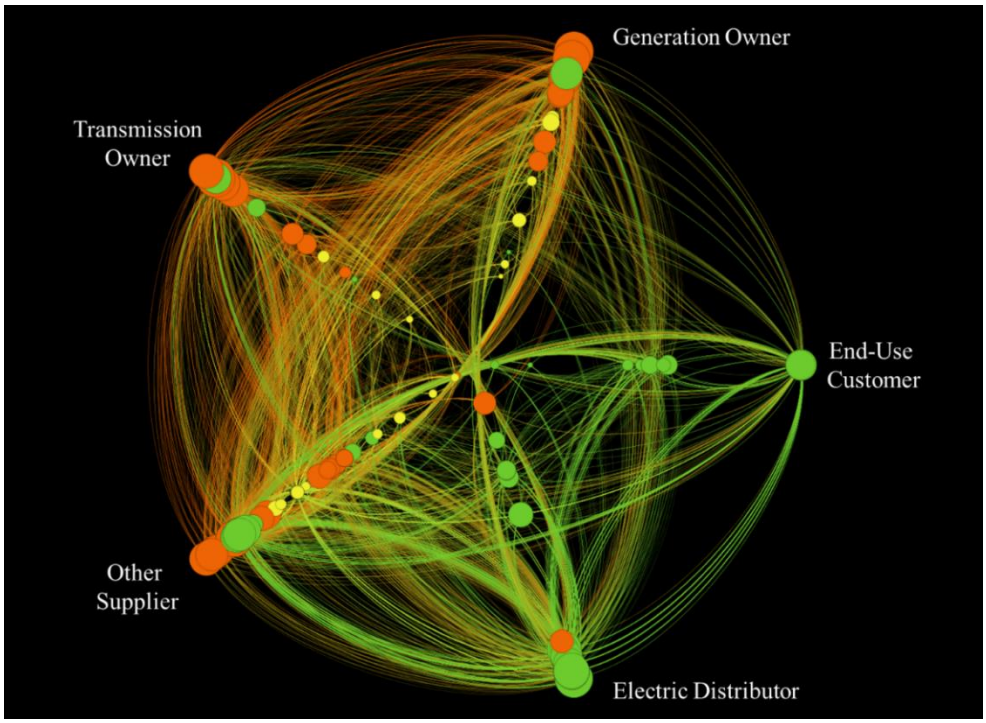


Figure 3-1 The No Voting network in the PJM Members Committee from 2011 to 2015. The node and edge colors correspond to the three different communities detected within the No network.

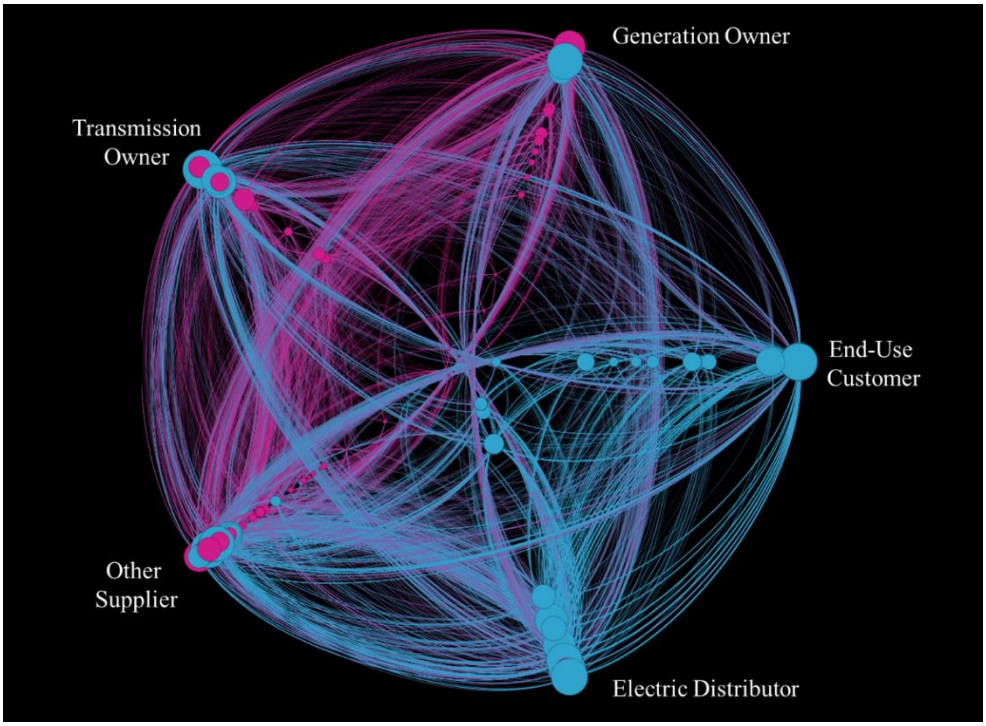


Figure 3-2 The Yes Voting network in the PJM Members Committee from 2011 to 2015. The node and edge colors correspond to the two different communities detected within the Yes network.

Detection of Strong Coalitions

The Louvain method (Blondel et al. 2008; Newman and Girvan 2003) is applied to discover the community structure of the PJM voting network. A number of different community detection algorithms exist (Lancichinetti et al. 2008; Lancichinetti and Fortunato 2009; Orman et al. 2013; Ronhovde and Nussinov 2008; Yang et al. 2016); I chose the Louvain method because the PJM voting network has a relatively small number of nodes and relatively large average mixing parameters, criteria set by (Yang et al. 2016). The algorithm maximizes modularity through iterative process of clustering nodes and altering community assignments. The modularity is a function that measures the difference between the number of edges within communities and the expected number of randomly placed edges; it has been used in numerous studies of community structure (Clauset et al. 2004; Newman 2006; Newman and Girvan 2003; Porter et al. 2007; Wakita and Tsurumi 2007; Waugh et al. 2009; Zhang et al. 2008). High modularity is desirable for searching community structure since it implies that there are more edges than expected within communities, or nodes in the same community are more connected than expected (Blondel et al. 2008; Newman 2003, 2006; Newman and Girvan 2003). Hence, the scheme optimizes the modularity measure over the possible segmentation of a network and finds a division that produces the largest modularity value. Equation 33 is a mathematical representation of the modularity measure where A_{ij} is the edge weight between vertices i and j; k_i represents the sum of edge weight of vertex i; c_i is the assigned community of vertex i; $m = \frac{1}{2m} \sum_{i,j} A_{ij}$; the delta function $\delta(a, b)$ is 1 if $a = b$ and 0 otherwise (Blondel et al. 2008).

$$\mathrm{Q} = \frac{1}{2m} \sum_{i,j} \left[A_{ij} - \frac{k_i k_j}{2m} \right] \delta(c_i, c_j) \tag{33}$$

The community detection algorithm identifies three distinct communities in the No network, indicated by the green, yellow and orange colors in Figure 3-1. It identifies two distinct

communities in the Yes network, indicated by the red and blue colors in Figure 3-2. In the context of voting, I interpret an identified community as a *coalition* – meaning voters in the same community voted more frequently together than voters of the other communities.

Table 3-1 shows the number of voters in the communities by sectors in the No network, while Table 3-2 shows the Yes network. Voters in the ED and EUC sectors tend to be entirely contained within the ED-EUC community, while voters in the GO and TO sectors are distributed more evenly among the identified communities.

Table 3-1. The number of voters in the detected communities by industry sectors (No network)

	Community 1 (Orange)	Community 2 (Yellow)	Community 3 (Green)	Total
Generation Owners	13 (62%)	5 (24%)	3 (14%)	21
Transmission Owners	11 (61%)	3 (17%)	4 (22%)	18
Other Suppliers	25 (41%)	21 (34%)	15 (25%)	61
Electric Distributors	2 (7%)	0 (0%)	28 (93%)	30
End Use Customers	0 (0%)	0 (0%)	17 (100%)	17

*Numbers in parenthesis are percentages of voters in each community within a sector

Table 3-2. The number of voters in the detected communities by industry sectors (Yes network)

	Community 1 (Red)	Community 2 (Blue)	Total
Generation Owners	18 (86%)	3 (14%)	21
Transmission Owners	13 (76%)	4 (24%)	17
Other Suppliers	41 (65%)	22 (35%)	63
Electric Distributors	1 (3%)	29 (97%)	30
End Use Customers	0 (0%)	17 (100%)	17

*Numbers in parenthesis are percentages of voters in each community within a sector

Note that modularity may show a *resolution limit* that suggests failure to detect small size communities and there are potential improvements to this limitation (Fortunato and Barthelemy 2006; Ronhovde and Nussinov 2008). Although this could remain as a future work, this study focuses on identifying sizable coalitions that could exercise political power (e.g. veto power).

Evaluation of detected coalitions

To address a concern of the quality of detected communities, I adopt a measure called *mixing parameter* (Lancichinetti and Fortunato 2009; Orman et al. 2011). This parameter is defined as:

$$\mu = \frac{k_i^{out}}{k_i^{in} + k_i^{out}} \tag{34}$$

where k_i^{out} is the external degree of node i, meaning the number of edges connecting node i outside its community (or, inter-community edges), and k_i^{in} is the internal degree of the node or the number of intra-community edges. If μ is high, the communities are not well defined. In other words, a high value of the mixing parameter indicates that vertices are more connected to vertices of different communities than within its community. Although the threshold for a high value of μ varies in the literature, (Radicchi et al. 2004) suggests that any value of μ greater than 0.5 is considered large while (Lancichinetti and Fortunato 2009) suggests a criterion for μ to be smaller than $(N - n_c)/N$, where N is the total number of nodes and n_c is the number of nodes of the community c. Tables 3-3 and 3-4 show the mixing parameters by identified communities in the No and Yes networks, respectively. All communities identified in the PJM voting network satisfy the condition suggested by (Lancichinetti and Fortunato 2009), having lower average μ than $(N - n_c)/N$. Only community 2 in the No network – made up largely of voters from the ED and EUC sectors and thus representative of a consumer coalition – has average μ lower than 0.5, which would satisfy the mixing-parameter threshold suggested in (Radicchi et al. 2004). The consumer coalition in the both the No and Yes networks has the lowest average mixing parameter, suggesting that voters in the consumer coalition tend to have the same position with the coalition more frequently compared to voters in the supplier coalition.

Table 3-3. Mixing parameters in detected communities in the No network

	Community 0 (Supplier coalition)	Community 1 (Supplier coalition)	Community 2 (Consumer coalition)
Number of nodes in the community	51	29	67
Range of mixing coefficient μ within a community	[0, 0.667]	[0.48, 0.769]	[0.147, 0.514]
Average mixing coefficient μ of a community	0.556	0.682	0.449
$(N - n_c)/N$	0.653	0.803	0.544

Table 3-4. Mixing parameters in detected communities in the Yes network

	Community 0 (Consumer coalition)	Community 1 (Supplier coalition)
Number of nodes in the community	75	73
Range of mixing coefficient μ within a community	[0.049, 0.485]	[0.088, 0.61]
Average mixing coefficient μ of a community	0.417	0.464
$(N - n_c)/N$	0.493	0.507

The strong consumer-side coalition that is identified is consistent with the perception of some of our interview respondents that consumer-side interests wield a greater amount of political power than supplier-side interests. Recall that because of the structure of the voting system in the PJM Members Committee, two sectors that vote in the same way can effectively prevent any potential rule change from passing. The strong ED-EUC coalition suggests that consumer-side interests do possess structural voting power. I do see evidence in the voting data set of four instances in which a proposed rule change failed to pass because the ED-EUC

coalition. I do not, however, see evidence in our voting data of a strong supplier-side coalition that is able to ensure or prevent passage of any proposed rule change. Information from the interviews does shed some light on why consumer-side interests are able to form a stronger coalition than supplier-side interests.

Topological Structure of the Voting Network

Although there have been numerous studies of identification of communities, to the best of my knowledge, topological structure of a voting network is not well-explored, especially given the lack of studies on RTO governance. In this section, I compare degree distribution of PJM MC's voting network to those of common abstract network models – Erdős-R*é*nyi (ER), small-world (SW), and preferential attachment (PA). By doing so, it would be possible to check whether the voting network has similar properties of abstract network models and to put the PJM's voting network in the context of existing social network literature.

Comparison with common abstract network models

Among numerous synthetic network models, ER, SW and PA models are the most cited and compared synthetic networks. ER model is for generating random graphs by which the number of nodes and edges are set in the model; basically, all nodes have equal probability to be connected (Erdos and Renyi 1959). Unlike ER random network, small-world network tries to imitate a common real-world network – often called *small world phenomenon* – in which neighbors of a node are likely to be neighbors of each other (Watts and Strogatz 1998). A scale-free network is a network whose degree distribution (asymptotically) follows power law – meaning degree distribution has a heavy-tail. Preferential attachment is one of the most well-

known methods that try to model scale-free network by assuming that nodes with high degree have higher chance to be connected (Barabasi and Albert 1999). Table 3-5 shows a summary of these three canonical networks that I generated in a way that they have the same number of nodes and would have similar chance of connection as those in the PJM voting network. This structural analysis uses a version of the PJM voting network with near-unanimous votes removed, since these votes will tend to inflate the node degree distribution. Parameters for generating an ER random network are the number of nodes and the probability for drawing an edge between two arbitrary nodes – which in our case is the total number of edges divided by all the possible number of edges with 147 nodes. For generating small-world networks, dimension of the lattice, number of nodes, number of neighbors, and rewiring probability are used as input parameters; I use one dimension, 147 nodes, 28 neighbors and a rewiring probability of 0.3; the number of neighbors, 28, is set to yield a similar number of edges as the actual PJM voting network (4,116 edges). I generate three different small-world networks by varying rewiring probabilities (0.2, 0.3, and 0.5) (Hong et al. 2004; Wang et al. 2010; Watts and Strogatz 1998). Finally, I created a scale-free network with 147 nodes and 4,290 edges; to have similar number of edges to the PJM voting network, I set 33 edges to be added in each time step of the network growth. After producing synthetic networks, I also tested whether they have a power-law degree distribution by Kolmogorov-Smirnov (KS) goodness-of-fit test based on 1,000 simulations (Clauset et al. 2004, 2009; Kolmogorov 1933; Smirnov 1939).

Even though the average degrees are similar, the degree distributions show different shape – Figure 3-3 shows cumulative degree distributions (in log-scale) of all three synthetic networks and the PJM No voting network. The degree distributions of the ER random and the small-world networks are more concentrated around their average degrees than commonly observed synthetic networks, which is due to a small number of nodes ($n = 147$) with high probability of drawing edges ($p = 0.408$). The degree distribution of the PJM MC voting network

exhibits similar shape to that of the preferential attachment network but the longer tail is more pronounced. Kolmogorov-Smirnoff (KS) tests reject the null hypothesis that the tested sample is drawn from the power-law distribution. Thus, all of the tested networks are not scale-free networks including preferential attachment. While this is surprising, particularly for the synthetic preferential attachment graphs which is supposed to follow power-law degree distribution, an examination of the tails of the degree distributions shows why. Figure 3-4 shows the power-law fit for both the synthetic preferential attachment graph and the PJM voting network. Both have fast-decaying tails, but have a small number of nodes with a larger than expected degree; it is also due to a small number of nodes with high probability of connection similar to the reason for the two random networks.

Table 3-5. Comparison between the PJM voting network and synthetic networks

	PJM voting network	Erdős-Rényi	Small world			Scale-free
			p = 0.2	p = 0.3	p = 0.5	
Number of nodes	147	147	147	147	147	147
Number of links	4381	4380	4116	4116	4116	4290
Average degree	59.67	59.59	56	56	56	58.37
Range of degrees	[6, 144]	[48, 72]	[43, 70]	[46, 69]	[42, 68]	[33, 99]
Range of betweenness centrality	[0, 0.06157]	[0.00258, 0.00595]	[0.00226, 0.00667]	[0.00224, 0.00633]	[0.00231, 0.00653]	[0.00067, 0.01134]
Power-law exponent	3.205	8.637	8.285	8.127	8.038	2.93
KS t-test result	0	0.011	0	0	0	0

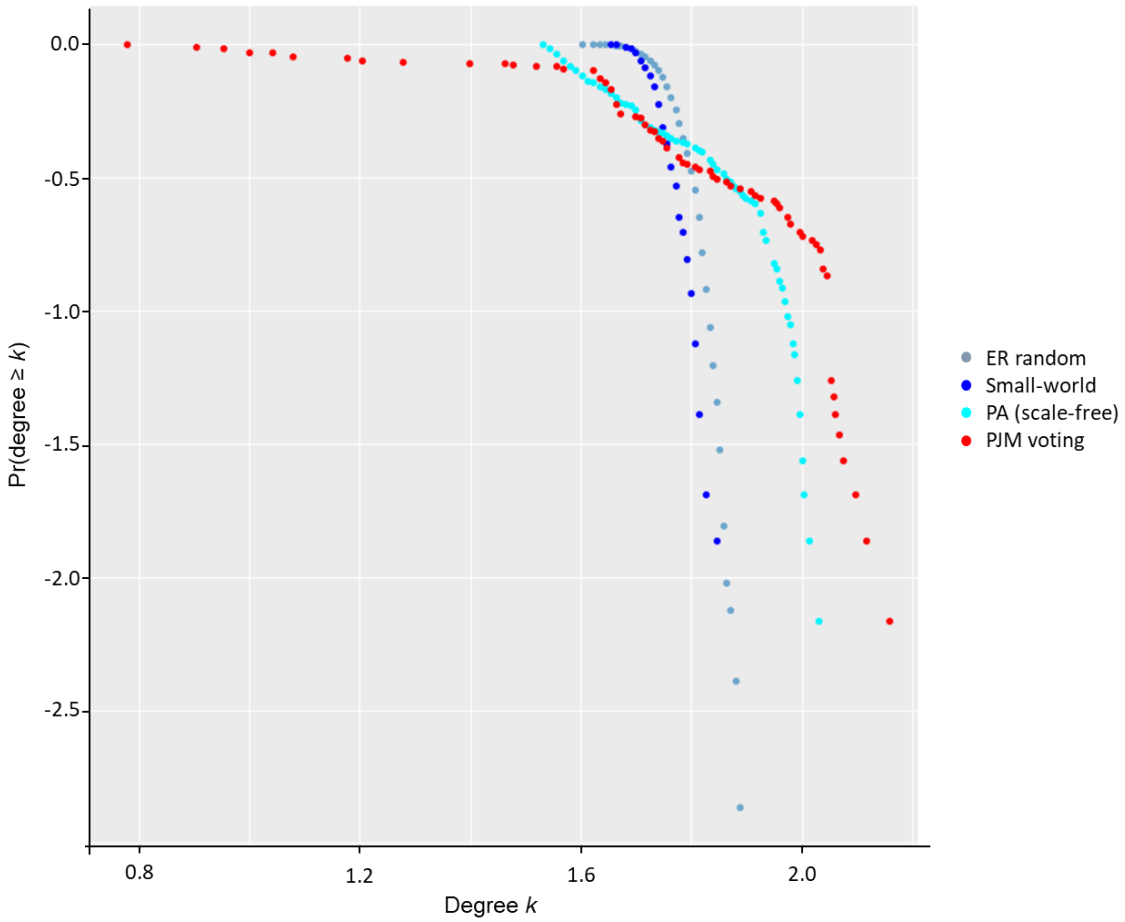


Figure 3-3 Cumulative degree distribution of the ER random (sky-blue), the small-world (blue), the scale-free (cyan), and the PJM voting (red) networks.

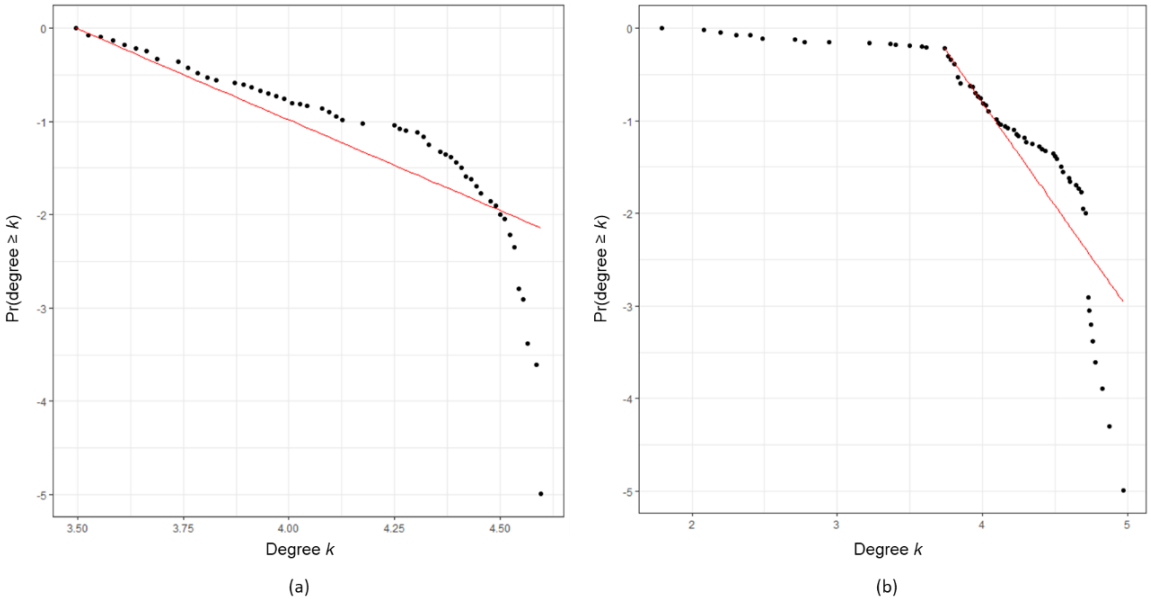


Figure 3-4 Power-law fitting of (a) the scale-free network and (b) the PJM voting network

Identifying swing voters

In figure 3-3, the degree distribution of the PJM voting network has a fatter tail than that of the preferential attachment. I argue that the tail voters are likely swing voters, who may be able to sway the final voting outcome by switching their positions. A reasoning behind this argument is that if a voter is connected by a degree to which one can explain with *homophily* – a character linked to the preferential attachment; a theory that similar nodes are more likely to be connected to each other than other dissimilar nodes (McPherson et al. 2001) – then the voter is just following a common behavior; they vote with others who have shared interests. If, however, a voter is connected to more voters than we can explain by homophily, then it means that the voter has voted with diverse groups of voters who might have opposite interests. In other words, given the community structure that I have detected in the PJM MC the voters in the tail of the degree distribution in Figures 3-3 are those who have voted with all of the coalitions at various points.

Yet, I suggest a more nuanced view of how to capture whether the tail voters are, in fact, swing voters. To evaluate the degree measure as a detection method for swing voters, I compare it with two other measures: mixing parameter and betweenness centrality. It has already been shown how one could expect swing voters to have high degree. Since mixing parameter use out- and in-degree, it also uses the concept of degree measure. The difference is that it requires community detection before trying to identify swing voters. Mixing parameters of swing voters are expected to be high because, by definition, swing voters are connected to multiple communities (i.e., sometimes voting with consumer interests and sometimes voting with supplier interests). Finally, because the voting network covers a number of different voting issues over a period of five years, a swing voter would also be one that connected two voters that otherwise are unconnected. Thus, I would expect swing voters to have high *betweenness centrality* – a network metric that calculates the number of times a node is on the shortest path between all pairs of nodes (Freeman 1977), and that has been used in multiple literature to measure *power* of a node (Grofman and Owen 1982; Ingold 2011; Lienert et al. 2013). Figure 3-5 shows the betweenness centrality distribution and the mixing parameter distribution of the PJM voting network. Most voters in the network have low betweenness centrality value, between 0 and 0.01, but there are a few that have extremely higher betweenness centrality than the other nodes; four voters have the centrality over 0.03 including one voter with the centrality value over 0.06. The mixing parameter distribution is more symmetric than the betweenness centrality distribution, though it is somewhat left-skewed.

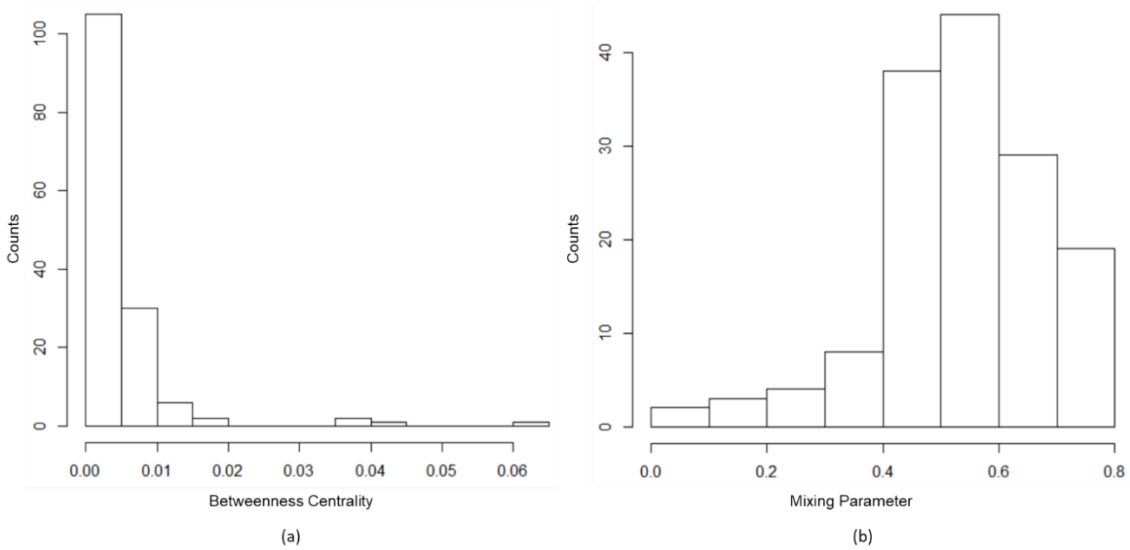


Figure 3-5 Histogram of (a) Normalized Betweenness centrality and (b) Mixing parameter distribution of the PJM voting network. Betweenness centrality was normalized by dividing it by $(n-1)(n-2)/2$.

To examine whether the three network structure measures – node degree, betweenness centrality, and mixing parameter – are sufficient to identify swing voters, I correlate these measures with the proportion of time that the identified swing voters voted with the consumer coalition on issues that I identified as contentious – based on issue's clear divisiveness between consumers and suppliers, and existence of strong coalition formation. An example of such a contentious issue was a set of the capacity market review votes, further described in the second chapter. Some of these proposed pricing changes would have clearly benefited suppliers and harmed consumers, while others would have had the opposite effect. I identified twelve such contentious issues for this analysis. Voting with the consumer coalition most of the time or almost never would suggest that the voter in question was not a swing voter. Thus, after detecting potential swing voters by the three network measures, a review of the frequency of voting with the consumer coalition could evaluate these measures as a false-positive test. Table 3-6 shows the frequency of a false positive when I attempt to identify swing voters using the three structural measures. Each column of Table 3-6 shows the top fifteen voters (identified by name) based on node degree, betweenness

centrality, and mixing parameter. The percentage figure next to each voter's name is the frequency with which that voter voted with the consumer coalition on contentious issues.

I note a few important observations about Table 3-6. First, the false positive rate for betweenness centrality as a swing-voter identification metric is quite high. Almost two-thirds of those identified as swing voters using betweenness centrality either voted with the consumer coalition 100% of the time on contentious issues, or never voted with the consumer coalition on contentious issues. On the contrary, the false positive rate for node degree is one out of fifteen, and the false positive rate for the mixing parameter is zero. The high rate of false-positive of the betweenness centrality may be caused by capturing regularly participating voters that make connections with a lot of irregular participants within the consumer coalition. Second, majority of the identified swing voters by node degree and those by the mixing parameter overlap. Eleven (among fifteen) of the voters identified as potential swing voters using node degree were also identified using the mixing parameter. Finally, there are relatively few voters that are identified as potential swing voters based on *all* three network-metrics. Direct Energy and Enerwise are example of voters that are identified as potential swing voters regardless of the network metric used. Therefore, I would not rush into the conclusion that picks a single measure as the only measure for identifying swing voters. Rather, it is better to use multiple measures as complementary criterion. For example, as mixing parameter shows the lowest false-positive rate, one would think it is better to only use the mixing parameter; however, there are three swing voters that are identified by the degree but not by the mixing parameter: Brookfield Energy, Potomac Electric Power Company, and PBF Power Marketing. On the other hand, there are four voters that are identified by the mixing parameter but not by the degree. Thus, the two measures could be good complements of each other.

Table 3-6. Top fifteen voters in the PJM voting network based on node degree, mixing parameter and betweenness centrality. The figures in the % column represent the frequency with which each voter voted with the consumer coalition on contentious rule changes in PJM.

Degree	%	Mixing parameter	%	Betweenness Centrality	%
Brookfield Energy Marketing LP	38%	**Direct Energy Business, LLC**	50%	Brookfield Energy Marketing LP	38%
Potomac Electric Power Company	40%	**Enerwise Global Technologies, Inc**	33%	Potomac Electric Power Company	40%
PBF Power Marketing LLC	40%	MidAtlantic Power Partners, LLC	50%	PBF Power Marketing LLC	40%
Enerwise Global Technologies, Inc	33%	**Iron Mountain Generation LLC**	33%	TransCanada Power Marketing Ltd	25%
Direct Energy Business, LLC	50%	**West Deptford Energy, LLC**	33%	Central Virginia Electric Cooperative	100%
Iron Mountain Generation LLC	33%	Black Oak Energy, LLC	50%	Virginia Electric & Power Company	0%
Central Virginia Electric Cooperative	100%	**Apple Group, LLC**	33%	Energy Consulting Services, LLC	100%
West Deptford Energy, LLC	33%	**Dyon, LLC**	33%	Invenergy LLC	0%
Apple Group, LLC	33%	**E Minus LLC**	33%	Enerwise Global Technologies, Inc	33%
Dyon, LLC	33%	**Great Bay Energy I, LLC**	33%	Direct Energy Business, LLC	50%
E Minus LLC	33%	**Hexis Energy Trading, LLC**	33%	Galt Power Inc	100%
Great Bay Energy I, LLC	33%	**Mac Trading, Inc**	33%	Borough of Lavallette, New Jersey	100%
Hexis Energy Trading, LLC	33%	**Monterey MA, LLC**	33%	The Trustees of the University of Pennsylvania	100%
Mac Trading, Inc	33%	Pure Energy, Inc	33%	Borough of Madison, New Jersey	100%
Monterey MA, LLC	33%	BJ Energy, LLC	33%	Borough of Milltown, New Jersey	100%

Conclusion

This work adds to an emerging body of literature on stakeholder decision processes and electricity policy formation by developing and illustrating a novel method for integrating qualitative information elicited from stakeholder perceptions with quantitative voting data; using community detection methods to identify political coalitions among stakeholders in Regional Transmission Organizations; leveraging voting network measures to identify potential swing voters in the stakeholder group. Using the PJM Regional Transmission Organization in the United States as a case study, I elicited perceptions of the stakeholder process from process participants and treated those perceptions as hypotheses regarding the presence and possession of political Power. Then, I used a network representation of voting data in PJM to evaluate these hypotheses. I find some evidence in support of the perception that customer-side interests form a strong coalition that is able to exercise some power in defeating proposed rule changes in the PJM market; however, I find less evidence in support of the perception that supplier side interests are able to exercise a similar amount of political power in the PJM MC. The structure of the voting network and detected communities, particularly as embodied in the node degree and mixing parameter, also allow identifying a number of stakeholder participants that act as swing voters on highly contentious rule changes. These swing voters tend not to vote with any one of the identified coalitions on a consistent basis, and may thus be engaged in vote trading or other strategic activity. The framework illustrated for the PJM RTO in the United States is portable to other contexts, and represents an approach to defining questions and hypotheses about stakeholder-driven governance; using data from these processes to build models and evaluate hypotheses, and using these models to evaluate alternative structures or voting rules for stakeholder processes.

Chapter 4

Connecting RTO Governance and Electricity Markets

This chapter aims to show governance of regional transmission organization (RTO) and independent system operator (ISO) is not just an administrative or supportive system but has a measurable impact on the electricity market. I explore different governance systems, especially voting rules, and show how different voting rules change market outcomes which can be presented in dollar terms. In this chapter, I try to show more direct and quantitative evidence of a relationship between RTO governance and market outcomes. Specifically, I explore different voting rules that could be applied to the PJM voting system and show how these differences could change market outcomes. An important caveat of this analysis is that although in the PJM decision-making process, the Members Committee (MC) has Section 205 filing rights over operating agreement but *not over tariffs*—while the PJM board has the right over both operating agreement and tariffs—the MC still proceeds its advisory vote which would be the guideline for the PJM board's decision. I acknowledge that there is no legal binding for the PJM board to follow the stakeholder's decision over tariff rule changes. Considering, however, that the FERC wants RTOs to be responsive to stakeholders in the decisions made in RTOs (Federal Energy Regulatory Commission 2008) and the PJM is sponsored by its membership from the stakeholders, if the PJM board were to deviate from the stakeholders' decision, they need to make a strong and convincing argument as to why they chose the specific option.

Chapter 2 suggested that stakeholders in PJM are unlikely to pass a proposal for a contentious issue under the current voting rule due to the coalition formation or a few swing voters. The results lead to a question of whether it is possible to have a passable proposal under *different* voting rules. In other words, does voting rule change could change a voting outcome? If

so, what are the potential outcomes on the market under various voting rules? Exploring various voting rules has two benefits: first, this chapter evaluates whether the voting rules matter at all by investigating if there is any change in voting outcome under different voting rules; second, results that show a range of possible consequences of adopting new voting system, especially in dollar terms, could inform the policy makers if they seek a potential reform. In applying different voting rules, I seek two different ways of rule changes: applying NYISO voting rules with lower the passage threshold and different sector weights (assuming other rules being equal to those of PJM) and applying a completely new structure, called *preferential voting* in which voters rank options in an order of their preference. Both, by nature, would allow the process to have higher chance to produce voting outcome—solving at least the problem of deadlock of the process. Note that I am not arguing that having a passable proposal for a contentious issue is better than failure to have a proposal; I do not assume that a selected proposal is a *good*—meaning it pursues efficient market outcome—or *bad* proposal. This study simply tries to explore possible voting systems that could avoid deadlock of an issue and to make prediction on what voting outcomes would be if the PJM MC wants to adopt a new system.

I utilize a specific set of votes on reviewing PJM's capacity market to predict possible voting outcomes under different voting rules. The capacity market is a mechanism that PJM and other RTOs use to ensure that they will have enough capacity to meet expected future demand and that works as a forward market for electricity capacity. The reason why I chose this specific issue is because in the capacity market, participants have relatively clear payoffs which makes parameterization of each player's preference order straightforward. Also, this thesis uses voting data of MC in the PJM, which is the only committee that publishes individual firm's voting data to the public. On October 2011, the PJM MC voted on 6 proposals to review the estimated demand curve of capacity market, or Variable Resource Requirement (VRR) curve, on the same

day including a status quo proposal that suggests to keep the capacity market exactly the way it is. As shown in Table 2-1, the MC failed to get a voting outcome.

To predict voting outcomes under preferential voting, I convert the voting records (displayed as yes, no, or abstain) on each proposal to orders of preference. As analyzed in the second chapter, proposed VRR curves could be ordered by expected capacity market clearing price—package 1 being expected to generate the highest clearing price and package 13 for the lowest price. I assign preference order by classifying all types of sequence of votes and identifying whether each type is consumer type that would prefer the lowest proposal the most or supplier type that would prefer the highest proposal the most. In doing so, however, I have to take care of uncertainty in the orders due to abstentions. If there are two or more abstention, preference order could be unclear. Since abstention means neutral in opinion, I do not make any assumption on their preference on the proposals that they abstained but I run simulations randomly assigning orders to the proposals that received abstention votes.

Different Voting Rules

This section introduces different voting rules which would be compared to PJM's voting system: *a voting system of New York Independent System Operator* (NYISO—its footprint covers the entire state of New York) in which the same yes-no voting procedure is applied but with different voting weights and threshold; *preferential voting procedures*, or ranked-choice voting (RCV), in which voters rank all candidates (or in this context, all proposals) in order of their preferences—a complete new voting system compared to yes-no voting procedure of PJM. I consider three types of RCV: the instant runoff voting (IRV), the Coombs rule, and the Borda count. Despite its drawbacks as suggested in some literature (Arrow 1950; Brams and Fishburn 2002; Gibbard 1973; Satterthwaite 1975), proponents of the preferential voting system argue that

it allows voters to fully express their preference, it is less vulnerable to strategic voting, and it ensures winners to get majority when there are more than two alternatives (Bartholdi III and Orlin 1991; Black 1986; Endersby and Towle 2014; Farrell and McAllister 2006; G. Saari 1990). It might be especially beneficial in case of frequent deadlock to get a voting outcome—as in PJM MC capacity market voting—since RCV always produce a voting outcome no matter how strong a coalition is. Note that I am not suggesting one system is better than the other or evaluating any system for that matter but trying to see how different rule changes influence voting outcome and its impact on the market.

Current voting rules in PJM

To vote in MC, every stakeholder must assign itself (freely) to one of the five industry sectors. Those are Generation Owners, Transmission Owners, Electric Distributors, End-Use Customers, and Other Suppliers. Compared to the other sectors that have reasonably obvious definitions, OS's are very heterogeneous, that includes Curtailment Service Providers (or demand response aggregators), Muni/co-op utilities, and Financial market players such as hedge funds. Each voting member in PJM MC can cast one vote per proposed alternative—*yes, no, or abstain*—and a proposed alternative is adopted if it receives two-thirds majority votes. If there are multiple alternatives, voting order is arranged beginning with the main motion which received the most support from lower-level committee(s) (PJM 2015). In terms of voting rules, MC implements *sector-weighted voting*. As explained in the first chapter, it is a weighted voting system in which all five sectors are equally weighted, having the same voting score one. Individual voters within the same sector share the one score and are inversely weighted by the number of voters of its sector. Votes are translated into score by sector as percentage of yes voters of a sector. If the sum of those score contributions, or sum of percentage of yes voters of each

sector, exceeds the threshold, then a voting issue would pass. It also follows *super majority* rule requiring the threshold to be two-thirds of the total voting score of five (since there are five sectors). What this system really implies is that the system encourages voters to cooperate and create a coalition to have veto power by allowing two sectors could block an issue. Moreover, since it gives equal weights to each sector, the formation of coalitions would highly likely be affected by voter's sector affiliation.

NYISO voting rules

Similar to PJM, voters in NYISO also have the same option per proposed voting issue—yes, no and abstain. There are, however, a few differences in terms of sector composition, sector weight, and passage threshold (table 4-1). Instead of having Electric Distributor sector, NYISO has Public Power sector. Also, unlike PJM, sectors in NYISO are not equally weighted; Generation Owner and Other Supplier sectors in NYISO have higher sector weight (21.5%) than the other sectors and Public Power has lower sector weight (17%) than the other sectors. Lastly, NYISO has lower level of passage threshold, 58%, compared to PJM's requirement—two-thirds or 66.67%).

Given these differences in voting system between PJM and NYISO, to see impact of sector weight and passage threshold on voting outcome, I make a few assumptions. Considering most of participants in Electric Distributor sector in PJM capacity market voting (11 among 12 EDs) satisfy the definition of Public Power of NYISO, I regard the voters in Electric Distributor and Public Power sectors would have similar interests—at least in the capacity market. Thus, I translate votes of ED in the PJM to votes of Public Power in the NYISO assuming that Electric Distributor sector has the same weight as Public Power sector. Another important assumption is that voting weight and threshold would not change voter's decision on each proposal. This

assumption would make the analysis of how different voting weight and different threshold would change voting outcomes possible without modeling voter's behavior as a function of voting weight and passage threshold, which in and of itself would be an interesting area of future research.

Table 4-1 Voting rule comparison – PJM vs. NYISO

	PJM		NYISO	
Passage threshold	66.67%		58%	
Sector and sector weight	Generation owners	20%	Generation owners	21.5%
	Other suppliers	20%	Other suppliers	21.5%
	Transmission owners	20%	Transmission owners	20%
	End-Use Consumers	20%	End-Use Consumers	20%
	Electric Distributor	20%	Public Power	17%

Preferential voting

Instant runoff voting (IRV), also known as alternative vote in Britain and Australia, is a preferential voting procedure with elimination. Voters in IRV rank all candidates (or alternatives, proposals, etc.) based on their preference. In the initial round, the first choices are counted and the winner is the one who gets votes greater than or equal to a quota (often majority). If no candidate receives the quota, then the candidate with the least vote count as a first choice is eliminated. For votes that chose this eliminated candidate as their favorite candidate, their next preferences are distributed among remaining candidates. Until one candidate gets the required vote threshold, this process of elimination continues[11] (Black 1986). Although IRV is often criticized for

[11] This process is also called single transferable vote (STV). Hence, instant runoff is a specific type of STV when STV is used in single-seat elections.

perplexity[12]—it asks voters to specify their full preference over all alternatives which requires deeper understandings and thus more time (Bartholdi III and Orlin 1991)—the proponents of IRV claim that IRV is comparatively resistant to strategic voting among preferential voting, increases probability for minority representation, and reduces cost in case of multiple runoffs are required (Edwards 2015; FairVote n.d.-a; Horowitz 1990; Kelly 1988). IRV has been adopted in Australia House of Representatives, political party elections in Canada and in the UK (Edwards 2015). In the US, the state of Minnesota (primary elections), Ann Arbor, Michigan (mayor elections), San Francisco (elections for mayor, sheriff, district and city attorney, and other public positions), and many other municipalities and professional organizations have adopted or passed referendums to adopt IRV (Edwards 2015; FairVote n.d.-b).

The Coombs rule is similar to IRV. It demands voters to rank all alternatives on ballots and the procedure of elimination and transfer of votes continues until a winner is elected. The difference is the elimination rule—when there is no winner, it eliminates a candidate that receives the most vote as the last choice. Grofman and Feld (Grofman and Feld 2004) asserted that Coombs rule is as good alternative to plurality vote as IRV, if not better.

The Borda count is a voting procedure that has been praised by numerous political scientists (Black 1986; Brams and Fishburn 2002; Grofman and Feld 2004; G. Saari 1990). Similar to the IRV and the Coombs rule, voters under the Borda count have to provide preference order of alternatives. If the number of alternatives is *n*, the procedure assigns $(n-1)$ score to the favorite candidate, $(n-2)$ to the next favorite, until it gives zero score to the least favored candidate in the order of preference of a voter (Black 1986; Borda 1781). After combining scores

[12] Besides criticism on preferential voting system largely based on the seminal works of Arrow (1963), Gibbard (1973) and Satterthwaite (1975), a number of other political scientists including Kelly (1987) and Tideman (1995) have pointed out that IRV (often referred as STV in some literature) lacks some properties of voting procedure such as Condorcet consistency and nonnegative responsiveness. In this study, however, we do not address properties from political theory.

from all voters, a candidate who received the highest scores wins. The procedure's susceptibility to strategic manipulation has long been a contentious topic among scholars (Brams and Fishburn 2002; Condorcet 1785; Dummett n.d.; D. G. Saari 1990, 1995; Satterthwaite 1975). Recognizing its flaws, Saari, who has been the most active advocate of the Borda rule (Grofman and Feld 2004), argues that the Borda count is the least susceptible voting system among preferential voting procedure (D. G. Saari 1990, 1995) which appears to be backed by other scholars (Black 1986; Brams and Fishburn 2002; Dummett n.d.).

Capacity Market Clearing Outcomes

This section aims to show different capacity market clearing outcomes by VRR curve proposals. To connect the voting outcomes and the market outcomes using the capacity market example, I first reintroduce modeling of VRR curve as a demand curve which I modeled in the second chapter. Second, I estimate the supply curve. For simplicity, the supply curve is estimated separately by three segments: a flat linear line and two different quadratic functions. Combining all the information on the supply curve and the VRR curve, I generate market clearing outcomes for each proposal.

Proposed VRR curves

All of the failed capacity market reform proposals were about reshaping an estimated demand curve for the capacity market called Variable Resource Requirement Curve (VRR curve). Once in every three years, VRR curve is updated through the stakeholder process in which voting members determine the parameters of the curve by voting. Figure 4-1 shows an example of the VRR curve. There are many parameters that shape this curve and we identified two critical

parameters of these redesign: the levels of point *a*, or the price cap, and point *b*, or an anchor point of downward sloping part of the curve. The capacity market clears where the system supply curve, an aggregate of supply offers by suppliers, meets the VRR curve (as a demand curve).

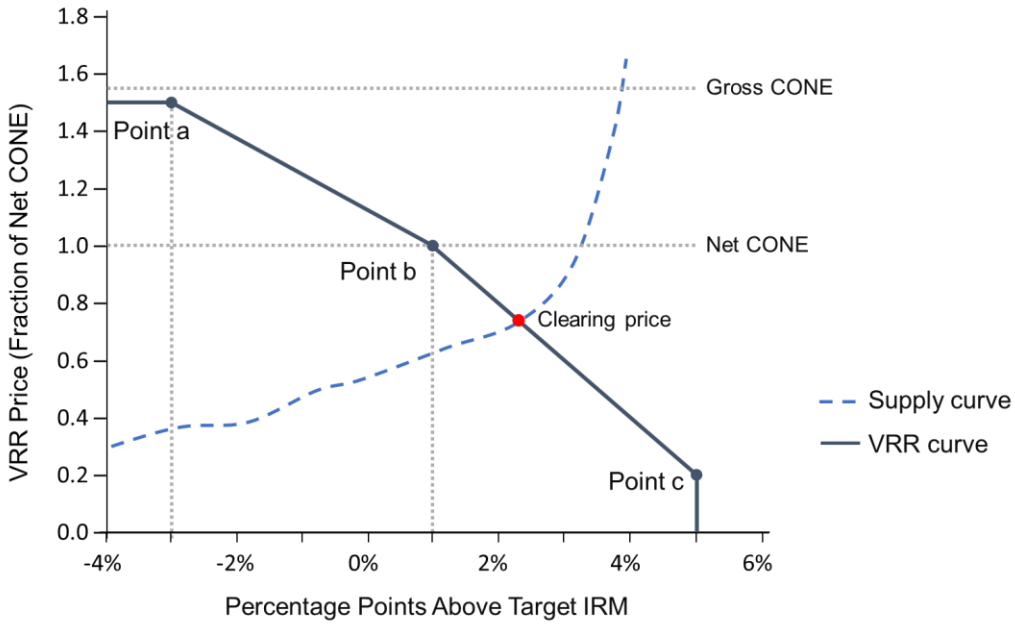


Figure 4-1 Supply and demand curves of the capacity market

Based on the parameter values in the proposals, we model the redesign proposals as six different demand curves (Figure 2-2). Compared to the dark blue line that is the proposal of no change, Package 1 and 10 suggest locating point *a* to right above point *b* which would yield higher capacity prices. On the other hand, package 11, 12, and 13 proposes lower level of point a and b which lowers the clearing price.

Supply curve estimation

To estimate the system supply curve, I employ data from the sensitivity analysis that was conducted by PJM (PJM 2012) and from the analysis report of the market monitor of PJM

(Monitoring Analytics 2015) [13]. Based on actual 2015/2016 BRA results, the sensitivity analysis (PJM 2012) shows different auction clearing results including cleared generation MW, resource clearing price, etc. I use the results of two scenarios: the first scenario assumes the annual supply *increases* by 6,000MW *from bottom of the supply curve*, shifting the supply curve to the right; the second scenario assume the supply *decreases* by the same amount, shifting the supply curve to the left. Note that these scenarios assume that offer prices of the additional supply of 6,000MW are close to zero. The clearing price in the first scenario implies the offer price at the actual cleared capacity minus 6,000MW in the original scenario; in the second scenario, it suggests the offer price at the cleared capacity, also in the original scenario, plus 6,000MW. Hence, with this sensitivity analysis, I know three data points of the original supply curve: the actual market clearing point (point 4 in figure 4-2), the first scenario's market clearing price at the clearing capacity of the base scenario minus 6,000MW (point 3 in figure 4-2), and the second scenario's market clearing price at the clearing capacity of the base scenario plus 6,000MW (point 5 in figure 4-2). Additionally, I picked two data points from the market monitor report (Monitoring Analytics 2015). According to the report, 77% of the cleared capacity offered at below $35/MW-day. Assuming that the most expensive unit of the 77% offered at $35/MW-day, the first data point is set at $35/MW-day and 77% of the cleared capacity (point 2 in figure 4-2). The second data point is based on the assumption that the last (or the most expensive) unit of the cleared capacity offered at the price cap (point 6 in figure 4-2). The end point of the flat portion (point 1 in figure 4-2) is arbitrarily set. In this study, however, it does not affect the clearing price result. Based on the five identified points, I am able to estimate the supply curve using a polynomial

[13] For the simplicity, we do not consider separate capacity requirement for Extended Summer Demand Response which might lead to a price separation when Annual and Extended Summer offers exceed the requirement. Moreover, from 2020/2021 auctions, PJM will procure a single capacity product, named Capacity Performance, by removing all these different types of Demand Response product.

curve fitting technique (figure 4-2). For simplicity, the supply curve is estimated separately by a flat linear line and *two quadratic functions*. First part is the flat portion of the curve meaning the offer price of this part is zero. Second part connects the end of the flat portion, $35/MW-day offer point (point 2), and then to the first scenario point (point 3). Third part is estimated using two scenario data points (points 3 and 5), actual market clearing point (point 4), and the price cap point (point 6).

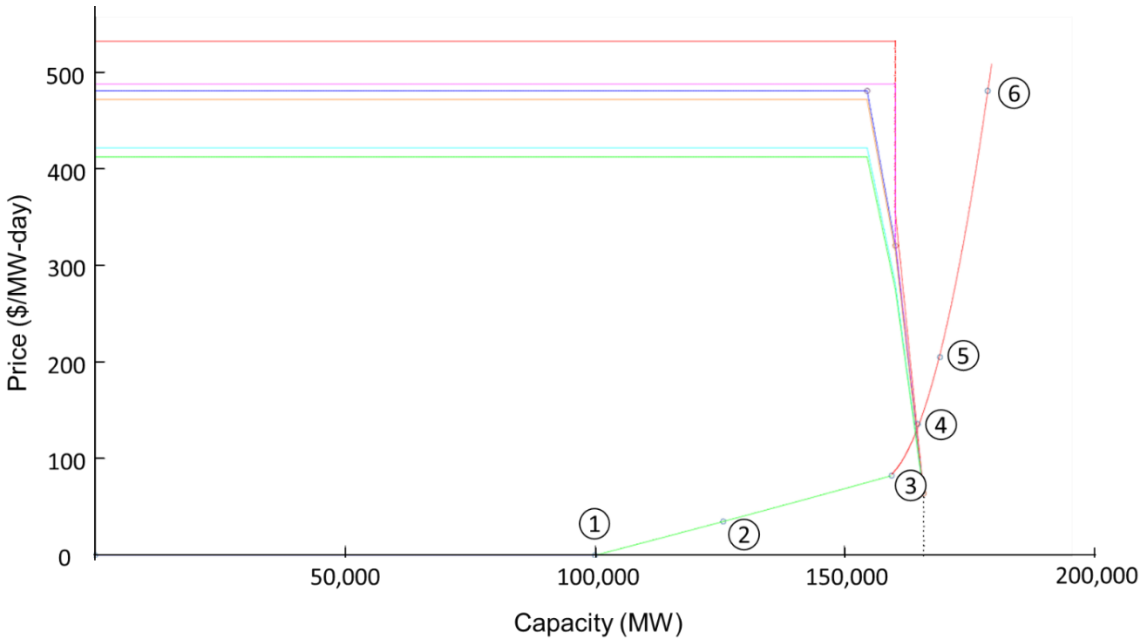


Figure 4-2 Estimating the supply curve of the capacity market

Different market clearing outcomes by proposals

With the estimated supply curve, I could get different market clearing outcomes by proposals (table 4-2 and figure 4-3). Packages 1 generates the highest clearing price (1.11% higher than that of status quo) and the second highest clearing prices is of package 10. Remaining proposals give lower clearing prices than that of the status quo proposal, package 13 being the

lowest (1.97% lower than status quo's clearing price). Hence, package 1 generates the highest market cost, more than 21.4 million dollars per day, and package 13 brings the lowest, about 20.7 million dollars per day. The difference between the two extreme proposals is $700,983/day which implies that the stakeholder process had a power to change market outcome of 256 million dollar a year via this single voting issue.

Table 4-2 Market clearing outcomes by proposals

Voting item	Clearing Price ($/MW-day, UCAP)	Clearing Quantity (MW, UCAP)	Total market payment ($/day)	% changes in Price compared to Status quo	% changes in Quantity compared to Status quo
Status Quo	128.90	164,340	21,183,426		
Package 1	130.64	164,470	21,486,361	1.35%	0.08%
Package 10	129.16	164,360	21,228,738	0.20%	0.01%
Package 11	128.54	164,310	21,120,407	-0.28%	-0.02%
Package 12	126.42	164,140	20,750,579	-1.92%	-0.12%
Package 13	125.93	164,110	20,666,372	-2.30%	-0.14%

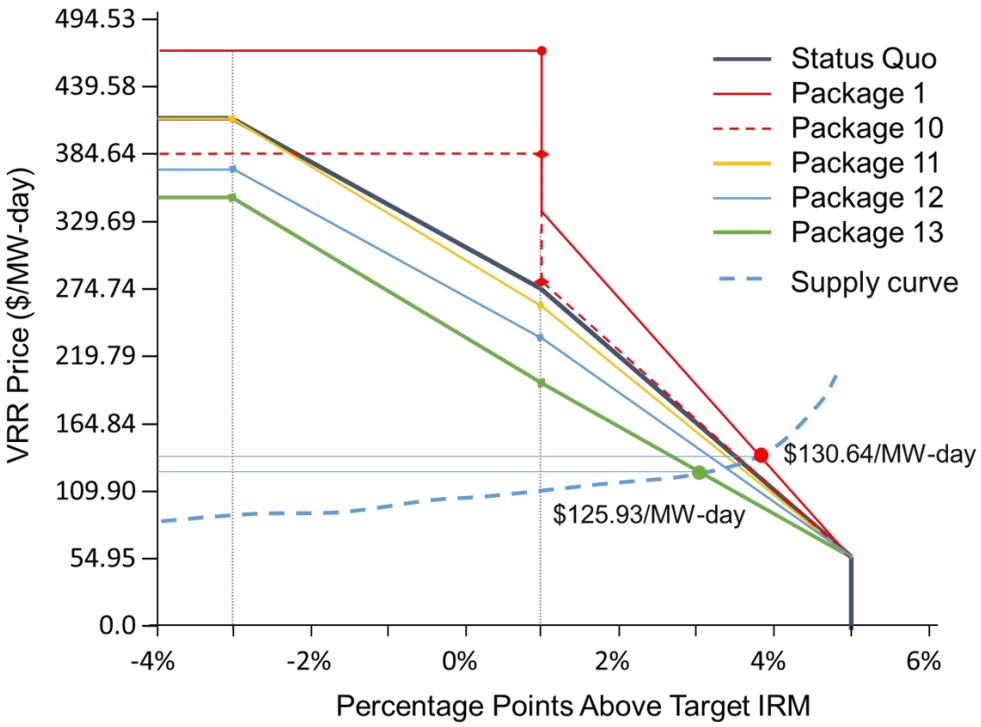


Figure 4-3 Market clearing outcomes by proposals

Different Voting Outcome by Voting Rules

This section shows predicted voting outcome under alternative voting rules: NYISO voting rules and preferential voting system. I apply the voting records of PJM MC on the capacity market review to all alternative rules. An important assumption is that the stakeholder's voting behavior does not change when voting rule changes and modeling voting behavior under different voting rules remains as a future work. While lowering the passage threshold is relatively clear in application, applying preferential voting has some uncertainty. Preferential voting requires voters to specify their full preference order without omitting any proposed alternatives. However, in the PJM RPM review voting, there is a considerable number of abstentions meaning no preference

specified (table 4-3). For example, some voted yes or no to all packages except status quo proposal which they abstained; some abstained package 10 and 11 but specified yes or no to the other proposals. Although most voters show clear preference which allows me to model their preference order, the number of voids in preference is not negligible. Thus, I run simulations that randomly assign preference order to those not specified and check how these abstention votes influence voting outcome depending on the voting procedures.

Modeling voter's preference order

The second chapter shows that the consumer's preference would be in the following order: package 13 (being the favorite for setting the lowest clearing price), package 12, package 11, status quo, package 10, and package 1 (being the least favorite for suggesting the highest clearing price) and the supplier's preference would be in the opposite order. Following this intuitive preference order, I assign number one to the favorite proposal (package 13 for the consumers and package 1 for the suppliers) and six to the least favorite (package 1 for the consumers and package 13 for the suppliers) by preference types.

To fill the abstain vote with preference order, I first categorize three preference types: *Clear* preference that evidently shows either the consumer or the supplier preference with no or one abstention vote, *Abstention* preference with two or more abstentions that makes their preference somewhat ambiguous, and *Inconsistent* preference that contains mixed signal meaning they voted yes to both increasing and decreasing clearing price proposals or there are too many abstention votes to identify their preference order. For the clear preference type, there are two groups of preference order as described in the previous paragraph—the consumer group of 48 voters and the supplier group of 36 voters. The abstentions preference type also has the consumer and the supplier groups. I assign the values in the same way as it is done for the clear preference

type but only to proposals that voters specified their preference and leave blanks for proposals that received abstain vote. For example, for Abstention 1 preference type, two voters voted in the same way in which they voted yes to package 1 and abstained for all the other proposals. In this case, I assign value one to package 1 for its preference order and leave blank for the others. Lastly, for the inconsistent preference type, I assume that they have random preference and leave their preference order entirely blank.

Table 4-3 Identifying types of preference based on actual voting data

Preference type	Package 1	Package 10	Status Quo	Package 11	Package 12	Package 13	count
Clear 1	No	No	No	Yes	Yes	Yes	38
Clear 2	No	No	No	No	No	Yes	5
Clear 3	No	No	Yes	Yes	Yes	Yes	2
Clear 4	No	No	No	No	Yes	Yes	2
Clear 5	No	No	Abstain	Yes	Yes	Yes	1
Clear 6	Abstain	No	No	Yes	Yes	Yes	1
Clear 7	Yes	Yes	No	No	No	No	25
Clear 8	Yes	Abstain	No	No	No	No	5
Clear 9	Yes	No	No	No	No	No	3
Clear 10	Yes	No	Abstain	No	No	No	2
Clear 11	Yes	Yes	Yes	No	No	No	1
Abstentions 1	Yes	Abstain	Abstain	Abstain	Abstain	Abstain	2
Abstentions 2	Abstain	Abstain	No	No	No	No	1
Abstentions 3	Yes	Abstain	No	Abstain	Abstain	Abstain	1
Abstentions 4	Abstain	No	No	Abstain	Abstain	Yes	2
Abstentions 5	No	Abstain	No	Abstain	Yes	Yes	1
Abstentions 6	No	No	Abstain	Abstain	Abstain	Yes	1
Abstentions 7	Abstain	No	Abstain	Abstain	Abstain	Yes	1
Abstentions 8	Abstain	Abstain	No	Abstain	Abstain	Yes	1
Abstentions 9	Abstain	Abstain	No	Abstain	Abstain	Abstain	1
Inconsistent 1	Yes	No	No	No	No	Yes	4
Inconsistent 2	Yes	Yes	No	No	Yes	No	1
Inconsistent 3	Abstain	Yes	Yes	No	No	Yes	1
Inconsistent 4	Abstain	Abstain	Yes	No	No	Yes	1
Inconsistent 5	Abstain	Yes	Yes	Abstain	Abstain	Yes	1
Inconsistent 6	Abstain	Abstain	Abstain	Abstain	No	Yes	1
Inconsistent 7	Abstain	Abstain	Abstain	Abstain	Abstain	Abstain	3

Expected voting outcomes—simulation considering uncertainty caused by abstention

This section shows expected voting outcomes under different voting rules including simulation results for preferential voting. When translating PJM votes to those of NYISO, I make a few assumptions. First, I assume that voters' decision would not change under different threshold and sector weights. Second, I assume each sector of PJM is equivalent to those of NYISO. For example, I assume voters in the GO sector of PJM corresponds to the GOs of NYISO (which has a greater weight than PJM); the EDs of PJM corresponds to the public power sector of NYISO (more detailed explanation is in the previous section). After changing the threshold to 58% from 66.67% and the sector weights (see table 4-1), the results show that all proposals would fail except the package 13 (table 4-4).

Table 4-4 Outcomes of RPM Redesign Votes

	Number of voters	Status Quo	Package 1	Package 10	Package 11	Package 12	Package 13
Generation Owner	15	0.071	0.833	0.714	0.077	0.231	0.267
Transmission Owner	12	0.083	0.8	0.75	0.167	0.167	0.333
Other Supplier	45	0.056	0.667	0.323	0.235	0.25	0.513
Electric Distributor	24	0.043	0	0	0.913	0.913	1
End Use Customer	12	0.083	0	0	0.909	1	1
Results		0.067	0.483	0.373	0.437	0.492	0.604
		Failed	Failed	Failed	Failed	Failed	Pass

For simulation outcomes by different voting rules, I randomly assign preference order to blanks or abstention votes. For *Clear* preference type, there is no need to run a simulation since there is no uncertainty. For *Inconsistent* preference type, the preference order is totally random regardless of VRR curve order—meaning the probability for each proposal to have the first

preference order is the same, one sixth. For *Abstentions* preference type, since they still show (weak) preference to either increasing or decreasing price proposal(s), I assign preference order to those that the voters show their preference and then randomly assign to the rest of the proposals. For example, *Abstentions 1* type voted yes only to the Package 1 and abstained for all the others. Accordingly, I assign preference order *one* to the package 1 and randomly assign order two to six to the rest of the proposals. For *Abstentions 6* type, the voter voted no to packages 1 and 10, yes to package 13, and abstention to the rest. In this case, I assign preference order 6 and 5 to packages 1 and 10, respectively, and preference order 1 to package 13; for packages 11, 12 and status quo, preference order 2, 3, and 4 are randomly assigned.

Table 4-5 shows the voting outcome simulation results by voting procedures with PJM voting weights and threshold and table 4-6 shows those with NYISO voting weights and threshold. It shows the number of wins of each package among the number of simulation iteration (from 200 to 1000); the numbers in parenthesis represent the number of winning times with a supporting voting score greater than two-thirds threshold while the numbers outside the parenthesis show winning times when the passage threshold is 50 per cent. Overall, the results opt for consumer's interest selecting packages which suggest to decrease the market clearing price. As shown, package 13 dominates as a voting outcome yet there are still some differences by different voting rules. IRV selects package 13 one hundred per cent both in PJM and NYISO voting systems although with NYISO voting system, there is more chance for it to be supported with greater voting score than the threshold. Similarly, under Coombs method, package 13 prevails as a voting outcome while it has slightly less chance in NYISO because under NYISO voting system with Coombs method, package 11 and 12 *have* chance to get selected (although it is almost negligible) unlike having zero chance under PJM rule or IRV method. Packages 11 and 12 have greater chance to become a voting outcome under Borda count while package 13 still has the highest chance to get selected—around 88 per cent under PJM rule and around 81 per cent

under NYISO rule. This dominance of consumer's interest in the voting outcomes is because, in the calculation process of voting outcome, the likely voting outcome is the one with the biggest voting score support excluding the abstentions which in this example is the package 13. *This difference in voting outcome, even with the same votes, implies that some changes in voting system would lead to different voting result and perhaps to different market clearing outcome*.

Table 4-5 Voting Outcome Simulation Results with PJM voting system

Voting Procedures	Voting Item	Number of Win by the number of simulation iteration				
		200	400	600	800	1000
IRV	Status Quo	0	0	0	0	0
	Package 1	0	0	0	0	0
	Package 10	0	0	0	0	0
	Package 11	0	0	0	0	0
	Package 12	0	0	0	0	0
	Package 13	200 (7)	400 (27)	600 (43)	800 (67)	1000 (65)
Coombs	Status Quo	0	0	0	0	0
	Package 1	0	0	0	0	0
	Package 10	0	0	0	0	0
	Package 11	0	0	0	0	0
	Package 12	0	0	0	0	0
	Package 13	200 (0)	400 (0)	600 (0)	800 (0)	1000 (0)
Borda Count	Status Quo	0	0	0	0	0
	Package 1	0	0	0	0	0
	Package 10	0	0	0	0	0
	Package 11	0	4	5	1	2
	Package 12	19	44	57	108	112
	Package 13	181	352	538	691	886

Table 4-6 Voting Outcome Simulation results with NYISO voting system

Voting Rules	Voting Item	Number of Win by the number of simulation iteration				
		200	400	600	800	1000
IRV	Status Quo	0	0	0	0	0
	Package 1	0	0	0	0	0
	Package 10	0	0	0	0	0
	Package 11	0	0	0	0	0
	Package 12	0	0	0	0	0
	Package 13	200 (113)	400 (205)	600 (327)	800 (439)	1000 (530)
Coombs	Status Quo	0	0	0	0	0
	Package 1	0	0	0	0	0
	Package 10	0	0	0	0	0
	Package 11	0	0	0	0	1 (0)
	Package 12	0	0	0	2 (0)	0
	Package 13	200 (83)	400 (190)	600 (278)	798 (360)	999 (456)
Borda Count	Status Quo	0	0	0	0	0
	Package 1	0	0	0	0	0
	Package 10	0	0	0	0	0
	Package 11	8	17	29	31	42
	Package 12	28	65	88	108	148
	Package 13	164	318	483	661	810

Different market clearing outcomes by different voting rules

PJM's current voting system could not generate a voting outcome in a divisive issue such as the capacity market because of a strong coalition with a veto power or a few pivotal voters (Yoo and Blumsack 2018b). In the previous section, however, I checked that if other voting procedures were introduced, they could have had a voting outcome even though the outcomes are in favor of consumer's interest. Considering that after the failure of voting, PJM proceeded with

the package 1, this section compares distinct market clearing results by voting procedures and compared them with the package 1.

As shown in the voting outcome simulations, IRV and Coombs[14] choose package 13 and Borda count selects among package 11, 12 and 13 with probability of 4%, 15%, and 81%, respectively. Table 4-7 combines this information with different clearing price results by proposed packages as shown in the previous section. As the voting procedures introduced in this study incline to select packages that favor consumer's interest, expected market clearing prices from these procedures are lower than the status quo outcome, from 0.28 per cent lower than the status quo market price down to about 2.3 per cent which is $2.92/MW-day. In addition to the simulation results, I included a result when just the NYISO voting rules are adopted. The outcome also prefers the consumer's interest, selecting the package 13 one hundred per cent. To check which element—between different sector weight and low passage threshold—has greater influence to this outcome, I compared the total voting score of the package 13 when PJM sector weight is applied versus when the NYISO sector weight is applied. When PJM sector weight is applied, the package 13 gets 0.62; when the NYISO sector weight is applied, the package 13 gets 0.60. In other words, the NYISO sector weight decreases the total voting score of the package 13—reducing the support for the package—compared to the PJM sector weight, implying the NYISO sector weight composition does not help the package 13 to pass the stakeholder process and it is the low passage threshold that leads the package 13 to be selected as a voting outcome.

One can argue the difference in market clearing results are negligible in the scale of PJM. What this thesis tries to do, however, is to bring awareness to the *governance* in RTO decision making by illustrating concrete example of its impact on the market in dollar terms. Despite the fact that this was a single vote among numerous decisions made by the stakeholder process, I am

[14] For simplicity, I assume Coombs method picks package 13 one hundred per cent of the time even though we know that under NYISO system, there is a slight chance that it would pick package 11 or 12.

able to show that having different voting procedure might result in decrease in market price by as large as two per cent. Given the lack of discussion on the governance of RTOs and quite frequent conflict raised during the process, I argue that the impact of governance on the market is not trivial but rather noteworthy.

Table 4-7 Expected Market Clearing Results by Voting Procedures

Voting Procedures		Voting Outcome	Simulation results* PJM (NYISO)	Clearing Price ($/MW-day)	% changes in Price compared to Status quo	% changes in Price compared to Package 1
PJM voting rule		No outcome**				
NYISO voting rule		Package 13	100%	125.93	-2.30%	-3.61%
Preferential voting	IRV	Package 13	100%	125.93	-2.30%	-3.61%
	Coombs	Package 13	100%	125.93	-2.30%	-3.61%
	Borda Count	Package 11	1% (4%)	128.54	-0.28%	-1.61%
		Package 12	11% (15%)	126.42	-1.92%	-3.23%
		Package 13	88% (81%)	125.93	-2.30%	-3.61%

* Numbers in parenthesis are results under NYISO voting rules (threshold + sector weights)
** After failing to get agreement in the stakeholder process, PJM made a filing with FERC based on its original proposal (package 1) and FERC accepted. [Docket No. ER14-2940-000]

Sensitivity analysis 1 – varying CONE values

This section evaluates the sensitivity of voting results caused by variations in Cost of New Entry (CONE) value. CONE value is a critical factor to determine the levels of points *a* and *b* which we identified as two key parameters in the capacity market voting. On this set of proposals, various CONE values were proposed by setting different reference resources, levelization method, net energy and ancillary services (E&AS) offset methodology, etc. These parameters are often altered by changes in policy which directly influence the shape of VRR

curve or the demand curve. Further, there has been changes (or proposed changes) in forming the supply curve. For example, PJM proposed a two-stage capacity auction which entails an impact on the capacity price in a way that shifts the supply curve to the left (Tideman 1995).

Figure 4-4 summarize the sensitivity analysis results by voting system and policy factors. X-axis is market clearing prices ($/MW-day) and y-axis (left) represents chances of observing indicated clearing price or lower depending on voting system and policy factors. Figures filled with dots indicate IRV and Coombs rules' outcomes[15] and shaded figures display outcomes of Borda count. The shapes of the points represent the voting outcome given the voting procedure and the policy factor variation. Circle indicates package 13 as a voting result; square is of package 12; triangle represents package 11; diamond shape refers to status quo. The picture also distinguishes variations in CONE values by setting different colors and line types to each variation. The blue solid line represents voting outcomes with original CONE values. Voting outcomes on the left are due to the smaller CONE value and those on the right are due to increased CONE value. The smaller (for decreased CONE variation) or the greater the CONE value (for increased CONE variation), the further the outcomes from the original outcome.

Figure 4-4 illustrates that without any changes in the CONE value (original), under Borda count there is about 81 per cent chance that the clearing price would be around $126.25/MW-day which is proposed by package 13; 96 per cent chance that the clearing price would be around $126.6/MW-day or less, or 15 per cent incremental chance that the clearing price would be around $126.6/MW-day which is suggested by package 12; 100 per cent chance that the clearing price would be $128.2/MW-day or less, or 4 per cent incremental chance that the clearing price would be $128.2/MW-day that is what package 11 proposes. In comparison, under RCV with original policy factors, the clearing price would be $126.25/MW-day by one hundred per cent

[15] Since both IRV and Coombs select package 13 as a voting outcome one hundred per cent of the time under PJM voting system, we combine two results into one figure for simplicity.

chance. The result also shows that policy variations do not change the probabilities of voting outcome (y-axis on the right side) except one type of variation—increase in CONE value under Borda count. Due to increase in CONE value, package 11's VRR curve becomes higher than that of status quo. Hence, status quo gets a chance to become a voting outcome (4%) instead of package 11 (0%) while the chances of package 12 (14%) and package 13 (82%) as a voting outcome remain as the same.

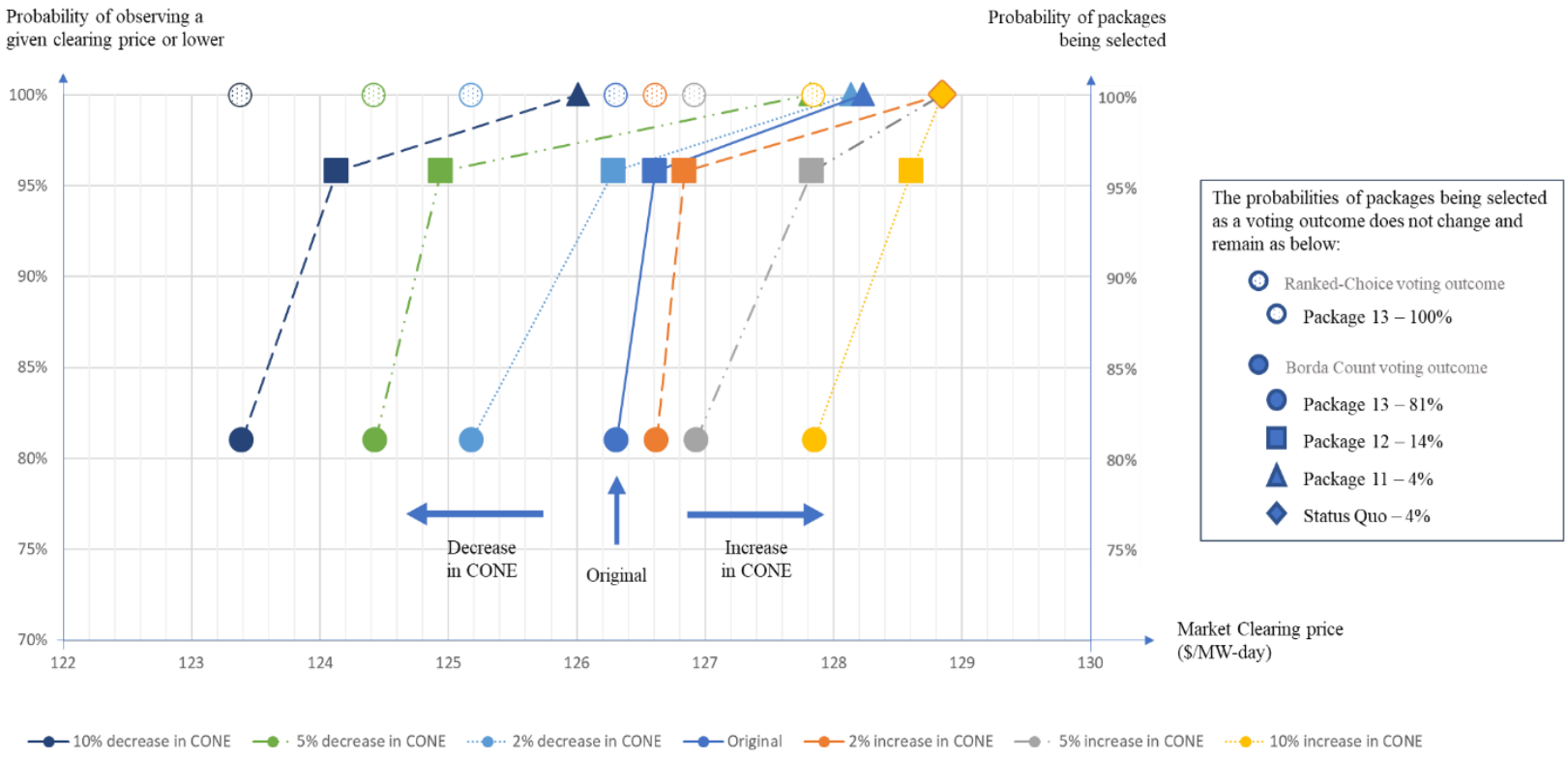


Figure 4-4 Sensitivity analysis: Cost of New Entry

Table 4-8 Sensitivity analysis: Cost of New Entry

Voting Procedures	Voting Outcome	%	10% decrease in CONE	5% decrease in CONE	2% decrease in CONE	**Original**	2% increase in CONE	5% increase in CONE	10% increase in CONE
PJM Current rule	Package 1	100%	130.64	130.64	130.64	**130.64**	130.64	130.64	130.64
IRV	Package 13	100%	123.39	124.43	125.18	**125.93**	126.62	126.93	127.85
Coombs	Package 13	100%	123.39	124.43	125.18	**125.93**	126.62	126.93	127.85
Borda Count	Package 11	4%	126.01	127.82	128.14	**128.54**	129.13	129.92	130.21
	Package 12	15%	124.13	124.94	126.29	**126.42**	126.84	127.83	128.61
	Package 13	81%	123.39	124.43	125.18	**125.93**	126.62	126.93	127.85
Max. Clearing price			128.85	128.85	128.85	**128.54**	129.13	129.92	130.21
Min. Clearing price			123.39	124.43	125.18	**125.93**	126.62	126.93	127.85
Diff. between Max. and Min.			5.46	4.42	3.67	**2.61**	2.51	2.99	2.36

Sensitivity analysis 2 – varying price elasticity of supply at the clearing point

This section evaluates the sensitivity of voting results by variations in supply curves. Specifically, I change the price elasticity of supply at the clearing price point within a range of elasticities of all the data points of the supply curve. The price elasticities of the supply are lower than 1, ranging from 0.0656 to 0.1656 which shows that the supply at the market clearing point is generally inelastic. Since at the clearing price point the price elasticity of the supply is the lowest (0.0656), I mostly increase the elasticity to show market prices when other supplies that have higher price elasticity clear the market. Yet, I still consider a few cases in which more inelastic supply offer appears. To change the price elasticity of the supply at the clearing price point, I decrease or increase the capacities of the data points 4, 5 and 6 in figure 4-2 by the same percentage. In other words, I assume that the price elasticities of supplies below the offer of the data point 3 stay the same and only those above the offer price of the data point 3 would increase. By keeping the three data points – 1, 2 and 3 – at the same level, I avoid simply moving the supply curve horizontally while keeping the level of an expected clearing price relatively close to the original market price.

Figure 4-5 illustrates a sensitivity analysis of the supply price elasticity at the clearing price point of which detailed results are presented in table 4-8. In figure 4-5, x-axis is the price elasticity of supply at the clearing price point, y-axis is the clearing price, and the curves correspond to each proposal. I decrease the cleared capacity of the points 4, 5, and 6 by 0.1% and 0.05% which corresponds to the price elasticity at the clearing price point of 0.0635 and 0.0646, respectively, decreased from the original elasticity of 0.0656. Additionally, I increase the capacity of the three points by 0.05%, 0.1%, 0.5%, 1%, 2%, and 5% which corresponds to an increase in the price elasticity from 0.0656 to 0.0666, 0.0676, 0.0757, 0.0859, 0.1060, and 0.1651, respectively. As the price elasticity increases, the difference between clearing prices of the status

quo and the package 13 tend to decrease. For example, with the original price elasticity of supply, 0.0656, the clearing price of the package 13 is $125.93/MW-day while that of the status quo is $128.90/MW-day. If the elasticity increases to 0.0757, the clearing price of the package 13 is $119.17/MW-day and that of the status quo is $121.58/MW-day. The difference between the two proposals' clearing price has decreased from $2.97/MW-day to $2.41/MW-day and this difference is smaller when the elasticity is 0.1651, the highest among our scenarios, which is $0.66/MW-day. The result is consistent with a geometric interpretation of the supply and the VRR curve in figure 2-2. From point *b* to point *c*, VRR curves are getting closer as they meet at the point *c*. Therefore, as the supply curve is getting flatter, or as the price elasticity of the supply increases, the difference between clearing prices of the highest VRR curve and the lowest VRR curve would decrease.

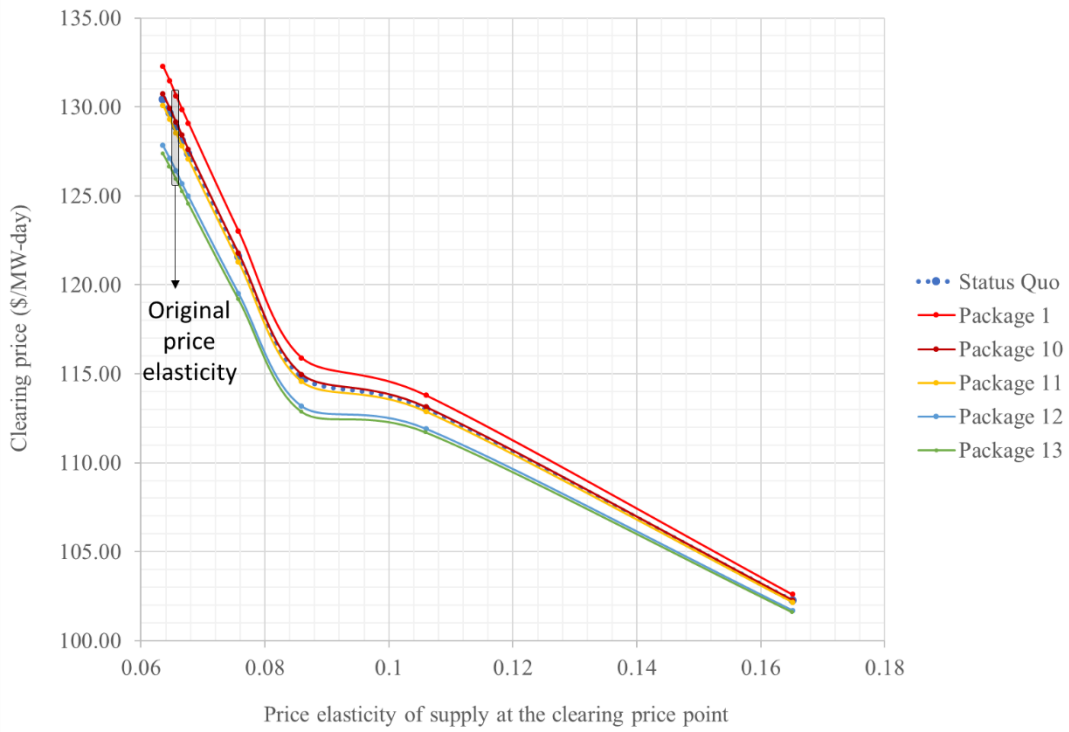


Figure 4-5 Sensitivity analysis: the price elasticity of supply at the market clearing point

Table 4-9 Sensitivity analysis: the price elasticity of supply at the market clearing point

a. Original price elasticity of supply at the clearing price point = **0.0656**

Voting item	Clearing Price ($/MW-day)	Clearing Quantity (MW)	Total market payment ($/day)	% changes in Price compared to Status quo	% changes in Quantity compared to Status quo
Status Quo	128.90	164,340	21,183,426		
Package 1	130.64	164,470	21,486,361	1.35%	0.08%
Package 10	129.16	164,360	21,228,738	0.20%	0.01%
Package 11	128.54	164,310	21,120,407	-0.28%	-0.02%
Package 12	126.42	164,140	20,750,579	-1.92%	-0.12%
Package 13	125.93	164,110	20,666,372	-2.30%	-0.14%

b. 0.1% decrease in cleared capacity of the base, the second, and the price cap scenarios
Price elasticity of supply at the clearing price point = **0.0635**

Status Quo	130.44	164,300	21,431,292		
Package 1	132.29	164,440	21,753,768	1.42%	0.09%
Package 10	130.73	164,320	21,481,554	0.22%	0.01%
Package 11	130.10	164,280	21,372,828	-0.26%	-0.01%
Package 12	127.84	164,100	20,978,544	-1.99%	-0.12%
Package 13	127.35	164,070	20,894,315	-2.37%	-0.14%

c. 0.05% decrease in cleared capacity of the base, the second, and the price cap scenarios
Price elasticity of supply at the clearing price point = **0.0646**

Status Quo	129.67	164,320	21,307,374		
Package 1	131.47	164,450	21,620,242	1.39%	0.08%
Package 10	129.94	164,340	21,354,340	0.21%	0.01%
Package 11	129.30	164,290	21,242,697	-0.29%	-0.02%
Package 12	127.11	164,120	20,861,293	-1.97%	-0.12%
Package 13	126.64	164,090	20,780,358	-2.34%	-0.14%

d. 0.05% increase in cleared capacity of the base, the second, and the price cap scenarios
Price elasticity of supply at the clearing price point = **0.0666**

Status Quo	128.13	164,350	21,058,166		
Package 1	129.87	164,480	21,361,018	1.36%	0.08%
Package 10	128.41	164,370	21,106,752	0.22%	0.01%
Package 11	127.79	164,330	20,999,731	-0.27%	-0.01%
Package 12	125.68	164,160	20,631,629	-1.91%	-0.12%
Package 13	125.26	164,120	20,557,671	-2.24%	-0.14%

e. 0.1% increase in cleared capacity of the base, the second, and the price cap scenarios
Price elasticity of supply at the clearing price point = **0.0676**

Status Quo	127.4	164,370	20,940,738		
Package 1	129.1	164,500	21,236,950	1.33%	0.08%
Package 10	127.63	164,390	20,981,096	0.18%	0.01%
Package 11	127.08	164,340	20,884,327	-0.25%	-0.02%
Package 12	124.99	164,180	20,520,858	-1.89%	-0.12%
Package 13	124.55	164,140	20,443,637	-2.24%	-0.14%

f. 0.5% increase in cleared capacity of the base, the second, and the price cap scenarios
Price elasticity of supply at the clearing price point = **0.0757**

Status Quo	121.58	164,500	19,999,910		
Package 1	123.02	164,620	20,251,552	1.18%	0.07%
Package 10	121.79	164,520	20,036,891	0.17%	0.01%
Package 11	121.3	164,470	19,950,211	-0.23%	-0.02%
Package 12	119.53	164,320	19,641,170	-1.69%	-0.11%
Package 13	119.17	164,290	19,578,439	-1.98%	-0.13%

g. 1% increase in cleared capacity of the base, the second, and the price cap scenarios
Price elasticity of supply at the clearing price point = **0.0859**

Status Quo	114.81	164,650	18,903,467		
Package 1	115.9	164,760	19,095,684	0.95%	0.07%
Package 10	114.98	164,660	18,932,607	0.15%	0.01%
Package 11	114.56	164,620	18,858,867	-0.22%	-0.02%
Package 12	113.18	164,490	18,616,978	-1.42%	-0.10%
Package 13	112.85	164,460	18,559,311	-1.71%	-0.12%

h. 2% increase in cleared capacity of the base, the second, and the price cap scenarios
Price elasticity of supply at the clearing price point = **0.1060**

Status Quo	113.03	164,680	18,613,780		
Package 1	113.79	164,800	18,752,592	0.67%	0.07%
Package 10	113.13	164,700	18,632,511	0.09%	0.01%
Package 11	112.87	164,660	18,585,174	-0.14%	-0.01%
Package 12	111.91	164,520	18,411,433	-0.99%	-0.10%
Package 13	111.69	164,490	18,371,888	-1.19%	-0.12%

i. 5% increase in cleared capacity of the base, the second, and the price cap scenarios
Price elasticity of supply at the clearing price point = **0.1651**

Status Quo	102.26	164,920	16,864,719		
Package 1	102.61	165,010	16,931,676	0.34%	0.05%
Package 10	102.29	164,940	16,871,713	0.03%	0.01%
Package 11	102.17	164,900	16,847,833	-0.09%	-0.01%
Package 12	101.71	164,780	16,759,774	-0.54%	-0.08%
Package 13	101.6	164,760	16,739,616	-0.65%	-0.10%

Conclusion

This chapter shows changes in voting outcome under different RTO governance, specifically voting rules. Under the current PJM's voting structure, it is difficult to reach an agreement that could be supported by two-thirds majority for divisive issues. I found that if it adopts alternative rules such as NYISO voting structure or preferential voting system, it could avoid impasse of the process but the outcome would likely prefer the consumer coalition's interest—producing package 13 as a voting outcome in most cases. Under the NYISO voting rule, package 13 was selected because it requires lower passage threshold; under the preferential voting systems, the likely outcome is a package with the biggest voting score support which is package 13. For the preferential voting outcome, in particular, it is in line with a result in the third chapter that the consumer coalition is stronger than the supplier coalition; the package 13 had the biggest voting score among the proposals supported by the strongest coalition—the consumer coalition—and the alternative voting rules would reinforce the political power of the consumer coalition. Again, I do not claim that having a voting outcome regardless of whether it is the best solution is better than not having a solution at all, nor that RTOs should consider adopting these specific voting rules. This analysis simply shows what could happen if PJM were to adopt NYISO voting rules (mainly due to the lower threshold) or preferential voting, among many alternative processes—the stakeholder process could at least have a passable proposal under these rules given the same preference distribution for a divisive issue even though it tends to prefer the consumer coalition's interests.

More importantly, this chapter provides evidence that voting rule has an impact on market outcomes which would affect two-thirds of the U.S. electricity consumption. The results show that a slight change in passage threshold makes difference in voting outcome and so in market outcome. Even though the difference might look small, considering that this study

accounts only one issue that has a time horizon for a year, and that there are numerous other tariffs or market rule related issues, the impact of RTO governance is not negligible.

This chapter also provides a good background to a comparison analysis across RTOs. Although I do not directly address difference in governance structures across RTOs and its consequences—except a comparison with PJM and NYISO—the result that shows changes in voting outcomes under different voting rules is sufficient to further develop a research what these differences mean. I am not arguing that RTO governing rules have to be the same across different RTOs. All RTOs have developed their own rules over time based on countless debate and discussion that reflect distinct regional characteristics. However, there are few studies on comparing rule differences even though it could make non-negligible impact on the markets.

Conclusion

As the first attempt to develop a quantitative model of RTO decision-making process focusing on voting rules, I aim to capture how the decision rules of the highly participatory processes can affect the performance of physical networks and systems. by modeling voter's decision behavior, analyzing complex voting networks in policy-making processes, and developing tools to treat socio-technical systems more holistically. This study focuses primarily on decision processes of the PJM, an RTO serving all or parts of thirteen states in the Mid-Atlantic U.S. plus the District of Columbia. PJM delegates the most powerful authority to the stakeholders and their process allowing them to bypass the PJM board and make filings directly to FERC (even though it rarely happens). Throughout this thesis, I utilize voting records of PJM's top-level committee which is the only committee that publish firm-level voting data. I gathered voting records of 28 votes from 2011 to 2015; voting issues include the capacity market review, demand response, FTR revenue adequacy, etc. Over all the issues, 147 voters participated, some of which voted regularly while a few others voted on just one issue. Information in the data set includes company name, line of business, net seller/buyer, size of assets, and voting records (yes, no, or abstain).

Based on this detailed-voting data, in the second chapter, I develop a predictive model of voting outcome especially focusing on one of the 28 voting issues, the capacity market review. After comparing predicted outcomes and actual voting records, I quantify political power of the critical voters which plays a critical role in settlement of voting outcomes. The analysis suggests two findings: first, due to coalition formation, there may be limits to the stakeholder-driven decision model causing frequent deadlock for contentious issues; second, divisive issues like capacity markets can shift political power in ways that, for certain circumstances, a few voters—or as defined in this study, *swing voters*, who are primarily financial players—can sway a voting

outcome. In a study of the voting network of the PJM stakeholders in the third chapter, I empirically proved an existence of a strong consumer-side *coalition*, using community detection method, and identified *swing voters*, using network measures, who can be pivotal in ensuring the passage or failure of highly contentious rule changes. The fourth chapter shows that governance of RTO is not just an administrative or supportive system but has a measurable impact on the electricity markets. I explore various voting rules that could be applied to the PJM MC and analyze whether changes in voting rules influence market outcomes.

The passable proposal model predicts that no capacity market review proposal could pass the PJM MC because two major coalitions with veto power have mutually exclusive interests. Comparison with actual voting records with the model prediction, however, suggests that in reality, more interesting dynamics exist than just a simple model prediction. Due to a few deviators from the presumed coalitions, there are certain circumstances in which a small number of voters who do not seem to have clear stake in the issue could sway a voting outcome, acting as swing voters. The results of the voting power analysis find evidence in the capacity market example that defections from the supplier coalition could give exclusive voting power to swing voters in the OS sector, primarily financial players, and abstentions could increase their voting power. While this study does not explore the motivation behind deviations, it confirms that the deviations help the undecided swing voters to attain voting power which has not been well perceived among stakeholders (Yoo and Blumsack 2018a). I am not arguing that it is wrong for voters to deviate from the presumed coalition or it is wrong for financial players to have political power in the process; however, it is imperative to bring attention to these swing voters and investigate their motivations, given the magnitude of the decision's influence. One shortcoming of the present modeling approach is its treatment of votes as independent events. In reality, the stakeholder process is more like a repeated game, and such a lens would likely provide additional insights into coalition formation, not just the ex post identification of shifts in voting power.

While this analysis suggests that market-driven constructs to ensure resource adequacy may not be amenable to design by stakeholder-driven processes, I would caution against more general conclusions about the stakeholder process itself. This modeling to date has been limited to an informative but very specific set of cases.

The third chapter adds to an emerging body of literature on stakeholder decision processes and electricity policy formation by developing and illustrating a novel method for integrating qualitative information elicited from stakeholder perceptions with quantitative voting data; using community detection methods to identify political coalitions among stakeholders in RTOs; leveraging voting network measures to identify potential swing voters in the stakeholder group. This analysis is, to my knowledge, the first attempt to explicitly model the decision-making process within RTOs using social network science. Using the PJM as a case study, I elicited perceptions of the stakeholder process from process participants and treated those perceptions as hypotheses regarding the presence and possession of political power. Then, I used a network representation of voting data in PJM to evaluate these hypotheses. I find some evidence in support of the perception that customer-side interests form a strong coalition that is able to exercise some power in defeating proposed rule changes in the PJM market; however, I find less evidence in support of the perception that supplier side interests are able to exercise a similar amount of political power in the PJM MC. The structure of the voting network and detected communities, particularly as embodied in the node degree and mixing parameter, also allow identifying a number of stakeholder participants that act as swing voters on highly contentious rule changes. These swing voters tend not to vote with any one of the identified coalitions on a consistent basis, and may thus be engaged in vote trading or other strategic activity. The framework illustrated for the PJM RTO in the United States is portable to other contexts, and represents an approach to defining questions and hypotheses about stakeholder-driven

governance; using data from these processes to build models and evaluate hypotheses, and using these models to evaluate alternative structures or voting rules for stakeholder processes.

The third chapter shows changes in voting outcome under different RTO governance, specifically voting rules. Under the current PJM's voting structure, it is difficult to reach an agreement that could be supported by two-thirds majority for divisive issues. I found that if it adopts alternative rules such as lower passage threshold or preferential voting, it could avoid impasse of the process but the outcome would likely prefer the largest coalition's interest. Again, I do not claim that having a voting outcome regardless of whether it is the best solution is better than not having a solution at all, nor that RTOs should consider adopting these specific voting rules. This analysis simply shows that, among many alternative processes, under NYISO voting rules (mainly due to the lower threshold) or preferential voting, the stakeholder process could at least have a passable proposal given the same preference distribution for a divisive issue—even though it tends to prefer the largest coalition's interests. More importantly, this study provides evidence that voting rule has an impact on market outcomes which would affect two-thirds of the U.S. electricity consumption. The results show that a slight change in passage threshold makes difference in voting outcome and so in market outcome. Even though the difference might look small, considering that this study accounts only one issue that has a time horizon for a year, and that there are numerous other tariffs or market rule related issues, the impact of RTO governance is not negligible. This study also provides a good background to a comparison analysis across RTOs. Although I do not directly address difference in governance structures across RTOs and its consequences—except a comparison with PJM and NYISO—the result that shows changes in voting outcomes under different voting rules is sufficient to further develop a research what these differences mean. I am not arguing that RTO governing rules have to be the same across different RTOs. All RTOs have developed their own rules over time based on countless debate and discussion that reflect distinct regional characteristics. However, there are few studies on

comparing rule differences even though it could make non-negligible impact on the markets. Avenues for future research with the framework in this study involve application to other market-rule issues and comparative analysis of voting structures between RTOs.

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Appendix

Table A-1 The capacity market votes of the PJM MC in 2014 and 2018 by sectors

2014 Triennial review							
Voting item	TO	GO	EUC	ED	OS	Results	
Status Quo	0.23	0.25	1	0.93	0.37	2.78	Failed
PJM Package	0.82	0.53	0	0.03	0.61	1.99	Failed
Package B	0.64	0.75	0	0.03	0.61	2.03	Failed
Package 1	0.67	0.80	0	0.07	0.56	2.10	Failed
PJM alternative	0.85	0.74	0	0.03	0.64	2.26	Failed
2018 Quadrennial review							
Voting item	TO	GO	EUC	ED	OS	Results	
PJM Package	0.40	0.43	0	0.93	0.56	2.32	Failed
IMM Package	0.18	0.10	1	0.48	0.20	1.96	Failed
Package C	0.58	0.86	0	0.07	0.63	2.14	Failed
Package D	0.09	0.10	0.94	0.17	0.13	1.42	Failed

Table A-2 Sector affiliation of identified swing voters by three network measures

	%	Company Sector	Company Line of Business
Apple Group, LLC	33%	Other Supplier	Financial Trader
BJ Energy, LLC	33%	Other Supplier	Financial Trader
Black Oak Energy, LLC	33%	Other Supplier	Financial Trader
E Minus LLC	33%	Other Supplier	Financial Trader
Hexis Energy Trading, LLC	33%	Other Supplier	Financial Trader
Mac Trading, Inc	33%	Other Supplier	Financial Trader
Pure Energy, Inc	33%	Other Supplier	Financial Trader
Brookfield Energy Marketing LP	38%	Other Supplier	Power Marketer
Dyon, LLC	33%	Other Supplier	Power Marketer
Great Bay Energy I, LLC	33%	Other Supplier	Power Marketer
Monterey MA, LLC	33%	Other Supplier	Power Marketer
TransCanada Power Marketing Ltd	25%	Other Supplier	Power Marketer
Energy Consulting Services, LLC	100%	Other Supplier	Power Marketer
Galt Power Inc	100%	Other Supplier	Power Marketer
Enerwise Global Technologies, Inc	33%	Other Supplier	CSP
MidAtlantic Power Partners, LLC	50%	Other Supplier	CSP
Direct Energy Business, LLC	50%	Other Supplier	Retail Energy Supplier
Invenergy LLC	0%	Generation Owner	Generation
Iron Mountain Generation LLC	33%	Generation Owner	Generation
PBF Power Marketing LLC	40%	Generation Owner	Generation
West Deptford Energy, LLC	33%	Generation Owner	Generation
Potomac Electric Power Company	40%	Electric Distributor	Transmission Owner
The Trustees of the University of Pennsylvania	100%	End Use Customer	Retail Energy Supplier
Virginia Electric & Power Company	0%	Transmission Owner	Transmission Owner
Borough of Lavallette, New Jersey	100%	Electric Distributor	Muni/Co-op
Borough of Madison, New Jersey	100%	Electric Distributor	Muni/Co-op
Borough of Milltown, New Jersey	100%	Electric Distributor	Muni/Co-op
Central Virginia Electric Cooperative	100%	Electric Distributor	Muni/Co-op

Table A-3 PJM Members Committee Voting data from 2011-2015

date	item	Vote	Company Name (in PJM CRM system)	Company Sector (in PJM CRM system)	Company Line of Business (in PJM CRM system)
8/25/2011	02c	Abstain	Hess Corporation	Other Supplier	Power Marketer
8/25/2011	02c	Abstain	Viridity Energy, Inc	Other Supplier	Curtailment Service Provider
8/25/2011	02c	No	American Municipal Power, Inc	Generation Owner	Muni/Co-op
8/25/2011	02c	No	Comperio Energy LLC dba ClearChoice Energ	Other Supplier	Curtailment Service Provider
8/25/2011	02c	No	Dayton Power & Light Company (The	Transmission Owner	Transmission Owner
8/25/2011	02c	No	DTE Energy Trading, Inc	Other Supplier	Power Marketer
8/25/2011	02c	No	EMC Development Company, LLC	Other Supplier	Curtailment Service Provider
8/25/2011	02c	No	Energy Consulting Services, LLC	Other Supplier	Power Marketer
8/25/2011	02c	No	EnergyConnect, Inc	Other Supplier	Curtailment Service Provider
8/25/2011	02c	No	EnerNOC, Inc.	Other Supplier	Curtailment Service Provider
8/25/2011	02c	No	Enerwise Global Technologies, Inc	Other Supplier	Curtailment Service Provider
8/25/2011	02c	No	Evraz Claymont Stee	Other Supplier	Retail Energy Supplie
8/25/2011	02c	No	GenOn Energy Management, LLC	Generation Owner	Generation
8/25/2011	02c	No	Icetec.com, Inc.	Other Supplier	Curtailment Service Provider
8/25/2011	02c	No	NextEra Energy Power Marketing, LLC	Generation Owner	Generation
8/25/2011	02c	No	North America Power Partners LLC	Other Supplier	Curtailment Service Provider
8/25/2011	02c	No	PBF Power Marketing LLC	Generation Owner	Generation
8/25/2011	02c	No	PPL Energy Plus, LLC	Transmission Owner	Transmission Owner
8/25/2011	02c	No	Premcor Refining Group, Inc. (The	Generation Owner	Generation
8/25/2011	02c	No	Public Service Electric & Gas Compan	Transmission Owner	Transmission Owner

8/25/2011	02c	Yes	Air Liquide Industrials U.S., L.P	End User Customer	Industrial
8/25/2011	02c	Yes	Air Products & Chemicals, Inc	End User Customer	Industrial
8/25/2011	02c	Yes	Allegheny Electric Cooperative, Inc	Transmission Owner	Transmission Owner
8/25/2011	02c	Yes	Appalachian Power Company	Transmission Owner	Transmission Owner
8/25/2011	02c	Yes	Atlantic Grid Operations A, LLC	Other Supplier	Transmission Owner
8/25/2011	02c	Yes	Baltimore Gas and Electric Company	Transmission Owner	Transmission Owner
8/25/2011	02c	Yes	Borough of Chambersburg	Electric Distributor	Muni/Co-op
8/25/2011	02c	Yes	Borough of Mont Alto, PA	Electric Distributor	Muni/Co-op
8/25/2011	02c	Yes	Buckeye Power, Inc	Electric Distributor	Muni/Co-op
8/25/2011	02c	Yes	Calpine Energy Services, L.P	Generation Owner	Generation
8/25/2011	02c	Yes	Castlebridge Energy Group, LLC	Other Supplier	Financial Trader
8/25/2011	02c	Yes	Covanta Energy Group, Inc	Generation Owner	Generation
8/25/2011	02c	Yes	Delaware Municipal Electric Corporatio	Electric Distributor	Muni/Co-op
8/25/2011	02c	Yes	Downes Associates, Inc	Other Supplier	Consultant, Service Company, Etc
8/25/2011	02c	Yes	Duquesne Light Compan	Transmission Owner	Transmission Owner
8/25/2011	02c	Yes	Easton Utilities Commissio	Electric Distributor	Muni/Co-op
8/25/2011	02c	Yes	Energy Cooperative Association of Pennsylvania (The)	Other Supplier	Muni/Co-op
8/25/2011	02c	Yes	FirstEnergy Solutions Corp	Transmission Owner	Power Marketer
8/25/2011	02c	Yes	Gerdau Ameristeel Energy, Inc	Other Supplier	Financial Trader
8/25/2011	02c	Yes	Hagerstown Light Departmen	Electric Distributor	Muni/Co-op
8/25/2011	02c	Yes	Illinois Municipal Electric Agenc	Electric Distributor	Muni/Co-op
8/25/2011	02c	Yes	Indiana Municipal Power Agenc	Generation Owner	Muni/Co-op
8/25/2011	02c	Yes	Industrial Energy Users-Ohi	Other Supplier	Retail Energy Supplie
8/25/2011	02c	Yes	Kimberly-Clark Corporation	Generation Owner	Generation
8/25/2011	02c	Yes	Kuehne Chemical Company, Inc	Other Supplier	Retail Energy Supplie
8/25/2011	02c	Yes	Lehigh Portland Cement Compan	End User Customer	Industrial
8/25/2011	02c	Yes	Letterkenny Industrial Development Authority - PA	Electric Distributor	Muni/Co-op
8/25/2011	02c	Yes	Linde LLC	End User Customer	Industrial

8/25/2011	02c	Yes	Long Island Lighting Company dba LIP	Other Supplier	Power Marketer
8/25/2011	02c	Yes	Madison Gas & Electric Compan	Other Supplier	Power Marketer
8/25/2011	02c	Yes	MeadWestvaco Corporation	End User Customer	Generation
8/25/2011	02c	Yes	NAEA Rock Springs, LLC	Transmission Owner	Transmission Owner
8/25/2011	02c	Yes	North Carolina Electric Membership Corporation	Electric Distributor	Muni/Co-op
8/25/2011	02c	Yes	Office of the People's Counsel for the District of Columbia	End User Customer	Consumer Advocate
8/25/2011	02c	Yes	Old Dominion Electric Cooperativ	Electric Distributor	Muni/Co-op
8/25/2011	02c	Yes	PECO Energy Company	Transmission Owner	Transmission Owner
8/25/2011	02c	Yes	Pennsylvania Office of Consumer Advocat	End User Customer	Consumer Advocate
8/25/2011	02c	Yes	Potomac Electric Power Company	Electric Distributor	Transmission Owner
8/25/2011	02c	Yes	Praxair, Inc	End User Customer	Industrial
8/25/2011	02c	Yes	Primary Power LLC	Other Supplier	Transmission Owne
8/25/2011	02c	Yes	Procter & Gamble Paper Products Company (The)	End User Customer	Industrial
8/25/2011	02c	Yes	RC Cape May Holdings, LLC	Generation Owner	Generation
8/25/2011	02c	Yes	RG Steel Sparrows Point LLC	End User Customer	Generation
8/25/2011	02c	Yes	Rockland Electric Company	Transmission Owner	Transmission Owner
8/25/2011	02c	Yes	Southern Maryland Electric Cooperative, Inc	Electric Distributor	Muni/Co-op
8/25/2011	02c	Yes	Sunoco, Inc. (R&M)	End User Customer	Generation
8/25/2011	02c	Yes	Thurmont Municipal Light Compan	Electric Distributor	Muni/Co-op
8/25/2011	02c	Yes	Town of Williamsport (The	Electric Distributor	Muni/Co-op
8/25/2011	02c	Yes	UGI Utilities, Inc	Transmission Owner	Transmission Owner
8/25/2011	02c	Yes	Virginia Electric & Power Company	Transmission Owner	Transmission Owner
8/25/2011	02c	Yes	Wabash Valley Power Association, Inc	Other Supplier	Muni/Co-op
8/25/2011	02c	Yes	Wellsboro Electric Company	Electric Distributor	Muni/Co-op
8/25/2011	02c	Yes	WPPI Energy	Other Supplier	Power Marketer
9/22/2011	03	Abstain	GenOn Energy Management, LLC	Generation Owner	Generation
9/22/2011	03	Abstain	H.Q. Energy Services (U.S.), Inc.	Other Supplier	Power Marketer

9/22/2011	03	Abstain	Virginia Electric & Power Company	Transmission Owner	Transmission Owner
9/22/2011	03	No	Borough of Butler, Butler Electric Division	Electric Distributor	Retail Energy Supplier
9/22/2011	03	No	Borough of Lavallette, New Jersey	Electric Distributor	Muni/Co-op
9/22/2011	03	No	Borough of Park Ridge, New Jersey	Electric Distributor	Muni/Co-op
9/22/2011	03	No	Borough of Seaside Heights, New Jersey	Electric Distributor	Muni/Co-op
9/22/2011	03	No	Borough of South River, New Jersey	Electric Distributor	Muni/Co-op
9/22/2011	03	No	Comperio Energy LLC dba ClearChoice Energy	Other Supplier	Curtailment Service Provider
9/22/2011	03	No	Dynegy Power Marketing, Inc.	Generation Owner	Power Marketer
9/22/2011	03	No	EMC Development Company, LLC	Other Supplier	Curtailment Service Provider
9/22/2011	03	No	EnergyConnect Group, Inc.	Other Supplier	Curtailment Service Provider
9/22/2011	03	No	EnerNOC, Inc.	Other Supplier	Curtailment Service Provider
9/22/2011	03	No	Enerwise Global Technologies, Inc.	Other Supplier	Curtailment Service Provider
9/22/2011	03	No	North America Power Partners LLC	Other Supplier	Curtailment Service Provider
9/22/2011	03	No	Public Service Electric & Gas Company	Transmission Owner	Transmission Owner
9/22/2011	03	No	Vineland Municipal Electric Utility	Electric Distributor	Muni/Co-op
9/22/2011	03	No	Viridity Energy, Inc.	Other Supplier	Curtailment Service Provider
9/22/2011	03	Yes	AC Energy, LLC	Other Supplier	Financial Trader
9/22/2011	03	Yes	Air Liquide Industrials U.S., L.P.	End User Customer	Industrial
9/22/2011	03	Yes	Air Products & Chemicals, Inc.	End User Customer	Industrial
9/22/2011	03	Yes	Allegheny Electric Cooperative, Inc.	Transmission Owner	Transmission Owner
9/22/2011	03	Yes	Appalachian Power Company	Transmission Owner	Transmission Owner
9/22/2011	03	Yes	ArcelorMittal USA LLC	End User Customer	Retail Energy Supplier
9/22/2011	03	Yes	Atlantic Grid Operations A, LLC	Other Supplier	Transmission Owner
9/22/2011	03	Yes	Baltimore Gas and Electric Company	Transmission Owner	Transmission Owner
9/22/2011	03	Yes	Borough of Chambersburg	Electric Distributor	Muni/Co-op

9/22/2011	03	Yes	Buckeye Power, Inc.	Electric Distributor	Muni/Co-op
9/22/2011	03	Yes	Castlebridge Energy Group, LLC	Other Supplier	Financial Trader
9/22/2011	03	Yes	CCES LLC	Other Supplier	Power Marketer
9/22/2011	03	Yes	City of Dover, Delaware	Electric Distributor	Muni/Co-op
9/22/2011	03	Yes	Covanta Energy Group, Inc.	Generation Owner	Generation
9/22/2011	03	Yes	Dayton Power & Light Company (The)	Transmission Owner	Transmission Owner
9/22/2011	03	Yes	Delaware Municipal Electric Corporation	Electric Distributor	Muni/Co-op
9/22/2011	03	Yes	Duke Energy Business Services LLC	Generation Owner	Power Marketer
9/22/2011	03	Yes	Duquesne Light Company	Transmission Owner	Transmission Owner
9/22/2011	03	Yes	Easton Utilities Commission	Electric Distributor	Muni/Co-op
9/22/2011	03	Yes	Edison Mission Marketing and Trading, Inc.	Generation Owner	Generation
9/22/2011	03	Yes	Energy Consulting Services, LLC	Other Supplier	Power Marketer
9/22/2011	03	Yes	Energy Cooperative Association of Pennsylvania (The)	Other Supplier	Muni/Co-op
9/22/2011	03	Yes	Evraz Claymont Steel	Other Supplier	Retail Energy Supplier
9/22/2011	03	Yes	FirstEnergy Solutions Corp.	Transmission Owner	Power Marketer
9/22/2011	03	Yes	Galt Power Inc.	Other Supplier	Power Marketer
9/22/2011	03	Yes	Gerdau Ameristeel Energy, Inc.	Other Supplier	Financial Trader
9/22/2011	03	Yes	Hagerstown Light Department	Electric Distributor	Muni/Co-op
9/22/2011	03	Yes	Hess Corporation	Other Supplier	Power Marketer
9/22/2011	03	Yes	Icetec.com, Inc.	Other Supplier	Curtailment Service Provider
9/22/2011	03	Yes	Illinois Municipal Electric Agency	Electric Distributor	Muni/Co-op
9/22/2011	03	Yes	Indiana Municipal Power Agency	Generation Owner	Muni/Co-op
9/22/2011	03	Yes	Industrial Energy Users-Ohio	Other Supplier	Retail Energy Supplier
9/22/2011	03	Yes	Jersey Green Energy, LLC	Other Supplier	Financial Trader
9/22/2011	03	Yes	Kimberly-Clark Corporation	Generation Owner	Generation
9/22/2011	03	Yes	Kuehne Chemical Company, Inc.	Other Supplier	Retail Energy Supplier
9/22/2011	03	Yes	Lehigh Portland Cement Company	End User Customer	Industrial

9/22/2011	03	Yes	Letterkenny Industrial Development Authority -PA	Electric Distributor	Muni/Co-op
9/22/2011	03	Yes	Linde LLC	End User Customer	Industrial
9/22/2011	03	Yes	Long Island Lighting Company dba LIPA	Other Supplier	Power Marketer
9/22/2011	03	Yes	Madison Gas & Electric Company	Other Supplier	Power Marketer
9/22/2011	03	Yes	MeadWestvaco Corporation	End User Customer	Generation
9/22/2011	03	Yes	NAEA Rock Springs, LLC	Transmission Owner	Transmission Owner
9/22/2011	03	Yes	New York State Electric & Gas Corporation	Other Supplier	Power Marketer
9/22/2011	03	Yes	North Carolina Electric Membership Corporation	Electric Distributor	Muni/Co-op
9/22/2011	03	Yes	NRG Power Marketing, L.L.C.	Generation Owner	Generation
9/22/2011	03	Yes	Office of the People's Counsel for the District of Columbia	End User Customer	Consumer Advocate
9/22/2011	03	Yes	Old Dominion Electric Cooperative	Electric Distributor	Muni/Co-op
9/22/2011	03	Yes	PBF Power Marketing LLC	Generation Owner	Generation
9/22/2011	03	Yes	PECO Energy Company	Transmission Owner	Transmission Owner
9/22/2011	03	Yes	Pennsylvania Office of Consumer Advocate	End User Customer	Consumer Advocate
9/22/2011	03	Yes	Potomac Electric Power Company	Electric Distributor	Transmission Owner
9/22/2011	03	Yes	PPL Energy Plus, LLC	Transmission Owner	Transmission Owner
9/22/2011	03	Yes	Praxair, Inc.	End User Customer	Industrial
9/22/2011	03	Yes	Primary Power LLC	Other Supplier	Transmission Owner
9/22/2011	03	Yes	Procter & Gamble Paper Products Company (The)	End User Customer	Industrial
9/22/2011	03	Yes	RC Cape May Holdings, LLC	Generation Owner	Generation
9/22/2011	03	Yes	RG Steel Sparrows Point LLC	End User Customer	Generation
9/22/2011	03	Yes	Rockland Electric Company	Transmission Owner	Transmission Owner
9/22/2011	03	Yes	Shell Energy North America (US), LP	Other Supplier	Generation
9/22/2011	03	Yes	Southern Maryland Electric Cooperative, Inc.	Electric Distributor	Muni/Co-op
9/22/2011	03	Yes	Sunoco, Inc. (R&M)	End User Customer	Generation

9/22/2011	03	Yes	Town of Williamsport (The)	Electric Distributor	Muni/Co-op
9/22/2011	03	Yes	UGI Utilities, Inc.	Transmission Owner	Transmission Owner
9/22/2011	03	Yes	Wabash Valley Power Association, Inc.	Other Supplier	Muni/Co-op
9/22/2011	03	Yes	Wellsboro Electric Company	Electric Distributor	Muni/Co-op
9/22/2011	03	Yes	WPPI Energy	Other Supplier	Power Marketer
10/20/2011	04b0	Abstain	Atlantic Grid Operations A, LLC	Other Supplier	Transmission Owner
10/20/2011	04b0	Abstain	Black Oak Energy, LLC	Other Supplier	Financial Trade
10/20/2011	04b0	Abstain	BP Energy Company	Other Supplier	Power Marketer
10/20/2011	04b0	Abstain	Brookfield Energy Marketing LP	Other Supplier	Power Marketer
10/20/2011	04b0	Abstain	Central Virginia Electric Cooperativ	Electric Distributor	Muni/Co-op
10/20/2011	04b0	Abstain	Domtar Paper Company, LLC	Generation Owner	Generation
10/20/2011	04b0	Abstain	EDF Trading North America, LLC	Other Supplier	Power Marketer
10/20/2011	04b0	Abstain	Galt Power Inc.	Other Supplier	Power Marketer
10/20/2011	04b0	Abstain	Primary Power LLC	Other Supplier	Transmission Owner
10/20/2011	04b0	Abstain	TransCanada Power Marketing Ltd	Other Supplier	Power Marketer
10/20/2011	04b0	No	Air Liquide Industrials U.S., L.P	End User Customer	Industrial
10/20/2011	04b0	No	Air Products & Chemicals, Inc	End User Customer	Industrial
10/20/2011	04b0	No	Allegheny Electric Cooperative, Inc	Transmission Owner	Transmission Owner
10/20/2011	04b0	No	Ameren Energy Marketing Company	Other Supplier	Power Marketer
10/20/2011	04b0	No	American Municipal Power, Inc	Generation Owner	Muni/Co-op
10/20/2011	04b0	No	Appalachian Power Company	Transmission Owner	Transmission Owner
10/20/2011	04b0	No	ArcLight Energy Marketing, L.L.C	Other Supplier	Power Marketer
10/20/2011	04b0	No	Baltimore Gas and Electric Company	Transmission Owner	Transmission Owner
10/20/2011	04b0	No	Beacon Power Corporation	Other Supplier	Financial Trade
10/20/2011	04b0	No	Blue Ridge Power Agency, Inc	Electric Distributor	Muni/Co-op
10/20/2011	04b0	No	Borough of Butler, Butler Electric Divisio	Electric Distributor	Retail Energy Supplier
10/20/2011	04b0	No	Borough of Chambersburg	Electric Distributor	Muni/Co-op
10/20/2011	04b0	No	Borough of Mont Alto, PA	Electric Distributor	Muni/Co-op
10/20/2011	04b0	No	Borough of Park Ridge, New Jersey	Electric Distributor	Muni/Co-op
10/20/2011	04b0	No	Borough of Seaside Heights, New Jerse	Electric Distributor	Muni/Co-op

10/20/2011	04b0	No	Borough of South River, New Jerse	Electric Distributor	Muni/Co-op
10/20/2011	04b0	No	Buckeye Power, Inc	Electric Distributor	Muni/Co-op
10/20/2011	04b0	No	Calpine Energy Services, L.P	Generation Owner	Generation
10/20/2011	04b0	No	Castlebridge Energy Group, LLC	Other Supplier	Financial Trade
10/20/2011	04b0	No	Citigroup Energy, Inc	Other Supplier	Financial Trade
10/20/2011	04b0	No	City of Dover, Delaware	Electric Distributor	Muni/Co-op
10/20/2011	04b0	No	Comperio Energy LLC dba ClearChoice Energ	Other Supplier	Curtailment Service Provide
10/20/2011	04b0	No	Covanta Energy Group, Inc	Generation Owner	Generation
10/20/2011	04b0	No	CP Energy Marketing (US) Inc	Other Supplier	Power Marketer
10/20/2011	04b0	No	Dayton Power & Light Company (The	Transmission Owner	Transmission Owner
10/20/2011	04b0	No	DC Energy LLC	Other Supplier	Financial Trade
10/20/2011	04b0	No	Delaware Municipal Electric Corporatio	Electric Distributor	Muni/Co-op
10/20/2011	04b0	No	Downes Associates, Inc	Other Supplier	Consultant, Service Company, Etc
10/20/2011	04b0	No	DTE Energy Trading, Inc	Other Supplier	Power Marketer
10/20/2011	04b0	No	Duke Energy Business Services LL	Generation Owner	Power Marketer
10/20/2011	04b0	No	Duquesne Light Compan	Transmission Owner	Transmission Owner
10/20/2011	04b0	No	Dynegy Power Marketing, Inc	Generation Owner	Power Marketer
10/20/2011	04b0	No	Easton Utilities Commissio	Electric Distributor	Muni/Co-op
10/20/2011	04b0	No	Edison Mission Marketing and Trading, Inc	Generation Owner	Generation
10/20/2011	04b0	No	Energy Cooperative Association of Pennsylvania (The)	Other Supplier	Muni/Co-op
10/20/2011	04b0	No	Energy Curtailment Specialists, Inc	Other Supplier	Curtailment Service Provide
10/20/2011	04b0	No	EnergyConnect Group, Inc	Other Supplier	Curtailment Service Provide
10/20/2011	04b0	No	EnerNOC, Inc.	Other Supplier	Curtailment Service Provide
10/20/2011	04b0	No	Evraz Claymont Stee	Other Supplier	Retail Energy Supplier
10/20/2011	04b0	No	FirstEnergy Solutions Corp	Transmission Owner	Power Marketer
10/20/2011	04b0	No	GDF SUEZ Energy Marketing NA, Inc	Other Supplier	Power Marketer

10/20/2011	04b0	No	GenOn Energy Management, LLC	Generation Owner	Generation
10/20/2011	04b0	No	Gerdau Ameristeel Energy, Inc	Other Supplier	Financial Trade
10/20/2011	04b0	No	Hagerstown Light Departmen	Electric Distributor	Muni/Co-op
10/20/2011	04b0	No	Hess Corporation	Other Supplier	Power Marketer
10/20/2011	04b0	No	Hoosier Energy REC, Inc	Other Supplier	Muni/Co-op
10/20/2011	04b0	No	H-P Energy Resources LLC	Other Supplier	Unspecified LOB
10/20/2011	04b0	No	Icetec.com, Inc.	Other Supplier	Curtailment Service Provider
10/20/2011	04b0	No	Illinois Municipal Electric Agenc	Electric Distributor	Muni/Co-op
10/20/2011	04b0	No	Indiana Municipal Power Agenc	Generation Owner	Muni/Co-op
10/20/2011	04b0	No	Industrial Energy Users-Ohi	Other Supplier	Retail Energy Supplier
10/20/2011	04b0	No	Jersey Green Energy, LLC	Other Supplier	Financial Trade
10/20/2011	04b0	No	Kimberly-Clark Corporation	Generation Owner	Generation
10/20/2011	04b0	No	Kuehne Chemical Company, Inc	Other Supplier	Retail Energy Supplier
10/20/2011	04b0	No	Lehigh Portland Cement Compan	End User Customer	Industrial
10/20/2011	04b0	No	Letterkenny Industrial Development Authority - PA	Electric Distributor	Muni/Co-op
10/20/2011	04b0	No	Linde LLC	End User Customer	Industrial
10/20/2011	04b0	No	Long Island Lighting Company dba LIP	Other Supplier	Power Marketer
10/20/2011	04b0	No	Madison Gas & Electric Compan	Other Supplier	Power Marketer
10/20/2011	04b0	No	MeadWestvaco Corporation	End User Customer	Generation
10/20/2011	04b0	No	NAEA Rock Springs, LLC	Transmission Owner	Transmission Owner
10/20/2011	04b0	No	New York State Electric & Gas Corporation	Other Supplier	Power Marketer
10/20/2011	04b0	No	NextEra Energy Power Marketing, LLC	Generation Owner	Generation
10/20/2011	04b0	No	North America Power Partners LLC	Other Supplier	Curtailment Service Provide
10/20/2011	04b0	No	North Carolina Electric Membership Corporation	Electric Distributor	Muni/Co-op
10/20/2011	04b0	No	Northern Virginia Electric Cooperative - NOVEC	Electric Distributor	Muni/Co-op
10/20/2011	04b0	No	NRG Power Marketing, L.L.C.	Generation Owner	Generation

10/20/2011	04b0	No	Occidental Power Services, Inc	End User Customer	Industrial
10/20/2011	04b0	No	Old Dominion Electric Cooperativ	Electric Distributor	Muni/Co-op
10/20/2011	04b0	No	PECO Energy Company	Transmission Owner	Transmission Owner
10/20/2011	04b0	No	Pennsylvania Office of Consumer Advocat	End User Customer	Consumer Advocate
10/20/2011	04b0	No	PPL Energy Plus, LLC	Transmission Owner	Transmission Owner
10/20/2011	04b0	No	Praxair, Inc	End User Customer	Industrial
10/20/2011	04b0	No	Procter & Gamble Paper Products Company (The)	End User Customer	Industrial
10/20/2011	04b0	No	Public Service Electric & Gas Compan	Transmission Owner	Transmission Owner
10/20/2011	04b0	No	RC Cape May Holdings, LLC	Generation Owner	Generation
10/20/2011	04b0	No	RG Steel Sparrows Point LLC	End User Customer	Generation
10/20/2011	04b0	No	Rockland Electric Company	Transmission Owner	Transmission Owner
10/20/2011	04b0	No	Scylla Energy LLC	Other Supplier	Power Marketer
10/20/2011	04b0	No	Shell Energy North America (US), LP	Other Supplier	Generation
10/20/2011	04b0	No	Southern Maryland Electric Cooperative, Inc	Electric Distributor	Muni/Co-op
10/20/2011	04b0	No	Sunoco, Inc. (R&M)	End User Customer	Generation
10/20/2011	04b0	No	Tangent Energy Solutions, Inc	Other Supplier	Curtailment Service Provide
10/20/2011	04b0	No	Tenaska Power Services Co	Generation Owner	Generation
10/20/2011	04b0	No	Thurmont Municipal Light Compan	Electric Distributor	Muni/Co-op
10/20/2011	04b0	No	Town of Williamsport (The	Electric Distributor	Muni/Co-op
10/20/2011	04b0	No	Vineland Municipal Electric Utilit	Electric Distributor	Muni/Co-op
10/20/2011	04b0	No	Vitol Inc.	Other Supplier	Power Marketer
10/20/2011	04b0	No	Wabash Valley Power Association, Inc	Other Supplier	Muni/Co-op
10/20/2011	04b0	No	Wellsboro Electric Company	Electric Distributor	Muni/Co-op
10/20/2011	04b0	No	WPPI Energy	Other Supplier	Power Marketer
10/20/2011	04b0	Yes	ArcelorMittal USA LLC	End User Customer	Retail Energy Supplier
10/20/2011	04b0	Yes	Direct Energy Business, LLC	Other Supplier	Retail Energy Supplier
10/20/2011	04b0	Yes	Energy Consulting Services, LLC	Other Supplier	Power Marketer
10/20/2011	04b0	Yes	PBF Power Marketing LLC	Generation Owner	Generation

10/20/2011	04b0	Yes	Potomac Electric Power Company	Electric Distributor	Transmission Owner
10/20/2011	04b0	Yes	Virginia Electric & Power Company	Transmission Owner	Transmission Owner
10/20/2011	04b1	Abstain	Buckeye Power, Inc	Electric Distributor	Muni/Co-op
10/20/2011	04b1	Abstain	Domtar Paper Company, LLC	Generation Owner	Generation
10/20/2011	04b1	Abstain	Kimberly-Clark Corporation	Generation Owner	Generation
10/20/2011	04b1	No	Air Liquide Industrials U.S., L.P	End User Customer	Industria
10/20/2011	04b1	No	Air Products & Chemicals, Inc	End User Customer	Industria
10/20/2011	04b1	No	Allegheny Electric Cooperative, Inc	Transmission Owner	Transmission Owner
10/20/2011	04b1	No	American Municipal Power, Inc	Generation Owner	Muni/Co-op
10/20/2011	04b1	No	ArcelorMittal USA LLC	End User Customer	Retail Energy Supplie
10/20/2011	04b1	No	Blue Ridge Power Agency, Inc	Electric Distributor	Muni/Co-op
10/20/2011	04b1	No	Borough of Butler, Butler Electric Divisio	Electric Distributor	Retail Energy Supplie
10/20/2011	04b1	No	Borough of Chambersburg	Electric Distributor	Muni/Co-op
10/20/2011	04b1	No	Borough of Mont Alto, PA	Electric Distributor	Muni/Co-op
10/20/2011	04b1	No	Borough of Park Ridge, New Jersey	Electric Distributor	Muni/Co-op
10/20/2011	04b1	No	Borough of Seaside Heights, New Jerse	Electric Distributor	Muni/Co-op
10/20/2011	04b1	No	Borough of South River, New Jerse	Electric Distributor	Muni/Co-op
10/20/2011	04b1	No	Castlebridge Energy Group, LLC	Other Supplier	Financial Trade
10/20/2011	04b1	No	Central Virginia Electric Cooperativ	Electric Distributor	Muni/Co-op
10/20/2011	04b1	No	City of Dover, Delaware	Electric Distributor	Muni/Co-op
10/20/2011	04b1	No	Delaware Municipal Electric Corporatio	Electric Distributor	Muni/Co-op
10/20/2011	04b1	No	Downes Associates, Inc	Other Supplier	Consultant, Service Company, Etc
10/20/2011	04b1	No	DTE Energy Trading, Inc	Other Supplier	Power Marketer
10/20/2011	04b1	No	Easton Utilities Commissio	Electric Distributor	Muni/Co-op
10/20/2011	04b1	No	Energy Consulting Services, LLC	Other Supplier	Power Marketer
10/20/2011	04b1	No	Energy Cooperative Association of Pennsylvania (The)	Other Supplier	Muni/Co-op
10/20/2011	04b1	No	Galt Power Inc.	Other Supplier	Power Marketer
10/20/2011	04b1	No	Gerdau Ameristeel Energy, Inc	Other Supplier	Financial Trade
10/20/2011	04b1	No	Hagerstown Light Departmen	Electric Distributor	Muni/Co-op

10/20/2011	04b1	No	Hoosier Energy REC, Inc	Other Supplier	Muni/Co-op
10/20/2011	04b1	No	Illinois Municipal Electric Agenc	Electric Distributor	Muni/Co-op
10/20/2011	04b1	No	Indiana Municipal Power Agenc	Generation Owner	Muni/Co-op
10/20/2011	04b1	No	Industrial Energy Users-Ohi	Other Supplier	Retail Energy Supplie
10/20/2011	04b1	No	Lehigh Portland Cement Compan	End User Customer	Industria
10/20/2011	04b1	No	Letterkenny Industrial Development Authority - PA	Electric Distributor	Muni/Co-op
10/20/2011	04b1	No	Linde LLC	End User Customer	Industria
10/20/2011	04b1	No	Long Island Lighting Company dba LIP	Other Supplier	Power Marketer
10/20/2011	04b1	No	Madison Gas & Electric Compan	Other Supplier	Power Marketer
10/20/2011	04b1	No	MeadWestvaco Corporation	End User Customer	Generation
10/20/2011	04b1	No	North Carolina Electric Membership Corporation	Electric Distributor	Muni/Co-op
10/20/2011	04b1	No	Northern Virginia Electric Cooperative - NOVEC	Electric Distributor	Muni/Co-op
10/20/2011	04b1	No	Old Dominion Electric Cooperativ	Electric Distributor	Muni/Co-op
10/20/2011	04b1	No	Pennsylvania Office of Consumer Advocat	End User Customer	Consumer Advocate
10/20/2011	04b1	No	Praxair, Inc	End User Customer	Industria
10/20/2011	04b1	No	Procter & Gamble Paper Products Company (The)	End User Customer	Industrial
10/20/2011	04b1	No	RG Steel Sparrows Point LLC	End User Customer	Generation
10/20/2011	04b1	No	Rockland Electric Company	Transmission Owner	Transmission Owner
10/20/2011	04b1	No	Southern Maryland Electric Cooperative, Inc	Electric Distributor	Muni/Co-op
10/20/2011	04b1	No	Sunoco, Inc. (R&M)	End User Customer	Generation
10/20/2011	04b1	No	Thurmont Municipal Light Compan	Electric Distributor	Muni/Co-op
10/20/2011	04b1	No	Town of Williamsport (The	Electric Distributor	Muni/Co-op
10/20/2011	04b1	No	Vineland Municipal Electric Utilit	Electric Distributor	Muni/Co-op
10/20/2011	04b1	No	Wabash Valley Power Association, Inc	Other Supplier	Muni/Co-op
10/20/2011	04b1	No	Wellsboro Electric Company	Electric Distributor	Muni/Co-op
10/20/2011	04b1	No	WPPI Energy	Other Supplier	Power Marketer

10/20/2011	04b1	Yes	Ameren Energy Marketing Company	Other Supplier	Power Marketer
10/20/2011	04b1	Yes	Appalachian Power Company	Transmission Owner	Transmission Owner
10/20/2011	04b1	Yes	ArcLight Energy Marketing, L.L.C	Other Supplier	Power Marketer
10/20/2011	04b1	Yes	Atlantic Grid Operations A, LLC	Other Supplier	Transmission Owne
10/20/2011	04b1	Yes	Baltimore Gas and Electric Company	Transmission Owner	Transmission Owner
10/20/2011	04b1	Yes	Beacon Power Corporation	Other Supplier	Financial Trade
10/20/2011	04b1	Yes	Brookfield Energy Marketing LP	Other Supplier	Power Marketer
10/20/2011	04b1	Yes	Calpine Energy Services, L.P	Generation Owner	Generation
10/20/2011	04b1	Yes	Citigroup Energy, Inc	Other Supplier	Financial Trade
10/20/2011	04b1	Yes	Comperio Energy LLC dba ClearChoice Energ	Other Supplier	Curtailment Service Provide
10/20/2011	04b1	Yes	Covanta Energy Group, Inc	Generation Owner	Generation
10/20/2011	04b1	Yes	CP Energy Marketing (US) Inc	Other Supplier	Power Marketer
10/20/2011	04b1	Yes	Dayton Power & Light Company (The	Transmission Owner	Transmission Owner
10/20/2011	04b1	Yes	DC Energy LLC	Other Supplier	Financial Trade
10/20/2011	04b1	Yes	Dynegy Power Marketing, Inc	Generation Owner	Power Marketer
10/20/2011	04b1	Yes	Edison Mission Marketing and Trading, Inc	Generation Owner	Generation
10/20/2011	04b1	Yes	Energy Curtailment Specialists, Inc	Other Supplier	Curtailment Service Provide
10/20/2011	04b1	Yes	EnergyConnect Group, Inc	Other Supplier	Curtailment Service Provide
10/20/2011	04b1	Yes	EnerNOC, Inc.	Other Supplier	Curtailment Service Provide
10/20/2011	04b1	Yes	Evraz Claymont Stee	Other Supplier	Retail Energy Supplie
10/20/2011	04b1	Yes	FirstEnergy Solutions Corp	Transmission Owner	Power Marketer
10/20/2011	04b1	Yes	GDF SUEZ Energy Marketing NA, Inc	Other Supplier	Power Marketer
10/20/2011	04b1	Yes	GenOn Energy Management, LLC	Generation Owner	Generation
10/20/2011	04b1	Yes	Hess Corporation	Other Supplier	Power Marketer
10/20/2011	04b1	Yes	H-P Energy Resources LLC	Other Supplier	Unspecified LOB
10/20/2011	04b1	Yes	Icetec.com, Inc.	Other Supplier	Curtailment Service Provide

10/20/2011	04b1	Yes	Jersey Green Energy, LLC	Other Supplier	Financial Trade
10/20/2011	04b1	Yes	Kuehne Chemical Company, Inc	Other Supplier	Retail Energy Supplie
10/20/2011	04b1	Yes	NAEA Rock Springs, LLC	Transmission Owner	Transmission Owner
10/20/2011	04b1	Yes	New York State Electric & Gas Corporation	Other Supplier	Power Marketer
10/20/2011	04b1	Yes	NextEra Energy Power Marketing, LLC	Generation Owner	Generation
10/20/2011	04b1	Yes	NRG Power Marketing, L.L.C.	Generation Owner	Generation
10/20/2011	04b1	Yes	PBF Power Marketing LLC	Generation Owner	Generation
10/20/2011	04b1	Yes	PECO Energy Company	Transmission Owner	Transmission Owner
10/20/2011	04b1	Yes	PPL Energy Plus, LLC	Transmission Owner	Transmission Owner
10/20/2011	04b1	Yes	Primary Power LLC	Other Supplier	Transmission Owne
10/20/2011	04b1	Yes	Public Service Electric & Gas Compan	Transmission Owner	Transmission Owner
10/20/2011	04b1	Yes	RC Cape May Holdings, LLC	Generation Owner	Generation
10/20/2011	04b1	Yes	Scylla Energy LLC	Other Supplier	Power Marketer
10/20/2011	04b1	Yes	Shell Energy North America (US), LP	Other Supplier	Generation
10/20/2011	04b1	Yes	Tangent Energy Solutions, Inc	Other Supplier	Curtailment Service Provide
10/20/2011	04b1	Yes	Tenaska Power Services Co	Generation Owner	Generation
10/20/2011	04b1	Yes	TransCanada Power Marketing Ltd	Other Supplier	Power Marketer
10/20/2011	04b1	Yes	Vitol Inc.	Other Supplier	Power Marketer
10/20/2011	04b2	Abstain	Atlantic Grid Operations A, LLC	Other Supplier	Transmission Owne
10/20/2011	04b2	Abstain	BP Energy Company	Other Supplier	Power Marketer
10/20/2011	04b2	Abstain	Duke Energy Business Services LL	Generation Owner	Power Marketer
10/20/2011	04b2	Abstain	Enerwise Global Technologies, Inc	Other Supplier	Curtailment Service Provide
10/20/2011	04b2	Abstain	North America Power Partners LLC	Other Supplier	Curtailment Service Provide
10/20/2011	04b2	Abstain	Primary Power LLC	Other Supplier	Transmission Owne
10/20/2011	04b2	Abstain	Vitol Inc.	Other Supplier	Power Marketer
10/20/2011	04b2	No	Air Liquide Industrials U.S., L.P	End User Customer	Industria
10/20/2011	04b2	No	Air Products & Chemicals, Inc	End User Customer	Industria
10/20/2011	04b2	No	Allegheny Electric Cooperative, Inc	Transmission Owner	Transmission Owner

10/20/2011	04b2	No	American Municipal Power, Inc	Generation Owner	Muni/Co-op
10/20/2011	04b2	No	ArcelorMittal USA LLC	End User Customer	Retail Energy Supplie
10/20/2011	04b2	No	Beacon Power Corporation	Other Supplier	Financial Trade
10/20/2011	04b2	No	Blue Ridge Power Agency, Inc	Electric Distributor	Muni/Co-op
10/20/2011	04b2	No	Borough of Butler, Butler Electric Divisio	Electric Distributor	Retail Energy Supplie
10/20/2011	04b2	No	Borough of Chambersburg	Electric Distributor	Muni/Co-op
10/20/2011	04b2	No	Borough of Mont Alto, PA	Electric Distributor	Muni/Co-op
10/20/2011	04b2	No	Borough of Park Ridge, New Jersey	Electric Distributor	Muni/Co-op
10/20/2011	04b2	No	Borough of Seaside Heights, New Jerse	Electric Distributor	Muni/Co-op
10/20/2011	04b2	No	Borough of South River, New Jerse	Electric Distributor	Muni/Co-op
10/20/2011	04b2	No	Brookfield Energy Marketing LP	Other Supplier	Power Marketer
10/20/2011	04b2	No	Buckeye Power, Inc	Electric Distributor	Muni/Co-op
10/20/2011	04b2	No	Castlebridge Energy Group, LLC	Other Supplier	Financial Trade
10/20/2011	04b2	No	Central Virginia Electric Cooperativ	Electric Distributor	Muni/Co-op
10/20/2011	04b2	No	City of Dover, Delaware	Electric Distributor	Muni/Co-op
10/20/2011	04b2	No	DC Energy LLC	Other Supplier	Financial Trade
10/20/2011	04b2	No	Delaware Municipal Electric Corporatio	Electric Distributor	Muni/Co-op
10/20/2011	04b2	No	Domtar Paper Company, LLC	Generation Owner	Generation
10/20/2011	04b2	No	Downes Associates, Inc	Other Supplier	Consultant, Service Company, Etc
10/20/2011	04b2	No	Duquesne Light Compan	Transmission Owner	Transmission Owner
10/20/2011	04b2	No	Easton Utilities Commissio	Electric Distributor	Muni/Co-op
10/20/2011	04b2	No	Energy Consulting Services, LLC	Other Supplier	Power Marketer
10/20/2011	04b2	No	Energy Cooperative Association of Pennsylvania (The)	Other Supplier	Muni/Co-op
10/20/2011	04b2	No	Evraz Claymont Stee	Other Supplier	Retail Energy Supplie
10/20/2011	04b2	No	Galt Power Inc.	Other Supplier	Power Marketer
10/20/2011	04b2	No	Gerdau Ameristeel Energy, Inc	Other Supplier	Financial Trade
10/20/2011	04b2	No	Hagerstown Light Departmen	Electric Distributor	Muni/Co-op
10/20/2011	04b2	No	Hoosier Energy REC, Inc	Other Supplier	Muni/Co-op

10/20/2011	04b2	No	Icetec.com, Inc.	Other Supplier	Curtailment Service Provide
10/20/2011	04b2	No	Illinois Municipal Electric Agenc	Electric Distributor	Muni/Co-op
10/20/2011	04b2	No	Indiana Municipal Power Agenc	Generation Owner	Muni/Co-op
10/20/2011	04b2	No	Industrial Energy Users-Ohi	Other Supplier	Retail Energy Supplie
10/20/2011	04b2	No	Kimberly-Clark Corporation	Generation Owner	Generation
10/20/2011	04b2	No	Kuehne Chemical Company, Inc	Other Supplier	Retail Energy Supplie
10/20/2011	04b2	No	Lehigh Portland Cement Compan	End User Customer	Industria
10/20/2011	04b2	No	Letterkenny Industrial Development Authority - PA	Electric Distributor	Muni/Co-op
10/20/2011	04b2	No	Linde LLC	End User Customer	Industria
10/20/2011	04b2	No	Long Island Lighting Company dba LIP	Other Supplier	Power Marketer
10/20/2011	04b2	No	Madison Gas & Electric Compan	Other Supplier	Power Marketer
10/20/2011	04b2	No	MeadWestvaco Corporation	End User Customer	Generation
10/20/2011	04b2	No	New York State Electric & Gas Corporation	Other Supplier	Power Marketer
10/20/2011	04b2	No	North Carolina Electric Membership Corporation	Electric Distributor	Muni/Co-op
10/20/2011	04b2	No	Northern Virginia Electric Cooperative - NOVEC	Electric Distributor	Muni/Co-op
10/20/2011	04b2	No	Old Dominion Electric Cooperativ	Electric Distributor	Muni/Co-op
10/20/2011	04b2	No	Pennsylvania Office of Consumer Advocat	End User Customer	Consumer Advocate
10/20/2011	04b2	No	Praxair, Inc	End User Customer	Industria
10/20/2011	04b2	No	Procter & Gamble Paper Products Company (The)	End User Customer	Industrial
10/20/2011	04b2	No	RG Steel Sparrows Point LLC	End User Customer	Generation
10/20/2011	04b2	No	Rockland Electric Company	Transmission Owner	Transmission Owner
10/20/2011	04b2	No	Southern Maryland Electric Cooperative, Inc	Electric Distributor	Muni/Co-op
10/20/2011	04b2	No	Sunoco, Inc. (R&M)	End User Customer	Generation
10/20/2011	04b2	No	Tangent Energy Solutions, Inc	Other Supplier	Curtailment Service Provide

10/20/2011	04b2	No	Thurmont Municipal Light Compan	Electric Distributor	Muni/Co-op
10/20/2011	04b2	No	Town of Williamsport (The	Electric Distributor	Muni/Co-op
10/20/2011	04b2	No	TransCanada Power Marketing Ltd	Other Supplier	Power Marketer
10/20/2011	04b2	No	Vineland Municipal Electric Utilit	Electric Distributor	Muni/Co-op
10/20/2011	04b2	No	Wabash Valley Power Association, Inc	Other Supplier	Muni/Co-op
10/20/2011	04b2	No	Wellsboro Electric Company	Electric Distributor	Muni/Co-op
10/20/2011	04b2	No	WPPI Energy	Other Supplier	Power Marketer
10/20/2011	04b2	Yes	Ameren Energy Marketing Company	Other Supplier	Power Marketer
10/20/2011	04b2	Yes	Appalachian Power Company	Transmission Owner	Transmission Owner
10/20/2011	04b2	Yes	ArcLight Energy Marketing, L.L.C	Other Supplier	Power Marketer
10/20/2011	04b2	Yes	Baltimore Gas and Electric Company	Transmission Owner	Transmission Owner
10/20/2011	04b2	Yes	Calpine Energy Services, L.P	Generation Owner	Generation
10/20/2011	04b2	Yes	Citigroup Energy, Inc	Other Supplier	Financial Trade
10/20/2011	04b2	Yes	Covanta Energy Group, Inc	Generation Owner	Generation
10/20/2011	04b2	Yes	CP Energy Marketing (US) Inc	Other Supplier	Power Marketer
10/20/2011	04b2	Yes	Dayton Power & Light Company (The	Transmission Owner	Transmission Owner
10/20/2011	04b2	Yes	Direct Energy Business, LLC	Other Supplier	Retail Energy Supplie
10/20/2011	04b2	Yes	Dynegy Power Marketing, Inc	Generation Owner	Power Marketer
10/20/2011	04b2	Yes	Edison Mission Marketing and Trading, Inc	Generation Owner	Generation
10/20/2011	04b2	Yes	FirstEnergy Solutions Corp	Transmission Owner	Power Marketer
10/20/2011	04b2	Yes	GDF SUEZ Energy Marketing NA, Inc	Other Supplier	Power Marketer
10/20/2011	04b2	Yes	GenOn Energy Management, LLC	Generation Owner	Generation
10/20/2011	04b2	Yes	H-P Energy Resources LLC	Other Supplier	Unspecified LOB
10/20/2011	04b2	Yes	Jersey Green Energy, LLC	Other Supplier	Financial Trade
10/20/2011	04b2	Yes	NAEA Rock Springs, LLC	Transmission Owner	Transmission Owner
10/20/2011	04b2	Yes	NextEra Energy Power Marketing, LLC	Generation Owner	Generation
10/20/2011	04b2	Yes	NRG Power Marketing, L.L.C.	Generation Owner	Generation
10/20/2011	04b2	Yes	PBF Power Marketing LLC	Generation Owner	Generation
10/20/2011	04b2	Yes	PECO Energy Company	Transmission Owner	Transmission Owner

10/20/2011	04b2	Yes	PPL Energy Plus, LLC	Transmission Owner	Transmission Owner
10/20/2011	04b2	Yes	Public Service Electric & Gas Compan	Transmission Owner	Transmission Owner
10/20/2011	04b2	Yes	RC Cape May Holdings, LLC	Generation Owner	Generation
10/20/2011	04b2	Yes	Scylla Energy LLC	Other Supplier	Power Marketer
10/20/2011	04b2	Yes	Shell Energy North America (US), LP	Other Supplier	Generation
10/20/2011	04b2	Yes	Tenaska Power Services Co	Generation Owner	Generation
10/20/2011	04b2	Yes	Virginia Electric & Power Company	Transmission Owner	Transmission Owner
10/20/2011	04b3	Abstain	Atlantic Grid Operations A, LLC	Other Supplier	Transmission Owne
10/20/2011	04b3	Abstain	BP Energy Company	Other Supplier	Power Marketer
10/20/2011	04b3	Abstain	Buckeye Power, Inc	Electric Distributor	Muni/Co-op
10/20/2011	04b3	Abstain	Direct Energy Business, LLC	Other Supplier	Retail Energy Supplie
10/20/2011	04b3	Abstain	Domtar Paper Company, LLC	Generation Owner	Generation
10/20/2011	04b3	Abstain	Enerwise Global Technologies, Inc	Other Supplier	Curtailment Service Provide
10/20/2011	04b3	Abstain	Galt Power Inc.	Other Supplier	Power Marketer
10/20/2011	04b3	Abstain	Kimberly-Clark Corporation	Generation Owner	Generation
10/20/2011	04b3	Abstain	North America Power Partners LLC	Other Supplier	Curtailment Service Provide
10/20/2011	04b3	Abstain	Primary Power LLC	Other Supplier	Transmission Owne
10/20/2011	04b3	No	Allegheny Electric Cooperative, Inc	Transmission Owner	Transmission Owner
10/20/2011	04b3	No	Ameren Energy Marketing Company	Other Supplier	Power Marketer
10/20/2011	04b3	No	American Municipal Power, Inc	Generation Owner	Muni/Co-op
10/20/2011	04b3	No	Appalachian Power Company	Transmission Owner	Transmission Owner
10/20/2011	04b3	No	ArcLight Energy Marketing, L.L.C	Other Supplier	Power Marketer
10/20/2011	04b3	No	Baltimore Gas and Electric Company	Transmission Owner	Transmission Owner
10/20/2011	04b3	No	Beacon Power Corporation	Other Supplier	Financial Trade
10/20/2011	04b3	No	Brookfield Energy Marketing LP	Other Supplier	Power Marketer
10/20/2011	04b3	No	Calpine Energy Services, L.P	Generation Owner	Generation
10/20/2011	04b3	No	Citigroup Energy, Inc	Other Supplier	Financial Trade
10/20/2011	04b3	No	Comperio Energy LLC dba ClearChoice Energ	Other Supplier	Curtailment Service Provide
10/20/2011	04b3	No	Covanta Energy Group, Inc	Generation Owner	Generation

10/20/2011	04b3	No	CP Energy Marketing (US) Inc	Other Supplier	Power Marketer
10/20/2011	04b3	No	Dayton Power & Light Company (The	Transmission Owner	Transmission Owner
10/20/2011	04b3	No	DC Energy LLC	Other Supplier	Financial Trade
10/20/2011	04b3	No	Duke Energy Business Services LL	Generation Owner	Power Marketer
10/20/2011	04b3	No	Dynegy Power Marketing, Inc	Generation Owner	Power Marketer
10/20/2011	04b3	No	Edison Mission Marketing and Trading, Inc	Generation Owner	Generation
10/20/2011	04b3	No	Energy Curtailment Specialists, Inc	Other Supplier	Curtailment Service Provide
10/20/2011	04b3	No	EnergyConnect Group, Inc	Other Supplier	Curtailment Service Provide
10/20/2011	04b3	No	EnerNOC, Inc.	Other Supplier	Curtailment Service Provide
10/20/2011	04b3	No	Evraz Claymont Stee	Other Supplier	Retail Energy Supplie
10/20/2011	04b3	No	FirstEnergy Solutions Corp	Transmission Owner	Power Marketer
10/20/2011	04b3	No	GDF SUEZ Energy Marketing NA, Inc	Other Supplier	Power Marketer
10/20/2011	04b3	No	GenOn Energy Management, LLC	Generation Owner	Generation
10/20/2011	04b3	No	Hess Corporation	Other Supplier	Power Marketer
10/20/2011	04b3	No	Hoosier Energy REC, Inc	Other Supplier	Muni/Co-op
10/20/2011	04b3	No	H-P Energy Resources LLC	Other Supplier	Unspecified LOB
10/20/2011	04b3	No	Icetec.com, Inc.	Other Supplier	Curtailment Service Provide
10/20/2011	04b3	No	Jersey Green Energy, LLC	Other Supplier	Financial Trade
10/20/2011	04b3	No	Kuehne Chemical Company, Inc	Other Supplier	Retail Energy Supplie
10/20/2011	04b3	No	Long Island Lighting Company dba LIP	Other Supplier	Power Marketer
10/20/2011	04b3	No	NAEA Rock Springs, LLC	Transmission Owner	Transmission Owner
10/20/2011	04b3	No	New York State Electric & Gas Corporation	Other Supplier	Power Marketer
10/20/2011	04b3	No	NextEra Energy Power Marketing, LLC	Generation Owner	Generation
10/20/2011	04b3	No	NRG Power Marketing, L.L.C.	Generation Owner	Generation
10/20/2011	04b3	No	PBF Power Marketing LLC	Generation Owner	Generation
10/20/2011	04b3	No	PECO Energy Company	Transmission Owner	Transmission Owner

10/20/2011	04b3	No	Pennsylvania Office of Consumer Advocat	End User Customer	Consumer Advocate
10/20/2011	04b3	No	Potomac Electric Power Company	Electric Distributor	Transmission Owne
10/20/2011	04b3	No	PPL Energy Plus, LLC	Transmission Owner	Transmission Owner
10/20/2011	04b3	No	Public Service Electric & Gas Compan	Transmission Owner	Transmission Owner
10/20/2011	04b3	No	RC Cape May Holdings, LLC	Generation Owner	Generation
10/20/2011	04b3	No	Scylla Energy LLC	Other Supplier	Power Marketer
10/20/2011	04b3	No	Shell Energy North America (US), LP	Other Supplier	Generation
10/20/2011	04b3	No	Southern Maryland Electric Cooperative, Inc	Electric Distributor	Muni/Co-op
10/20/2011	04b3	No	Tangent Energy Solutions, Inc	Other Supplier	Curtailment Service Provide
10/20/2011	04b3	No	Tenaska Power Services Co	Generation Owner	Generation
10/20/2011	04b3	No	TransCanada Power Marketing Ltd	Other Supplier	Power Marketer
10/20/2011	04b3	No	Virginia Electric & Power Company	Transmission Owner	Transmission Owner
10/20/2011	04b3	No	Wabash Valley Power Association, Inc	Other Supplier	Muni/Co-op
10/20/2011	04b3	Yes	Air Liquide Industrials U.S., L.P	End User Customer	Industria
10/20/2011	04b3	Yes	Air Products & Chemicals, Inc	End User Customer	Industria
10/20/2011	04b3	Yes	ArcelorMittal USA LLC	End User Customer	Retail Energy Supplie
10/20/2011	04b3	Yes	Blue Ridge Power Agency, Inc	Electric Distributor	Muni/Co-op
10/20/2011	04b3	Yes	Borough of Butler, Butler Electric Divisio	Electric Distributor	Retail Energy Supplie
10/20/2011	04b3	Yes	Borough of Chambersburg	Electric Distributor	Muni/Co-op
10/20/2011	04b3	Yes	Borough of Mont Alto, PA	Electric Distributor	Muni/Co-op
10/20/2011	04b3	Yes	Borough of Park Ridge, New Jersey	Electric Distributor	Muni/Co-op
10/20/2011	04b3	Yes	Borough of Seaside Heights, New Jerse	Electric Distributor	Muni/Co-op
10/20/2011	04b3	Yes	Borough of South River, New Jerse	Electric Distributor	Muni/Co-op
10/20/2011	04b3	Yes	Castlebridge Energy Group, LLC	Other Supplier	Financial Trade
10/20/2011	04b3	Yes	Central Virginia Electric Cooperativ	Electric Distributor	Muni/Co-op
10/20/2011	04b3	Yes	City of Dover, Delaware	Electric Distributor	Muni/Co-op
10/20/2011	04b3	Yes	Delaware Municipal Electric Corporatio	Electric Distributor	Muni/Co-op

10/20/2011	04b3	Yes	Downes Associates, Inc	Other Supplier	Consultant, Service Company, Etc
10/20/2011	04b3	Yes	Duquesne Light Compan	Transmission Owner	Transmission Owner
10/20/2011	04b3	Yes	Easton Utilities Commissio	Electric Distributor	Muni/Co-op
10/20/2011	04b3	Yes	Energy Consulting Services, LLC	Other Supplier	Power Marketer
10/20/2011	04b3	Yes	Energy Cooperative Association of Pennsylvania (The)	Other Supplier	Muni/Co-op
10/20/2011	04b3	Yes	Gerdau Ameristeel Energy, Inc	Other Supplier	Financial Trade
10/20/2011	04b3	Yes	Hagerstown Light Departmen	Electric Distributor	Muni/Co-op
10/20/2011	04b3	Yes	Illinois Municipal Electric Agenc	Electric Distributor	Muni/Co-op
10/20/2011	04b3	Yes	Indiana Municipal Power Agenc	Generation Owner	Muni/Co-op
10/20/2011	04b3	Yes	Industrial Energy Users-Ohi	Other Supplier	Retail Energy Supplie
10/20/2011	04b3	Yes	Lehigh Portland Cement Compan	End User Customer	Industria
10/20/2011	04b3	Yes	Letterkenny Industrial Development Authority - PA	Electric Distributor	Muni/Co-op
10/20/2011	04b3	Yes	Linde LLC	End User Customer	Industria
10/20/2011	04b3	Yes	Madison Gas & Electric Compan	Other Supplier	Power Marketer
10/20/2011	04b3	Yes	MeadWestvaco Corporation	End User Customer	Generation
10/20/2011	04b3	Yes	North Carolina Electric Membership Corporation	Electric Distributor	Muni/Co-op
10/20/2011	04b3	Yes	Northern Virginia Electric Cooperative - NOVEC	Electric Distributor	Muni/Co-op
10/20/2011	04b3	Yes	Old Dominion Electric Cooperativ	Electric Distributor	Muni/Co-op
10/20/2011	04b3	Yes	Praxair, Inc	End User Customer	Industria
10/20/2011	04b3	Yes	Procter & Gamble Paper Products Company (The)	End User Customer	Industrial
10/20/2011	04b3	Yes	RG Steel Sparrows Point LLC	End User Customer	Generation
10/20/2011	04b3	Yes	Rockland Electric Company	Transmission Owner	Transmission Owner
10/20/2011	04b3	Yes	Sunoco, Inc. (R&M)	End User Customer	Generation
10/20/2011	04b3	Yes	Thurmont Municipal Light Compan	Electric Distributor	Muni/Co-op
10/20/2011	04b3	Yes	Town of Williamsport (The	Electric Distributor	Muni/Co-op
10/20/2011	04b3	Yes	Vineland Municipal Electric Utilit	Electric Distributor	Muni/Co-op

10/20/2011	04b3	Yes	Wellsboro Electric Company	Electric Distributor	Muni/Co-op
10/20/2011	04b3	Yes	WPPI Energy	Other Supplier	Power Marketer
10/20/2011	04b4	Abstain	Atlantic Grid Operations A, LLC	Other Supplier	Transmission Owne
10/20/2011	04b4	Abstain	BP Energy Company	Other Supplier	Power Marketer
10/20/2011	04b4	Abstain	Buckeye Power, Inc	Electric Distributor	Muni/Co-op
10/20/2011	04b4	Abstain	Direct Energy Business, LLC	Other Supplier	Retail Energy Supplie
10/20/2011	04b4	Abstain	Domtar Paper Company, LLC	Generation Owner	Generation
10/20/2011	04b4	Abstain	Enerwise Global Technologies, Inc	Other Supplier	Curtailment Service Provide
10/20/2011	04b4	Abstain	Galt Power Inc.	Other Supplier	Power Marketer
10/20/2011	04b4	Abstain	Kimberly-Clark Corporation	Generation Owner	Generation
10/20/2011	04b4	Abstain	North America Power Partners LLC	Other Supplier	Curtailment Service Provide
10/20/2011	04b4	Abstain	Primary Power LLC	Other Supplier	Transmission Owne
10/20/2011	04b4	Abstain	Vitol Inc.	Other Supplier	Power Marketer
10/20/2011	04b4	No	Allegheny Electric Cooperative, Inc	Transmission Owner	Transmission Owner
10/20/2011	04b4	No	Ameren Energy Marketing Company	Other Supplier	Power Marketer
10/20/2011	04b4	No	Appalachian Power Company	Transmission Owner	Transmission Owner
10/20/2011	04b4	No	ArcLight Energy Marketing, L.L.C	Other Supplier	Power Marketer
10/20/2011	04b4	No	Baltimore Gas and Electric Company	Transmission Owner	Transmission Owner
10/20/2011	04b4	No	Beacon Power Corporation	Other Supplier	Financial Trade
10/20/2011	04b4	No	Brookfield Energy Marketing LP	Other Supplier	Power Marketer
10/20/2011	04b4	No	Calpine Energy Services, L.P	Generation Owner	Generation
10/20/2011	04b4	No	Citigroup Energy, Inc	Other Supplier	Financial Trade
10/20/2011	04b4	No	Comperio Energy LLC dba ClearChoice Energ	Other Supplier	Curtailment Service Provide
10/20/2011	04b4	No	Covanta Energy Group, Inc	Generation Owner	Generation
10/20/2011	04b4	No	CP Energy Marketing (US) Inc	Other Supplier	Power Marketer
10/20/2011	04b4	No	Dayton Power & Light Company (The	Transmission Owner	Transmission Owner
10/20/2011	04b4	No	DC Energy LLC	Other Supplier	Financial Trade
10/20/2011	04b4	No	Duke Energy Business Services LL	Generation Owner	Power Marketer
10/20/2011	04b4	No	EDF Trading North America, LLC	Other Supplier	Power Marketer

10/20/2011	04b4	No	Edison Mission Marketing and Trading, Inc	Generation Owner	Generation
10/20/2011	04b4	No	Energy Curtailment Specialists, Inc	Other Supplier	Curtailment Service Provide
10/20/2011	04b4	No	EnergyConnect Group, Inc	Other Supplier	Curtailment Service Provide
10/20/2011	04b4	No	EnerNOC, Inc.	Other Supplier	Curtailment Service Provide
10/20/2011	04b4	No	Evraz Claymont Stee	Other Supplier	Retail Energy Supplie
10/20/2011	04b4	No	FirstEnergy Solutions Corp	Transmission Owner	Power Marketer
10/20/2011	04b4	No	GDF SUEZ Energy Marketing NA, Inc	Other Supplier	Power Marketer
10/20/2011	04b4	No	GenOn Energy Management, LLC	Generation Owner	Generation
10/20/2011	04b4	No	Hess Corporation	Other Supplier	Power Marketer
10/20/2011	04b4	No	Hoosier Energy REC, Inc	Other Supplier	Muni/Co-op
10/20/2011	04b4	No	H-P Energy Resources LLC	Other Supplier	Unspecified LOB
10/20/2011	04b4	No	Icetec.com, Inc.	Other Supplier	Curtailment Service Provide
10/20/2011	04b4	No	Jersey Green Energy, LLC	Other Supplier	Financial Trade
10/20/2011	04b4	No	Kuehne Chemical Company, Inc	Other Supplier	Retail Energy Supplie
10/20/2011	04b4	No	Long Island Lighting Company dba LIP	Other Supplier	Power Marketer
10/20/2011	04b4	No	NAEA Rock Springs, LLC	Transmission Owner	Transmission Owner
10/20/2011	04b4	No	New York State Electric & Gas Corporation	Other Supplier	Power Marketer
10/20/2011	04b4	No	NextEra Energy Power Marketing, LLC	Generation Owner	Generation
10/20/2011	04b4	No	NRG Power Marketing, L.L.C.	Generation Owner	Generation
10/20/2011	04b4	No	PBF Power Marketing LLC	Generation Owner	Generation
10/20/2011	04b4	No	PECO Energy Company	Transmission Owner	Transmission Owner
10/20/2011	04b4	No	Potomac Electric Power Company	Electric Distributor	Transmission Owne
10/20/2011	04b4	No	PPL Energy Plus, LLC	Transmission Owner	Transmission Owner
10/20/2011	04b4	No	Public Service Electric & Gas Compan	Transmission Owner	Transmission Owner
10/20/2011	04b4	No	RC Cape May Holdings, LLC	Generation Owner	Generation
10/20/2011	04b4	No	Scylla Energy LLC	Other Supplier	Power Marketer

10/20/2011	04b4	No	Shell Energy North America (US), LP	Other Supplier	Generation
10/20/2011	04b4	No	Southern Maryland Electric Cooperative, Inc	Electric Distributor	Muni/Co-op
10/20/2011	04b4	No	Tangent Energy Solutions, Inc	Other Supplier	Curtailment Service Provide
10/20/2011	04b4	No	Tenaska Power Services Co	Generation Owner	Generation
10/20/2011	04b4	No	TransCanada Power Marketing Ltd	Other Supplier	Power Marketer
10/20/2011	04b4	No	Virginia Electric & Power Company	Transmission Owner	Transmission Owner
10/20/2011	04b4	No	Wabash Valley Power Association, Inc	Other Supplier	Muni/Co-op
10/20/2011	04b4	Yes	Air Liquide Industrials U.S., L.P	End User Customer	Industria
10/20/2011	04b4	Yes	Air Products & Chemicals, Inc	End User Customer	Industria
10/20/2011	04b4	Yes	American Municipal Power, Inc	Generation Owner	Muni/Co-op
10/20/2011	04b4	Yes	ArcelorMittal USA LLC	End User Customer	Retail Energy Supplie
10/20/2011	04b4	Yes	Blue Ridge Power Agency, Inc	Electric Distributor	Muni/Co-op
10/20/2011	04b4	Yes	Borough of Butler, Butler Electric Divisio	Electric Distributor	Retail Energy Supplie
10/20/2011	04b4	Yes	Borough of Chambersburg	Electric Distributor	Muni/Co-op
10/20/2011	04b4	Yes	Borough of Mont Alto, PA	Electric Distributor	Muni/Co-op
10/20/2011	04b4	Yes	Borough of Park Ridge, New Jersey	Electric Distributor	Muni/Co-op
10/20/2011	04b4	Yes	Borough of Seaside Heights, New Jerse	Electric Distributor	Muni/Co-op
10/20/2011	04b4	Yes	Borough of South River, New Jerse	Electric Distributor	Muni/Co-op
10/20/2011	04b4	Yes	Castlebridge Energy Group, LLC	Other Supplier	Financial Trade
10/20/2011	04b4	Yes	Central Virginia Electric Cooperativ	Electric Distributor	Muni/Co-op
10/20/2011	04b4	Yes	City of Dover, Delaware	Electric Distributor	Muni/Co-op
10/20/2011	04b4	Yes	Delaware Municipal Electric Corporatio	Electric Distributor	Muni/Co-op
10/20/2011	04b4	Yes	Downes Associates, Inc	Other Supplier	Consultant, Service Company, Etc
10/20/2011	04b4	Yes	DTE Energy Trading, Inc	Other Supplier	Power Marketer
10/20/2011	04b4	Yes	Duquesne Light Compan	Transmission Owner	Transmission Owner
10/20/2011	04b4	Yes	Dynegy Power Marketing, Inc	Generation Owner	Power Marketer
10/20/2011	04b4	Yes	Easton Utilities Commissio	Electric Distributor	Muni/Co-op
10/20/2011	04b4	Yes	Energy Consulting Services, LLC	Other Supplier	Power Marketer

10/20/2011	04b4	Yes	Energy Cooperative Association of Pennsylvania (The)	Other Supplier	Muni/Co-op
10/20/2011	04b4	Yes	Gerdau Ameristeel Energy, Inc	Other Supplier	Financial Trade
10/20/2011	04b4	Yes	Hagerstown Light Departmen	Electric Distributor	Muni/Co-op
10/20/2011	04b4	Yes	Illinois Municipal Electric Agenc	Electric Distributor	Muni/Co-op
10/20/2011	04b4	Yes	Indiana Municipal Power Agenc	Generation Owner	Muni/Co-op
10/20/2011	04b4	Yes	Industrial Energy Users-Ohi	Other Supplier	Retail Energy Supplie
10/20/2011	04b4	Yes	Lehigh Portland Cement Compan	End User Customer	Industria
10/20/2011	04b4	Yes	Letterkenny Industrial Development Authority - PA	Electric Distributor	Muni/Co-op
10/20/2011	04b4	Yes	Linde LLC	End User Customer	Industria
10/20/2011	04b4	Yes	Madison Gas & Electric Compan	Other Supplier	Power Marketer
10/20/2011	04b4	Yes	MeadWestvaco Corporation	End User Customer	Generation
10/20/2011	04b4	Yes	North Carolina Electric Membership Corporation	Electric Distributor	Muni/Co-op
10/20/2011	04b4	Yes	Northern Virginia Electric Cooperative - NOVEC	Electric Distributor	Muni/Co-op
10/20/2011	04b4	Yes	Old Dominion Electric Cooperativ	Electric Distributor	Muni/Co-op
10/20/2011	04b4	Yes	Pennsylvania Office of Consumer Advocat	End User Customer	Consumer Advocate
10/20/2011	04b4	Yes	Praxair, Inc	End User Customer	Industria
10/20/2011	04b4	Yes	Procter & Gamble Paper Products Company (The)	End User Customer	Industrial
10/20/2011	04b4	Yes	RG Steel Sparrows Point LLC	End User Customer	Generation
10/20/2011	04b4	Yes	Rockland Electric Company	Transmission Owner	Transmission Owner
10/20/2011	04b4	Yes	Sunoco, Inc. (R&M)	End User Customer	Generation
10/20/2011	04b4	Yes	Thurmont Municipal Light Compan	Electric Distributor	Muni/Co-op
10/20/2011	04b4	Yes	Town of Williamsport (The	Electric Distributor	Muni/Co-op
10/20/2011	04b4	Yes	Vineland Municipal Electric Utilit	Electric Distributor	Muni/Co-op
10/20/2011	04b4	Yes	Wellsboro Electric Company	Electric Distributor	Muni/Co-op
10/20/2011	04b4	Yes	WPPI Energy	Other Supplier	Power Marketer
10/20/2011	04b5	Abstain	Atlantic Grid Operations A, LLC	Other Supplier	Transmission Owne

10/20/2011	04b5	Abstain	BP Energy Company	Other Supplier	Power Marketer
10/20/2011	04b5	Abstain	Enerwise Global Technologies, Inc	Other Supplier	Curtailment Service Provide
10/20/2011	04b5	Abstain	Primary Power LLC	Other Supplier	Transmission Owne
10/20/2011	04b5	Abstain	Vitol Inc.	Other Supplier	Power Marketer
10/20/2011	04b5	No	Ameren Energy Marketing Company	Other Supplier	Power Marketer
10/20/2011	04b5	No	Appalachian Power Company	Transmission Owner	Transmission Owner
10/20/2011	04b5	No	ArcLight Energy Marketing, L.L.C	Other Supplier	Power Marketer
10/20/2011	04b5	No	Baltimore Gas and Electric Company	Transmission Owner	Transmission Owner
10/20/2011	04b5	No	Beacon Power Corporation	Other Supplier	Financial Trade
10/20/2011	04b5	No	Brookfield Energy Marketing LP	Other Supplier	Power Marketer
10/20/2011	04b5	No	Calpine Energy Services, L.P	Generation Owner	Generation
10/20/2011	04b5	No	Citigroup Energy, Inc	Other Supplier	Financial Trade
10/20/2011	04b5	No	Comperio Energy LLC dba ClearChoice Energ	Other Supplier	Curtailment Service Provide
10/20/2011	04b5	No	Covanta Energy Group, Inc	Generation Owner	Generation
10/20/2011	04b5	No	CP Energy Marketing (US) Inc	Other Supplier	Power Marketer
10/20/2011	04b5	No	Dayton Power & Light Company (The	Transmission Owner	Transmission Owner
10/20/2011	04b5	No	DC Energy LLC	Other Supplier	Financial Trade
10/20/2011	04b5	No	Duke Energy Business Services LL	Generation Owner	Power Marketer
10/20/2011	04b5	No	Dynegy Power Marketing, Inc	Generation Owner	Power Marketer
10/20/2011	04b5	No	Edison Mission Marketing and Trading, Inc	Generation Owner	Generation
10/20/2011	04b5	No	Energy Curtailment Specialists, Inc	Other Supplier	Curtailment Service Provide
10/20/2011	04b5	No	EnergyConnect Group, Inc	Other Supplier	Curtailment Service Provide
10/20/2011	04b5	No	EnerNOC, Inc.	Other Supplier	Curtailment Service Provide
10/20/2011	04b5	No	FirstEnergy Solutions Corp	Transmission Owner	Power Marketer
10/20/2011	04b5	No	GDF SUEZ Energy Marketing NA, Inc	Other Supplier	Power Marketer
10/20/2011	04b5	No	GenOn Energy Management, LLC	Generation Owner	Generation

10/20/2011	04b5	No	Hess Corporation	Other Supplier	Power Marketer
10/20/2011	04b5	No	H-P Energy Resources LLC	Other Supplier	Unspecified LOB
10/20/2011	04b5	No	Jersey Green Energy, LLC	Other Supplier	Financial Trade
10/20/2011	04b5	No	NAEA Rock Springs, LLC	Transmission Owner	Transmission Owner
10/20/2011	04b5	No	NextEra Energy Power Marketing, LLC	Generation Owner	Generation
10/20/2011	04b5	No	NRG Power Marketing, L.L.C.	Generation Owner	Generation
10/20/2011	04b5	No	PBF Power Marketing LLC	Generation Owner	Generation
10/20/2011	04b5	No	PECO Energy Company	Transmission Owner	Transmission Owner
10/20/2011	04b5	No	PPL Energy Plus, LLC	Transmission Owner	Transmission Owner
10/20/2011	04b5	No	Public Service Electric & Gas Compan	Transmission Owner	Transmission Owner
10/20/2011	04b5	No	RC Cape May Holdings, LLC	Generation Owner	Generation
10/20/2011	04b5	No	Scylla Energy LLC	Other Supplier	Power Marketer
10/20/2011	04b5	No	Shell Energy North America (US), LP	Other Supplier	Generation
10/20/2011	04b5	No	Tangent Energy Solutions, Inc	Other Supplier	Curtailment Service Provide
10/20/2011	04b5	No	Tenaska Power Services Co	Generation Owner	Generation
10/20/2011	04b5	No	TransCanada Power Marketing Ltd	Other Supplier	Power Marketer
10/20/2011	04b5	Yes	Air Liquide Industrials U.S., L.P	End User Customer	Industria
10/20/2011	04b5	Yes	Air Products & Chemicals, Inc	End User Customer	Industria
10/20/2011	04b5	Yes	Allegheny Electric Cooperative, Inc	Transmission Owner	Transmission Owner
10/20/2011	04b5	Yes	American Municipal Power, Inc	Generation Owner	Muni/Co-op
10/20/2011	04b5	Yes	ArcelorMittal USA LLC	End User Customer	Retail Energy Supplie
10/20/2011	04b5	Yes	Blue Ridge Power Agency, Inc	Electric Distributor	Muni/Co-op
10/20/2011	04b5	Yes	Borough of Butler, Butler Electric Divisio	Electric Distributor	Retail Energy Supplie
10/20/2011	04b5	Yes	Borough of Chambersburg	Electric Distributor	Muni/Co-op
10/20/2011	04b5	Yes	Borough of Mont Alto, PA	Electric Distributor	Muni/Co-op
10/20/2011	04b5	Yes	Borough of Park Ridge, New Jersey	Electric Distributor	Muni/Co-op
10/20/2011	04b5	Yes	Borough of Seaside Heights, New Jerse	Electric Distributor	Muni/Co-op
10/20/2011	04b5	Yes	Borough of South River, New Jerse	Electric Distributor	Muni/Co-op
10/20/2011	04b5	Yes	Buckeye Power, Inc	Electric Distributor	Muni/Co-op

10/20/2011	04b5	Yes	Castlebridge Energy Group, LLC	Other Supplier	Financial Trade
10/20/2011	04b5	Yes	Central Virginia Electric Cooperativ	Electric Distributor	Muni/Co-op
10/20/2011	04b5	Yes	City of Dover, Delaware	Electric Distributor	Muni/Co-op
10/20/2011	04b5	Yes	Delaware Municipal Electric Corporatio	Electric Distributor	Muni/Co-op
10/20/2011	04b5	Yes	Direct Energy Business, LLC	Other Supplier	Retail Energy Supplie
10/20/2011	04b5	Yes	Domtar Paper Company, LLC	Generation Owner	Generation
10/20/2011	04b5	Yes	Downes Associates, Inc	Other Supplier	Consultant, Service Company, Etc
10/20/2011	04b5	Yes	DTE Energy Trading, Inc	Other Supplier	Power Marketer
10/20/2011	04b5	Yes	Duquesne Light Compan	Transmission Owner	Transmission Owner
10/20/2011	04b5	Yes	Easton Utilities Commissio	Electric Distributor	Muni/Co-op
10/20/2011	04b5	Yes	EDF Trading North America, LLC	Other Supplier	Power Marketer
10/20/2011	04b5	Yes	Energy Consulting Services, LLC	Other Supplier	Power Marketer
10/20/2011	04b5	Yes	Energy Cooperative Association of Pennsylvania (The)	Other Supplier	Muni/Co-op
10/20/2011	04b5	Yes	Evraz Claymont Stee	Other Supplier	Retail Energy Supplie
10/20/2011	04b5	Yes	Galt Power Inc.	Other Supplier	Power Marketer
10/20/2011	04b5	Yes	Gerdau Ameristeel Energy, Inc	Other Supplier	Financial Trade
10/20/2011	04b5	Yes	Hagerstown Light Departmen	Electric Distributor	Muni/Co-op
10/20/2011	04b5	Yes	Hoosier Energy REC, Inc	Other Supplier	Muni/Co-op
10/20/2011	04b5	Yes	Icetec.com, Inc.	Other Supplier	Curtailment Service Provide
10/20/2011	04b5	Yes	Illinois Municipal Electric Agenc	Electric Distributor	Muni/Co-op
10/20/2011	04b5	Yes	Indiana Municipal Power Agenc	Generation Owner	Muni/Co-op
10/20/2011	04b5	Yes	Industrial Energy Users-Ohi	Other Supplier	Retail Energy Supplie
10/20/2011	04b5	Yes	Kimberly-Clark Corporation	Generation Owner	Generation
10/20/2011	04b5	Yes	Kuehne Chemical Company, Inc	Other Supplier	Retail Energy Supplie
10/20/2011	04b5	Yes	Lehigh Portland Cement Compan	End User Customer	Industria
10/20/2011	04b5	Yes	Letterkenny Industrial Development Authority - PA	Electric Distributor	Muni/Co-op
10/20/2011	04b5	Yes	Linde LLC	End User Customer	Industria
10/20/2011	04b5	Yes	Long Island Lighting Company dba LIP	Other Supplier	Power Marketer

10/20/2011	04b5	Yes	Madison Gas & Electric Compan	Other Supplier	Power Marketer
10/20/2011	04b5	Yes	MeadWestvaco Corporation	End User Customer	Generation
10/20/2011	04b5	Yes	New York State Electric & Gas Corporation	Other Supplier	Power Marketer
10/20/2011	04b5	Yes	North America Power Partners LLC	Other Supplier	Curtailment Service Provide
10/20/2011	04b5	Yes	North Carolina Electric Membership Corporation	Electric Distributor	Muni/Co-op
10/20/2011	04b5	Yes	Northern Virginia Electric Cooperative - NOVEC	Electric Distributor	Muni/Co-op
10/20/2011	04b5	Yes	Old Dominion Electric Cooperativ	Electric Distributor	Muni/Co-op
10/20/2011	04b5	Yes	Pennsylvania Office of Consumer Advocat	End User Customer	Consumer Advocate
10/20/2011	04b5	Yes	Potomac Electric Power Company	Electric Distributor	Transmission Owne
10/20/2011	04b5	Yes	Praxair, Inc	End User Customer	Industria
10/20/2011	04b5	Yes	Procter & Gamble Paper Products Company (The)	End User Customer	Industrial
10/20/2011	04b5	Yes	RG Steel Sparrows Point LLC	End User Customer	Generation
10/20/2011	04b5	Yes	Rockland Electric Company	Transmission Owner	Transmission Owner
10/20/2011	04b5	Yes	Southern Maryland Electric Cooperative, Inc	Electric Distributor	Muni/Co-op
10/20/2011	04b5	Yes	Sunoco, Inc. (R&M)	End User Customer	Generation
10/20/2011	04b5	Yes	Thurmont Municipal Light Compan	Electric Distributor	Muni/Co-op
10/20/2011	04b5	Yes	Town of Williamsport (The	Electric Distributor	Muni/Co-op
10/20/2011	04b5	Yes	Vineland Municipal Electric Utilit	Electric Distributor	Muni/Co-op
10/20/2011	04b5	Yes	Virginia Electric & Power Company	Transmission Owner	Transmission Owner
10/20/2011	04b5	Yes	Wabash Valley Power Association, Inc	Other Supplier	Muni/Co-op
10/20/2011	04b5	Yes	Wellsboro Electric Company	Electric Distributor	Muni/Co-op
10/20/2011	04b5	Yes	WPPI Energy	Other Supplier	Power Marketer
11/22/2011	03b1	Abstain	Atlantic Grid Operations A, LLC	Other Supplier	Transmission Owne
11/22/2011	03b1	Abstain	EDP Renewables North America, LLC	Generation Owner	Generation
11/22/2011	03b1	Abstain	H.Q. Energy Services (U.S.), Inc	Other Supplier	Power Marketer
11/22/2011	03b1	Abstain	Highlands Energy Group LLC (The	Other Supplier	Financial Trade

11/22/2011	03b1	Abstain	North America Power Partners LLC	Other Supplier	Curtailment Service Provide
11/22/2011	03b1	Abstain	Primary Power LLC	Other Supplier	Transmission Owne
11/22/2011	03b1	No	AES Beaver Valley, LLC	Generation Owner	Generation
11/22/2011	03b1	No	Ameren Energy Marketing Company	Other Supplier	Power Marketer
11/22/2011	03b1	No	Appalachian Power Company	Transmission Owner	Transmission Owner
11/22/2011	03b1	No	Baltimore Gas and Electric Company	Transmission Owner	Transmission Owner
11/22/2011	03b1	No	Brookfield Energy Marketing LP	Other Supplier	Power Marketer
11/22/2011	03b1	No	Calpine Energy Services, L.P	Generation Owner	Generation
11/22/2011	03b1	No	Citigroup Energy, Inc	Other Supplier	Financial Trade
11/22/2011	03b1	No	Covanta Energy Group, Inc	Generation Owner	Generation
11/22/2011	03b1	No	CP Energy Marketing (US) Inc	Other Supplier	Power Marketer
11/22/2011	03b1	No	CPV Maryland, LLC	Generation Owner	Generation
11/22/2011	03b1	No	Dayton Power & Light Company (The	Transmission Owner	Transmission Owner
11/22/2011	03b1	No	DC Energy LLC	Other Supplier	Financial Trade
11/22/2011	03b1	No	Duke Energy Business Services LL	Generation Owner	Power Marketer
11/22/2011	03b1	No	Dynegy Power Marketing, LLC	Generation Owner	Power Marketer
11/22/2011	03b1	No	E.ON Climate & Renewables North America Inc.	Generation Owner	Generation
11/22/2011	03b1	No	EDF Trading North America, LLC	Other Supplier	Power Marketer
11/22/2011	03b1	No	Edison Mission Marketing and Trading, Inc	Generation Owner	Generation
11/22/2011	03b1	No	ENBALA Power Networks Inc.	Other Supplier	Curtailment Service Provide
11/22/2011	03b1	No	EnergyConnect Group, Inc	Other Supplier	Curtailment Service Provide
11/22/2011	03b1	No	FirstEnergy Solutions Corp	Transmission Owner	Power Marketer
11/22/2011	03b1	No	GDF SUEZ Energy Marketing NA, Inc	Other Supplier	Power Marketer
11/22/2011	03b1	No	GenOn Energy Management, LLC	Generation Owner	Generation
11/22/2011	03b1	No	Hess Corporation	Other Supplier	Power Marketer
11/22/2011	03b1	No	IBERDROLA RENEWABLES, Inc.	Generation Owner	Generation
11/22/2011	03b1	No	Invenergy LLC	Generation Owner	Generation

11/22/2011	03b1	No	Jersey Green Energy, LLC	Other Supplier	Financial Trade
11/22/2011	03b1	No	Liberty Electric Power, LLC	Generation Owner	Generation
11/22/2011	03b1	No	Linden VFT LLC	Transmission Owner	Transmission Owner
11/22/2011	03b1	No	NAEA Rock Springs, LLC	Transmission Owner	Transmission Owner
11/22/2011	03b1	No	NextEra Energy Power Marketing, LLC	Generation Owner	Generation
11/22/2011	03b1	No	NRG Power Marketing, L.L.C.	Generation Owner	Generation
11/22/2011	03b1	No	PECO Energy Company	Transmission Owner	Transmission Owner
11/22/2011	03b1	No	PPL Energy Plus, LLC	Transmission Owner	Transmission Owner
11/22/2011	03b1	No	Public Service Electric & Gas Compan	Transmission Owner	Transmission Owner
11/22/2011	03b1	No	RC Cape May Holdings, LLC	Generation Owner	Generation
11/22/2011	03b1	No	SESCO Enterprises LLC	Other Supplier	Power Marketer
11/22/2011	03b1	No	Shell Energy North America (US), LP	Other Supplier	Generation
11/22/2011	03b1	No	Tenaska Power Services Co	Generation Owner	Generation
11/22/2011	03b1	No	TransCanada Power Marketing Ltd	Other Supplier	Power Marketer
11/22/2011	03b1	No	Vitol Inc.	Other Supplier	Power Marketer
11/22/2011	03b1	Yes	Air Liquide Industrials U.S., L.P	End User Customer	Industria
11/22/2011	03b1	Yes	Air Products & Chemicals, Inc	End User Customer	Industria
11/22/2011	03b1	Yes	Allegheny Electric Cooperative, Inc	Transmission Owner	Transmission Owner
11/22/2011	03b1	Yes	American Municipal Power, Inc	Generation Owner	Muni/Co-op
11/22/2011	03b1	Yes	ArcelorMittal USA LLC	End User Customer	Retail Energy Supplie
11/22/2011	03b1	Yes	Blue Ridge Power Agency, Inc	Electric Distributor	Muni/Co-op
11/22/2011	03b1	Yes	Borough of Butler, Butler Electric Divisio	Electric Distributor	Retail Energy Supplie
11/22/2011	03b1	Yes	Borough of Chambersburg	Electric Distributor	Muni/Co-op
11/22/2011	03b1	Yes	Borough of Lavallette, New Jerse	Electric Distributor	Muni/Co-op
11/22/2011	03b1	Yes	Borough of Mont Alto, PA	Electric Distributor	Muni/Co-op
11/22/2011	03b1	Yes	Borough of Park Ridge, New Jersey	Electric Distributor	Muni/Co-op
11/22/2011	03b1	Yes	Borough of South River, New Jerse	Electric Distributor	Muni/Co-op
11/22/2011	03b1	Yes	Buckeye Power, Inc	Electric Distributor	Muni/Co-op
11/22/2011	03b1	Yes	Castlebridge Energy Group, LLC	Other Supplier	Financial Trade
11/22/2011	03b1	Yes	Central Virginia Electric Cooperativ	Electric Distributor	Muni/Co-op

11/22/2011	03b1	Yes	City of Dover, Delaware	Electric Distributor	Muni/Co-op
11/22/2011	03b1	Yes	Delaware Municipal Electric Corporatio	Electric Distributor	Muni/Co-op
11/22/2011	03b1	Yes	Direct Energy Business, LLC	Other Supplier	Retail Energy Supplie
11/22/2011	03b1	Yes	Downes Associates, Inc	Other Supplier	Consultant, Service Company, Etc
11/22/2011	03b1	Yes	DTE Energy Trading, Inc	Other Supplier	Power Marketer
11/22/2011	03b1	Yes	Duquesne Light Compan	Transmission Owner	Transmission Owner
11/22/2011	03b1	Yes	Easton Utilities Commissio	Electric Distributor	Muni/Co-op
11/22/2011	03b1	Yes	Energy Consulting Services, LLC	Other Supplier	Power Marketer
11/22/2011	03b1	Yes	Energy Cooperative Association of Pennsylvania (The)	Other Supplier	Muni/Co-op
11/22/2011	03b1	Yes	Galt Power Inc.	Other Supplier	Power Marketer
11/22/2011	03b1	Yes	Gerdau Ameristeel Energy, Inc	Other Supplier	Financial Trade
11/22/2011	03b1	Yes	Hagerstown Light Departmen	Electric Distributor	Muni/Co-op
11/22/2011	03b1	Yes	Illinois Municipal Electric Agenc	Electric Distributor	Muni/Co-op
11/22/2011	03b1	Yes	Indiana Municipal Power Agenc	Generation Owner	Muni/Co-op
11/22/2011	03b1	Yes	Industrial Energy Users-Ohi	Other Supplier	Retail Energy Supplie
11/22/2011	03b1	Yes	Kimberly-Clark Corporation	Generation Owner	Generation
11/22/2011	03b1	Yes	Lehigh Portland Cement Compan	End User Customer	Industria
11/22/2011	03b1	Yes	Letterkenny Industrial Development Authority - PA	Electric Distributor	Muni/Co-op
11/22/2011	03b1	Yes	Linde LLC	End User Customer	Industria
11/22/2011	03b1	Yes	Long Island Lighting Company dba LIP	Other Supplier	Power Marketer
11/22/2011	03b1	Yes	Madison Gas & Electric Compan	Other Supplier	Power Marketer
11/22/2011	03b1	Yes	MeadWestvaco Corporation	End User Customer	Generation
11/22/2011	03b1	Yes	New York State Electric & Gas Corporation	Other Supplier	Power Marketer
11/22/2011	03b1	Yes	North Carolina Electric Membership Corporation	Electric Distributor	Muni/Co-op
11/22/2011	03b1	Yes	Northern Virginia Electric Cooperative - NOVEC	Electric Distributor	Muni/Co-op
11/22/2011	03b1	Yes	Old Dominion Electric Cooperativ	Electric Distributor	Muni/Co-op

11/22/2011	03b1	Yes	Pennsylvania Office of Consumer Advocat	End User Customer	Consumer Advocate
11/22/2011	03b1	Yes	Potomac Electric Power Company	Electric Distributor	Transmission Owner
11/22/2011	03b1	Yes	Praxair, Inc	End User Customer	Industria
11/22/2011	03b1	Yes	Procter & Gamble Paper Products Company (The)	End User Customer	Industrial
11/22/2011	03b1	Yes	RG Steel Sparrows Point LLC	End User Customer	Generation
11/22/2011	03b1	Yes	Rockland Electric Company	Transmission Owner	Transmission Owner
11/22/2011	03b1	Yes	Southern Maryland Electric Cooperative, Inc	Electric Distributor	Muni/Co-op
11/22/2011	03b1	Yes	Sunoco, Inc. (R&M)	End User Customer	Generation
11/22/2011	03b1	Yes	Tangent Energy Solutions, Inc	Other Supplier	Curtailment Service Provide
11/22/2011	03b1	Yes	The Trustees of the University of Pennsylvania, Pennsylvania Non-Profit Corporation d/b/a University of Pennsylvania	End User Customer	Retail Energy Supplier
11/22/2011	03b1	Yes	Thurmont Municipal Light Compan	Electric Distributor	Muni/Co-op
11/22/2011	03b1	Yes	Town of Williamsport (The	Electric Distributor	Muni/Co-op
11/22/2011	03b1	Yes	UGI Utilities, Inc	Transmission Owner	Transmission Owner
11/22/2011	03b1	Yes	Vineland Municipal Electric Utilit	Electric Distributor	Muni/Co-op
11/22/2011	03b1	Yes	Virginia Electric & Power Company	Transmission Owner	Transmission Owner
11/22/2011	03b1	Yes	Viridity Energy, Inc	Other Supplier	Curtailment Service Provide
11/22/2011	03b1	Yes	Wellsboro Electric Company	Electric Distributor	Muni/Co-op
11/22/2011	03b1	Yes	WPPI Energy	Other Supplier	Power Marketer
1/26/2012	05a	Abstain	Beacon Power Corporation	Other Supplier	Financial Trade
1/26/2012	05a	Abstain	Cargill Power Markets LLC	Other Supplier	Retail Energy Supplie
1/26/2012	05a	Abstain	EDF Trading North America, LLC	Other Supplier	Power Marketer
1/26/2012	05a	Abstain	H.Q. Energy Services (U.S.), Inc	Other Supplier	Power Marketer
1/26/2012	05a	Abstain	J. Aron & Company	Other Supplier	Power Marketer
1/26/2012	05a	Abstain	Southern Maryland Electric Cooperative, Inc	Electric Distributor	Muni/Co-op

1/26/2012	05a	Abstain	Wabash Valley Power Association, Inc	Other Supplier	Muni/Co-op
1/26/2012	05a	No	American Municipal Power, Inc	Generation Owner	Muni/Co-op
1/26/2012	05a	No	Comperio Energy LLC dba ClearChoice Energ	Other Supplier	Curtailment Service Provide
1/26/2012	05a	No	Energy Curtailment Specialists, Inc	Other Supplier	Curtailment Service Provide
1/26/2012	05a	No	EnergyConnect Group, Inc	Other Supplier	Curtailment Service Provide
1/26/2012	05a	No	Public Service Electric & Gas Compan	Transmission Owner	Transmission Owner
1/26/2012	05a	No	Viridity Energy, Inc	Other Supplier	Curtailment Service Provide
1/26/2012	05a	Yes	Air Liquide Industrials U.S., L.P	End User Customer	Industria
1/26/2012	05a	Yes	Air Products & Chemicals, Inc	End User Customer	Industria
1/26/2012	05a	Yes	Allegheny Electric Cooperative, Inc	Transmission Owner	Transmission Owner
1/26/2012	05a	Yes	Appalachian Power Company	Transmission Owner	Transmission Owner
1/26/2012	05a	Yes	Atlantic Grid Operations A, LLC	Other Supplier	Transmission Owne
1/26/2012	05a	Yes	Baltimore Gas and Electric Company	Transmission Owner	Transmission Owner
1/26/2012	05a	Yes	Blue Ridge Power Agency, Inc	Electric Distributor	Muni/Co-op
1/26/2012	05a	Yes	Borough of Butler, Butler Electric Divisio	Electric Distributor	Retail Energy Supplie
1/26/2012	05a	Yes	Borough of Chambersburg	Electric Distributor	Muni/Co-op
1/26/2012	05a	Yes	Borough of Lavallette, New Jerse	Electric Distributor	Muni/Co-op
1/26/2012	05a	Yes	Borough of Madison, New Jerse	Electric Distributor	Muni/Co-op
1/26/2012	05a	Yes	Borough of Milltown	Electric Distributor	Muni/Co-op
1/26/2012	05a	Yes	Borough of Mont Alto, PA	Electric Distributor	Muni/Co-op
1/26/2012	05a	Yes	Borough of Park Ridge, New Jersey	Electric Distributor	Muni/Co-op
1/26/2012	05a	Yes	Borough of Pemberton	Electric Distributor	Muni/Co-op
1/26/2012	05a	Yes	Borough of Seaside Heights, New Jerse	Electric Distributor	Muni/Co-op
1/26/2012	05a	Yes	Borough of South River, New Jerse	Electric Distributor	Muni/Co-op
1/26/2012	05a	Yes	Buckeye Power, Inc	Electric Distributor	Muni/Co-op
1/26/2012	05a	Yes	Calpine Energy Services, L.P	Generation Owner	Generation
1/26/2012	05a	Yes	Castlebridge Energy Group, LLC	Other Supplier	Financial Trade

1/26/2012	05a	Yes	Central Virginia Electric Cooperativ	Electric Distributor	Muni/Co-op
1/26/2012	05a	Yes	Citigroup Energy, Inc	Other Supplier	Financial Trade
1/26/2012	05a	Yes	City of Dover, Delaware	Electric Distributor	Muni/Co-op
1/26/2012	05a	Yes	Covanta Energy Group, Inc	Generation Owner	Generation
1/26/2012	05a	Yes	Dayton Power & Light Company (The	Transmission Owner	Transmission Owner
1/26/2012	05a	Yes	Delaware Municipal Electric Corporatio	Electric Distributor	Muni/Co-op
1/26/2012	05a	Yes	Downes Associates, Inc	Other Supplier	Consultant, Service Company, Etc
1/26/2012	05a	Yes	Duke Energy Business Services LL	Generation Owner	Power Marketer
1/26/2012	05a	Yes	Duquesne Light Compan	Transmission Owner	Transmission Owner
1/26/2012	05a	Yes	Dynegy Power Marketing, LLC	Generation Owner	Power Marketer
1/26/2012	05a	Yes	Easton Utilities Commissio	Electric Distributor	Muni/Co-op
1/26/2012	05a	Yes	Energy Consulting Services, LLC	Other Supplier	Power Marketer
1/26/2012	05a	Yes	Energy Cooperative Association of Pennsylvania (The)	Other Supplier	Muni/Co-op
1/26/2012	05a	Yes	EnerNOC, Inc.	Other Supplier	Curtailment Service Provide
1/26/2012	05a	Yes	Enerwise Global Technologies, Inc	Other Supplier	Curtailment Service Provide
1/26/2012	05a	Yes	Evraz Claymont Stee	Other Supplier	Retail Energy Supplie
1/26/2012	05a	Yes	FirstEnergy Solutions Corp	Transmission Owner	Power Marketer
1/26/2012	05a	Yes	GenOn Energy Management, LLC	Generation Owner	Generation
1/26/2012	05a	Yes	Gerdau Ameristeel Energy, Inc	Other Supplier	Financial Trade
1/26/2012	05a	Yes	Hagerstown Light Departmen	Electric Distributor	Muni/Co-op
1/26/2012	05a	Yes	Hess Corporation	Other Supplier	Power Marketer
1/26/2012	05a	Yes	Icetec.com, Inc.	Other Supplier	Curtailment Service Provide
1/26/2012	05a	Yes	Illinois Municipal Electric Agenc	Electric Distributor	Muni/Co-op
1/26/2012	05a	Yes	Indiana Municipal Power Agenc	Generation Owner	Muni/Co-op
1/26/2012	05a	Yes	Industrial Energy Users-Ohi	Other Supplier	Retail Energy Supplie
1/26/2012	05a	Yes	J.P. Morgan Ventures Energy Corporatio	Other Supplier	Financial Trade
1/26/2012	05a	Yes	Jersey Green Energy, LLC	Other Supplier	Financial Trade

1/26/2012	05a	Yes	Kimberly-Clark Corporation	Generation Owner	Generation
1/26/2012	05a	Yes	Kuehne Chemical Company, Inc	Other Supplier	Retail Energy Supplie
1/26/2012	05a	Yes	Lehigh Portland Cement Compan	End User Customer	Industria
1/26/2012	05a	Yes	Letterkenny Industrial Development Authority - PA	Electric Distributor	Muni/Co-op
1/26/2012	05a	Yes	Linde LLC	End User Customer	Industria
1/26/2012	05a	Yes	Long Island Lighting Company dba LIP	Other Supplier	Power Marketer
1/26/2012	05a	Yes	Madison Gas & Electric Compan	Other Supplier	Power Marketer
1/26/2012	05a	Yes	MeadWestvaco Corporation	End User Customer	Generation
1/26/2012	05a	Yes	NAEA Rock Springs, LLC	Transmission Owner	Transmission Owner
1/26/2012	05a	Yes	New York State Electric & Gas Corporation	Other Supplier	Power Marketer
1/26/2012	05a	Yes	NextEra Energy Power Marketing, LLC	Generation Owner	Generation
1/26/2012	05a	Yes	North Carolina Electric Membership Corporation	Electric Distributor	Muni/Co-op
1/26/2012	05a	Yes	Northern Virginia Electric Cooperative - NOVEC	Electric Distributor	Muni/Co-op
1/26/2012	05a	Yes	NRG Power Marketing, L.L.C.	Generation Owner	Generation
1/26/2012	05a	Yes	Old Dominion Electric Cooperativ	Electric Distributor	Muni/Co-op
1/26/2012	05a	Yes	PBF Power Marketing LLC	Generation Owner	Generation
1/26/2012	05a	Yes	PECO Energy Company	Transmission Owner	Transmission Owner
1/26/2012	05a	Yes	Pennsylvania Office of Consumer Advocat	End User Customer	Consumer Advocate
1/26/2012	05a	Yes	Potomac Electric Power Company	Electric Distributor	Transmission Owner
1/26/2012	05a	Yes	PPL Energy Plus, LLC	Transmission Owner	Transmission Owner
1/26/2012	05a	Yes	Praxair, Inc	End User Customer	Industria
1/26/2012	05a	Yes	Primary Power LLC	Other Supplier	Transmission Owne
1/26/2012	05a	Yes	Procter & Gamble Paper Products Company (The)	End User Customer	Industrial
1/26/2012	05a	Yes	RC Cape May Holdings, LLC	Generation Owner	Generation
1/26/2012	05a	Yes	RG Steel Sparrows Point LLC	End User Customer	Generation
1/26/2012	05a	Yes	Rockland Electric Company	Transmission Owner	Transmission Owner

1/26/2012	05a	Yes	Sunoco, Inc. (R&M)	End User Customer	Generation
1/26/2012	05a	Yes	Tangent Energy Solutions, Inc	Other Supplier	Curtailment Service Provide
1/26/2012	05a	Yes	The Trustees of the University of Pennsylvania, Pennsylvania Non-Profit Corporation d/b/a University of Pennsylvania	End User Customer	Retail Energy Supplier
1/26/2012	05a	Yes	Thurmont Municipal Light Compan	Electric Distributor	Muni/Co-op
1/26/2012	05a	Yes	Town of Williamsport (The	Electric Distributor	Muni/Co-op
1/26/2012	05a	Yes	UGI Utilities, Inc	Transmission Owner	Transmission Owner
1/26/2012	05a	Yes	Vineland Municipal Electric Utilit	Electric Distributor	Muni/Co-op
1/26/2012	05a	Yes	Wellsboro Electric Company	Electric Distributor	Muni/Co-op
1/26/2012	05a	Yes	WPPI Energy	Other Supplier	Power Marketer
2/23/2012	04a	Abstain	Ameren Energy Marketing Company	Other Supplier	Power Marketer
2/23/2012	04a	Abstain	Appalachian Power Company	Transmission Owner	Transmission Owner
2/23/2012	04a	Abstain	Covanta Energy Group, Inc	Generation Owner	Generation
2/23/2012	04a	Abstain	Dayton Power & Light Company (The	Transmission Owner	Transmission Owner
2/23/2012	04a	Abstain	DTE Energy Trading, Inc	Other Supplier	Power Marketer
2/23/2012	04a	Abstain	Duke Energy Business Services LL	Generation Owner	Power Marketer
2/23/2012	04a	Abstain	ENBALA Power Networks Inc.	Other Supplier	Curtailment Service Provide
2/23/2012	04a	Abstain	Energy Consulting Services, LLC	Other Supplier	Power Marketer
2/23/2012	04a	Abstain	Energy Curtailment Specialists, Inc	Other Supplier	Curtailment Service Provide
2/23/2012	04a	Abstain	EnergyConnect Group, Inc	Other Supplier	Curtailment Service Provide
2/23/2012	04a	Abstain	Enerwise Global Technologies, Inc	Other Supplier	Curtailment Service Provide
2/23/2012	04a	Abstain	EP Rock Springs, LLC	Transmission Owner	Transmission Owner
2/23/2012	04a	Abstain	Evraz Claymont Stee	Other Supplier	Retail Energy Supplie
2/23/2012	04a	Abstain	Galt Power Inc.	Other Supplier	Power Marketer
2/23/2012	04a	Abstain	Icetec.com, Inc.	Other Supplier	Curtailment Service Provide

2/23/2012	04a	Abstain	IPR-GDF Suez Energy Marketing North America, Inc.	Other Supplier	Power Marketer
2/23/2012	04a	Abstain	Kuehne Chemical Company, Inc	Other Supplier	Retail Energy Supplie
2/23/2012	04a	Abstain	North America Power Partners LLC	Other Supplier	Curtailment Service Provide
2/23/2012	04a	Abstain	PBF Power Marketing LLC	Generation Owner	Generation
2/23/2012	04a	Abstain	Southern Maryland Electric Cooperative, Inc	Electric Distributor	Muni/Co-op
2/23/2012	04a	Abstain	Viridity Energy, Inc	Other Supplier	Curtailment Service Provide
2/23/2012	04a	Abstain	Wabash Valley Power Association, Inc	Other Supplier	Muni/Co-op
2/23/2012	04a	No	American Municipal Power, Inc	Electric Distributor	Muni/Co-op
2/23/2012	04a	No	Baltimore Gas and Electric Company	Transmission Owner	Transmission Owner
2/23/2012	04a	No	Borough of Butler, Butler Electric Division	Electric Distributor	Retail Energy Supplie
2/23/2012	04a	No	Borough of Lavallette, New Jersey	Electric Distributor	Muni/Co-op
2/23/2012	04a	No	Borough of Madison, New Jersey	Electric Distributor	Muni/Co-op
2/23/2012	04a	No	Borough of Milltown	Electric Distributor	Muni/Co-op
2/23/2012	04a	No	Borough of Park Ridge, New Jersey	Electric Distributor	Muni/Co-op
2/23/2012	04a	No	Borough of Pemberton	Electric Distributor	Muni/Co-op
2/23/2012	04a	No	Borough of Seaside Heights, New Jersey	Electric Distributor	Muni/Co-op
2/23/2012	04a	No	Borough of South River, New Jersey	Electric Distributor	Muni/Co-op
2/23/2012	04a	No	Calpine Energy Services, L.P	Generation Owner	Generation
2/23/2012	04a	No	Citigroup Energy, Inc	Other Supplier	Financial Trade
2/23/2012	04a	No	DC Energy LLC	Other Supplier	Financial Trade
2/23/2012	04a	No	Direct Energy Business, LLC	Other Supplier	Retail Energy Supplie
2/23/2012	04a	No	Dynegy Power Marketing, LLC	Generation Owner	Power Marketer
2/23/2012	04a	No	Edison Mission Marketing and Trading, Inc	Generation Owner	Generation
2/23/2012	04a	No	Elliott Bay Energy Trading, LLC	Other Supplier	Financial Trade
2/23/2012	04a	No	GenOn Energy Management, LLC	Generation Owner	Generation
2/23/2012	04a	No	Highlands Energy Group LLC (The	Other Supplier	Financial Trade

2/23/2012	04a	No	J.P. Morgan Ventures Energy Corporatio	Other Supplier	Financial Trade
2/23/2012	04a	No	Noble Americas Gas & Power Corp	Other Supplier	Power Marketer
2/23/2012	04a	No	NRG Power Marketing, L.L.C.	Generation Owner	Generation
2/23/2012	04a	No	Old Dominion Electric Cooperativ	Electric Distributor	Muni/Co-op
2/23/2012	04a	No	PECO Energy Company	Transmission Owner	Transmission Owner
2/23/2012	04a	No	Potomac Electric Power Company	Electric Distributor	Transmission Owne
2/23/2012	04a	No	PPL Energy Plus, LLC	Transmission Owner	Transmission Owner
2/23/2012	04a	No	Rockland Electric Company	Transmission Owner	Transmission Owner
2/23/2012	04a	No	Vineland Municipal Electric Utilit	Electric Distributor	Muni/Co-op
2/23/2012	04a	Yes	Air Liquide Industrials U.S., L.P	End User Customer	Industria
2/23/2012	04a	Yes	Air Products & Chemicals, Inc	End User Customer	Industria
2/23/2012	04a	Yes	Allegheny Electric Cooperative, Inc	Transmission Owner	Transmission Owner
2/23/2012	04a	Yes	Atlantic Grid Operations A, LLC	Other Supplier	Transmission Owne
2/23/2012	04a	Yes	Blue Ridge Power Agency, Inc	Electric Distributor	Muni/Co-op
2/23/2012	04a	Yes	Borough of Chambersburg	Electric Distributor	Muni/Co-op
2/23/2012	04a	Yes	Borough of Mont Alto, PA	Electric Distributor	Muni/Co-op
2/23/2012	04a	Yes	Buckeye Power, Inc	Electric Distributor	Muni/Co-op
2/23/2012	04a	Yes	Castlebridge Energy Group, LLC	Other Supplier	Financial Trade
2/23/2012	04a	Yes	Central Virginia Electric Cooperativ	Electric Distributor	Muni/Co-op
2/23/2012	04a	Yes	City of Cleveland, DPU, Div of Cleveland Public Pwr	Electric Distributor	Power Marketer
2/23/2012	04a	Yes	City of Dover, Delaware	Electric Distributor	Muni/Co-op
2/23/2012	04a	Yes	Delaware Municipal Electric Corporation	Electric Distributor	Muni/Co-op
2/23/2012	04a	Yes	Downes Associates, Inc	Other Supplier	Consultant, Service Company, Etc
2/23/2012	04a	Yes	Duquesne Light Compan	Transmission Owner	Transmission Owner
2/23/2012	04a	Yes	Easton Utilities Commissio	Electric Distributor	Muni/Co-op
2/23/2012	04a	Yes	Energy Cooperative Association of Pennsylvania (The)	Other Supplier	Muni/Co-op
2/23/2012	04a	Yes	FirstEnergy Solutions Corp	Transmission Owner	Power Marketer
2/23/2012	04a	Yes	Gerdau Ameristeel Energy, Inc	Other Supplier	Financial Trade

2/23/2012	04a	Yes	Hagerstown Light Departmen	Electric Distributor	Muni/Co-op
2/23/2012	04a	Yes	Hess Corporation	Other Supplier	Power Marketer
2/23/2012	04a	Yes	Illinois Municipal Electric Agenc	Electric Distributor	Muni/Co-op
2/23/2012	04a	Yes	Indiana Municipal Power Agenc	Generation Owner	Muni/Co-op
2/23/2012	04a	Yes	Industrial Energy Users-Ohi	Other Supplier	Retail Energy Supplie
2/23/2012	04a	Yes	Jersey Green Energy, LLC	Other Supplier	Financial Trade
2/23/2012	04a	Yes	Kimberly-Clark Corporation	Generation Owner	Generation
2/23/2012	04a	Yes	Lehigh Portland Cement Compan	End User Customer	Industria
2/23/2012	04a	Yes	Letterkenny Industrial Development Authority - PA	Electric Distributor	Muni/Co-op
2/23/2012	04a	Yes	Linde LLC	End User Customer	Industria
2/23/2012	04a	Yes	Long Island Lighting Company dba LIP	Other Supplier	Power Marketer
2/23/2012	04a	Yes	Madison Gas & Electric Co	Other Supplier	Power Marketer
2/23/2012	04a	Yes	MeadWestvaco Corporation	End User Customer	Generation
2/23/2012	04a	Yes	NextEra Energy Power Marketing, LLC	Generation Owner	Generation
2/23/2012	04a	Yes	North Carolina Electric Membership Corporation	Electric Distributor	Muni/Co-op
2/23/2012	04a	Yes	Northern Virginia Electric Cooperative - NOVEC	Electric Distributor	Muni/Co-op
2/23/2012	04a	Yes	Pennsylvania Office of Consumer Advocat	End User Customer	Consumer Advocate
2/23/2012	04a	Yes	Praxair, Inc	End User Customer	Industria
2/23/2012	04a	Yes	Primary Power LLC	Other Supplier	Transmission Owne
2/23/2012	04a	Yes	Procter & Gamble Paper Products Company (The)	End User Customer	Industrial
2/23/2012	04a	Yes	Public Service Electric & Gas Compan	Transmission Owner	Transmission Owner
2/23/2012	04a	Yes	RC Cape May Holdings, LLC	Generation Owner	Generation
2/23/2012	04a	Yes	RG Steel Sparrows Point LLC	End User Customer	Generation
2/23/2012	04a	Yes	Sunoco, Inc. (R&M)	End User Customer	Generation
2/23/2012	04a	Yes	Tangent Energy Solutions, Inc	Other Supplier	Curtailment Service Provide
2/23/2012	04a	Yes	The Trustees of the University of Pennsylvania, Pennsylvania Non-Profit	End User Customer	Retail Energy Supplier

			Corporation d/b/a University of Pennsylvania		
2/23/2012	04a	Yes	Thurmont Municipal Light Compan	Electric Distributor	Muni/Co-op
2/23/2012	04a	Yes	Town of Williamsport (The	Electric Distributor	Muni/Co-op
2/23/2012	04a	Yes	Virginia Electric & Power Company	Transmission Owner	Transmission Owner
2/23/2012	04a	Yes	Wellsboro Electric Company	Electric Distributor	Muni/Co-op
2/23/2012	04a	Yes	WPPI Energy	Other Supplier	Power Marketer
2/23/2012	04ftr	Abstain	ENBALA Power Networks Inc.	Other Supplier	Curtailment Service Provide
2/23/2012	04ftr	Abstain	Energy Curtailment Specialists, Inc	Other Supplier	Curtailment Service Provide
2/23/2012	04ftr	Abstain	EnergyConnect Group, Inc	Other Supplier	Curtailment Service Provide
2/23/2012	04ftr	Abstain	Enerwise Global Technologies, Inc	Other Supplier	Curtailment Service Provide
2/23/2012	04ftr	Abstain	North America Power Partners LLC	Other Supplier	Curtailment Service Provide
2/23/2012	04ftr	Abstain	PPL Energy Plus, LLC	Transmission Owner	Transmission Owner
2/23/2012	04ftr	Abstain	Tangent Energy Solutions, Inc	Other Supplier	Curtailment Service Provide
2/23/2012	04ftr	Abstain	Viridity Energy, Inc	Other Supplier	Curtailment Service Provide
2/23/2012	04ftr	No	Air Liquide Industrials U.S., L.P	End User Customer	Industria
2/23/2012	04ftr	No	Air Products & Chemicals, Inc	End User Customer	Industria
2/23/2012	04ftr	No	Blue Ridge Power Agency, Inc	Electric Distributor	Muni/Co-op
2/23/2012	04ftr	No	Borough of Chambersburg	Electric Distributor	Muni/Co-op
2/23/2012	04ftr	No	Buckeye Power, Inc	Electric Distributor	Muni/Co-op
2/23/2012	04ftr	No	Castlebridge Energy Group, LLC	Other Supplier	Financial Trade
2/23/2012	04ftr	No	Central Virginia Electric Cooperativ	Electric Distributor	Muni/Co-op
2/23/2012	04ftr	No	Citigroup Energy, Inc	Other Supplier	Financial Trade
2/23/2012	04ftr	No	City of Dover, Delaware	Electric Distributor	Muni/Co-op
2/23/2012	04ftr	No	Delaware Municipal Electric Corporatio	Electric Distributor	Muni/Co-op
2/23/2012	04ftr	No	Easton Utilities Commissio	Electric Distributor	Muni/Co-op

2/23/2012	04ftr	No	FirstEnergy Solutions Corp	Transmission Owner	Power Marketer
2/23/2012	04ftr	No	Gerdau Ameristeel Energy, Inc	Other Supplier	Financial Trade
2/23/2012	04ftr	No	Hagerstown Light Departmen	Electric Distributor	Muni/Co-op
2/23/2012	04ftr	No	Hess Corporation	Other Supplier	Power Marketer
2/23/2012	04ftr	No	Illinois Municipal Electric Agenc	Electric Distributor	Muni/Co-op
2/23/2012	04ftr	No	Indiana Municipal Power Agenc	Generation Owner	Muni/Co-op
2/23/2012	04ftr	No	Industrial Energy Users-Ohi	Other Supplier	Retail Energy Supplie
2/23/2012	04ftr	No	Kimberly-Clark Corporation	Generation Owner	Generation
2/23/2012	04ftr	No	Lehigh Portland Cement Compan	End User Customer	Industria
2/23/2012	04ftr	No	Letterkenny Industrial Development Authority - PA	Electric Distributor	Muni/Co-op
2/23/2012	04ftr	No	Linde LLC	End User Customer	Industria
2/23/2012	04ftr	No	Madison Gas & Electric Co	Other Supplier	Power Marketer
2/23/2012	04ftr	No	MeadWestvaco Corporation	End User Customer	Generation
2/23/2012	04ftr	No	Northern Virginia Electric Cooperative - NOVEC	Electric Distributor	Muni/Co-op
2/23/2012	04ftr	No	Praxair, Inc	End User Customer	Industria
2/23/2012	04ftr	No	Procter & Gamble Paper Products Company (The)	End User Customer	Industrial
2/23/2012	04ftr	No	Public Service Electric & Gas Compan	Transmission Owner	Transmission Owner
2/23/2012	04ftr	No	RG Steel Sparrows Point LLC	End User Customer	Generation
2/23/2012	04ftr	No	Sunoco, Inc. (R&M)	End User Customer	Generation
2/23/2012	04ftr	No	The Trustees of the University of Pennsylvania, Pennsylvania Non-Profit Corporation d/b/a University of Pennsylvania	End User Customer	Retail Energy Supplier
2/23/2012	04ftr	No	Town of Williamsport (The	Electric Distributor	Muni/Co-op
2/23/2012	04ftr	No	Wellsboro Electric Company	Electric Distributor	Muni/Co-op
2/23/2012	04ftr	No	WPPI Energy	Other Supplier	Power Marketer
2/23/2012	04ftr	Yes	Allegheny Electric Cooperative, Inc	Transmission Owner	Transmission Owner
2/23/2012	04ftr	Yes	Ameren Energy Marketing Company	Other Supplier	Power Marketer
2/23/2012	04ftr	Yes	American Municipal Power, Inc	Electric Distributor	Muni/Co-op

2/23/2012	04ftr	Yes	Appalachian Power Company	Transmission Owner	Transmission Owner
2/23/2012	04ftr	Yes	Atlantic Grid Operations A, LLC	Other Supplier	Transmission Owne
2/23/2012	04ftr	Yes	Baltimore Gas and Electric Company	Transmission Owner	Transmission Owner
2/23/2012	04ftr	Yes	Borough of Butler, Butler Electric Divisio	Electric Distributor	Retail Energy Supplie
2/23/2012	04ftr	Yes	Borough of Lavallette, New Jerse	Electric Distributor	Muni/Co-op
2/23/2012	04ftr	Yes	Borough of Madison, New Jerse	Electric Distributor	Muni/Co-op
2/23/2012	04ftr	Yes	Borough of Milltown	Electric Distributor	Muni/Co-op
2/23/2012	04ftr	Yes	Borough of Mont Alto, PA	Electric Distributor	Muni/Co-op
2/23/2012	04ftr	Yes	Borough of Park Ridge, New Jersey	Electric Distributor	Muni/Co-op
2/23/2012	04ftr	Yes	Borough of Pemberton	Electric Distributor	Muni/Co-op
2/23/2012	04ftr	Yes	Borough of Seaside Heights, New Jerse	Electric Distributor	Muni/Co-op
2/23/2012	04ftr	Yes	Borough of South River, New Jerse	Electric Distributor	Muni/Co-op
2/23/2012	04ftr	Yes	Calpine Energy Services, L.P	Generation Owner	Generation
2/23/2012	04ftr	Yes	City of Cleveland, DPU, Div of Cleveland Public Pwr	Electric Distributor	Power Marketer
2/23/2012	04ftr	Yes	Covanta Energy Group, Inc	Generation Owner	Generation
2/23/2012	04ftr	Yes	Dayton Power & Light Company (The	Transmission Owner	Transmission Owner
2/23/2012	04ftr	Yes	DC Energy LLC	Other Supplier	Financial Trade
2/23/2012	04ftr	Yes	Direct Energy Business, LLC	Other Supplier	Retail Energy Supplie
2/23/2012	04ftr	Yes	Downes Associates, Inc	Other Supplier	Consultant, Service Company, Etc
2/23/2012	04ftr	Yes	DTE Energy Trading, Inc	Other Supplier	Power Marketer
2/23/2012	04ftr	Yes	Duke Energy Business Services LL	Generation Owner	Power Marketer
2/23/2012	04ftr	Yes	Duquesne Light Compan	Transmission Owner	Transmission Owner
2/23/2012	04ftr	Yes	Dynegy Power Marketing, LLC	Generation Owner	Power Marketer
2/23/2012	04ftr	Yes	Edison Mission Marketing and Trading, Inc	Generation Owner	Generation
2/23/2012	04ftr	Yes	Elliott Bay Energy Trading, LLC	Other Supplier	Financial Trade
2/23/2012	04ftr	Yes	EP Rock Springs, LLC	Transmission Owner	Transmission Owner
2/23/2012	04ftr	Yes	GenOn Energy Management, LLC	Generation Owner	Generation
2/23/2012	04ftr	Yes	Highlands Energy Group LLC (The	Other Supplier	Financial Trade

2/23/2012	04ftr	Yes	Jersey Green Energy, LLC	Other Supplier	Financial Trade
2/23/2012	04ftr	Yes	Long Island Lighting Company dba LIP	Other Supplier	Power Marketer
2/23/2012	04ftr	Yes	NextEra Energy Power Marketing, LLC	Generation Owner	Generation
2/23/2012	04ftr	Yes	Noble Americas Gas & Power Corp	Other Supplier	Power Marketer
2/23/2012	04ftr	Yes	North Carolina Electric Membership Corporation	Electric Distributor	Muni/Co-op
2/23/2012	04ftr	Yes	NRG Power Marketing, L.L.C.	Generation Owner	Generation
2/23/2012	04ftr	Yes	Old Dominion Electric Cooperativ	Electric Distributor	Muni/Co-op
2/23/2012	04ftr	Yes	PECO Energy Company	Transmission Owner	Transmission Owner
2/23/2012	04ftr	Yes	Pennsylvania Office of Consumer Advocat	End User Customer	Consumer Advocate
2/23/2012	04ftr	Yes	Potomac Electric Power Company	Electric Distributor	Transmission Owne
2/23/2012	04ftr	Yes	Primary Power LLC	Other Supplier	Transmission Owne
2/23/2012	04ftr	Yes	RC Cape May Holdings, LLC	Generation Owner	Generation
2/23/2012	04ftr	Yes	Rockland Electric Company	Transmission Owner	Transmission Owner
2/23/2012	04ftr	Yes	Southern Maryland Electric Cooperative, Inc	Electric Distributor	Muni/Co-op
2/23/2012	04ftr	Yes	Thurmont Municipal Light Compan	Electric Distributor	Muni/Co-op
2/23/2012	04ftr	Yes	Vineland Municipal Electric Utilit	Electric Distributor	Muni/Co-op
2/23/2012	04ftr	Yes	Virginia Electric & Power Company	Transmission Owner	Transmission Owner
2/23/2012	04ftr	Yes	Wabash Valley Power Association, Inc	Other Supplier	Muni/Co-op
3/29/2012	04	Abstain	Castlebridge Energy Group, LLC	Other Supplier	Financial Trade
3/29/2012	04	Abstain	ENBALA Power Networks Inc.	Other Supplier	Curtailment Service Provide
3/29/2012	04	Abstain	Energy Curtailment Specialists, Inc	Other Supplier	Curtailment Service Provide
3/29/2012	04	Abstain	Enerwise Global Technologies, Inc	Other Supplier	Curtailment Service Provide
3/29/2012	04	Abstain	Illinois Municipal Electric Agenc	Electric Distributor	Muni/Co-op
3/29/2012	04	Abstain	Kimberly-Clark Corporation	Generation Owner	Generation
3/29/2012	04	Abstain	Letterkenny Industrial Development Authority - PA	Electric Distributor	Muni/Co-op
3/29/2012	04	Abstain	MeadWestvaco Corporation	End User Customer	Generation

3/29/2012	04	Abstain	North America Power Partners LLC	Other Supplier	Curtailment Service Provide
3/29/2012	04	Abstain	Pennsylvania Office of Consumer Advocat	End User Customer	Consumer Advocate
3/29/2012	04	Abstain	Procter & Gamble Paper Products Company (The)	End User Customer	Industrial
3/29/2012	04	Abstain	RG Steel Sparrows Point LLC	End User Customer	Generation
3/29/2012	04	Abstain	Sunoco, Inc. (R&M)	End User Customer	Generation
3/29/2012	04	Abstain	Tenaska Power Services Co	Generation Owner	Generation
3/29/2012	04	Abstain	The Trustees of the University of Pennsylvania, Pennsylvania Non-Profit Corporation d/b/a University of Pennsylvania	End User Customer	Retail Energy Supplier
3/29/2012	04	Abstain	Wellsboro Electric Company	Electric Distributor	Muni/Co-op
3/29/2012	04	No	Air Liquide Industrials U.S., L.P	End User Customer	Industria
3/29/2012	04	No	Air Products & Chemicals, Inc	End User Customer	Industria
3/29/2012	04	No	Allegheny Electric Cooperative, Inc	Transmission Owner	Transmission Owner
3/29/2012	04	No	Borough of Butler, Butler Electric Divisio	Electric Distributor	Retail Energy Supplie
3/29/2012	04	No	Borough of Lavallette, New Jerse	Electric Distributor	Muni/Co-op
3/29/2012	04	No	Borough of Madison, New Jerse	Electric Distributor	Muni/Co-op
3/29/2012	04	No	Borough of Milltown	Electric Distributor	Muni/Co-op
3/29/2012	04	No	Borough of Park Ridge, New Jersey	Electric Distributor	Muni/Co-op
3/29/2012	04	No	Borough of Pemberton	Electric Distributor	Muni/Co-op
3/29/2012	04	No	Borough of Seaside Heights, New Jerse	Electric Distributor	Muni/Co-op
3/29/2012	04	No	Borough of South River, New Jerse	Electric Distributor	Muni/Co-op
3/29/2012	04	No	DC Energy LLC	Other Supplier	Financial Trade
3/29/2012	04	No	Dynegy Power Marketing, LLC	Generation Owner	Power Marketer
3/29/2012	04	No	Energy Consulting Services, LLC	Other Supplier	Power Marketer
3/29/2012	04	No	Evraz Claymont Stee	Other Supplier	Retail Energy Supplie
3/29/2012	04	No	Gerdau Ameristeel Energy, Inc	Other Supplier	Financial Trade
3/29/2012	04	No	Icetec.com, Inc.	Other Supplier	Curtailment Service Provide

3/29/2012	04	No	Industrial Energy Users-Ohi	Other Supplier	Retail Energy Supplie
3/29/2012	04	No	Kuehne Chemical Company, Inc	Other Supplier	Retail Energy Supplie
3/29/2012	04	No	Lehigh Portland Cement Compan	End User Customer	Industria
3/29/2012	04	No	Linde LLC	End User Customer	Industria
3/29/2012	04	No	Long Island Lighting Company dba LIP	Other Supplier	Power Marketer
3/29/2012	04	No	Noble Americas Gas & Power Corp	Other Supplier	Power Marketer
3/29/2012	04	No	Praxair, Inc	End User Customer	Industria
3/29/2012	04	No	Vineland Municipal Electric Utilit	Electric Distributor	Muni/Co-op
3/29/2012	04	Yes	Appalachian Power Company	Transmission Owner	Transmission Owner
3/29/2012	04	Yes	Atlantic Grid Operations A, LLC	Other Supplier	Transmission Owner
3/29/2012	04	Yes	Blue Ridge Power Agency, Inc	Electric Distributor	Muni/Co-op
3/29/2012	04	Yes	Borough of Chambersburg	Electric Distributor	Muni/Co-op
3/29/2012	04	Yes	Borough of Mont Alto, PA	Electric Distributor	Muni/Co-op
3/29/2012	04	Yes	Buckeye Power, Inc	Electric Distributor	Muni/Co-op
3/29/2012	04	Yes	Calpine Energy Services, L.P	Generation Owner	Generation
3/29/2012	04	Yes	Central Virginia Electric Cooperativ	Electric Distributor	Muni/Co-op
3/29/2012	04	Yes	City of Dover, Delaware	Electric Distributor	Muni/Co-op
3/29/2012	04	Yes	Covanta Energy Group, Inc	Generation Owner	Generation
3/29/2012	04	Yes	Dayton Power & Light Company (The	Transmission Owner	Transmission Owner
3/29/2012	04	Yes	Delaware Municipal Electric Corporatio	Electric Distributor	Muni/Co-op
3/29/2012	04	Yes	Direct Energy Business, LLC	Other Supplier	Retail Energy Supplie
3/29/2012	04	Yes	Downes Associates, Inc	Other Supplier	Consultant, Service Company, Etc
3/29/2012	04	Yes	Duke Energy Business Services LL	Generation Owner	Power Marketer
3/29/2012	04	Yes	Duquesne Light Compan	Transmission Owner	Transmission Owner
3/29/2012	04	Yes	Easton Utilities Commissio	Electric Distributor	Muni/Co-op
3/29/2012	04	Yes	Edison Mission Marketing and Trading, Inc	Generation Owner	Generation
3/29/2012	04	Yes	Energy Cooperative Association of Pennsylvania (The)	Other Supplier	Muni/Co-op
3/29/2012	04	Yes	EnergyConnect, Inc	Other Supplier	Curtailment Service Provide

3/29/2012	04	Yes	EP Rock Springs, LLC	Transmission Owner	Transmission Owner
3/29/2012	04	Yes	FirstEnergy Solutions Corp	Transmission Owner	Power Marketer
3/29/2012	04	Yes	GenOn Energy Management, LLC	Generation Owner	Generation
3/29/2012	04	Yes	Hagerstown Light Departmen	Electric Distributor	Muni/Co-op
3/29/2012	04	Yes	Hess Corporation	Other Supplier	Power Marketer
3/29/2012	04	Yes	IBERDROLA RENEWABLES, Inc.	Generation Owner	Generation
3/29/2012	04	Yes	Indiana Municipal Power Agenc	Generation Owner	Muni/Co-op
3/29/2012	04	Yes	J. Aron & Company	Other Supplier	Power Marketer
3/29/2012	04	Yes	Jersey Green Energy, LLC	Other Supplier	Financial Trade
3/29/2012	04	Yes	Madison Gas & Electric Compan	Other Supplier	Power Marketer
3/29/2012	04	Yes	NextEra Energy Power Marketing, LLC	Generation Owner	Generation
3/29/2012	04	Yes	North Carolina Electric Membership Corporation	Electric Distributor	Muni/Co-op
3/29/2012	04	Yes	Northern Virginia Electric Cooperative - NOVEC	Electric Distributor	Muni/Co-op
3/29/2012	04	Yes	NRG Power Marketing, L.L.C.	Generation Owner	Generation
3/29/2012	04	Yes	Old Dominion Electric Cooperativ	Electric Distributor	Muni/Co-op
3/29/2012	04	Yes	PBF Power Marketing LLC	Generation Owner	Generation
3/29/2012	04	Yes	PECO Energy Company	Transmission Owner	Transmission Owner
3/29/2012	04	Yes	Potomac Electric Power Company	Electric Distributor	Transmission Owne
3/29/2012	04	Yes	PPL Energy Plus, LLC	Transmission Owner	Transmission Owner
3/29/2012	04	Yes	Primary Power LLC	Other Supplier	Transmission Owne
3/29/2012	04	Yes	Public Service Electric & Gas Compan	Transmission Owner	Transmission Owner
3/29/2012	04	Yes	RC Cape May Holdings, LLC	Generation Owner	Generation
3/29/2012	04	Yes	Rockland Electric Company	Transmission Owner	Transmission Owner
3/29/2012	04	Yes	Shell Energy North America (US), LP	Other Supplier	Generation
3/29/2012	04	Yes	Southern Maryland Electric Cooperative, Inc	Electric Distributor	Muni/Co-op
3/29/2012	04	Yes	Thurmont Municipal Light Compan	Electric Distributor	Muni/Co-op
3/29/2012	04	Yes	Town of Williamsport (The	Electric Distributor	Muni/Co-op
3/29/2012	04	Yes	Vitol Inc.	Other Supplier	Power Marketer
3/29/2012	04	Yes	WPPI Energy	Other Supplier	Power Marketer

11/29/2012	03mopr	Abstain	Atlantic Grid Operations A, LLC	Other Supplier	Transmission Owne
11/29/2012	03mopr	Abstain	Castlebridge Energy Group, LLC	Other Supplier	Financial Trade
11/29/2012	03mopr	Abstain	Gerdau Ameristeel Energy, Inc	Other Supplier	Financial Trade
11/29/2012	03mopr	Abstain	Hagerstown Light Departmen	Electric Distributor	Muni/Co-op
11/29/2012	03mopr	Abstain	Industrial Energy Users-Ohi	Other Supplier	Retail Energy Supplie
11/29/2012	03mopr	Abstain	Long Island Lighting Company dba LIP	Other Supplier	Power Marketer
11/29/2012	03mopr	Abstain	NRG Power Marketing, LLC	Generation Owner	Generation
11/29/2012	03mopr	Abstain	Primary Power, LLC	Other Supplier	Transmission Owne
11/29/2012	03mopr	No	CPV Maryland, LLC	Generation Owner	Generation
11/29/2012	03mopr	No	FirstEnergy Solutions Corp	Transmission Owner	Power Marketer
11/29/2012	03mopr	No	Hess Corporation	Other Supplier	Power Marketer
11/29/2012	03mopr	No	Maryland Office of People's Counse	End User Customer	Consumer Advocate
11/29/2012	03mopr	No	New Jersey Division of Rate Counse	End User Customer	Consumer Advocate
11/29/2012	03mopr	No	Pennsylvania Office of Consumer Advocat	End User Customer	Consumer Advocate
11/29/2012	03mopr	No	Potomac Electric Power Company	Electric Distributor	Transmission Owne
11/29/2012	03mopr	No	Rockland Electric Company	Transmission Owner	Transmission Owner
11/29/2012	03mopr	No	Shell Energy North America (US), L.P	Other Supplier	Generation
11/29/2012	03mopr	Yes	Air Liquide Industrials U.S., L.P	End User Customer	Industria
11/29/2012	03mopr	Yes	Air Products & Chemicals, Inc	End User Customer	Industria
11/29/2012	03mopr	Yes	Allegheny Electric Cooperative, Inc	Transmission Owner	Transmission Owner
11/29/2012	03mopr	Yes	American Municipal Power, Inc	Electric Distributor	Muni/Co-op
11/29/2012	03mopr	Yes	Appalachian Power Company	Transmission Owner	Transmission Owner
11/29/2012	03mopr	Yes	Apple Group, LLC	Other Supplier	Financial Trade
11/29/2012	03mopr	Yes	BJ Energy, LLC	Other Supplier	Financial Trade
11/29/2012	03mopr	Yes	Blue Ridge Power Agency, Inc	Electric Distributor	Muni/Co-op
11/29/2012	03mopr	Yes	Borough of Chambersburg	Electric Distributor	Muni/Co-op
11/29/2012	03mopr	Yes	Borough of Mont Alto, Pennsylvani	Electric Distributor	Muni/Co-op
11/29/2012	03mopr	Yes	Brookfield Energy Marketing, Inc	Other Supplier	Generation
11/29/2012	03mopr	Yes	Buckeye Power, Inc	Electric Distributor	Muni/Co-op
11/29/2012	03mopr	Yes	Calpine Energy Services, L.P	Generation Owner	Generation

11/29/2012	03mopr	Yes	Central Virginia Electric Cooperativ	Electric Distributor	Muni/Co-op
11/29/2012	03mopr	Yes	City of Dover, Delaware	Electric Distributor	Muni/Co-op
11/29/2012	03mopr	Yes	Covanta Energy Group, Inc	Generation Owner	Generation
11/29/2012	03mopr	Yes	CP Energy Marketing (US) Inc	Other Supplier	Power Marketer
11/29/2012	03mopr	Yes	Dayton Power & Light Company (The	Transmission Owner	Transmission Owner
11/29/2012	03mopr	Yes	Delaware Municipal Electric Corporation, Inc	Electric Distributor	Muni/Co-op
11/29/2012	03mopr	Yes	Diamond State Generation Partners, LLC	Generation Owner	Generation
11/29/2012	03mopr	Yes	Direct Energy Business, LLC	Other Supplier	Retail Energy Supplie
11/29/2012	03mopr	Yes	Division of the Public Advocate of the State of Delaware	End User Customer	Consumer Advocate
11/29/2012	03mopr	Yes	Downes Associates, Inc	Other Supplier	Consultant, Service Company, Etc
11/29/2012	03mopr	Yes	DTE Energy Trading, Inc	Other Supplier	Power Marketer
11/29/2012	03mopr	Yes	Duquesne Light Compan	Transmission Owner	Transmission Owner
11/29/2012	03mopr	Yes	Dyon, LLC	Other Supplier	Power Marketer
11/29/2012	03mopr	Yes	E Minus LLC	Other Supplier	Financial Trade
11/29/2012	03mopr	Yes	East Kentucky Power Cooperative, Inc	Other Supplier	Power Marketer
11/29/2012	03mopr	Yes	Easton Utilities Commissio	Electric Distributor	Muni/Co-op
11/29/2012	03mopr	Yes	EDF Trading North America, LLC	Other Supplier	Power Marketer
11/29/2012	03mopr	Yes	Edison Mission Marketing and Trading, Inc	Generation Owner	Generation
11/29/2012	03mopr	Yes	Energy Authority, Inc. (The	Other Supplier	Power Marketer
11/29/2012	03mopr	Yes	Energy Consulting Services, LLC	Other Supplier	Power Marketer
11/29/2012	03mopr	Yes	Energy Cooperative Association of Pennsylvania (The)	Other Supplier	Muni/Co-op
11/29/2012	03mopr	Yes	EnergyConnect, Inc	Other Supplier	Curtailment Service Provide
11/29/2012	03mopr	Yes	Enerwise Global Technologies, Inc	Other Supplier	Curtailment Service Provide
11/29/2012	03mopr	Yes	EP Rock Springs, LLC	Transmission Owner	Transmission Owner
11/29/2012	03mopr	Yes	Evraz Claymont Stee	Other Supplier	Retail Energy Supplie
11/29/2012	03mopr	Yes	Exelon Business Services Company, LL	Transmission Owner	Transmission Owner

11/29/2012	03mopr	Yes	Galt Power, Inc.	Other Supplier	Power Marketer
11/29/2012	03mopr	Yes	GenOn Energy Management, LLC	Generation Owner	Generation
11/29/2012	03mopr	Yes	Great Bay Energy I, LLC	Other Supplier	Power Marketer
11/29/2012	03mopr	Yes	Hexis Energy Trading, LLC	Other Supplier	Financial Trade
11/29/2012	03mopr	Yes	Homer City Generation, L.P	Generation Owner	Generation
11/29/2012	03mopr	Yes	H-P Energy Resources, LLC	Other Supplier	Unspecified LOB
11/29/2012	03mopr	Yes	Icetec.com, Inc.	Other Supplier	Curtailment Service Provide
11/29/2012	03mopr	Yes	Illinois Municipal Electric Agenc	Electric Distributor	Muni/Co-op
11/29/2012	03mopr	Yes	Indiana Municipal Power Agenc	Generation Owner	Muni/Co-op
11/29/2012	03mopr	Yes	IPR-GDF Suez Energy Marketing North America, Inc.	Other Supplier	Power Marketer
11/29/2012	03mopr	Yes	J.P. Morgan Ventures Energy Corporatio	Other Supplier	Financial Trade
11/29/2012	03mopr	Yes	Jersey Green Energy, LLC	Other Supplier	Financial Trade
11/29/2012	03mopr	Yes	Kimberly-Clark Corporation	Generation Owner	Generation
11/29/2012	03mopr	Yes	Kuehne Chemical Company, Inc	Other Supplier	Retail Energy Supplie
11/29/2012	03mopr	Yes	Lehigh Portland Cement Compan	End User Customer	Industria
11/29/2012	03mopr	Yes	Letterkenny Industrial Development Authority - PA	Electric Distributor	Muni/Co-op
11/29/2012	03mopr	Yes	Liberty Electric Power, LLC	Generation Owner	Generation
11/29/2012	03mopr	Yes	Linde, LLC	End User Customer	Industria
11/29/2012	03mopr	Yes	Mac Trading, Inc	Other Supplier	Financial Trade
11/29/2012	03mopr	Yes	Madison Gas & Electric Co	Other Supplier	Power Marketer
11/29/2012	03mopr	Yes	MeadWestvaco Corporation	End User Customer	Generation
11/29/2012	03mopr	Yes	Monterey MA, LLC	Other Supplier	Power Marketer
11/29/2012	03mopr	Yes	Moxie Liberty LLC	Other Supplier	Generation
11/29/2012	03mopr	Yes	NextEra Energy Power Marketing, LLC	Generation Owner	Generation
11/29/2012	03mopr	Yes	North Carolina Electric Membership Corporation	Electric Distributor	Muni/Co-op
11/29/2012	03mopr	Yes	Northern Illinois Municipal Power Agenc	Other Supplier	Muni/Co-op

11/29/2012	03mopr	Yes	Northern Virginia Electric Cooperative (NOVEC)	Electric Distributor	Muni/Co-op
11/29/2012	03mopr	Yes	Old Dominion Electric Cooperativ	Electric Distributor	Muni/Co-op
11/29/2012	03mopr	Yes	PBF Power Marketing, LLC	Generation Owner	Generation
11/29/2012	03mopr	Yes	PPL Energy Plus, LLC	Transmission Owner	Transmission Owner
11/29/2012	03mopr	Yes	Prairieland Energy, Inc	End User Customer	Retail Energy Supplie
11/29/2012	03mopr	Yes	Praxair, Inc	End User Customer	Industria
11/29/2012	03mopr	Yes	Procter & Gamble Paper Products Company (The)	End User Customer	Industrial
11/29/2012	03mopr	Yes	Public Service Electric & Gas Compan	Transmission Owner	Transmission Owner
11/29/2012	03mopr	Yes	Pure Energy, Inc	Other Supplier	Financial Trade
11/29/2012	03mopr	Yes	RC Cape May Holdings, LLC	Generation Owner	Generation
11/29/2012	03mopr	Yes	Red Wolf Energy Trading, LLC	Other Supplier	Financial Trade
11/29/2012	03mopr	Yes	RG Steel Sparrows Point, LLC	End User Customer	Generation
11/29/2012	03mopr	Yes	Richland-Stryker Generation, LLC	Generation Owner	Generation
11/29/2012	03mopr	Yes	Southern Maryland Electric Cooperative, Inc	Electric Distributor	Muni/Co-op
11/29/2012	03mopr	Yes	Sunoco, Inc. (R&M)	End User Customer	Generation
11/29/2012	03mopr	Yes	Tangent Energy Solutions, Inc	Other Supplier	Curtailment Service Provide
11/29/2012	03mopr	Yes	Tenaska Power Services Co	Generation Owner	Generation
11/29/2012	03mopr	Yes	The Trustees of the University of Pennsylvania, Pennsylvania Non-Profit Corporation d/b/a University of Pennsylvania	End User Customer	Retail Energy Supplier
11/29/2012	03mopr	Yes	Thurmont Municipal Light Compan	Electric Distributor	Muni/Co-op
11/29/2012	03mopr	Yes	Town of Williamsport (The	Electric Distributor	Muni/Co-op
11/29/2012	03mopr	Yes	UGI Utilities, Inc	Transmission Owner	Transmission Owner
11/29/2012	03mopr	Yes	Vel Energy, LLC	Other Supplier	Power Marketer
11/29/2012	03mopr	Yes	Virginia Electric & Power Company	Transmission Owner	Transmission Owner
11/29/2012	03mopr	Yes	Viridity Energy, Inc	Other Supplier	Curtailment Service Provide
11/29/2012	03mopr	Yes	Vitol Inc.	Other Supplier	Power Marketer

11/29/2012	03mopr	Yes	Wabash Valley Power Association, Inc	Other Supplier	Muni/Co-op
11/29/2012	03mopr	Yes	Wellsboro Electric Company	Electric Distributor	Muni/Co-op
11/29/2012	03mopr	Yes	Wolverine Power Supply Cooperative, Inc	Other Supplier	Power Marketer
11/29/2012	03mopr	Yes	WPPI Energy	Other Supplier	Power Marketer
6/27/2013	03pmu	Abstain	Blue Ridge Power Agency, Inc.	Electric Distributor	Muni/Co-op
6/27/2013	03pmu	Abstain	Borough of Chambersburg	Electric Distributor	Muni/Co-op
6/27/2013	03pmu	Abstain	Buckeye Power, Inc.	Electric Distributor	Muni/Co-op
6/27/2013	03pmu	Abstain	Castlebridge Energy Group, LLC	Other Supplier	Financial Trader
6/27/2013	03pmu	Abstain	Central Virginia Electric Cooperative	Electric Distributor	Muni/Co-op
6/27/2013	03pmu	Abstain	City of Dover, Delaware	Electric Distributor	Muni/Co-op
6/27/2013	03pmu	Abstain	Delaware Municipal Electric Corporation, Inc.	Electric Distributor	Muni/Co-op
6/27/2013	03pmu	Abstain	East Kentucky Power Cooperative, Inc.	Transmission Owner	Transmission Owner
6/27/2013	03pmu	Abstain	Easton Utilities Commission	Electric Distributor	Muni/Co-op
6/27/2013	03pmu	Abstain	Energy Curtailment Specialists, Inc.	Other Supplier	Curtailment Service Provider
6/27/2013	03pmu	Abstain	EnerNOC, Inc.	Other Supplier	Curtailment Service Provider
6/27/2013	03pmu	Abstain	Hagerstown Light Department	Electric Distributor	Muni/Co-op
6/27/2013	03pmu	Abstain	Illinois Municipal Electric Agency	Electric Distributor	Muni/Co-op
6/27/2013	03pmu	Abstain	Indiana Municipal Power Agency	Generation Owner	Muni/Co-op
6/27/2013	03pmu	Abstain	Kimberly-Clark Corporation	Generation Owner	Generation
6/27/2013	03pmu	Abstain	Madison Gas & Electric Co.	Other Supplier	Power Marketer
6/27/2013	03pmu	Abstain	MeadWestvaco Corporation	End User Customer	Generation
6/27/2013	03pmu	Abstain	New York Power Authority	Other Supplier	Financial Trader
6/27/2013	03pmu	Abstain	North Carolina Electric Membership Corporation	Electric Distributor	Muni/Co-op
6/27/2013	03pmu	Abstain	Northern Virginia Electric Cooperative (NOVEC)	Electric Distributor	Muni/Co-op
6/27/2013	03pmu	Abstain	Occidental Power Services, Inc.	Other Supplier	Unspecified LOB
6/27/2013	03pmu	Abstain	Procter & Gamble Paper Products Company (The)	End User Customer	Industrial

6/27/2013	03pmu	Abstain	Richland-Stryker Generation, LLC	Generation Owner	Generation
6/27/2013	03pmu	Abstain	Town of Williamsport (The)	Electric Distributor	Muni/Co-op
6/27/2013	03pmu	Abstain	WPPI Energy	Other Supplier	Power Marketer
6/27/2013	03pmu	No	Brookfield Energy Marketing LP	Other Supplier	Power Marketer
6/27/2013	03pmu	No	Calpine Energy Services, L.P.	Generation Owner	Generation
6/27/2013	03pmu	No	City of Cleveland, DPU, Division of Cleveland Public Power	Electric Distributor	Power Marketer
6/27/2013	03pmu	No	Dayton Power & Light Company (The)	Transmission Owner	Transmission Owner
6/27/2013	03pmu	No	Duke Energy Business Services LLC	Transmission Owner	Unspecified LOB
6/27/2013	03pmu	No	Dynegy Marketing and Trade, LLC	Generation Owner	Generation
6/27/2013	03pmu	No	Edison Mission Marketing and Trading, Inc.	Generation Owner	Generation
6/27/2013	03pmu	No	EnergyConnect, Inc.	Other Supplier	Curtailment Service Provider
6/27/2013	03pmu	No	Hess Corporation	Other Supplier	Power Marketer
6/27/2013	03pmu	No	Invenergy, LLC	Generation Owner	Generation
6/27/2013	03pmu	No	Iron Mountain Generation LLC	Generation Owner	Generation
6/27/2013	03pmu	No	Liberty Electric Power, LLC	Generation Owner	Generation
6/27/2013	03pmu	No	NextEra Energy Power Marketing, LLC	Generation Owner	Generation
6/27/2013	03pmu	No	Primary Power, LLC	Other Supplier	Transmission Owner
6/27/2013	03pmu	No	Public Service Electric & Gas Company	Transmission Owner	Transmission Owner
6/27/2013	03pmu	Yes	Achieving Equilibrium LLC	Other Supplier	Curtailment Service Provider
6/27/2013	03pmu	Yes	Air Liquide Industrials U.S., L.P.	End User Customer	Industrial
6/27/2013	03pmu	Yes	Air Products & Chemicals, Inc.	End User Customer	Industrial
6/27/2013	03pmu	Yes	Allegheny Electric Cooperative, Inc.	Electric Distributor	Transmission Owner
6/27/2013	03pmu	Yes	Appalachian Power Company	Transmission Owner	Transmission Owner
6/27/2013	03pmu	Yes	Atlantic Grid Operations A, LLC	Other Supplier	Transmission Owner
6/27/2013	03pmu	Yes	Citigroup Energy, Inc.	Other Supplier	Financial Trader
6/27/2013	03pmu	Yes	Covanta Energy Group, Inc.	Generation Owner	Generation
6/27/2013	03pmu	Yes	DC Energy, LLC	Other Supplier	Financial Trader
6/27/2013	03pmu	Yes	Direct Energy Business, LLC	Other Supplier	Retail Energy Supplier

6/27/2013	03pmu	Yes	DTE Energy Trading, Inc.	Other Supplier	Power Marketer
6/27/2013	03pmu	Yes	Duquesne Light Company	Transmission Owner	Transmission Owner
6/27/2013	03pmu	Yes	Energy Cooperative Association of Pennsylvania (The)	Other Supplier	Muni/Co-op
6/27/2013	03pmu	Yes	Enerwise Global Technologies, Inc.	Other Supplier	Curtailment Service Provider
6/27/2013	03pmu	Yes	Exelon Business Services Company, LLC	Transmission Owner	Transmission Owner
6/27/2013	03pmu	Yes	FirstEnergy Solutions Corp.	Transmission Owner	Power Marketer
6/27/2013	03pmu	Yes	Gerdau Ameristeel Energy, Inc.	Other Supplier	Financial Trader
6/27/2013	03pmu	Yes	Industrial Energy Users-Ohio	Other Supplier	Retail Energy Supplier
6/27/2013	03pmu	Yes	Jersey Green Energy, LLC	Other Supplier	Financial Trader
6/27/2013	03pmu	Yes	Lehigh Portland Cement Company	End User Customer	Industrial
6/27/2013	03pmu	Yes	Letterkenny Industrial Development Authority - PA	Electric Distributor	Muni/Co-op
6/27/2013	03pmu	Yes	Linde, LLC	End User Customer	Industrial
6/27/2013	03pmu	Yes	Old Dominion Electric Cooperative	Electric Distributor	Muni/Co-op
6/27/2013	03pmu	Yes	Potomac Electric Power Company	Electric Distributor	Transmission Owner
6/27/2013	03pmu	Yes	PPL Energy Plus, LLC	Transmission Owner	Transmission Owner
6/27/2013	03pmu	Yes	Praxair, Inc.	End User Customer	Industrial
6/27/2013	03pmu	Yes	RC Cape May Holdings, LLC	Generation Owner	Generation
6/27/2013	03pmu	Yes	Rockland Electric Company	Transmission Owner	Transmission Owner
6/27/2013	03pmu	Yes	Southern Maryland Electric Cooperative, Inc.	Electric Distributor	Muni/Co-op
6/27/2013	03pmu	Yes	The Trustees of the University of Pennsylvania, Pennsylvania Non-Profit Corporation d/b/a University of Pennsylvania	End User Customer	Retail Energy Supplier
6/27/2013	03pmu	Yes	UGI Utilities, Inc.	Transmission Owner	Transmission Owner
6/27/2013	03pmu	Yes	Virginia Electric & Power Company	Transmission Owner	Transmission Owner
6/27/2013	03pmu	Yes	Wabash Valley Power Association, Inc.	Electric Distributor	Muni/Co-op
6/27/2013	03pmu	Yes	Wellsboro Electric Company	Electric Distributor	Muni/Co-op

6/27/2013	03pmu	Yes	West Virginia Consumer Advocate Division	End User Customer	Consumer Advocate
6/27/2013	04dr	Abstain	Allegheny Electric Cooperative, Inc.	Electric Distributor	Transmission Owner
6/27/2013	04dr	Abstain	Atlantic Grid Operations A, LLC	Other Supplier	Transmission Owner
6/27/2013	04dr	Abstain	Blue Ridge Power Agency, Inc.	Electric Distributor	Muni/Co-op
6/27/2013	04dr	Abstain	Borough of Chambersburg	Electric Distributor	Muni/Co-op
6/27/2013	04dr	Abstain	Brookfield Energy Marketing LP	Other Supplier	Power Marketer
6/27/2013	04dr	Abstain	Buckeye Power, Inc.	Electric Distributor	Muni/Co-op
6/27/2013	04dr	Abstain	Central Virginia Electric Cooperative	Electric Distributor	Muni/Co-op
6/27/2013	04dr	Abstain	City of Dover, Delaware	Electric Distributor	Muni/Co-op
6/27/2013	04dr	Abstain	Delaware Municipal Electric Corporation, Inc.	Electric Distributor	Muni/Co-op
6/27/2013	04dr	Abstain	East Kentucky Power Cooperative, Inc.	Transmission Owner	Transmission Owner
6/27/2013	04dr	Abstain	Easton Utilities Commission	Electric Distributor	Muni/Co-op
6/27/2013	04dr	Abstain	Energy Cooperative Association of Pennsylvania (The)	Other Supplier	Muni/Co-op
6/27/2013	04dr	Abstain	Hagerstown Light Department	Electric Distributor	Muni/Co-op
6/27/2013	04dr	Abstain	Hess Corporation	Other Supplier	Power Marketer
6/27/2013	04dr	Abstain	Illinois Municipal Electric Agency	Electric Distributor	Muni/Co-op
6/27/2013	04dr	Abstain	Indiana Municipal Power Agency	Generation Owner	Muni/Co-op
6/27/2013	04dr	Abstain	Madison Gas & Electric Co.	Other Supplier	Power Marketer
6/27/2013	04dr	Abstain	MidAtlantic Power Partners, LLC	Other Supplier	Curtailment Service Provider
6/27/2013	04dr	Abstain	North Carolina Electric Membership Corporation	Electric Distributor	Muni/Co-op
6/27/2013	04dr	Abstain	Northern Virginia Electric Cooperative (NOVEC)	Electric Distributor	Muni/Co-op
6/27/2013	04dr	Abstain	Old Dominion Electric Cooperative	Electric Distributor	Muni/Co-op
6/27/2013	04dr	Abstain	Public Service Electric & Gas Company	Transmission Owner	Transmission Owner
6/27/2013	04dr	Abstain	Town of Williamsport (The)	Electric Distributor	Muni/Co-op
6/27/2013	04dr	Abstain	WPPI Energy	Other Supplier	Power Marketer
6/27/2013	04dr	No	Achieving Equilibrium LLC	Other Supplier	Curtailment Service Provider

6/27/2013	04dr	No	Citigroup Energy, Inc.	Other Supplier	Financial Trader
6/27/2013	04dr	No	City of Cleveland, DPU, Division of Cleveland Public Power	Electric Distributor	Power Marketer
6/27/2013	04dr	No	Energy Curtailment Specialists, Inc.	Other Supplier	Curtailment Service Provider
6/27/2013	04dr	No	EnergyConnect, Inc.	Other Supplier	Curtailment Service Provider
6/27/2013	04dr	No	Enerwise Global Technologies, Inc.	Other Supplier	Curtailment Service Provider
6/27/2013	04dr	No	North America Power Partners, LLC	Other Supplier	Curtailment Service Provider
6/27/2013	04dr	No	West Virginia Consumer Advocate Division	End User Customer	Consumer Advocate
6/27/2013	04dr	Yes	Air Liquide Industrials U.S., L.P.	End User Customer	Industrial
6/27/2013	04dr	Yes	Air Products & Chemicals, Inc.	End User Customer	Industrial
6/27/2013	04dr	Yes	Appalachian Power Company	Transmission Owner	Transmission Owner
6/27/2013	04dr	Yes	Calpine Energy Services, L.P.	Generation Owner	Generation
6/27/2013	04dr	Yes	Covanta Energy Group, Inc.	Generation Owner	Generation
6/27/2013	04dr	Yes	Dayton Power & Light Company (The)	Transmission Owner	Transmission Owner
6/27/2013	04dr	Yes	DC Energy, LLC	Other Supplier	Financial Trader
6/27/2013	04dr	Yes	Direct Energy Business, LLC	Other Supplier	Retail Energy Supplier
6/27/2013	04dr	Yes	DTE Energy Trading, Inc.	Other Supplier	Power Marketer
6/27/2013	04dr	Yes	Duke Energy Business Services LLC	Transmission Owner	Unspecified LOB
6/27/2013	04dr	Yes	Duquesne Light Company	Transmission Owner	Transmission Owner
6/27/2013	04dr	Yes	Dynegy Marketing and Trade, LLC	Generation Owner	Generation
6/27/2013	04dr	Yes	Edison Mission Marketing and Trading, Inc.	Generation Owner	Generation
6/27/2013	04dr	Yes	EnerNOC, Inc.	Other Supplier	Curtailment Service Provider
6/27/2013	04dr	Yes	Exelon Business Services Company, LLC	Transmission Owner	Transmission Owner
6/27/2013	04dr	Yes	FirstEnergy Solutions Corp.	Transmission Owner	Power Marketer
6/27/2013	04dr	Yes	Gerdau Ameristeel Energy, Inc.	Other Supplier	Financial Trader

6/27/2013	04dr	Yes	Industrial Energy Users-Ohio	Other Supplier	Retail Energy Supplier
6/27/2013	04dr	Yes	Invenergy, LLC	Generation Owner	Generation
6/27/2013	04dr	Yes	Iron Mountain Generation LLC	Generation Owner	Generation
6/27/2013	04dr	Yes	Jersey Green Energy, LLC	Other Supplier	Financial Trader
6/27/2013	04dr	Yes	Kimberly-Clark Corporation	Generation Owner	Generation
6/27/2013	04dr	Yes	Lehigh Portland Cement Company	End User Customer	Industrial
6/27/2013	04dr	Yes	Letterkenny Industrial Development Authority - PA	Electric Distributor	Muni/Co-op
6/27/2013	04dr	Yes	Liberty Electric Power, LLC	Generation Owner	Generation
6/27/2013	04dr	Yes	Linde, LLC	End User Customer	Industrial
6/27/2013	04dr	Yes	MeadWestvaco Corporation	End User Customer	Generation
6/27/2013	04dr	Yes	New York Power Authority	Other Supplier	Financial Trader
6/27/2013	04dr	Yes	NextEra Energy Power Marketing, LLC	Generation Owner	Generation
6/27/2013	04dr	Yes	Potomac Electric Power Company	Electric Distributor	Transmission Owner
6/27/2013	04dr	Yes	PPL Energy Plus, LLC	Transmission Owner	Transmission Owner
6/27/2013	04dr	Yes	Praxair, Inc.	End User Customer	Industrial
6/27/2013	04dr	Yes	Primary Power, LLC	Other Supplier	Transmission Owner
6/27/2013	04dr	Yes	Procter & Gamble Paper Products Company (The)	End User Customer	Industrial
6/27/2013	04dr	Yes	RC Cape May Holdings, LLC	Generation Owner	Generation
6/27/2013	04dr	Yes	Richland-Stryker Generation, LLC	Generation Owner	Generation
6/27/2013	04dr	Yes	Rockland Electric Company	Transmission Owner	Transmission Owner
6/27/2013	04dr	Yes	Southern Maryland Electric Cooperative, Inc.	Electric Distributor	Muni/Co-op
6/27/2013	04dr	Yes	The Trustees of the University of Pennsylvania, Pennsylvania Non-Profit Corporation d/b/a University of Pennsylvania	End User Customer	Retail Energy Supplier
6/27/2013	04dr	Yes	Twin Cities Power, LLC	Other Supplier	Power Marketer
6/27/2013	04dr	Yes	UGI Utilities, Inc.	Transmission Owner	Transmission Owner
6/27/2013	04dr	Yes	Wabash Valley Power Association, Inc.	Electric Distributor	Muni/Co-op
6/27/2013	04dr	Yes	Wellsboro Electric Company	Electric Distributor	Muni/Co-op

8/1/2013	04must	Abstain	Atlantic Grid Operations A, LLC	Other Supplier	Transmission Owner
8/1/2013	04must	Abstain	DC Energy, LLC	Other Supplier	Financial Trader
8/1/2013	04must	Abstain	East Kentucky Power Cooperative, Inc.	Transmission Owner	Transmission Owner
8/1/2013	04must	Abstain	EnergyConnect, Inc.	Other Supplier	Curtailment Service Provider
8/1/2013	04must	Abstain	Exelon Business Services Company, LLC	Transmission Owner	Transmission Owner
8/1/2013	04must	Abstain	Kimberly-Clark Corporation	Generation Owner	Generation
8/1/2013	04must	Abstain	Vitol Inc.	Other Supplier	Power Marketer
8/1/2013	04must	No	Appalachian Power Company	Transmission Owner	Transmission Owner
8/1/2013	04must	No	Edison Mission Marketing and Trading, Inc.	Generation Owner	Generation
8/1/2013	04must	No	Liberty Electric Power, LLC	Generation Owner	Generation
8/1/2013	04must	No	NRG Power Marketing, LLC	Generation Owner	Generation
8/1/2013	04must	No	PPL Energy Plus, LLC	Transmission Owner	Transmission Owner
8/1/2013	04must	No	Public Service Electric & Gas Company	Transmission Owner	Transmission Owner
8/1/2013	04must	Yes	Air Liquide Industrials U.S., L.P.	End User Customer	Industrial
8/1/2013	04must	Yes	Air Products & Chemicals, Inc.	End User Customer	Industrial
8/1/2013	04must	Yes	Allegheny Electric Cooperative, Inc.	Electric Distributor	Transmission Owner
8/1/2013	04must	Yes	American Municipal Power, Inc.	Electric Distributor	Muni/Co-op
8/1/2013	04must	Yes	Blue Ridge Power Agency, Inc.	Electric Distributor	Muni/Co-op
8/1/2013	04must	Yes	Borough of Butler, Butler Electric Division	Electric Distributor	Retail Energy Supplier
8/1/2013	04must	Yes	Borough of Chambersburg	Electric Distributor	Muni/Co-op
8/1/2013	04must	Yes	Borough of Lavallette, New Jersey	Electric Distributor	Muni/Co-op
8/1/2013	04must	Yes	Borough of Madison, New Jersey	Electric Distributor	Muni/Co-op
8/1/2013	04must	Yes	Borough of Milltown, New Jersey	Electric Distributor	Muni/Co-op
8/1/2013	04must	Yes	Borough of Park Ridge, New Jersey	Electric Distributor	Muni/Co-op
8/1/2013	04must	Yes	Borough of Pemberton, New Jersey	Electric Distributor	Muni/Co-op
8/1/2013	04must	Yes	Borough of Seaside Heights, New Jersey	Electric Distributor	Muni/Co-op
8/1/2013	04must	Yes	Borough of South River, New Jersey	Electric Distributor	Muni/Co-op
8/1/2013	04must	Yes	Buckeye Power, Inc.	Electric Distributor	Muni/Co-op

8/1/2013	04must	Yes	Calpine Energy Services, L.P.	Generation Owner	Generation
8/1/2013	04must	Yes	Castlebridge Energy Group, LLC	Other Supplier	Financial Trader
8/1/2013	04must	Yes	Central Virginia Electric Cooperative	Electric Distributor	Muni/Co-op
8/1/2013	04must	Yes	City of Dover, Delaware	Electric Distributor	Muni/Co-op
8/1/2013	04must	Yes	Covanta Energy Group, Inc.	Generation Owner	Generation
8/1/2013	04must	Yes	Dayton Power & Light Company (The)	Transmission Owner	Transmission Owner
8/1/2013	04must	Yes	Delaware Municipal Electric Corporation, Inc.	Electric Distributor	Muni/Co-op
8/1/2013	04must	Yes	Direct Energy Business, LLC	Other Supplier	Retail Energy Supplier
8/1/2013	04must	Yes	Duke Energy Business Services LLC	Transmission Owner	Unspecified LOB
8/1/2013	04must	Yes	Duquesne Light Company	Transmission Owner	Transmission Owner
8/1/2013	04must	Yes	Easton Utilities Commission	Electric Distributor	Muni/Co-op
8/1/2013	04must	Yes	Energy Cooperative Association of Pennsylvania (The)	Other Supplier	Muni/Co-op
8/1/2013	04must	Yes	EnerNOC, Inc.	Other Supplier	Curtailment Service Provider
8/1/2013	04must	Yes	Enerwise Global Technologies, Inc.	Other Supplier	Curtailment Service Provider
8/1/2013	04must	Yes	FirstEnergy Solutions Corp.	Transmission Owner	Power Marketer
8/1/2013	04must	Yes	Galt Power, Inc.	Other Supplier	Power Marketer
8/1/2013	04must	Yes	Gerdau Ameristeel Energy, Inc.	Other Supplier	Financial Trader
8/1/2013	04must	Yes	Hagerstown Light Department	Electric Distributor	Muni/Co-op
8/1/2013	04must	Yes	Hess Corporation	Other Supplier	Power Marketer
8/1/2013	04must	Yes	Homer City Generation, L.P.	Generation Owner	Generation
8/1/2013	04must	Yes	Illinois Municipal Electric Agency	Electric Distributor	Muni/Co-op
8/1/2013	04must	Yes	Indiana Municipal Power Agency	Generation Owner	Muni/Co-op
8/1/2013	04must	Yes	Industrial Energy Users-Ohio	Other Supplier	Retail Energy Supplier
8/1/2013	04must	Yes	Iron Mountain Generation LLC	Generation Owner	Generation
8/1/2013	04must	Yes	Jersey Green Energy, LLC	Other Supplier	Financial Trader
8/1/2013	04must	Yes	Lehigh Portland Cement Company	End User Customer	Industrial
8/1/2013	04must	Yes	Letterkenny Industrial Development Authority - PA	Electric Distributor	Muni/Co-op

8/1/2013	04must	Yes	Linde, LLC	End User Customer	Industrial
8/1/2013	04must	Yes	Madison Gas & Electric Co.	Other Supplier	Power Marketer
8/1/2013	04must	Yes	MeadWestvaco Corporation	End User Customer	Generation
8/1/2013	04must	Yes	New York Power Authority	Other Supplier	Financial Trader
8/1/2013	04must	Yes	NextEra Energy Power Marketing, LLC	Generation Owner	Generation
8/1/2013	04must	Yes	North Carolina Electric Membership Corporation	Electric Distributor	Muni/Co-op
8/1/2013	04must	Yes	Northern Virginia Electric Cooperative (NOVEC)	Electric Distributor	Muni/Co-op
8/1/2013	04must	Yes	Occidental Power Services, Inc.	Other Supplier	Unspecified LOB
8/1/2013	04must	Yes	Pennsylvania Office of Consumer Advocate	End User Customer	Consumer Advocate
8/1/2013	04must	Yes	Potomac Electric Power Company	Electric Distributor	Transmission Owner
8/1/2013	04must	Yes	Praxair, Inc.	End User Customer	Industrial
8/1/2013	04must	Yes	Primary Power, LLC	Other Supplier	Transmission Owner
8/1/2013	04must	Yes	Procter & Gamble Paper Products Company (The)	End User Customer	Industrial
8/1/2013	04must	Yes	RC Cape May Holdings, LLC	Generation Owner	Generation
8/1/2013	04must	Yes	Richland-Stryker Generation, LLC	Generation Owner	Generation
8/1/2013	04must	Yes	The Trustees of the University of Pennsylvania, Pennsylvania Non-Profit Corporation d/b/a University of Pennsylvania	End User Customer	Retail Energy Supplier
8/1/2013	04must	Yes	Town of Williamsport (The)	Electric Distributor	Muni/Co-op
8/1/2013	04must	Yes	UGI Utilities, Inc.	Transmission Owner	Transmission Owner
8/1/2013	04must	Yes	Vineland Municipal Electric Utility	Electric Distributor	Muni/Co-op
8/1/2013	04must	Yes	Wellsboro Electric Company	Electric Distributor	Muni/Co-op
8/1/2013	04must	Yes	WPPI Energy	Other Supplier	Power Marketer
9/26/2013	05nodal	Abstain	Allegheny Electric Cooperative, Inc.	Electric Distributor	Transmission Owner
9/26/2013	05nodal	Abstain	Appalachian Power Company	Transmission Owner	Transmission Owner
9/26/2013	05nodal	Abstain	Covanta Energy Group, Inc.	Generation Owner	Generation
9/26/2013	05nodal	Abstain	DC Energy, LLC	Other Supplier	Financial Trader

9/26/2013	05nodal	Abstain	Energy Consulting Services, LLC	Other Supplier	Power Marketer
9/26/2013	05nodal	Abstain	Essential Power Rock Springs, LLC	Transmission Owner	Transmission Owner
9/26/2013	05nodal	Abstain	Forest Investment Group, LLC	Other Supplier	Financial Trader
9/26/2013	05nodal	Abstain	Iron Mountain Generation LLC	Generation Owner	Generation
9/26/2013	05nodal	Abstain	Jersey Green Energy, LLC	Other Supplier	Financial Trader
9/26/2013	05nodal	Abstain	Office of the People's Counsel for the District of Columbia	End User Customer	Consumer Advocate
9/26/2013	05nodal	Abstain	Pennsylvania Office of Consumer Advocate	End User Customer	Consumer Advocate
9/26/2013	05nodal	Abstain	Rock Island Clean Line LLC	Other Supplier	Transmission Owner
9/26/2013	05nodal	No	Dayton Power & Light Company (The)	Transmission Owner	Transmission Owner
9/26/2013	05nodal	No	DTE Energy Trading, Inc.	Other Supplier	Power Marketer
9/26/2013	05nodal	No	Duquesne Light Company	Transmission Owner	Transmission Owner
9/26/2013	05nodal	No	Dynegy Marketing and Trade, LLC	Generation Owner	Generation
9/26/2013	05nodal	No	Edison Mission Marketing and Trading, Inc.	Generation Owner	Generation
9/26/2013	05nodal	No	EnerNOC, Inc.	Other Supplier	Curtailment Service Provider
9/26/2013	05nodal	No	Exelon Business Services Company, LLC	Transmission Owner	Transmission Owner
9/26/2013	05nodal	No	FirstEnergy Solutions Corp.	Transmission Owner	Power Marketer
9/26/2013	05nodal	No	Hess Corporation	Other Supplier	Power Marketer
9/26/2013	05nodal	No	Letterkenny Industrial Development Authority - PA	Electric Distributor	Muni/Co-op
9/26/2013	05nodal	No	Liberty Electric Power, LLC	Generation Owner	Generation
9/26/2013	05nodal	No	New York Power Authority	Other Supplier	Financial Trader
9/26/2013	05nodal	No	Potomac Electric Power Company	Electric Distributor	Transmission Owner
9/26/2013	05nodal	No	PPL Energy Plus, LLC	Transmission Owner	Transmission Owner
9/26/2013	05nodal	No	Public Service Electric & Gas Company	Transmission Owner	Transmission Owner
9/26/2013	05nodal	No	RC Cape May Holdings, LLC	Generation Owner	Generation
9/26/2013	05nodal	No	Richland-Stryker Generation, LLC	Generation Owner	Generation
9/26/2013	05nodal	No	Rockland Electric Company	Transmission Owner	Transmission Owner

9/26/2013	05nodal	No	Vitol Inc.	Other Supplier	Power Marketer
9/26/2013	05nodal	No	Wellsboro Electric Company	Electric Distributor	Muni/Co-op
9/26/2013	05nodal	Yes	Air Liquide Industrials U.S., L.P.	End User Customer	Industrial
9/26/2013	05nodal	Yes	Air Products & Chemicals, Inc.	End User Customer	Industrial
9/26/2013	05nodal	Yes	American Municipal Power, Inc.	Electric Distributor	Muni/Co-op
9/26/2013	05nodal	Yes	Atlantic Grid Operations A, LLC	Other Supplier	Transmission Owner
9/26/2013	05nodal	Yes	Blue Ridge Power Agency, Inc.	Electric Distributor	Muni/Co-op
9/26/2013	05nodal	Yes	Borough of Chambersburg	Electric Distributor	Muni/Co-op
9/26/2013	05nodal	Yes	Buckeye Power, Inc.	Electric Distributor	Muni/Co-op
9/26/2013	05nodal	Yes	Calpine Energy Services, L.P.	Generation Owner	Generation
9/26/2013	05nodal	Yes	Central Virginia Electric Cooperative	Electric Distributor	Muni/Co-op
9/26/2013	05nodal	Yes	Citigroup Energy, Inc.	Other Supplier	Financial Trader
9/26/2013	05nodal	Yes	City of Dover, Delaware	Electric Distributor	Muni/Co-op
9/26/2013	05nodal	Yes	Delaware Municipal Electric Corporation, Inc.	Electric Distributor	Muni/Co-op
9/26/2013	05nodal	Yes	Diamond State Generation Partners, LLC	Generation Owner	Generation
9/26/2013	05nodal	Yes	Direct Energy Business, LLC	Other Supplier	Retail Energy Supplier
9/26/2013	05nodal	Yes	Easton Utilities Commission	Electric Distributor	Muni/Co-op
9/26/2013	05nodal	Yes	Energy Cooperative Association of Pennsylvania (The)	Other Supplier	Muni/Co-op
9/26/2013	05nodal	Yes	Evraz Claymont Steel	Other Supplier	Retail Energy Supplier
9/26/2013	05nodal	Yes	Gerdau Ameristeel Energy, Inc.	Other Supplier	Financial Trader
9/26/2013	05nodal	Yes	Hagerstown Light Department	Electric Distributor	Muni/Co-op
9/26/2013	05nodal	Yes	Icetec.com, Inc.	Other Supplier	Curtailment Service Provider
9/26/2013	05nodal	Yes	Illinois Municipal Electric Agency	Electric Distributor	Muni/Co-op
9/26/2013	05nodal	Yes	Indiana Municipal Power Agency	Generation Owner	Muni/Co-op
9/26/2013	05nodal	Yes	Industrial Energy Users-Ohio	Other Supplier	Retail Energy Supplier
9/26/2013	05nodal	Yes	Kimberly-Clark Corporation	Generation Owner	Generation
9/26/2013	05nodal	Yes	Kuehne Chemical Company, Inc.	Other Supplier	Retail Energy Supplier
9/26/2013	05nodal	Yes	Lehigh Portland Cement Company	End User Customer	Industrial
9/26/2013	05nodal	Yes	Linde, LLC	End User Customer	Industrial

9/26/2013	05nodal	Yes	Long Island Lighting Company dba LIPA	Other Supplier	Power Marketer
9/26/2013	05nodal	Yes	Madison Gas & Electric Co.	Other Supplier	Power Marketer
9/26/2013	05nodal	Yes	MeadWestvaco Corporation	End User Customer	Generation
9/26/2013	05nodal	Yes	North Carolina Electric Membership Corporation	Electric Distributor	Muni/Co-op
9/26/2013	05nodal	Yes	Northern Virginia Electric Cooperative (NOVEC)	Electric Distributor	Muni/Co-op
9/26/2013	05nodal	Yes	Old Dominion Electric Cooperative	Electric Distributor	Muni/Co-op
9/26/2013	05nodal	Yes	PBF Power Marketing, LLC	Generation Owner	Generation
9/26/2013	05nodal	Yes	Praxair, Inc.	End User Customer	Industrial
9/26/2013	05nodal	Yes	Primary Power, LLC	Other Supplier	Transmission Owner
9/26/2013	05nodal	Yes	Procter & Gamble Paper Products Company (The)	End User Customer	Industrial
9/26/2013	05nodal	Yes	Tangent Energy Solutions, Inc.	Other Supplier	Curtailment Service Provider
9/26/2013	05nodal	Yes	The Trustees of the University of Pennsylvania, Pennsylvania Non-Profit Corporation d/b/a University of Pennsylvania	End User Customer	Retail Energy Supplier
9/26/2013	05nodal	Yes	Town of Williamsport (The)	Electric Distributor	Muni/Co-op
9/26/2013	05nodal	Yes	Twin Cities Power, LLC	Other Supplier	Power Marketer
9/26/2013	05nodal	Yes	UGI Utilities, Inc.	Transmission Owner	Transmission Owner
9/26/2013	05nodal	Yes	Virginia Electric & Power Company	Transmission Owner	Transmission Owner
9/26/2013	05nodal	Yes	WPPI Energy	Other Supplier	Power Marketer
11/21/2013	03maximum_alternate	Abstain	Capacity Markets Partners, LLC	Other Supplier	Curtailment Service Provide
11/21/2013	03maximum_alternate	Abstain	Comperio Energy LLC dba ClearChoice Energ	Other Supplier	Curtailment Service Provide
11/21/2013	03maximum_alternate	Abstain	EMC Development Company, Inc	Other Supplier	Curtailment Service Provide
11/21/2013	03maximum_alternate	Abstain	Energy Consulting Services, LLC	Other Supplier	Power Marketer
11/21/2013	03maximum_alternate	Abstain	Enerwise Global Technologies, Inc	Other Supplier	Curtailment Service Provide

11/21/2013	03maximum_alternate	Abstain	Exelon Business Services Company, LL	Transmission Owner	Transmission Owner
11/21/2013	03maximum_alternate	Abstain	Galt Power, Inc.	Other Supplier	Power Marketer
11/21/2013	03maximum_alternate	Abstain	Iberdrola Renewables, LLC	Generation Owner	Generation
11/21/2013	03maximum_alternate	Abstain	Illinois Municipal Electric Agenc	Electric Distributor	Muni/Co-op
11/21/2013	03maximum_alternate	Abstain	Kimberly-Clark Corporation	Generation Owner	Generation
11/21/2013	03maximum_alternate	Abstain	Madison Gas & Electric Co	Other Supplier	Power Marketer
11/21/2013	03maximum_alternate	Abstain	MEG Generating Company, LLC	Generation Owner	Generation
11/21/2013	03maximum_alternate	Abstain	MidAtlantic Power Partners, LLC	Other Supplier	Curtailment Service Provide
11/21/2013	03maximum_alternate	Abstain	New York Power Authority	Other Supplier	Financial Trade
11/21/2013	03maximum_alternate	Abstain	NextEra Energy Power Marketing, LLC	Generation Owner	Generation
11/21/2013	03maximum_alternate	Abstain	RBC Energy Services, L.P	Other Supplier	Power Marketer
11/21/2013	03maximum_alternate	Abstain	Richland-Stryker Generation, LLC	Generation Owner	Generation
11/21/2013	03maximum_alternate	Abstain	Virginia Electric & Power Company	Transmission Owner	Transmission Owner
11/21/2013	03maximum_alternate	Abstain	Viridity Energy, Inc	Other Supplier	Curtailment Service Provide
11/21/2013	03maximum_alternate	Abstain	WPPI Energy	Other Supplier	Power Marketer
11/21/2013	03maximum_alternate	No	American Municipal Power, Inc	Electric Distributor	Muni/Co-op
11/21/2013	03maximum_alternate	No	Black Oak Energy, LLC	Other Supplier	Financial Trade
11/21/2013	03maximum_alternate	No	Borough of Butler, Butler Electric Divisio	Electric Distributor	Retail Energy Supplie
11/21/2013	03maximum_alternate	No	Borough of Lavallette, New Jerse	Electric Distributor	Muni/Co-op
11/21/2013	03maximum_alternate	No	Borough of Madison, New Jerse	Electric Distributor	Muni/Co-op
11/21/2013	03maximum_alternate	No	Borough of Milltown, New Jerse	Electric Distributor	Muni/Co-op
11/21/2013	03maximum_alternate	No	Borough of Mont Alto, Pennsylvani	Electric Distributor	Muni/Co-op
11/21/2013	03maximum_alternate	No	Borough of Park Ridge, New Jersey	Electric Distributor	Muni/Co-op
11/21/2013	03maximum_alternate	No	Borough of Pemberton, New Jersey	Electric Distributor	Muni/Co-op
11/21/2013	03maximum_alternate	No	Borough of Seaside Heights, New Jerse	Electric Distributor	Muni/Co-op
11/21/2013	03maximum_alternate	No	Borough of South River, New Jerse	Electric Distributor	Muni/Co-op
11/21/2013	03maximum_alternate	No	Downes Associates, Inc	Other Supplier	Consultant, Service Company, Etc

11/21/2013	03maximum_alternate	No	Edison Mission Marketing and Trading, Inc	Generation Owner	Generation
11/21/2013	03maximum_alternate	No	Essential Power Rock Springs, LLC	Transmission Owner	Transmission Owner
11/21/2013	03maximum_alternate	No	J.P. Morgan Ventures Energy Corporatio	Other Supplier	Financial Trade
11/21/2013	03maximum_alternate	No	Public Service Electric & Gas Compan	Transmission Owner	Transmission Owner
11/21/2013	03maximum_alternate	No	Thurmont Municipal Light Compan	Electric Distributor	Muni/Co-op
11/21/2013	03maximum_alternate	No	Vineland Municipal Electric Utilit	Electric Distributor	Muni/Co-op
11/21/2013	03maximum_alternate	Yes	Achieving Equilibrium LLC	Other Supplier	Curtailment Service Provide
11/21/2013	03maximum_alternate	Yes	Air Liquide Industrials U.S., L.P	End User Customer	Industria
11/21/2013	03maximum_alternate	Yes	Air Products & Chemicals, Inc	End User Customer	Industria
11/21/2013	03maximum_alternate	Yes	Allegheny Electric Cooperative, Inc	Electric Distributor	Transmission Owne
11/21/2013	03maximum_alternate	Yes	Alphataraxia Palladium LLC	Other Supplier	Power Marketer
11/21/2013	03maximum_alternate	Yes	Appalachian Power Company	Transmission Owner	Transmission Owner
11/21/2013	03maximum_alternate	Yes	Apple Group, LLC	Other Supplier	Financial Trade
11/21/2013	03maximum_alternate	Yes	BJ Energy, LLC	Other Supplier	Financial Trade
11/21/2013	03maximum_alternate	Yes	Blue Ridge Power Agency, Inc	Electric Distributor	Muni/Co-op
11/21/2013	03maximum_alternate	Yes	Borough of Chambersburg	Electric Distributor	Muni/Co-op
11/21/2013	03maximum_alternate	Yes	Brookfield Energy Marketing LP	Other Supplier	Power Marketer
11/21/2013	03maximum_alternate	Yes	Buckeye Power, Inc	Electric Distributor	Muni/Co-op
11/21/2013	03maximum_alternate	Yes	Calpine Energy Services, L.P	Generation Owner	Generation
11/21/2013	03maximum_alternate	Yes	Castlebridge Energy Group, LLC	Other Supplier	Financial Trade
11/21/2013	03maximum_alternate	Yes	Central Virginia Electric Cooperativ	Electric Distributor	Muni/Co-op
11/21/2013	03maximum_alternate	Yes	Citigroup Energy, Inc	Other Supplier	Financial Trade
11/21/2013	03maximum_alternate	Yes	City of Dover, Delaware	Electric Distributor	Muni/Co-op
11/21/2013	03maximum_alternate	Yes	CMS Energy Resource Management Compan	Other Supplier	Power Marketer
11/21/2013	03maximum_alternate	Yes	Covanta Energy Group, Inc	Generation Owner	Generation
11/21/2013	03maximum_alternate	Yes	Dayton Power & Light Company (The	Transmission Owner	Transmission Owner
11/21/2013	03maximum_alternate	Yes	Delaware Municipal Electric Corporation, Inc	Electric Distributor	Muni/Co-op
11/21/2013	03maximum_alternate	Yes	Diamond State Generation Partners, LLC	Generation Owner	Generation

11/21/2013	03maximum_alternate	Yes	Direct Energy Business, LLC	Other Supplier	Retail Energy Supplie
11/21/2013	03maximum_alternate	Yes	Division of the Public Advocate of the State of Delaware	End User Customer	Consumer Advocate
11/21/2013	03maximum_alternate	Yes	DTE Energy Trading, Inc	Other Supplier	Power Marketer
11/21/2013	03maximum_alternate	Yes	Duke Energy Business Services LL	Transmission Owner	Unspecified LOB
11/21/2013	03maximum_alternate	Yes	Duquesne Light Compan	Transmission Owner	Transmission Owner
11/21/2013	03maximum_alternate	Yes	Dynegy Marketing and Trade, LLC	Generation Owner	Generation
11/21/2013	03maximum_alternate	Yes	Dyon, LLC	Other Supplier	Power Marketer
11/21/2013	03maximum_alternate	Yes	E Minus LLC	Other Supplier	Financial Trade
11/21/2013	03maximum_alternate	Yes	East Kentucky Power Cooperative, Inc	Transmission Owner	Transmission Owner
11/21/2013	03maximum_alternate	Yes	Easton Utilities Commissio	Electric Distributor	Muni/Co-op
11/21/2013	03maximum_alternate	Yes	Energy Cooperative Association of Pennsylvania (The)	Other Supplier	Muni/Co-op
11/21/2013	03maximum_alternate	Yes	EnergyConnect, Inc	Other Supplier	Curtailment Service Provide
11/21/2013	03maximum_alternate	Yes	EnerNOC, Inc.	Other Supplier	Curtailment Service Provide
11/21/2013	03maximum_alternate	Yes	Evraz Claymont Stee	Other Supplier	Retail Energy Supplie
11/21/2013	03maximum_alternate	Yes	FirstEnergy Solutions Corp	Transmission Owner	Power Marketer
11/21/2013	03maximum_alternate	Yes	GDF Suez Energy Marketing NA, Inc	Other Supplier	Power Marketer
11/21/2013	03maximum_alternate	Yes	Gerdau Ameristeel Energy, Inc	Other Supplier	Financial Trade
11/21/2013	03maximum_alternate	Yes	Great Bay Energy I, LLC	Other Supplier	Power Marketer
11/21/2013	03maximum_alternate	Yes	Hagerstown Light Departmen	Electric Distributor	Muni/Co-op
11/21/2013	03maximum_alternate	Yes	Hess Corporation	Other Supplier	Power Marketer
11/21/2013	03maximum_alternate	Yes	Hexis Energy Trading, LLC	Other Supplier	Financial Trade
11/21/2013	03maximum_alternate	Yes	Icetec.com, Inc.	Other Supplier	Curtailment Service Provide
11/21/2013	03maximum_alternate	Yes	Illinois Citizen Utility Boar	End User Customer	Consumer Advocate
11/21/2013	03maximum_alternate	Yes	Indiana Municipal Power Agenc	Generation Owner	Muni/Co-op
11/21/2013	03maximum_alternate	Yes	Industrial Energy Users-Ohi	Other Supplier	Retail Energy Supplie
11/21/2013	03maximum_alternate	Yes	Iron Mountain Generation LLC	Generation Owner	Generation
11/21/2013	03maximum_alternate	Yes	Jersey Green Energy, LLC	Other Supplier	Financial Trade

11/21/2013	03maximum_alternate	Yes	Kuehne Chemical Company, Inc	Other Supplier	Retail Energy Supplie
11/21/2013	03maximum_alternate	Yes	Lehigh Portland Cement Compan	End User Customer	Industria
11/21/2013	03maximum_alternate	Yes	Letterkenny Industrial Development Authority - PA	Electric Distributor	Muni/Co-op
11/21/2013	03maximum_alternate	Yes	Liberty Electric Power, LLC	Generation Owner	Generation
11/21/2013	03maximum_alternate	Yes	Linde, LLC	End User Customer	Industria
11/21/2013	03maximum_alternate	Yes	LM Power, LLC	Other Supplier	Financial Trade
11/21/2013	03maximum_alternate	Yes	Long Island Lighting Company dba LIP	Other Supplier	Power Marketer
11/21/2013	03maximum_alternate	Yes	Mac Trading, Inc	Other Supplier	Financial Trade
11/21/2013	03maximum_alternate	Yes	Maryland Office of People's Counse	End User Customer	Consumer Advocate
11/21/2013	03maximum_alternate	Yes	MeadWestvaco Corporation	End User Customer	Generation
11/21/2013	03maximum_alternate	Yes	MET MA, LLC	Other Supplier	Power Marketer
11/21/2013	03maximum_alternate	Yes	Monterey MA, LLC	Other Supplier	Power Marketer
11/21/2013	03maximum_alternate	Yes	New Jersey Division of Rate Counse	End User Customer	Consumer Advocate
11/21/2013	03maximum_alternate	Yes	North Carolina Electric Membership Corporation	Electric Distributor	Muni/Co-op
11/21/2013	03maximum_alternate	Yes	Northern Virginia Electric Cooperative (NOVEC)	Electric Distributor	Muni/Co-op
11/21/2013	03maximum_alternate	Yes	NRG Power Marketing, LLC	Generation Owner	Generation
11/21/2013	03maximum_alternate	Yes	Office of the People's Counsel for the District of Columbia	End User Customer	Consumer Advocate
11/21/2013	03maximum_alternate	Yes	Old Dominion Electric Cooperativ	Electric Distributor	Muni/Co-op
11/21/2013	03maximum_alternate	Yes	PBF Power Marketing, LLC	Generation Owner	Generation
11/21/2013	03maximum_alternate	Yes	Potomac Electric Power Company	Electric Distributor	Transmission Owner
11/21/2013	03maximum_alternate	Yes	PPL Energy Plus, LLC	Transmission Owner	Transmission Owner
11/21/2013	03maximum_alternate	Yes	Praxair, Inc	End User Customer	Industria
11/21/2013	03maximum_alternate	Yes	Primary Power, LLC	Other Supplier	Transmission Owne
11/21/2013	03maximum_alternate	Yes	Procter & Gamble Paper Products Company (The)	End User Customer	Industrial
11/21/2013	03maximum_alternate	Yes	Property Endeavors, LLC	End User Customer	Power Marketer
11/21/2013	03maximum_alternate	Yes	Pure Energy, Inc	Other Supplier	Financial Trade
11/21/2013	03maximum_alternate	Yes	RC Cape May Holdings, LLC	Generation Owner	Generation

11/21/2013	03maximum_alternate	Yes	Red Wolf Energy Trading, LLC	Other Supplier	Financial Trade
11/21/2013	03maximum_alternate	Yes	Rock Island Clean Line LLC	Other Supplier	Transmission Owne
11/21/2013	03maximum_alternate	Yes	Rockland Electric Company	Transmission Owner	Transmission Owner
11/21/2013	03maximum_alternate	Yes	Southern Maryland Electric Cooperative, Inc	Electric Distributor	Muni/Co-op
11/21/2013	03maximum_alternate	Yes	Tangent Energy Solutions, Inc	Other Supplier	Curtailment Service Provide
11/21/2013	03maximum_alternate	Yes	The Trustees of the University of Pennsylvania, Pennsylvania Non-Profit Corporation d/b/a University of Pennsylvania	End User Customer	Retail Energy Supplier
11/21/2013	03maximum_alternate	Yes	Town of Williamsport (The	Electric Distributor	Muni/Co-op
11/21/2013	03maximum_alternate	Yes	UGI Utilities, Inc	Transmission Owner	Transmission Owner
11/21/2013	03maximum_alternate	Yes	Vitol Inc.	Other Supplier	Power Marketer
11/21/2013	03maximum_alternate	Yes	Wabash Valley Power Association, Inc	Electric Distributor	Muni/Co-op
11/21/2013	03maximum_alternate	Yes	Wellsboro Electric Company	Electric Distributor	Muni/Co-op
11/21/2013	03maximum_alternate	Yes	West Deptford Energy, LLC	Generation Owner	Generation
11/21/2013	03maximum_alternate	Yes	West Virginia Consumer Advocate Divisio	End User Customer	Consumer Advocate
11/21/2013	03maximum_alternate	Yes	York County Solid Waste and Refuse Authority	Generation Owner	Generation
11/21/2013	03maximum_main	Abstain	Buckeye Power, Inc	Electric Distributor	Muni/Co-op
11/21/2013	03maximum_main	Abstain	Capacity Markets Partners, LLC	Other Supplier	Curtailment Service Provide
11/21/2013	03maximum_main	Abstain	Comperio Energy LLC dba ClearChoice Energ	Other Supplier	Curtailment Service Provide
11/21/2013	03maximum_main	Abstain	Duquesne Light Compan	Transmission Owner	Transmission Owner
11/21/2013	03maximum_main	Abstain	EMC Development Company, Inc	Other Supplier	Curtailment Service Provide
11/21/2013	03maximum_main	Abstain	Energy Consulting Services, LLC	Other Supplier	Power Marketer
11/21/2013	03maximum_main	Abstain	Enerwise Global Technologies, Inc	Other Supplier	Curtailment Service Provide
11/21/2013	03maximum_main	Abstain	Galt Power, Inc.	Other Supplier	Power Marketer
11/21/2013	03maximum_main	Abstain	Iberdrola Renewables, LLC	Generation Owner	Generation

11/21/2013	03maximum_main	Abstain	Kimberly-Clark Corporation	Generation Owner	Generation
11/21/2013	03maximum_main	Abstain	MidAtlantic Power Partners, LLC	Other Supplier	Curtailment Service Provide
11/21/2013	03maximum_main	Abstain	New York Power Authority	Other Supplier	Financial Trade
11/21/2013	03maximum_main	Abstain	NextEra Energy Power Marketing, LLC	Generation Owner	Generation
11/21/2013	03maximum_main	Abstain	Property Endeavors, LLC	End User Customer	Power Marketer
11/21/2013	03maximum_main	Abstain	Red Wolf Energy Trading, LLC	Other Supplier	Financial Trade
11/21/2013	03maximum_main	Abstain	Richland-Stryker Generation, LLC	Generation Owner	Generation
11/21/2013	03maximum_main	Abstain	Viridity Energy, Inc	Other Supplier	Curtailment Service Provide
11/21/2013	03maximum_main	No	Achieving Equilibrium LLC	Other Supplier	Curtailment Service Provide
11/21/2013	03maximum_main	No	Air Liquide Industrials U.S., L.P	End User Customer	Industria
11/21/2013	03maximum_main	No	Air Products & Chemicals, Inc	End User Customer	Industria
11/21/2013	03maximum_main	No	Allegheny Electric Cooperative, Inc	Electric Distributor	Transmission Owne
11/21/2013	03maximum_main	No	Alphataraxia Palladium LLC	Other Supplier	Power Marketer
11/21/2013	03maximum_main	No	American Municipal Power, Inc	Electric Distributor	Muni/Co-op
11/21/2013	03maximum_main	No	Appalachian Power Company	Transmission Owner	Transmission Owner
11/21/2013	03maximum_main	No	Apple Group, LLC	Other Supplier	Financial Trade
11/21/2013	03maximum_main	No	BJ Energy, LLC	Other Supplier	Financial Trade
11/21/2013	03maximum_main	No	Black Oak Energy, LLC	Other Supplier	Financial Trade
11/21/2013	03maximum_main	No	Blue Ridge Power Agency, Inc	Electric Distributor	Muni/Co-op
11/21/2013	03maximum_main	No	Borough of Butler, Butler Electric Divisio	Electric Distributor	Retail Energy Supplie
11/21/2013	03maximum_main	No	Borough of Chambersburg	Electric Distributor	Muni/Co-op
11/21/2013	03maximum_main	No	Borough of Lavallette, New Jerse	Electric Distributor	Muni/Co-op
11/21/2013	03maximum_main	No	Borough of Madison, New Jerse	Electric Distributor	Muni/Co-op
11/21/2013	03maximum_main	No	Borough of Milltown, New Jerse	Electric Distributor	Muni/Co-op
11/21/2013	03maximum_main	No	Borough of Mont Alto, Pennsylvani	Electric Distributor	Muni/Co-op
11/21/2013	03maximum_main	No	Borough of Park Ridge, New Jersey	Electric Distributor	Muni/Co-op
11/21/2013	03maximum_main	No	Borough of Pemberton, New Jersey	Electric Distributor	Muni/Co-op
11/21/2013	03maximum_main	No	Borough of Seaside Heights, New Jerse	Electric Distributor	Muni/Co-op

11/21/2013	03maximum_main	No	Borough of South River, New Jerse	Electric Distributor	Muni/Co-op
11/21/2013	03maximum_main	No	Brookfield Energy Marketing LP	Other Supplier	Power Marketer
11/21/2013	03maximum_main	No	Calpine Energy Services, L.P	Generation Owner	Generation
11/21/2013	03maximum_main	No	Castlebridge Energy Group, LLC	Other Supplier	Financial Trade
11/21/2013	03maximum_main	No	Central Virginia Electric Cooperativ	Electric Distributor	Muni/Co-op
11/21/2013	03maximum_main	No	City of Dover, Delaware	Electric Distributor	Muni/Co-op
11/21/2013	03maximum_main	No	CMS Energy Resource Management Compan	Other Supplier	Power Marketer
11/21/2013	03maximum_main	No	Delaware Municipal Electric Corporation, Inc	Electric Distributor	Muni/Co-op
11/21/2013	03maximum_main	No	Diamond State Generation Partners, LLC	Generation Owner	Generation
11/21/2013	03maximum_main	No	Division of the Public Advocate of the State of Delaware	End User Customer	Consumer Advocate
11/21/2013	03maximum_main	No	Downes Associates, Inc	Other Supplier	Consultant, Service Company, Etc
11/21/2013	03maximum_main	No	DTE Energy Trading, Inc	Other Supplier	Power Marketer
11/21/2013	03maximum_main	No	Duke Energy Business Services LL	Transmission Owner	Unspecified LOB
11/21/2013	03maximum_main	No	Dynegy Marketing and Trade, LLC	Generation Owner	Generation
11/21/2013	03maximum_main	No	Dyon, LLC	Other Supplier	Power Marketer
11/21/2013	03maximum_main	No	E Minus LLC	Other Supplier	Financial Trade
11/21/2013	03maximum_main	No	Easton Utilities Commissio	Electric Distributor	Muni/Co-op
11/21/2013	03maximum_main	No	Energy Cooperative Association of Pennsylvania (The)	Other Supplier	Muni/Co-op
11/21/2013	03maximum_main	No	Evraz Claymont Stee	Other Supplier	Retail Energy Supplie
11/21/2013	03maximum_main	No	Gerdau Ameristeel Energy, Inc	Other Supplier	Financial Trade
11/21/2013	03maximum_main	No	Great Bay Energy I, LLC	Other Supplier	Power Marketer
11/21/2013	03maximum_main	No	Hagerstown Light Departmen	Electric Distributor	Muni/Co-op
11/21/2013	03maximum_main	No	Hexis Energy Trading, LLC	Other Supplier	Financial Trade
11/21/2013	03maximum_main	No	Icetec.com, Inc.	Other Supplier	Curtailment Service Provide
11/21/2013	03maximum_main	No	Illinois Citizen Utility Boar	End User Customer	Consumer Advocate
11/21/2013	03maximum_main	No	Illinois Municipal Electric Agenc	Electric Distributor	Muni/Co-op

11/21/2013	03maximum_main	No	Indiana Municipal Power Agenc	Generation Owner	Muni/Co-op
11/21/2013	03maximum_main	No	Industrial Energy Users-Ohi	Other Supplier	Retail Energy Supplie
11/21/2013	03maximum_main	No	Kuehne Chemical Company, Inc	Other Supplier	Retail Energy Supplie
11/21/2013	03maximum_main	No	Lehigh Portland Cement Compan	End User Customer	Industria
11/21/2013	03maximum_main	No	Letterkenny Industrial Development Authority - PA	Electric Distributor	Muni/Co-op
11/21/2013	03maximum_main	No	Linde, LLC	End User Customer	Industria
11/21/2013	03maximum_main	No	LM Power, LLC	Other Supplier	Financial Trade
11/21/2013	03maximum_main	No	Mac Trading, Inc	Other Supplier	Financial Trade
11/21/2013	03maximum_main	No	Madison Gas & Electric Co	Other Supplier	Power Marketer
11/21/2013	03maximum_main	No	Maryland Office of People's Counse	End User Customer	Consumer Advocate
11/21/2013	03maximum_main	No	MeadWestvaco Corporation	End User Customer	Generation
11/21/2013	03maximum_main	No	MET MA, LLC	Other Supplier	Power Marketer
11/21/2013	03maximum_main	No	Monterey MA, LLC	Other Supplier	Power Marketer
11/21/2013	03maximum_main	No	New Jersey Division of Rate Counse	End User Customer	Consumer Advocate
11/21/2013	03maximum_main	No	North Carolina Electric Membership Corporation	Electric Distributor	Muni/Co-op
11/21/2013	03maximum_main	No	Northern Virginia Electric Cooperative (NOVEC)	Electric Distributor	Muni/Co-op
11/21/2013	03maximum_main	No	NRG Power Marketing, LLC	Generation Owner	Generation
11/21/2013	03maximum_main	No	Old Dominion Electric Cooperativ	Electric Distributor	Muni/Co-op
11/21/2013	03maximum_main	No	PBF Power Marketing, LLC	Generation Owner	Generation
11/21/2013	03maximum_main	No	Potomac Electric Power Company	Electric Distributor	Transmission Owne
11/21/2013	03maximum_main	No	Praxair, Inc	End User Customer	Industria
11/21/2013	03maximum_main	No	Procter & Gamble Paper Products Company (The)	End User Customer	Industrial
11/21/2013	03maximum_main	No	Pure Energy, Inc	Other Supplier	Financial Trade
11/21/2013	03maximum_main	No	Rock Island Clean Line LLC	Other Supplier	Transmission Owne
11/21/2013	03maximum_main	No	Rockland Electric Company	Transmission Owner	Transmission Owner
11/21/2013	03maximum_main	No	Southern Maryland Electric Cooperative, Inc	Electric Distributor	Muni/Co-op

11/21/2013	03maximum_main	No	The Trustees of the University of Pennsylvania, Pennsylvania Non-Profit Corporation d/b/a University of Pennsylvania	End User Customer	Retail Energy Supplier
11/21/2013	03maximum_main	No	Thurmont Municipal Light Compan	Electric Distributor	Muni/Co-op
11/21/2013	03maximum_main	No	Town of Williamsport (The	Electric Distributor	Muni/Co-op
11/21/2013	03maximum_main	No	UGI Utilities, Inc	Transmission Owner	Transmission Owner
11/21/2013	03maximum_main	No	Vineland Municipal Electric Utilit	Electric Distributor	Muni/Co-op
11/21/2013	03maximum_main	No	Wellsboro Electric Company	Electric Distributor	Muni/Co-op
11/21/2013	03maximum_main	No	West Deptford Energy, LLC	Generation Owner	Generation
11/21/2013	03maximum_main	No	West Virginia Consumer Advocate Divisio	End User Customer	Consumer Advocate
11/21/2013	03maximum_main	No	WPPI Energy	Other Supplier	Power Marketer
11/21/2013	03maximum_main	Yes	Citigroup Energy, Inc	Other Supplier	Financial Trade
11/21/2013	03maximum_main	Yes	Covanta Energy Group, Inc	Generation Owner	Generation
11/21/2013	03maximum_main	Yes	Dayton Power & Light Company (The	Transmission Owner	Transmission Owner
11/21/2013	03maximum_main	Yes	Direct Energy Business, LLC	Other Supplier	Retail Energy Supplie
11/21/2013	03maximum_main	Yes	East Kentucky Power Cooperative, Inc	Transmission Owner	Transmission Owner
11/21/2013	03maximum_main	Yes	Edison Mission Marketing and Trading, Inc	Generation Owner	Generation
11/21/2013	03maximum_main	Yes	EnergyConnect, Inc	Other Supplier	Curtailment Service Provide
11/21/2013	03maximum_main	Yes	EnerNOC, Inc.	Other Supplier	Curtailment Service Provide
11/21/2013	03maximum_main	Yes	Essential Power Rock Springs, LLC	Transmission Owner	Transmission Owner
11/21/2013	03maximum_main	Yes	Exelon Business Services Company, LL	Transmission Owner	Transmission Owner
11/21/2013	03maximum_main	Yes	FirstEnergy Solutions Corp	Transmission Owner	Power Marketer
11/21/2013	03maximum_main	Yes	GDF Suez Energy Marketing NA, Inc	Other Supplier	Power Marketer
11/21/2013	03maximum_main	Yes	Hess Corporation	Other Supplier	Power Marketer
11/21/2013	03maximum_main	Yes	Iron Mountain Generation LLC	Generation Owner	Generation
11/21/2013	03maximum_main	Yes	J.P. Morgan Ventures Energy Corporatio	Other Supplier	Financial Trade
11/21/2013	03maximum_main	Yes	Jersey Green Energy, LLC	Other Supplier	Financial Trade

11/21/2013	03maximum_main	Yes	Liberty Electric Power, LLC	Generation Owner	Generation
11/21/2013	03maximum_main	Yes	Long Island Lighting Company dba LIP	Other Supplier	Power Marketer
11/21/2013	03maximum_main	Yes	MEG Generating Company, LLC	Generation Owner	Generation
11/21/2013	03maximum_main	Yes	Office of the People's Counsel for the District of Columbia	End User Customer	Consumer Advocate
11/21/2013	03maximum_main	Yes	PPL Energy Plus, LLC	Transmission Owner	Transmission Owner
11/21/2013	03maximum_main	Yes	Primary Power, LLC	Other Supplier	Transmission Owne
11/21/2013	03maximum_main	Yes	Public Service Electric & Gas Compan	Transmission Owner	Transmission Owner
11/21/2013	03maximum_main	Yes	RBC Energy Services, L.P	Other Supplier	Power Marketer
11/21/2013	03maximum_main	Yes	RC Cape May Holdings, LLC	Generation Owner	Generation
11/21/2013	03maximum_main	Yes	Virginia Electric & Power Company	Transmission Owner	Transmission Owner
11/21/2013	03maximum_main	Yes	Vitol Inc.	Other Supplier	Power Marketer
11/21/2013	03maximum_main	Yes	Wabash Valley Power Association, Inc	Electric Distributor	Muni/Co-op
11/21/2013	03maximum_main	Yes	York County Solid Waste and Refuse Authority	Generation Owner	Generation
11/21/2013	04clearing_a	Abstain	CPV Maryland, LLC	Generation Owner	Generation
11/21/2013	04clearing_a	Abstain	Kimberly-Clark Corporation	Generation Owner	Generation
11/21/2013	04clearing_a	Abstain	Long Island Lighting Company dba LIP	Other Supplier	Power Marketer
11/21/2013	04clearing_a	Abstain	Richland-Stryker Generation, LLC	Generation Owner	Generation
11/21/2013	04clearing_a	Abstain	Wabash Valley Power Association, Inc	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_a	No	Achieving Equilibrium LLC	Other Supplier	Curtailment Service Provide
11/21/2013	04clearing_a	No	Air Liquide Industrials U.S., L.P	End User Customer	Industria
11/21/2013	04clearing_a	No	Air Products & Chemicals, Inc	End User Customer	Industria
11/21/2013	04clearing_a	No	Allegheny Electric Cooperative, Inc	Electric Distributor	Transmission Owne
11/21/2013	04clearing_a	No	American Municipal Power, Inc	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_a	No	Blue Ridge Power Agency, Inc	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_a	No	Borough of Butler, Butler Electric Divisio	Electric Distributor	Retail Energy Supplie
11/21/2013	04clearing_a	No	Borough of Chambersburg	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_a	No	Borough of Lavallette, New Jerse	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_a	No	Borough of Madison, New Jerse	Electric Distributor	Muni/Co-op

11/21/2013	04clearing_a	No	Borough of Milltown, New Jerse	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_a	No	Borough of Mont Alto, Pennsylvani	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_a	No	Borough of Park Ridge, New Jersey	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_a	No	Borough of Pemberton, New Jersey	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_a	No	Borough of Seaside Heights, New Jerse	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_a	No	Borough of South River, New Jerse	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_a	No	Brookfield Energy Marketing LP	Other Supplier	Power Marketer
11/21/2013	04clearing_a	No	Castlebridge Energy Group, LLC	Other Supplier	Financial Trade
11/21/2013	04clearing_a	No	Central Virginia Electric Cooperativ	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_a	No	City of Dover, Delaware	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_a	No	CMS Energy Resource Management Compan	Other Supplier	Power Marketer
11/21/2013	04clearing_a	No	Comperio Energy LLC dba ClearChoice Energ	Other Supplier	Curtailment Service Provide
11/21/2013	04clearing_a	No	Delaware Municipal Electric Corporation, Inc	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_a	No	Demansys Energy, LLC	Other Supplier	Curtailment Service Provide
11/21/2013	04clearing_a	No	Direct Energy Business, LLC	Other Supplier	Retail Energy Supplie
11/21/2013	04clearing_a	No	Division of the Public Advocate of the State of Delaware	End User Customer	Consumer Advocate
11/21/2013	04clearing_a	No	Downes Associates, Inc	Other Supplier	Consultant, Service Company, Etc
11/21/2013	04clearing_a	No	Duquesne Light Compan	Transmission Owner	Transmission Owner
11/21/2013	04clearing_a	No	Easton Utilities Commissio	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_a	No	Energy Consulting Services, LLC	Other Supplier	Power Marketer
11/21/2013	04clearing_a	No	Energy Cooperative Association of Pennsylvania (The)	Other Supplier	Muni/Co-op
11/21/2013	04clearing_a	No	EnergyConnect, Inc	Other Supplier	Curtailment Service Provide
11/21/2013	04clearing_a	No	EnerNOC, Inc.	Other Supplier	Curtailment Service Provide

11/21/2013	04clearing_a	No	Enerwise Global Technologies, Inc	Other Supplier	Curtailment Service Provide
11/21/2013	04clearing_a	No	Evraz Claymont Stee	Other Supplier	Retail Energy Supplie
11/21/2013	04clearing_a	No	Galt Power, Inc.	Other Supplier	Power Marketer
11/21/2013	04clearing_a	No	GDF Suez Energy Marketing NA, Inc	Other Supplier	Power Marketer
11/21/2013	04clearing_a	No	Gerdau Ameristeel Energy, Inc	Other Supplier	Financial Trade
11/21/2013	04clearing_a	No	Hagerstown Light Departmen	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_a	No	Icetec.com, Inc.	Other Supplier	Curtailment Service Provide
11/21/2013	04clearing_a	No	Illinois Citizen Utility Boar	End User Customer	Consumer Advocate
11/21/2013	04clearing_a	No	Illinois Municipal Electric Agenc	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_a	No	Indiana Municipal Power Agenc	Generation Owner	Muni/Co-op
11/21/2013	04clearing_a	No	Industrial Energy Users-Ohi	Other Supplier	Retail Energy Supplie
11/21/2013	04clearing_a	No	Iron Mountain Generation LLC	Generation Owner	Generation
11/21/2013	04clearing_a	No	Kuehne Chemical Company, Inc	Other Supplier	Retail Energy Supplie
11/21/2013	04clearing_a	No	Lehigh Portland Cement Compan	End User Customer	Industria
11/21/2013	04clearing_a	No	Letterkenny Industrial Development Authority - PA	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_a	No	Linde, LLC	End User Customer	Industria
11/21/2013	04clearing_a	No	Madison Gas & Electric Co	Other Supplier	Power Marketer
11/21/2013	04clearing_a	No	Maryland Office of People's Counse	End User Customer	Consumer Advocate
11/21/2013	04clearing_a	No	MeadWestvaco Corporation	End User Customer	Generation
11/21/2013	04clearing_a	No	MidAtlantic Power Partners, LLC	Other Supplier	Curtailment Service Provide
11/21/2013	04clearing_a	No	New Jersey Division of Rate Counse	End User Customer	Consumer Advocate
11/21/2013	04clearing_a	No	North Carolina Electric Membership Corporation	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_a	No	Northern Virginia Electric Cooperative (NOVEC)	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_a	No	Office of the People's Counsel for the District of Columbia	End User Customer	Consumer Advocate
11/21/2013	04clearing_a	No	Old Dominion Electric Cooperativ	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_a	No	PBF Power Marketing, LLC	Generation Owner	Generation

11/21/2013	04clearing_a	No	Potomac Electric Power Company	Electric Distributor	Transmission Owne
11/21/2013	04clearing_a	No	Praxair, Inc	End User Customer	Industria
11/21/2013	04clearing_a	No	Procter & Gamble Paper Products Company (The)	End User Customer	Industrial
11/21/2013	04clearing_a	No	Rockland Electric Company	Transmission Owner	Transmission Owner
11/21/2013	04clearing_a	No	Southern Maryland Electric Cooperative, Inc	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_a	No	Tangent Energy Solutions, Inc	Other Supplier	Curtailment Service Provide
11/21/2013	04clearing_a	No	The Trustees of the University of Pennsylvania, Pennsylvania Non-Profit Corporation d/b/a University of Pennsylvania	End User Customer	Retail Energy Supplier
11/21/2013	04clearing_a	No	Thurmont Municipal Light Compan	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_a	No	Town of Williamsport (The	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_a	No	Vineland Municipal Electric Utilit	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_a	No	Viridity Energy, Inc	Other Supplier	Curtailment Service Provide
11/21/2013	04clearing_a	No	Wellsboro Electric Company	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_a	No	West Virginia Consumer Advocate Divisio	End User Customer	Consumer Advocate
11/21/2013	04clearing_a	No	WPPI Energy	Other Supplier	Power Marketer
11/21/2013	04clearing_a	Yes	Alphataraxia Palladium LLC	Other Supplier	Power Marketer
11/21/2013	04clearing_a	Yes	Appalachian Power Company	Transmission Owner	Transmission Owner
11/21/2013	04clearing_a	Yes	Apple Group, LLC	Other Supplier	Financial Trade
11/21/2013	04clearing_a	Yes	Atlantic Grid Operations A, LLC	Other Supplier	Transmission Owne
11/21/2013	04clearing_a	Yes	BJ Energy, LLC	Other Supplier	Financial Trade
11/21/2013	04clearing_a	Yes	Buckeye Power, Inc	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_a	Yes	Calpine Energy Services, L.P	Generation Owner	Generation
11/21/2013	04clearing_a	Yes	Citigroup Energy, Inc	Other Supplier	Financial Trade
11/21/2013	04clearing_a	Yes	Covanta Energy Group, Inc	Generation Owner	Generation
11/21/2013	04clearing_a	Yes	Dayton Power & Light Company (The	Transmission Owner	Transmission Owner
11/21/2013	04clearing_a	Yes	Diamond State Generation Partners, LLC	Generation Owner	Generation

11/21/2013	04clearing_a	Yes	Duke Energy Business Services LL	Transmission Owner	Unspecified LOB
11/21/2013	04clearing_a	Yes	Dynegy Marketing and Trade, LLC	Generation Owner	Generation
11/21/2013	04clearing_a	Yes	Dyon, LLC	Other Supplier	Power Marketer
11/21/2013	04clearing_a	Yes	E Minus LLC	Other Supplier	Financial Trade
11/21/2013	04clearing_a	Yes	East Kentucky Power Cooperative, Inc	Transmission Owner	Transmission Owner
11/21/2013	04clearing_a	Yes	Edison Mission Marketing and Trading, Inc	Generation Owner	Generation
11/21/2013	04clearing_a	Yes	Essential Power Rock Springs, LLC	Transmission Owner	Transmission Owner
11/21/2013	04clearing_a	Yes	Exelon Business Services Company, LL	Transmission Owner	Transmission Owner
11/21/2013	04clearing_a	Yes	FirstEnergy Solutions Corp	Transmission Owner	Power Marketer
11/21/2013	04clearing_a	Yes	Great Bay Energy I, LLC	Other Supplier	Power Marketer
11/21/2013	04clearing_a	Yes	Hess Corporation	Other Supplier	Power Marketer
11/21/2013	04clearing_a	Yes	Hexis Energy Trading, LLC	Other Supplier	Financial Trade
11/21/2013	04clearing_a	Yes	J.P. Morgan Ventures Energy Corporatio	Other Supplier	Financial Trade
11/21/2013	04clearing_a	Yes	Jersey Green Energy, LLC	Other Supplier	Financial Trade
11/21/2013	04clearing_a	Yes	Liberty Electric Power, LLC	Generation Owner	Generation
11/21/2013	04clearing_a	Yes	LM Power, LLC	Other Supplier	Financial Trade
11/21/2013	04clearing_a	Yes	Mac Trading, Inc	Other Supplier	Financial Trade
11/21/2013	04clearing_a	Yes	MEG Generating Company, LLC	Generation Owner	Generation
11/21/2013	04clearing_a	Yes	MET MA, LLC	Other Supplier	Power Marketer
11/21/2013	04clearing_a	Yes	Monterey MA, LLC	Other Supplier	Power Marketer
11/21/2013	04clearing_a	Yes	New York Power Authority	Other Supplier	Financial Trade
11/21/2013	04clearing_a	Yes	NextEra Energy Power Marketing, LLC	Generation Owner	Generation
11/21/2013	04clearing_a	Yes	NRG Power Marketing, LLC	Generation Owner	Generation
11/21/2013	04clearing_a	Yes	PPL Energy Plus, LLC	Transmission Owner	Transmission Owner
11/21/2013	04clearing_a	Yes	Primary Power, LLC	Other Supplier	Transmission Owne
11/21/2013	04clearing_a	Yes	Property Endeavors, LLC	End User Customer	Power Marketer
11/21/2013	04clearing_a	Yes	Public Service Electric & Gas Compan	Transmission Owner	Transmission Owner
11/21/2013	04clearing_a	Yes	Pure Energy, Inc	Other Supplier	Financial Trade
11/21/2013	04clearing_a	Yes	RBC Energy Services, L.P	Other Supplier	Power Marketer
11/21/2013	04clearing_a	Yes	RC Cape May Holdings, LLC	Generation Owner	Generation

11/21/2013	04clearing_a	Yes	Red Wolf Energy Trading, LLC	Other Supplier	Financial Trade
11/21/2013	04clearing_a	Yes	Rock Island Clean Line LLC	Other Supplier	Transmission Owne
11/21/2013	04clearing_a	Yes	UGI Utilities, Inc	Transmission Owner	Transmission Owner
11/21/2013	04clearing_a	Yes	Virginia Electric & Power Company	Transmission Owner	Transmission Owner
11/21/2013	04clearing_a	Yes	Vitol Inc.	Other Supplier	Power Marketer
11/21/2013	04clearing_a	Yes	West Deptford Energy, LLC	Generation Owner	Generation
11/21/2013	04clearing_a	Yes	York County Solid Waste and Refuse Authority	Generation Owner	Generation
11/21/2013	04clearing_b	Abstain	Buckeye Power, Inc	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_b	Abstain	CPV Maryland, LLC	Generation Owner	Generation
11/21/2013	04clearing_b	Abstain	EnerNOC, Inc.	Other Supplier	Curtailment Service Provide
11/21/2013	04clearing_b	Abstain	Kimberly-Clark Corporation	Generation Owner	Generation
11/21/2013	04clearing_b	Abstain	Potomac Electric Power Company	Electric Distributor	Transmission Owne
11/21/2013	04clearing_b	Abstain	Richland-Stryker Generation, LLC	Generation Owner	Generation
11/21/2013	04clearing_b	Abstain	Wabash Valley Power Association, Inc	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_b	No	Alphataraxia Palladium LLC	Other Supplier	Power Marketer
11/21/2013	04clearing_b	No	Appalachian Power Company	Transmission Owner	Transmission Owne
11/21/2013	04clearing_b	No	Apple Group, LLC	Other Supplier	Financial Trade
11/21/2013	04clearing_b	No	Atlantic Grid Operations A, LLC	Other Supplier	Transmission Owne
11/21/2013	04clearing_b	No	BJ Energy, LLC	Other Supplier	Financial Trade
11/21/2013	04clearing_b	No	Brookfield Energy Marketing LP	Other Supplier	Power Marketer
11/21/2013	04clearing_b	No	Calpine Energy Services, L.P	Generation Owner	Generation
11/21/2013	04clearing_b	No	Citigroup Energy, Inc	Other Supplier	Financial Trade
11/21/2013	04clearing_b	No	Covanta Energy Group, Inc	Generation Owner	Generation
11/21/2013	04clearing_b	No	Dayton Power & Light Company (The	Transmission Owner	Transmission Owne
11/21/2013	04clearing_b	No	Diamond State Generation Partners, LLC	Generation Owner	Generation
11/21/2013	04clearing_b	No	Direct Energy Business, LLC	Other Supplier	Retail Energy Supplie
11/21/2013	04clearing_b	No	Duke Energy Business Services LL	Transmission Owner	Unspecified LOB
11/21/2013	04clearing_b	No	Dynegy Marketing and Trade, LLC	Generation Owner	Generation
11/21/2013	04clearing_b	No	Dyon, LLC	Other Supplier	Power Marketer

11/21/2013	04clearing_b	No	E Minus LLC	Other Supplier	Financial Trade
11/21/2013	04clearing_b	No	East Kentucky Power Cooperative, Inc	Transmission Owner	Transmission Owne
11/21/2013	04clearing_b	No	Edison Mission Marketing and Trading, Inc	Generation Owner	Generation
11/21/2013	04clearing_b	No	Enerwise Global Technologies, Inc	Other Supplier	Curtailment Service Provide
11/21/2013	04clearing_b	No	Essential Power Rock Springs, LLC	Transmission Owner	Transmission Owne
11/21/2013	04clearing_b	No	Exelon Business Services Company, LL	Transmission Owner	Transmission Owne
11/21/2013	04clearing_b	No	FirstEnergy Solutions Corp	Transmission Owner	Power Marketer
11/21/2013	04clearing_b	No	GDF Suez Energy Marketing NA, Inc	Other Supplier	Power Marketer
11/21/2013	04clearing_b	No	Great Bay Energy I, LLC	Other Supplier	Power Marketer
11/21/2013	04clearing_b	No	Hess Corporation	Other Supplier	Power Marketer
11/21/2013	04clearing_b	No	Hexis Energy Trading, LLC	Other Supplier	Financial Trade
11/21/2013	04clearing_b	No	Invenergy, LLC	Generation Owner	Generation
11/21/2013	04clearing_b	No	Iron Mountain Generation LLC	Generation Owner	Generation
11/21/2013	04clearing_b	No	J.P. Morgan Ventures Energy Corporatio	Other Supplier	Financial Trade
11/21/2013	04clearing_b	No	Jersey Green Energy, LLC	Other Supplier	Financial Trade
11/21/2013	04clearing_b	No	Liberty Electric Power, LLC	Generation Owner	Generation
11/21/2013	04clearing_b	No	LM Power, LLC	Other Supplier	Financial Trade
11/21/2013	04clearing_b	No	Mac Trading, Inc	Other Supplier	Financial Trade
11/21/2013	04clearing_b	No	MEG Generating Company, LLC	Generation Owner	Generation
11/21/2013	04clearing_b	No	MET MA, LLC	Other Supplier	Power Marketer
11/21/2013	04clearing_b	No	Monterey MA, LLC	Other Supplier	Power Marketer
11/21/2013	04clearing_b	No	New York Power Authority	Other Supplier	Financial Trade
11/21/2013	04clearing_b	No	NextEra Energy Power Marketing, LLC	Generation Owner	Generation
11/21/2013	04clearing_b	No	NRG Power Marketing, LLC	Generation Owner	Generation
11/21/2013	04clearing_b	No	PPL Energy Plus, LLC	Transmission Owner	Transmission Owne
11/21/2013	04clearing_b	No	Primary Power, LLC	Other Supplier	Transmission Owne
11/21/2013	04clearing_b	No	Property Endeavors, LLC	End User Customer	Power Marketer
11/21/2013	04clearing_b	No	Public Service Electric & Gas Compan	Transmission Owner	Transmission Owne
11/21/2013	04clearing_b	No	Pure Energy, Inc	Other Supplier	Financial Trade

11/21/2013	04clearing_b	No	RBC Energy Services, L.P	Other Supplier	Power Marketer
11/21/2013	04clearing_b	No	RC Cape May Holdings, LLC	Generation Owner	Generation
11/21/2013	04clearing_b	No	Red Wolf Energy Trading, LLC	Other Supplier	Financial Trade
11/21/2013	04clearing_b	No	Rock Island Clean Line LLC	Other Supplier	Transmission Owne
11/21/2013	04clearing_b	No	Virginia Electric & Power Company	Transmission Owner	Transmission Owne
11/21/2013	04clearing_b	No	Vitol Inc.	Other Supplier	Power Marketer
11/21/2013	04clearing_b	No	West Deptford Energy, LLC	Generation Owner	Generation
11/21/2013	04clearing_b	No	York County Solid Waste and Refuse Authority	Generation Owner	Generation
11/21/2013	04clearing_b	Yes	Achieving Equilibrium LLC	Other Supplier	Curtailment Service Provide
11/21/2013	04clearing_b	Yes	Air Liquide Industrials U.S., L.P	End User Customer	Industria
11/21/2013	04clearing_b	Yes	Air Products & Chemicals, Inc	End User Customer	Industria
11/21/2013	04clearing_b	Yes	Allegheny Electric Cooperative, Inc	Electric Distributor	Transmission Owne
11/21/2013	04clearing_b	Yes	American Municipal Power, Inc	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_b	Yes	Blue Ridge Power Agency, Inc	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_b	Yes	Borough of Butler, Butler Electric Divisio	Electric Distributor	Retail Energy Supplie
11/21/2013	04clearing_b	Yes	Borough of Chambersburg	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_b	Yes	Borough of Lavallette, New Jerse	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_b	Yes	Borough of Madison, New Jerse	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_b	Yes	Borough of Milltown, New Jerse	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_b	Yes	Borough of Mont Alto, Pennsylvani	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_b	Yes	Borough of Park Ridge, New Jersey	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_b	Yes	Borough of Pemberton, New Jersey	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_b	Yes	Borough of Seaside Heights, New Jerse	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_b	Yes	Borough of South River, New Jerse	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_b	Yes	Castlebridge Energy Group, LLC	Other Supplier	Financial Trade
11/21/2013	04clearing_b	Yes	Central Virginia Electric Cooperativ	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_b	Yes	City of Dover, Delaware	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_b	Yes	Comperio Energy LLC dba ClearChoice Energ	Other Supplier	Curtailment Service Provide

11/21/2013	04clearing_b	Yes	Delaware Municipal Electric Corporation, Inc	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_b	Yes	Demansys Energy, LLC	Other Supplier	Curtailment Service Provide
11/21/2013	04clearing_b	Yes	Division of the Public Advocate of the State of Delaware	End User Customer	Consumer Advocate
11/21/2013	04clearing_b	Yes	Downes Associates, Inc	Other Supplier	Consultant, Service Company, Etc
11/21/2013	04clearing_b	Yes	Duquesne Light Compan	Transmission Owner	Transmission Owne
11/21/2013	04clearing_b	Yes	Easton Utilities Commissio	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_b	Yes	Energy Consulting Services, LLC	Other Supplier	Power Marketer
11/21/2013	04clearing_b	Yes	Energy Cooperative Association of Pennsylvania (The)	Other Supplier	Muni/Co-op
11/21/2013	04clearing_b	Yes	EnergyConnect, Inc	Other Supplier	Curtailment Service Provide
11/21/2013	04clearing_b	Yes	Evraz Claymont Stee	Other Supplier	Retail Energy Supplie
11/21/2013	04clearing_b	Yes	Galt Power, Inc.	Other Supplier	Power Marketer
11/21/2013	04clearing_b	Yes	Gerdau Ameristeel Energy, Inc	Other Supplier	Financial Trade
11/21/2013	04clearing_b	Yes	Hagerstown Light Departmen	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_b	Yes	Icetec.com, Inc.	Other Supplier	Curtailment Service Provide
11/21/2013	04clearing_b	Yes	Illinois Citizen Utility Boar	End User Customer	Consumer Advocate
11/21/2013	04clearing_b	Yes	Illinois Municipal Electric Agenc	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_b	Yes	Indiana Municipal Power Agenc	Generation Owner	Muni/Co-op
11/21/2013	04clearing_b	Yes	Industrial Energy Users-Ohi	Other Supplier	Retail Energy Supplie
11/21/2013	04clearing_b	Yes	Kuehne Chemical Company, Inc	Other Supplier	Retail Energy Supplie
11/21/2013	04clearing_b	Yes	Lehigh Portland Cement Compan	End User Customer	Industria
11/21/2013	04clearing_b	Yes	Letterkenny Industrial Development Authority - PA	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_b	Yes	Linde, LLC	End User Customer	Industria
11/21/2013	04clearing_b	Yes	Long Island Lighting Company dba LIP	Other Supplier	Power Marketer
11/21/2013	04clearing_b	Yes	Madison Gas & Electric Co	Other Supplier	Power Marketer
11/21/2013	04clearing_b	Yes	Maryland Office of People's Counse	End User Customer	Consumer Advocate

11/21/2013	04clearing_b	Yes	MeadWestvaco Corporation	End User Customer	Generation
11/21/2013	04clearing_b	Yes	MidAtlantic Power Partners, LLC	Other Supplier	Curtailment Service Provide
11/21/2013	04clearing_b	Yes	New Jersey Division of Rate Counse	End User Customer	Consumer Advocate
11/21/2013	04clearing_b	Yes	North Carolina Electric Membership Corporation	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_b	Yes	Northern Virginia Electric Cooperative (NOVEC)	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_b	Yes	Office of the People's Counsel for the District of Columbia	End User Customer	Consumer Advocate
11/21/2013	04clearing_b	Yes	PBF Power Marketing, LLC	Generation Owner	Generation
11/21/2013	04clearing_b	Yes	Praxair, Inc	End User Customer	Industria
11/21/2013	04clearing_b	Yes	Procter & Gamble Paper Products Company (The)	End User Customer	Industrial
11/21/2013	04clearing_b	Yes	Rockland Electric Company	Transmission Owner	Transmission Owne
11/21/2013	04clearing_b	Yes	Southern Maryland Electric Cooperative, Inc	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_b	Yes	Tangent Energy Solutions, Inc	Other Supplier	Curtailment Service Provide
11/21/2013	04clearing_b	Yes	The Trustees of the University of Pennsylvania, Pennsylvania Non-Profit Corporation d/b/a University of Pennsylvania	End User Customer	Retail Energy Supplier
11/21/2013	04clearing_b	Yes	Thurmont Municipal Light Compan	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_b	Yes	Town of Williamsport (The	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_b	Yes	UGI Utilities, Inc	Transmission Owner	Transmission Owne
11/21/2013	04clearing_b	Yes	Vineland Municipal Electric Utilit	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_b	Yes	Viridity Energy, Inc	Other Supplier	Curtailment Service Provide
11/21/2013	04clearing_b	Yes	Wellsboro Electric Company	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_b	Yes	West Virginia Consumer Advocate Divisio	End User Customer	Consumer Advocate
11/21/2013	04clearing_b	Yes	WPPI Energy	Other Supplier	Power Marketer

11/21/2013	04clearing_odec	Abstain	EnerNOC, Inc.	Other Supplier	Curtailment Service Provide
11/21/2013	04clearing_odec	Abstain	Kimberly-Clark Corporation	Generation Owner	Generation
11/21/2013	04clearing_odec	Abstain	Mercuria Energy America, Inc	Other Supplier	Power Marketer
11/21/2013	04clearing_odec	Abstain	Potomac Electric Power Company	Electric Distributor	Transmission Owne
11/21/2013	04clearing_odec	Abstain	Richland-Stryker Generation, LLC	Generation Owner	Generation
11/21/2013	04clearing_odec	Abstain	Virginia Electric & Power Company	Transmission Owner	Transmission Owne
11/21/2013	04clearing_odec	No	Alphataraxia Palladium LLC	Other Supplier	Power Marketer
11/21/2013	04clearing_odec	No	Appalachian Power Company	Transmission Owner	Transmission Owne
11/21/2013	04clearing_odec	No	Apple Group, LLC	Other Supplier	Financial Trade
11/21/2013	04clearing_odec	No	Atlantic Grid Operations A, LLC	Other Supplier	Transmission Owne
11/21/2013	04clearing_odec	No	BJ Energy, LLC	Other Supplier	Financial Trade
11/21/2013	04clearing_odec	No	Black Oak Energy, LLC	Other Supplier	Financial Trade
11/21/2013	04clearing_odec	No	Calpine Energy Services, L.P	Generation Owner	Generation
11/21/2013	04clearing_odec	No	Citigroup Energy, Inc	Other Supplier	Financial Trade
11/21/2013	04clearing_odec	No	CMS Energy Resource Management Compan	Other Supplier	Power Marketer
11/21/2013	04clearing_odec	No	Comperio Energy LLC dba ClearChoice Energ	Other Supplier	Curtailment Service Provide
11/21/2013	04clearing_odec	No	Dayton Power & Light Company (The	Transmission Owner	Transmission Owne
11/21/2013	04clearing_odec	No	DC Energy, LLC	Other Supplier	Financial Trade
11/21/2013	04clearing_odec	No	Duke Energy Business Services LL	Transmission Owner	Unspecified LOB
11/21/2013	04clearing_odec	No	Dynegy Marketing and Trade, LLC	Generation Owner	Generation
11/21/2013	04clearing_odec	No	Dyon, LLC	Other Supplier	Power Marketer
11/21/2013	04clearing_odec	No	E Minus LLC	Other Supplier	Financial Trade
11/21/2013	04clearing_odec	No	East Kentucky Power Cooperative, Inc	Transmission Owner	Transmission Owne
11/21/2013	04clearing_odec	No	Edison Mission Marketing and Trading, Inc	Generation Owner	Generation
11/21/2013	04clearing_odec	No	Elliott Bay Energy Trading, LLC	Other Supplier	Financial Trade
11/21/2013	04clearing_odec	No	EnergyConnect, Inc	Other Supplier	Curtailment Service Provide

11/21/2013	04clearing_odec	No	Enerwise Global Technologies, Inc	Other Supplier	Curtailment Service Provide
11/21/2013	04clearing_odec	No	Essential Power Rock Springs, LLC	Transmission Owner	Transmission Owne
11/21/2013	04clearing_odec	No	Exelon Business Services Company, LL	Transmission Owner	Transmission Owne
11/21/2013	04clearing_odec	No	FirstEnergy Solutions Corp	Transmission Owner	Power Marketer
11/21/2013	04clearing_odec	No	GDF Suez Energy Marketing NA, Inc	Other Supplier	Power Marketer
11/21/2013	04clearing_odec	No	Great Bay Energy I, LLC	Other Supplier	Power Marketer
11/21/2013	04clearing_odec	No	Hess Corporation	Other Supplier	Power Marketer
11/21/2013	04clearing_odec	No	Hexis Energy Trading, LLC	Other Supplier	Financial Trade
11/21/2013	04clearing_odec	No	Iron Mountain Generation LLC	Generation Owner	Generation
11/21/2013	04clearing_odec	No	J.P. Morgan Ventures Energy Corporatio	Other Supplier	Financial Trade
11/21/2013	04clearing_odec	No	Liberty Electric Power, LLC	Generation Owner	Generation
11/21/2013	04clearing_odec	No	LM Power, LLC	Other Supplier	Financial Trade
11/21/2013	04clearing_odec	No	Mac Trading, Inc	Other Supplier	Financial Trade
11/21/2013	04clearing_odec	No	MEG Generating Company, LLC	Generation Owner	Generation
11/21/2013	04clearing_odec	No	MET MA, LLC	Other Supplier	Power Marketer
11/21/2013	04clearing_odec	No	MidAtlantic Power Partners, LLC	Other Supplier	Curtailment Service Provide
11/21/2013	04clearing_odec	No	Monterey MA, LLC	Other Supplier	Power Marketer
11/21/2013	04clearing_odec	No	New York Power Authority	Other Supplier	Financial Trade
11/21/2013	04clearing_odec	No	NextEra Energy Power Marketing, LLC	Generation Owner	Generation
11/21/2013	04clearing_odec	No	NRG Power Marketing, LLC	Generation Owner	Generation
11/21/2013	04clearing_odec	No	PPL Energy Plus, LLC	Transmission Owner	Transmission Owne
11/21/2013	04clearing_odec	No	Primary Power, LLC	Other Supplier	Transmission Owne
11/21/2013	04clearing_odec	No	Property Endeavors, LLC	End User Customer	Power Marketer
11/21/2013	04clearing_odec	No	Public Service Electric & Gas Compan	Transmission Owner	Transmission Owne
11/21/2013	04clearing_odec	No	Pure Energy, Inc	Other Supplier	Financial Trade
11/21/2013	04clearing_odec	No	RBC Energy Services, L.P	Other Supplier	Power Marketer
11/21/2013	04clearing_odec	No	Red Wolf Energy Trading, LLC	Other Supplier	Financial Trade
11/21/2013	04clearing_odec	No	Rock Island Clean Line LLC	Other Supplier	Transmission Owne
11/21/2013	04clearing_odec	No	Saracen Energy East, L.P	Other Supplier	Financial Trade

11/21/2013	04clearing_odec	No	SESCO Enterprises, LLC	Other Supplier	Power Marketer
11/21/2013	04clearing_odec	No	Solios Power, LLC	Other Supplier	Financial Trade
11/21/2013	04clearing_odec	No	Tangent Energy Solutions, Inc	Other Supplier	Curtailment Service Provide
11/21/2013	04clearing_odec	No	Twin Cities Power, LLC	Other Supplier	Power Marketer
11/21/2013	04clearing_odec	No	Vitol Inc.	Other Supplier	Power Marketer
11/21/2013	04clearing_odec	No	West Deptford Energy, LLC	Generation Owner	Generation
11/21/2013	04clearing_odec	Yes	Achieving Equilibrium LLC	Other Supplier	Curtailment Service Provide
11/21/2013	04clearing_odec	Yes	Air Liquide Industrials U.S., L.P	End User Customer	Industria
11/21/2013	04clearing_odec	Yes	Air Products & Chemicals, Inc	End User Customer	Industria
11/21/2013	04clearing_odec	Yes	Allegheny Electric Cooperative, Inc	Electric Distributor	Transmission Owne
11/21/2013	04clearing_odec	Yes	American Municipal Power, Inc	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_odec	Yes	Blue Ridge Power Agency, Inc	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_odec	Yes	Borough of Butler, Butler Electric Divisio	Electric Distributor	Retail Energy Supplie
11/21/2013	04clearing_odec	Yes	Borough of Chambersburg	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_odec	Yes	Borough of Lavallette, New Jerse	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_odec	Yes	Borough of Madison, New Jerse	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_odec	Yes	Borough of Milltown, New Jerse	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_odec	Yes	Borough of Mont Alto, Pennsylvani	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_odec	Yes	Borough of Park Ridge, New Jersey	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_odec	Yes	Borough of Pemberton, New Jersey	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_odec	Yes	Borough of Seaside Heights, New Jerse	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_odec	Yes	Borough of South River, New Jerse	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_odec	Yes	Buckeye Power, Inc	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_odec	Yes	Castlebridge Energy Group, LLC	Other Supplier	Financial Trade
11/21/2013	04clearing_odec	Yes	Central Virginia Electric Cooperativ	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_odec	Yes	City of Dover, Delaware	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_odec	Yes	Covanta Energy Group, Inc	Generation Owner	Generation
11/21/2013	04clearing_odec	Yes	Delaware Municipal Electric Corporation, Inc	Electric Distributor	Muni/Co-op

11/21/2013	04clearing_odec	Yes	Demansys Energy, LLC	Other Supplier	Curtailment Service Provide
11/21/2013	04clearing_odec	Yes	Diamond State Generation Partners, LLC	Generation Owner	Generation
11/21/2013	04clearing_odec	Yes	Division of the Public Advocate of the State of Delaware	End User Customer	Consumer Advocate
11/21/2013	04clearing_odec	Yes	Downes Associates, Inc	Other Supplier	Consultant, Service Company, Etc
11/21/2013	04clearing_odec	Yes	DTE Energy Trading, Inc	Other Supplier	Power Marketer
11/21/2013	04clearing_odec	Yes	Duquesne Light Compan	Transmission Owner	Transmission Owne
11/21/2013	04clearing_odec	Yes	Easton Utilities Commissio	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_odec	Yes	Energy Consulting Services, LLC	Other Supplier	Power Marketer
11/21/2013	04clearing_odec	Yes	Energy Cooperative Association of Pennsylvania (The)	Other Supplier	Muni/Co-op
11/21/2013	04clearing_odec	Yes	Evraz Claymont Stee	Other Supplier	Retail Energy Supplie
11/21/2013	04clearing_odec	Yes	Galt Power, Inc.	Other Supplier	Power Marketer
11/21/2013	04clearing_odec	Yes	Gerdau Ameristeel Energy, Inc	Other Supplier	Financial Trade
11/21/2013	04clearing_odec	Yes	Hagerstown Light Departmen	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_odec	Yes	Icetec.com, Inc.	Other Supplier	Curtailment Service Provide
11/21/2013	04clearing_odec	Yes	Illinois Citizen Utility Boar	End User Customer	Consumer Advocate
11/21/2013	04clearing_odec	Yes	Illinois Municipal Electric Agenc	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_odec	Yes	Indiana Municipal Power Agenc	Generation Owner	Muni/Co-op
11/21/2013	04clearing_odec	Yes	Industrial Energy Users-Ohi	Other Supplier	Retail Energy Supplie
11/21/2013	04clearing_odec	Yes	Jersey Green Energy, LLC	Other Supplier	Financial Trade
11/21/2013	04clearing_odec	Yes	Kuehne Chemical Company, Inc	Other Supplier	Retail Energy Supplie
11/21/2013	04clearing_odec	Yes	Lehigh Portland Cement Compan	End User Customer	Industria
11/21/2013	04clearing_odec	Yes	Letterkenny Industrial Development Authority - PA	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_odec	Yes	Linde, LLC	End User Customer	Industria
11/21/2013	04clearing_odec	Yes	Long Island Lighting Company dba LIP	Other Supplier	Power Marketer
11/21/2013	04clearing_odec	Yes	Madison Gas & Electric Co	Other Supplier	Power Marketer
11/21/2013	04clearing_odec	Yes	Maryland Office of People's Counse	End User Customer	Consumer Advocate

11/21/2013	04clearing_odec	Yes	MeadWestvaco Corporation	End User Customer	Generation
11/21/2013	04clearing_odec	Yes	New Jersey Division of Rate Counse	End User Customer	Consumer Advocate
11/21/2013	04clearing_odec	Yes	North Carolina Electric Membership Corporation	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_odec	Yes	Northern Virginia Electric Cooperative (NOVEC)	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_odec	Yes	Office of the People's Counsel for the District of Columbia	End User Customer	Consumer Advocate
11/21/2013	04clearing_odec	Yes	Old Dominion Electric Cooperativ	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_odec	Yes	PBF Power Marketing, LLC	Generation Owner	Generation
11/21/2013	04clearing_odec	Yes	Praxair, Inc	End User Customer	Industria
11/21/2013	04clearing_odec	Yes	Procter & Gamble Paper Products Company (The)	End User Customer	Industrial
11/21/2013	04clearing_odec	Yes	RC Cape May Holdings, LLC	Generation Owner	Generation
11/21/2013	04clearing_odec	Yes	Rockland Electric Company	Transmission Owner	Transmission Owne
11/21/2013	04clearing_odec	Yes	Southern Maryland Electric Cooperative, Inc	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_odec	Yes	The Trustees of the University of Pennsylvania, Pennsylvania Non-Profit Corporation d/b/a University of Pennsylvania	End User Customer	Retail Energy Supplier
11/21/2013	04clearing_odec	Yes	Thurmont Municipal Light Compan	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_odec	Yes	Town of Williamsport (The	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_odec	Yes	UGI Utilities, Inc	Transmission Owner	Transmission Owne
11/21/2013	04clearing_odec	Yes	Vineland Municipal Electric Utilit	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_odec	Yes	Viridity Energy, Inc	Other Supplier	Curtailment Service Provide
11/21/2013	04clearing_odec	Yes	Wabash Valley Power Association, Inc	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_odec	Yes	Wellsboro Electric Company	Electric Distributor	Muni/Co-op
11/21/2013	04clearing_odec	Yes	West Virginia Consumer Advocate Divisio	End User Customer	Consumer Advocate
11/21/2013	04clearing_odec	Yes	WPPI Energy	Other Supplier	Power Marketer
11/21/2013	04clearing_odec	Yes	York County Solid Waste and Refuse Authority	Generation Owner	Generation

6/26/2014	05fmu	Abstain	Atlantic Grid Operations A, LLC	Other Supplier	Transmission Owner
6/26/2014	05fmu	Abstain	CMS Energy Resource Management Company	Other Supplier	Power Marketer
6/26/2014	05fmu	Abstain	New York Power Authority	Other Supplier	Financial Trader
6/26/2014	05fmu	Abstain	Virginia Electric & Power Company	Transmission Owner	Transmission Owner
6/26/2014	05fmu	No	Appalachian Power Company	Transmission Owner	Transmission Owner
6/26/2014	05fmu	No	Calpine Energy Services, L.P.	Generation Owner	Generation
6/26/2014	05fmu	No	Citigroup Energy, Inc.	Other Supplier	Financial Trader
6/26/2014	05fmu	No	Covanta Energy Group, Inc.	Generation Owner	Generation
6/26/2014	05fmu	No	Dayton Power & Light Company (The)	Transmission Owner	Transmission Owner
6/26/2014	05fmu	No	DC Energy, LLC	Other Supplier	Financial Trader
6/26/2014	05fmu	No	EnerNOC, Inc.	Other Supplier	Curtailment Service Provider
6/26/2014	05fmu	No	FirstEnergy Solutions Corp.	Transmission Owner	Power Marketer
6/26/2014	05fmu	No	Grays Ferry Cogeneration Partnership	Generation Owner	Generation
6/26/2014	05fmu	No	J.P. Morgan Ventures Energy Corporation	Other Supplier	Financial Trader
6/26/2014	05fmu	No	Jersey Green Energy, LLC	Other Supplier	Financial Trader
6/26/2014	05fmu	No	Liberty Electric Power, LLC	Generation Owner	Generation
6/26/2014	05fmu	No	MEG Generating Company, LLC	Generation Owner	Generation
6/26/2014	05fmu	No	NextEra Energy Power Marketing, LLC	Generation Owner	Generation
6/26/2014	05fmu	No	NRG Power Marketing, LLC	Generation Owner	Generation
6/26/2014	05fmu	No	PPL Energy Plus, LLC	Transmission Owner	Transmission Owner
6/26/2014	05fmu	No	Public Service Electric & Gas Company	Transmission Owner	Transmission Owner
6/26/2014	05fmu	No	RC Cape May Holdings, LLC	Generation Owner	Generation
6/26/2014	05fmu	No	West Deptford Energy, LLC	Generation Owner	Generation
6/26/2014	05fmu	No	York County Solid Waste and Refuse Authority	Generation Owner	Generation
6/26/2014	05fmu	Yes	Air Liquide Industrials U.S., L.P.	End User Customer	Industrial
6/26/2014	05fmu	Yes	Air Products & Chemicals, Inc.	End User Customer	Industrial
6/26/2014	05fmu	Yes	American Municipal Power, Inc.	Electric Distributor	Muni/Co-op
6/26/2014	05fmu	Yes	Blue Ridge Power Agency, Inc.	Electric Distributor	Muni/Co-op

6/26/2014	05fmu	Yes	Borough of Butler, Butler Electric Division	Electric Distributor	Retail Energy Supplier
6/26/2014	05fmu	Yes	Borough of Chambersburg	Electric Distributor	Muni/Co-op
6/26/2014	05fmu	Yes	Borough of Lavallette, New Jersey	Electric Distributor	Muni/Co-op
6/26/2014	05fmu	Yes	Borough of Madison, New Jersey	Electric Distributor	Muni/Co-op
6/26/2014	05fmu	Yes	Borough of Milltown, New Jersey	Electric Distributor	Muni/Co-op
6/26/2014	05fmu	Yes	Borough of Park Ridge, New Jersey	Electric Distributor	Muni/Co-op
6/26/2014	05fmu	Yes	Borough of Pemberton, New Jersey	Electric Distributor	Muni/Co-op
6/26/2014	05fmu	Yes	Borough of Seaside Heights, New Jersey	Electric Distributor	Muni/Co-op
6/26/2014	05fmu	Yes	Borough of South River, New Jersey	Electric Distributor	Muni/Co-op
6/26/2014	05fmu	Yes	Buckeye Power, Inc.	Electric Distributor	Muni/Co-op
6/26/2014	05fmu	Yes	Central Virginia Electric Cooperative	Electric Distributor	Muni/Co-op
6/26/2014	05fmu	Yes	City of Dover, Delaware	Electric Distributor	Muni/Co-op
6/26/2014	05fmu	Yes	Delaware Municipal Electric Corporation, Inc.	Electric Distributor	Muni/Co-op
6/26/2014	05fmu	Yes	Division of the Public Advocate of the State of Delaware	End User Customer	Consumer Advocate
6/26/2014	05fmu	Yes	DTE Energy Trading, Inc.	Other Supplier	Power Marketer
6/26/2014	05fmu	Yes	Duke Energy Business Services LLC	Transmission Owner	Unspecified LOB
6/26/2014	05fmu	Yes	Duquesne Light Company	Transmission Owner	Transmission Owner
6/26/2014	05fmu	Yes	Easton Utilities Commission	Electric Distributor	Muni/Co-op
6/26/2014	05fmu	Yes	Energy Cooperative Association of Pennsylvania	Other Supplier	Muni/Co-op
6/26/2014	05fmu	Yes	Exelon Business Services Company, LLC	Transmission Owner	Transmission Owner
6/26/2014	05fmu	Yes	Gerdau Ameristeel Energy, Inc.	Other Supplier	Financial Trader
6/26/2014	05fmu	Yes	Hagerstown Light Department	Electric Distributor	Muni/Co-op
6/26/2014	05fmu	Yes	Illinois Citizen Utility Board	End User Customer	Consumer Advocate
6/26/2014	05fmu	Yes	Illinois Municipal Electric Agency	Electric Distributor	Muni/Co-op
6/26/2014	05fmu	Yes	IMG Midstream LLC	Generation Owner	Generation
6/26/2014	05fmu	Yes	Indiana Municipal Power Agency	Generation Owner	Muni/Co-op
6/26/2014	05fmu	Yes	Industrial Energy Users-Ohio	Other Supplier	Retail Energy Supplier

6/26/2014	05fmu	Yes	Kimberly-Clark Corporation	Generation Owner	Generation
6/26/2014	05fmu	Yes	Lehigh Portland Cement Company	End User Customer	Industrial
6/26/2014	05fmu	Yes	Letterkenny Industrial Development Authority - PA	Electric Distributor	Muni/Co-op
6/26/2014	05fmu	Yes	Linde, LLC	End User Customer	Industrial
6/26/2014	05fmu	Yes	Madison Gas & Electric Co.	Other Supplier	Power Marketer
6/26/2014	05fmu	Yes	Maryland Office of People's Counsel	End User Customer	Consumer Advocate
6/26/2014	05fmu	Yes	MeadWestvaco Corporation	End User Customer	Generation
6/26/2014	05fmu	Yes	New Jersey Division of Rate Counsel	End User Customer	Consumer Advocate
6/26/2014	05fmu	Yes	North Carolina Electric Membership Corporation	Electric Distributor	Muni/Co-op
6/26/2014	05fmu	Yes	Northern Virginia Electric Cooperative (NOVEC)	Electric Distributor	Muni/Co-op
6/26/2014	05fmu	Yes	Office of the People's Counsel for the District of Columbia	End User Customer	Consumer Advocate
6/26/2014	05fmu	Yes	Old Dominion Electric Cooperative	Electric Distributor	Muni/Co-op
6/26/2014	05fmu	Yes	Potomac Electric Power Company	Electric Distributor	Transmission Owner
6/26/2014	05fmu	Yes	Praxair, Inc.	End User Customer	Industrial
6/26/2014	05fmu	Yes	Procter & Gamble Paper Products Company (The)	End User Customer	Industrial
6/26/2014	05fmu	Yes	Rockland Electric Company	Transmission Owner	Transmission Owner
6/26/2014	05fmu	Yes	Southern Maryland Electric Cooperative, Inc.	Electric Distributor	Muni/Co-op
6/26/2014	05fmu	Yes	The Trustees of the University of Pennsylvania, a Pennsylvania Non-Profit Corporation d/b/a University of Pennsylvania	End User Customer	Retail Energy Supplier
6/26/2014	05fmu	Yes	Town of Williamsport (The)	Electric Distributor	Muni/Co-op
6/26/2014	05fmu	Yes	UGI Utilities, Inc.	Transmission Owner	Transmission Owner
6/26/2014	05fmu	Yes	Vineland Municipal Electric Utility	Electric Distributor	Muni/Co-op
6/26/2014	05fmu	Yes	Wabash Valley Power Association, Inc.	Electric Distributor	Muni/Co-op
6/26/2014	05fmu	Yes	Wellsboro Electric Company	Electric Distributor	Muni/Co-op

6/26/2014	05fmu	Yes	West Virginia Consumer Advocate Division	End User Customer	Consumer Advocate
6/26/2014	05fmu	Yes	WPPI Energy	Other Supplier	Power Marketer
11/20/2014	04a_window_alternate	Abstain	Appalachian Power Company	Transmission Owner	Transmission Owner
11/20/2014	04a_window_alternate	Abstain	Brookfield Energy Marketing LP	Other Supplier	Power Marketer
11/20/2014	04a_window_alternate	Abstain	MEG Generating Company, LLC	Generation Owner	Generation
11/20/2014	04a_window_alternate	Abstain	New York Power Authority	Other Supplier	Financial Trader
11/20/2014	04a_window_alternate	Abstain	Office of the People's Counsel for the District of Columbia	End User Customer	Consumer Advocate
11/20/2014	04a_window_alternate	Abstain	Shell Energy North America (US), L.P.	Other Supplier	Generation
11/20/2014	04a_window_alternate	No	Dayton Power & Light Company (The)	Transmission Owner	Transmission Owner
11/20/2014	04a_window_alternate	No	Essential Power Rock Springs, LLC	Transmission Owner	Transmission Owner
11/20/2014	04a_window_alternate	No	Exelon Business Services Company, LLC	Transmission Owner	Transmission Owner
11/20/2014	04a_window_alternate	No	FirstEnergy Solutions Corp.	Transmission Owner	Power Marketer
11/20/2014	04a_window_alternate	No	Potomac Electric Power Company	Electric Distributor	Transmission Owner
11/20/2014	04a_window_alternate	No	PPL Energy Plus, LLC	Transmission Owner	Transmission Owner
11/20/2014	04a_window_alternate	No	Public Service Electric & Gas Company	Transmission Owner	Transmission Owner
11/20/2014	04a_window_alternate	No	Virginia Electric & Power Company	Transmission Owner	Transmission Owner
11/20/2014	04a_window_alternate	No	Westar Energy, Inc.	Other Supplier	Power Marketer
11/20/2014	04a_window_alternate	Yes	Air Liquide Industrials U.S., L.P.	End User Customer	Industrial
11/20/2014	04a_window_alternate	Yes	Air Products & Chemicals, Inc.	End User Customer	Industrial
11/20/2014	04a_window_alternate	Yes	Allegheny Electric Cooperative, Inc.	Electric Distributor	Transmission Owner
11/20/2014	04a_window_alternate	Yes	Alphataraxia Palladium LLC	Other Supplier	Power Marketer
11/20/2014	04a_window_alternate	Yes	American Municipal Power, Inc.	Electric Distributor	Muni/Co-op
11/20/2014	04a_window_alternate	Yes	Apple Group, LLC	Other Supplier	Financial Trader
11/20/2014	04a_window_alternate	Yes	Atlantic Grid Operations A, LLC	Other Supplier	Transmission Owner
11/20/2014	04a_window_alternate	Yes	Blue Ridge Power Agency, Inc.	Electric Distributor	Muni/Co-op
11/20/2014	04a_window_alternate	Yes	Borough of Chambersburg	Electric Distributor	Muni/Co-op
11/20/2014	04a_window_alternate	Yes	Buckeye Power, Inc.	Electric Distributor	Muni/Co-op
11/20/2014	04a_window_alternate	Yes	Calpine Energy Services, L.P.	Generation Owner	Generation
11/20/2014	04a_window_alternate	Yes	Central Virginia Electric Cooperative	Electric Distributor	Muni/Co-op

11/20/2014	04a_window_alternate	Yes	Citigroup Energy, Inc.	Other Supplier	Financial Trader
11/20/2014	04a_window_alternate	Yes	City of Dover, Delaware	Electric Distributor	Muni/Co-op
11/20/2014	04a_window_alternate	Yes	Covanta Energy Group, Inc.	Generation Owner	Generation
11/20/2014	04a_window_alternate	Yes	DC Energy, LLC	Other Supplier	Financial Trader
11/20/2014	04a_window_alternate	Yes	Delaware Municipal Electric Corporation, Inc.	Electric Distributor	Muni/Co-op
11/20/2014	04a_window_alternate	Yes	DTE Energy Trading, Inc.	Other Supplier	Power Marketer
11/20/2014	04a_window_alternate	Yes	Duke Energy Business Services LLC	Transmission Owner	Unspecified LOB
11/20/2014	04a_window_alternate	Yes	Duke Energy Progress, Inc.	Other Supplier	Power Marketer
11/20/2014	04a_window_alternate	Yes	Duquesne Light Company	Transmission Owner	Transmission Owner
11/20/2014	04a_window_alternate	Yes	Dynegy Marketing and Trade, LLC	Generation Owner	Generation
11/20/2014	04a_window_alternate	Yes	Dyon, LLC	Other Supplier	Power Marketer
11/20/2014	04a_window_alternate	Yes	E Minus LLC	Other Supplier	Financial Trader
11/20/2014	04a_window_alternate	Yes	Easton Utilities Commission	Electric Distributor	Muni/Co-op
11/20/2014	04a_window_alternate	Yes	Energy Cooperative Association of Pennsylvania (The)	Other Supplier	Muni/Co-op
11/20/2014	04a_window_alternate	Yes	EnergyConnect, Inc.	Other Supplier	Curtailment Service Provider
11/20/2014	04a_window_alternate	Yes	Gerdau Ameristeel Energy, Inc.	Other Supplier	Financial Trader
11/20/2014	04a_window_alternate	Yes	Great Bay Energy I, LLC	Other Supplier	Power Marketer
11/20/2014	04a_window_alternate	Yes	Hagerstown Light Department	Electric Distributor	Muni/Co-op
11/20/2014	04a_window_alternate	Yes	Hexis Energy Trading, LLC	Other Supplier	Financial Trader
11/20/2014	04a_window_alternate	Yes	Illinois Municipal Electric Agency	Electric Distributor	Muni/Co-op
11/20/2014	04a_window_alternate	Yes	IMG Midstream LLC	Generation Owner	Generation
11/20/2014	04a_window_alternate	Yes	Indiana Municipal Power Agency	Generation Owner	Muni/Co-op
11/20/2014	04a_window_alternate	Yes	Industrial Energy Users-Ohio	Other Supplier	Retail Energy Supplier
11/20/2014	04a_window_alternate	Yes	Invenergy, LLC	Generation Owner	Generation
11/20/2014	04a_window_alternate	Yes	Jersey Green Energy, LLC	Other Supplier	Financial Trader
11/20/2014	04a_window_alternate	Yes	Kimberly-Clark Corporation	Generation Owner	Generation
11/20/2014	04a_window_alternate	Yes	Lehigh Portland Cement Company	End User Customer	Industrial
11/20/2014	04a_window_alternate	Yes	Letterkenny Industrial Development Authority - PA	Electric Distributor	Muni/Co-op

11/20/2014	04a_window_alternate	Yes	Liberty Electric Power, LLC	Generation Owner	Generation
11/20/2014	04a_window_alternate	Yes	Linde, LLC	End User Customer	Industrial
11/20/2014	04a_window_alternate	Yes	Long Island Lighting Company dba LIPA	Other Supplier	Power Marketer
11/20/2014	04a_window_alternate	Yes	Mac Trading, Inc.	Other Supplier	Financial Trader
11/20/2014	04a_window_alternate	Yes	Madison Gas & Electric Co.	Other Supplier	Power Marketer
11/20/2014	04a_window_alternate	Yes	Maryland Office of People's Counsel	End User Customer	Consumer Advocate
11/20/2014	04a_window_alternate	Yes	MeadWestvaco Corporation	End User Customer	Generation
11/20/2014	04a_window_alternate	Yes	MET MA, LLC	Other Supplier	Power Marketer
11/20/2014	04a_window_alternate	Yes	Monterey MA, LLC	Other Supplier	Power Marketer
11/20/2014	04a_window_alternate	Yes	New Jersey Division of Rate Counsel	End User Customer	Consumer Advocate
11/20/2014	04a_window_alternate	Yes	NextEra Energy Power Marketing, LLC	Generation Owner	Generation
11/20/2014	04a_window_alternate	Yes	North Carolina Electric Membership Corporation	Electric Distributor	Muni/Co-op
11/20/2014	04a_window_alternate	Yes	Northern Virginia Electric Cooperative (NOVEC)	Electric Distributor	Muni/Co-op
11/20/2014	04a_window_alternate	Yes	NRG Power Marketing, LLC	Generation Owner	Generation
11/20/2014	04a_window_alternate	Yes	Old Dominion Electric Cooperative	Electric Distributor	Muni/Co-op
11/20/2014	04a_window_alternate	Yes	Praxair, Inc.	End User Customer	Industrial
11/20/2014	04a_window_alternate	Yes	Procter & Gamble Paper Products Company (The)	End User Customer	Industrial
11/20/2014	04a_window_alternate	Yes	Pure Energy, Inc.	Other Supplier	Financial Trader
11/20/2014	04a_window_alternate	Yes	RC Cape May Holdings, LLC	Generation Owner	Generation
11/20/2014	04a_window_alternate	Yes	Red Wolf Energy Trading, LLC	Other Supplier	Financial Trader
11/20/2014	04a_window_alternate	Yes	Rockland Electric Company	Transmission Owner	Transmission Owner
11/20/2014	04a_window_alternate	Yes	The Trustees of the University of Pennsylvania, a Pennsylvania Non-Profit Corporation d/b/a University of Pennsylvania	End User Customer	Retail Energy Supplier
11/20/2014	04a_window_alternate	Yes	Town of Williamsport (The)	Electric Distributor	Muni/Co-op
11/20/2014	04a_window_alternate	Yes	Vitol Inc.	Other Supplier	Power Marketer
11/20/2014	04a_window_alternate	Yes	Wellsboro Electric Company	Electric Distributor	Muni/Co-op

11/20/2014	04a_window_alternate	Yes	West Deptford Energy, LLC	Generation Owner	Generation
11/20/2014	04a_window_alternate	Yes	WPPI Energy	Other Supplier	Power Marketer
11/20/2014	04a_window_alternate	Yes	York County Solid Waste and Refuse Authority	Generation Owner	Generation
11/20/2014	04a_window_voting	Abstain	Brookfield Energy Marketing LP	Other Supplier	Power Marketer
11/20/2014	04a_window_voting	Abstain	Calpine Energy Services, L.P.	Generation Owner	Generation
11/20/2014	04a_window_voting	Abstain	Castlebridge Energy Group, LLC	Other Supplier	Financial Trader
11/20/2014	04a_window_voting	Abstain	Church Hill Solar Farm, LLC	Generation Owner	Generation Owner/Ancillary Service Provider
11/20/2014	04a_window_voting	Abstain	Covanta Energy Group, Inc.	Generation Owner	Generation
11/20/2014	04a_window_voting	Abstain	Diamond State Generation Partners, LLC	Generation Owner	Generation
11/20/2014	04a_window_voting	Abstain	Energy Consulting Services, LLC	Other Supplier	Power Marketer
11/20/2014	04a_window_voting	Abstain	Evraz Claymont Steel	Other Supplier	Retail Energy Supplier
11/20/2014	04a_window_voting	Abstain	Icetec.com, Inc.	Other Supplier	Curtailment Service Provider
11/20/2014	04a_window_voting	Abstain	Jersey Green Energy, LLC	Other Supplier	Financial Trader
11/20/2014	04a_window_voting	Abstain	Kuehne Chemical Company, Inc.	Other Supplier	Retail Energy Supplier
11/20/2014	04a_window_voting	Abstain	Liberty Electric Power, LLC	Generation Owner	Generation
11/20/2014	04a_window_voting	Abstain	New York Power Authority	Other Supplier	Financial Trader
11/20/2014	04a_window_voting	Abstain	PBF Power Marketing, LLC	Generation Owner	Generation
11/20/2014	04a_window_voting	Abstain	RC Cape May Holdings, LLC	Generation Owner	Generation
11/20/2014	04a_window_voting	Abstain	Shell Energy North America (US), L.P.	Other Supplier	Generation
11/20/2014	04a_window_voting	Abstain	Virginia Electric & Power Company	Transmission Owner	Transmission Owner
11/20/2014	04a_window_voting	Abstain	York County Solid Waste and Refuse Authority	Generation Owner	Generation
11/20/2014	04a_window_voting	No	Allegheny Electric Cooperative, Inc.	Electric Distributor	Transmission Owner
11/20/2014	04a_window_voting	No	American Municipal Power, Inc.	Electric Distributor	Muni/Co-op
11/20/2014	04a_window_voting	No	Atlantic Grid Operations A, LLC	Other Supplier	Transmission Owner
11/20/2014	04a_window_voting	No	Blue Ridge Power Agency, Inc.	Electric Distributor	Muni/Co-op
11/20/2014	04a_window_voting	No	Borough of Butler, Butler Electric Division	Electric Distributor	Retail Energy Supplier

11/20/2014	04a_window_voting	No	Borough of Chambersburg	Electric Distributor	Muni/Co-op
11/20/2014	04a_window_voting	No	Borough of Lavallette, New Jersey	Electric Distributor	Muni/Co-op
11/20/2014	04a_window_voting	No	Borough of Madison, New Jersey	Electric Distributor	Muni/Co-op
11/20/2014	04a_window_voting	No	Borough of Milltown, New Jersey	Electric Distributor	Muni/Co-op
11/20/2014	04a_window_voting	No	Borough of Park Ridge, New Jersey	Electric Distributor	Muni/Co-op
11/20/2014	04a_window_voting	No	Borough of Pemberton, New Jersey	Electric Distributor	Muni/Co-op
11/20/2014	04a_window_voting	No	Borough of Seaside Heights, New Jersey	Electric Distributor	Muni/Co-op
11/20/2014	04a_window_voting	No	Borough of South River, New Jersey	Electric Distributor	Muni/Co-op
11/20/2014	04a_window_voting	No	Buckeye Power, Inc.	Electric Distributor	Muni/Co-op
11/20/2014	04a_window_voting	No	Central Virginia Electric Cooperative	Electric Distributor	Muni/Co-op
11/20/2014	04a_window_voting	No	Citigroup Energy, Inc.	Other Supplier	Financial Trader
11/20/2014	04a_window_voting	No	City of Dover, Delaware	Electric Distributor	Muni/Co-op
11/20/2014	04a_window_voting	No	DC Energy, LLC	Other Supplier	Financial Trader
11/20/2014	04a_window_voting	No	Delaware Municipal Electric Corporation, Inc.	Electric Distributor	Muni/Co-op
11/20/2014	04a_window_voting	No	Dynegy Marketing and Trade, LLC	Generation Owner	Generation
11/20/2014	04a_window_voting	No	Easton Utilities Commission	Electric Distributor	Muni/Co-op
11/20/2014	04a_window_voting	No	Energy Cooperative Association of Pennsylvania (The)	Other Supplier	Muni/Co-op
11/20/2014	04a_window_voting	No	Exelon Business Services Company, LLC	Transmission Owner	Transmission Owner
11/20/2014	04a_window_voting	No	Hagerstown Light Department	Electric Distributor	Muni/Co-op
11/20/2014	04a_window_voting	No	Illinois Municipal Electric Agency	Electric Distributor	Muni/Co-op
11/20/2014	04a_window_voting	No	Indiana Municipal Power Agency	Generation Owner	Muni/Co-op
11/20/2014	04a_window_voting	No	Invenergy, LLC	Generation Owner	Generation
11/20/2014	04a_window_voting	No	Madison Gas & Electric Co.	Other Supplier	Power Marketer
11/20/2014	04a_window_voting	No	NextEra Energy Power Marketing, LLC	Generation Owner	Generation
11/20/2014	04a_window_voting	No	North Carolina Electric Membership Corporation	Electric Distributor	Muni/Co-op
11/20/2014	04a_window_voting	No	Northern Virginia Electric Cooperative (NOVEC)	Electric Distributor	Muni/Co-op
11/20/2014	04a_window_voting	No	Old Dominion Electric Cooperative	Electric Distributor	Muni/Co-op

11/20/2014	04a_window_voting	No	Town of Williamsport (The)	Electric Distributor	Muni/Co-op
11/20/2014	04a_window_voting	No	Vineland Municipal Electric Utility	Electric Distributor	Muni/Co-op
11/20/2014	04a_window_voting	No	Vitol Inc.	Other Supplier	Power Marketer
11/20/2014	04a_window_voting	No	West Deptford Energy, LLC	Generation Owner	Generation
11/20/2014	04a_window_voting	No	WPPI Energy	Other Supplier	Power Marketer
11/20/2014	04a_window_voting	Yes	Air Liquide Industrials U.S., L.P.	End User Customer	Industrial
11/20/2014	04a_window_voting	Yes	Air Products & Chemicals, Inc.	End User Customer	Industrial
11/20/2014	04a_window_voting	Yes	Appalachian Power Company	Transmission Owner	Transmission Owner
11/20/2014	04a_window_voting	Yes	Dayton Power & Light Company (The)	Transmission Owner	Transmission Owner
11/20/2014	04a_window_voting	Yes	Direct Energy Business, LLC	Other Supplier	Retail Energy Supplier
11/20/2014	04a_window_voting	Yes	DTE Energy Trading, Inc.	Other Supplier	Power Marketer
11/20/2014	04a_window_voting	Yes	Duke Energy Business Services LLC	Transmission Owner	Unspecified LOB
11/20/2014	04a_window_voting	Yes	Duke Energy Progress, Inc.	Other Supplier	Power Marketer
11/20/2014	04a_window_voting	Yes	Duquesne Light Company	Transmission Owner	Transmission Owner
11/20/2014	04a_window_voting	Yes	EnergyConnect, Inc.	Other Supplier	Curtailment Service Provider
11/20/2014	04a_window_voting	Yes	Essential Power Rock Springs, LLC	Transmission Owner	Transmission Owner
11/20/2014	04a_window_voting	Yes	FirstEnergy Solutions Corp.	Transmission Owner	Power Marketer
11/20/2014	04a_window_voting	Yes	Gerdau Ameristeel Energy, Inc.	Other Supplier	Financial Trader
11/20/2014	04a_window_voting	Yes	IMG Midstream LLC	Generation Owner	Generation
11/20/2014	04a_window_voting	Yes	Industrial Energy Users-Ohio	Other Supplier	Retail Energy Supplier
11/20/2014	04a_window_voting	Yes	Kimberly-Clark Corporation	Generation Owner	Generation
11/20/2014	04a_window_voting	Yes	Lehigh Portland Cement Company	End User Customer	Industrial
11/20/2014	04a_window_voting	Yes	Letterkenny Industrial Development Authority - PA	Electric Distributor	Muni/Co-op
11/20/2014	04a_window_voting	Yes	Linde, LLC	End User Customer	Industrial
11/20/2014	04a_window_voting	Yes	Long Island Lighting Company dba LIPA	Other Supplier	Power Marketer
11/20/2014	04a_window_voting	Yes	Maryland Office of People's Counsel	End User Customer	Consumer Advocate
11/20/2014	04a_window_voting	Yes	MeadWestvaco Corporation	End User Customer	Generation
11/20/2014	04a_window_voting	Yes	MEG Generating Company, LLC	Generation Owner	Generation
11/20/2014	04a_window_voting	Yes	New Jersey Division of Rate Counsel	End User Customer	Consumer Advocate

11/20/2014	04a_window_voting	Yes	Office of the People's Counsel for the District of Columbia	End User Customer	Consumer Advocate
11/20/2014	04a_window_voting	Yes	Potomac Electric Power Company	Electric Distributor	Transmission Owner
11/20/2014	04a_window_voting	Yes	PPL Energy Plus, LLC	Transmission Owner	Transmission Owner
11/20/2014	04a_window_voting	Yes	Praxair, Inc.	End User Customer	Industrial
11/20/2014	04a_window_voting	Yes	Procter & Gamble Paper Products Company (The)	End User Customer	Industrial
11/20/2014	04a_window_voting	Yes	Public Service Electric & Gas Company	Transmission Owner	Transmission Owner
11/20/2014	04a_window_voting	Yes	Rockland Electric Company	Transmission Owner	Transmission Owner
11/20/2014	04a_window_voting	Yes	The Trustees of the University of Pennsylvania, a Pennsylvania Non-Profit Corporation d/b/a University of Pennsylvania	End User Customer	Retail Energy Supplier
11/20/2014	04a_window_voting	Yes	Wellsboro Electric Company	Electric Distributor	Muni/Co-op
11/20/2014	04a_window_voting	Yes	Westar Energy, Inc.	Other Supplier	Power Marketer
8/27/2015	FTRSTF ODEC	Abstain	York County Solid Waste and Refuse Authority	Generation Owner	Generation
8/27/2015	FTRSTF ODEC	Abstain	Atlantic Grid Operations A, LLC	Other Supplier	Transmission Owner
8/27/2015	FTRSTF ODEC	Abstain	EnergyConnect, Inc.	Other Supplier	Curtailment Service Provider
8/27/2015	FTRSTF ODEC	Abstain	GDF Suez Energy Marketing NA, Inc.	Other Supplier	Power Marketer
8/27/2015	FTRSTF ODEC	Abstain	Icetec.com, Inc.	Other Supplier	Curtailment Service Provider
8/27/2015	FTRSTF ODEC	Abstain	J. Aron & Company	Other Supplier	Power Marketer
8/27/2015	FTRSTF ODEC	Abstain	Jersey Green Energy, LLC	Other Supplier	Financial Trader
8/27/2015	FTRSTF ODEC	Abstain	MidAtlantic Power Partners, LLC	Other Supplier	Curtailment Service Provider
8/27/2015	FTRSTF ODEC	Abstain	Noble Americas Gas & Power Corp.	Other Supplier	Power Marketer
8/27/2015	FTRSTF ODEC	Abstain	Duke Energy Business Services LLC	Transmission Owner	Transmission Owner
8/27/2015	FTRSTF ODEC	Abstain	Exelon Business Services Company, LLC	Transmission Owner	Transmission Owner
8/27/2015	FTRSTF ODEC	No	Property Endeavors, LLC	End User Customer	Power Marketer
8/27/2015	FTRSTF ODEC	No	Calpine Energy Services, L.P.	Generation Owner	Generation

8/27/2015	FTRSTF ODEC	No	Covanta Energy Group, LLC	Generation Owner	Generation
8/27/2015	FTRSTF ODEC	No	Dynegy Marketing and Trade, LLC	Generation Owner	Generation
8/27/2015	FTRSTF ODEC	No	Iberdrola Renewables, LLC	Generation Owner	Generation
8/27/2015	FTRSTF ODEC	No	IMG Midstream LLC	Generation Owner	Generation
8/27/2015	FTRSTF ODEC	No	NextEra Energy Power Marketing, LLC	Generation Owner	Generation
8/27/2015	FTRSTF ODEC	No	PPGI Fund A/B Development, LLC	Generation Owner	Generation
8/27/2015	FTRSTF ODEC	No	RC Cape May Holdings, LLC	Generation Owner	Generation
8/27/2015	FTRSTF ODEC	No	Talen Energy Marketing, LLC	Generation Owner	Generation
8/27/2015	FTRSTF ODEC	No	West Deptford Energy, LLC	Generation Owner	Generation
8/27/2015	FTRSTF ODEC	No	Alphataraxia Palladium LLC	Other Supplier	Power Marketer
8/27/2015	FTRSTF ODEC	No	Apple Group, LLC	Other Supplier	Financial Trader
8/27/2015	FTRSTF ODEC	No	BJ Energy, LLC	Other Supplier	Financial Trader
8/27/2015	FTRSTF ODEC	No	Brookfield Energy Marketing LP	Other Supplier	Power Marketer
8/27/2015	FTRSTF ODEC	No	Citigroup Energy, Inc.	Other Supplier	Financial Trader
8/27/2015	FTRSTF ODEC	No	DC Energy, LLC	Other Supplier	Financial Trader
8/27/2015	FTRSTF ODEC	No	Dufossat Capital I, LLC	Other Supplier	Financial Trader
8/27/2015	FTRSTF ODEC	No	Dyon, LLC	Other Supplier	Power Marketer
8/27/2015	FTRSTF ODEC	No	E Minus LLC	Other Supplier	Financial Trader
8/27/2015	FTRSTF ODEC	No	EDP Renewables North America, LLC	Other Supplier	Generation
8/27/2015	FTRSTF ODEC	No	Elliott Bay Energy Trading, LLC	Other Supplier	Financial Trader
8/27/2015	FTRSTF ODEC	No	Falcon Energy, LLC	Other Supplier	Power Marketer
8/27/2015	FTRSTF ODEC	No	Great Bay Energy I, LLC	Other Supplier	Power Marketer
8/27/2015	FTRSTF ODEC	No	Greene Energy, LLC	Other Supplier	Financial Trader
8/27/2015	FTRSTF ODEC	No	Hemsworth Capital, L.P.	Other Supplier	Financial Trader
8/27/2015	FTRSTF ODEC	No	Hexis Energy Trading, LLC	Other Supplier	Financial Trader
8/27/2015	FTRSTF ODEC	No	Highlands Energy Group, LLC (The)	Other Supplier	Financial Trader
8/27/2015	FTRSTF ODEC	No	H-P Energy Resources, LLC	Other Supplier	Financial Trader
8/27/2015	FTRSTF ODEC	No	Inertia Power I, LLC	Other Supplier	Power Marketer
8/27/2015	FTRSTF ODEC	No	Liberty Hill Power, LLC	Other Supplier	Power Marketer
8/27/2015	FTRSTF ODEC	No	Mac Trading, Inc.	Other Supplier	Financial Trader
8/27/2015	FTRSTF ODEC	No	Mercuria Energy America, Inc.	Other Supplier	Power Marketer

8/27/2015	FTRSTF ODEC	No	MET MA, LLC	Other Supplier	Power Marketer
8/27/2015	FTRSTF ODEC	No	Monterey MA, LLC	Other Supplier	Power Marketer
8/27/2015	FTRSTF ODEC	No	Northstar Trading Ltd.	Other Supplier	Financial Trader
8/27/2015	FTRSTF ODEC	No	Pure Energy, Inc.	Other Supplier	Financial Trader
8/27/2015	FTRSTF ODEC	No	Red Wolf Energy Trading, LLC	Other Supplier	Financial Trader
8/27/2015	FTRSTF ODEC	No	RJUMR Energy Partners Corp.	Other Supplier	Financial Trader
8/27/2015	FTRSTF ODEC	No	Saracen Energy East, L.P.	Other Supplier	Financial Trader
8/27/2015	FTRSTF ODEC	No	SESCO Enterprises, LLC	Other Supplier	Power Marketer
8/27/2015	FTRSTF ODEC	No	Shell Energy North America (US), L.P.	Other Supplier	Generation
8/27/2015	FTRSTF ODEC	No	Solea Energy, LLC	Other Supplier	Power Marketer
8/27/2015	FTRSTF ODEC	No	Southard Energy Partners LLC	Other Supplier	Power Marketer
8/27/2015	FTRSTF ODEC	No	Twin Cities Power, LLC	Other Supplier	Power Marketer
8/27/2015	FTRSTF ODEC	No	Vitol Inc.	Other Supplier	Power Marketer
8/27/2015	FTRSTF ODEC	No	Yasmin Partners LLC	Other Supplier	Financial Trader
8/27/2015	FTRSTF ODEC	No	Essential Power Rock Springs, LLC	Transmission Owner	Transmission Owner
8/27/2015	FTRSTF ODEC	No	PPL Electric Utilities Corporation d/b/a PPL Utilities	Transmission Owner	Transmission Owner
8/27/2015	FTRSTF ODEC	No	Public Service Electric & Gas Company	Transmission Owner	Transmission Owner
8/27/2015	FTRSTF ODEC	Yes	Blue Ridge Power Agency, Inc.	Electric Distributor	Muni/Co-op
8/27/2015	FTRSTF ODEC	Yes	Borough of Butler, Butler Electric Division	Electric Distributor	Retail Energy Supplier
8/27/2015	FTRSTF ODEC	Yes	Borough of Chambersburg	Electric Distributor	Muni/Co-op
8/27/2015	FTRSTF ODEC	Yes	Borough of Lavallette, New Jersey	Electric Distributor	Muni/Co-op
8/27/2015	FTRSTF ODEC	Yes	Borough of Madison, New Jersey	Electric Distributor	Muni/Co-op
8/27/2015	FTRSTF ODEC	Yes	Borough of Milltown, New Jersey	Electric Distributor	Muni/Co-op
8/27/2015	FTRSTF ODEC	Yes	Borough of Park Ridge, New Jersey	Electric Distributor	Muni/Co-op
8/27/2015	FTRSTF ODEC	Yes	Borough of Pemberton, New Jersey	Electric Distributor	Muni/Co-op
8/27/2015	FTRSTF ODEC	Yes	Borough of Seaside Heights, New Jersey	Electric Distributor	Muni/Co-op
8/27/2015	FTRSTF ODEC	Yes	Borough of South River, New Jersey	Electric Distributor	Muni/Co-op
8/27/2015	FTRSTF ODEC	Yes	Buckeye Power, Inc.	Electric Distributor	Muni/Co-op
8/27/2015	FTRSTF ODEC	Yes	Central Virginia Electric Cooperative	Electric Distributor	Muni/Co-op

8/27/2015	FTRSTF ODEC	Yes	City of Dover, Delaware	Electric Distributor	Muni/Co-op
8/27/2015	FTRSTF ODEC	Yes	Delaware Municipal Electric Corporation, Inc.	Electric Distributor	Muni/Co-op
8/27/2015	FTRSTF ODEC	Yes	Easton Utilities Commission	Electric Distributor	Muni/Co-op
8/27/2015	FTRSTF ODEC	Yes	Hagerstown Light Department	Electric Distributor	Muni/Co-op
8/27/2015	FTRSTF ODEC	Yes	Illinois Municipal Electric Agency	Electric Distributor	Muni/Co-op
8/27/2015	FTRSTF ODEC	Yes	Letterkenny Industrial Development Authority - PA	Electric Distributor	Muni/Co-op
8/27/2015	FTRSTF ODEC	Yes	North Carolina Electric Membership Corporation	Electric Distributor	Muni/Co-op
8/27/2015	FTRSTF ODEC	Yes	Northern Virginia Electric Cooperative (NOVEC)	Electric Distributor	Muni/Co-op
8/27/2015	FTRSTF ODEC	Yes	Old Dominion Electric Cooperative	Electric Distributor	Muni/Co-op
8/27/2015	FTRSTF ODEC	Yes	Potomac Electric Power Company	Electric Distributor	Transmission Owner
8/27/2015	FTRSTF ODEC	Yes	Potomac Electric Power Company	Electric Distributor	Transmission Owner
8/27/2015	FTRSTF ODEC	Yes	Potomac Electric Power Company	Electric Distributor	Transmission Owner
8/27/2015	FTRSTF ODEC	Yes	Southern Maryland Electric Cooperative, Inc.	Electric Distributor	Muni/Co-op
8/27/2015	FTRSTF ODEC	Yes	Town of Williamsport (The)	Electric Distributor	Muni/Co-op
8/27/2015	FTRSTF ODEC	Yes	Vineland Municipal Electric Utility	Electric Distributor	Muni/Co-op
8/27/2015	FTRSTF ODEC	Yes	Wabash Valley Power Association, Inc.	Electric Distributor	Muni/Co-op
8/27/2015	FTRSTF ODEC	Yes	Wellsboro Electric Company	Electric Distributor	Muni/Co-op
8/27/2015	FTRSTF ODEC	Yes	Air Liquide Industrials U.S., L.P.	End User Customer	Industrial
8/27/2015	FTRSTF ODEC	Yes	Air Products & Chemicals, Inc.	End User Customer	Industrial
8/27/2015	FTRSTF ODEC	Yes	Division of the Public Advocate of the State of Delaware	End User Customer	Consumer Advocate
8/27/2015	FTRSTF ODEC	Yes	Illinois Citizen Utility Board	End User Customer	Consumer Advocate
8/27/2015	FTRSTF ODEC	Yes	Lehigh Portland Cement Company	End User Customer	Industrial
8/27/2015	FTRSTF ODEC	Yes	Linde, LLC	End User Customer	Industrial
8/27/2015	FTRSTF ODEC	Yes	Maryland Office of People's Counsel	End User Customer	Consumer Advocate
8/27/2015	FTRSTF ODEC	Yes	MeadWestvaco Corporation	End User Customer	Generation
8/27/2015	FTRSTF ODEC	Yes	New Jersey Division of Rate Counsel	End User Customer	Consumer Advocate

8/27/2015	FTRSTF ODEC	Yes	Office of the People's Counsel for the District of Columbia	End User Customer	Consumer Advocate
8/27/2015	FTRSTF ODEC	Yes	Pennsylvania Office of Consumer Advocate	End User Customer	Consumer Advocate
8/27/2015	FTRSTF ODEC	Yes	Praxair, Inc.	End User Customer	Industrial
8/27/2015	FTRSTF ODEC	Yes	Procter & Gamble Paper Products Company (The)	End User Customer	Industrial
8/27/2015	FTRSTF ODEC	Yes	The Trustees of the University of Pennsylvania, a Pennsylvania Non-Profit Corporation d/b/a University of Pennsylvania	End User Customer	Retail Energy Supplier
8/27/2015	FTRSTF ODEC	Yes	West Virginia Consumer Advocate Division	End User Customer	Consumer Advocate
8/27/2015	FTRSTF ODEC	Yes	Church Hill Solar Farm, LLC	Generation Owner	Generation Owner Service Provider
8/27/2015	FTRSTF ODEC	Yes	Diamond State Generation Partners, LLC	Generation Owner	Generation
8/27/2015	FTRSTF ODEC	Yes	Indiana Municipal Power Agency	Generation Owner	Muni/Co-op
8/27/2015	FTRSTF ODEC	Yes	Kimberly-Clark Corporation	Generation Owner	Generation
8/27/2015	FTRSTF ODEC	Yes	PBF Power Marketing, LLC	Generation Owner	Generation
8/27/2015	FTRSTF ODEC	Yes	Achieving Equilibrium LLC	Other Supplier	Curtailment Service Provider
8/27/2015	FTRSTF ODEC	Yes	Castlebridge Energy Group, LLC	Other Supplier	Financial Trader
8/27/2015	FTRSTF ODEC	Yes	Demansys Energy, LLC	Other Supplier	Curtailment Service Provider
8/27/2015	FTRSTF ODEC	Yes	Direct Energy Business, LLC	Other Supplier	Retail Energy Supplier
8/27/2015	FTRSTF ODEC	Yes	DTE Energy Trading, Inc.	Other Supplier	Power Marketer
8/27/2015	FTRSTF ODEC	Yes	EMC Development Company, Inc.	Other Supplier	Curtailment Service Provider
8/27/2015	FTRSTF ODEC	Yes	Energy Consulting Services, LLC	Other Supplier	Power Marketer
8/27/2015	FTRSTF ODEC	Yes	Energy Cooperative Association of Pennsylvania (The)	Other Supplier	Muni/Co-op
8/27/2015	FTRSTF ODEC	Yes	EnerNOC, Inc.	Other Supplier	Curtailment Service Provider

8/27/2015	FTRSTF ODEC	Yes	Enerwise Global Technologies, Inc.	Other Supplier	Curtailment Service Provider
8/27/2015	FTRSTF ODEC	Yes	Gerdau Ameristeel Energy, Inc.	Other Supplier	Financial Trader
8/27/2015	FTRSTF ODEC	Yes	Industrial Energy Users-Ohio	Other Supplier	Retail Energy Supplier
8/27/2015	FTRSTF ODEC	Yes	ITC Mid-Atlantic Development LLC	Other Supplier	Transmission Owner
8/27/2015	FTRSTF ODEC	Yes	Kuehne Chemical Company, Inc.	Other Supplier	Retail Energy Supplier
8/27/2015	FTRSTF ODEC	Yes	Madison Gas & Electric Co.	Other Supplier	Power Marketer
8/27/2015	FTRSTF ODEC	Yes	New York Power Authority	Other Supplier	Financial Trader
8/27/2015	FTRSTF ODEC	Yes	Tangent Energy Solutions, Inc.	Other Supplier	Curtailment Service Provider
8/27/2015	FTRSTF ODEC	Yes	WPPI Energy	Other Supplier	Power Marketer
8/27/2015	FTRSTF ODEC	Yes	Appalachian Power Company	Transmission Owner	Transmission Owner
8/27/2015	FTRSTF ODEC	Yes	Dayton Power & Light Company (The)	Transmission Owner	Transmission Owner
8/27/2015	FTRSTF ODEC	Yes	Duquesne Light Company	Transmission Owner	Transmission Owner
8/27/2015	FTRSTF ODEC	Yes	East Kentucky Power Cooperative, Inc.	Transmission Owner	Transmission Owner
8/27/2015	FTRSTF ODEC	Yes	FirstEnergy Solutions Corp.	Transmission Owner	Transmission Owner
8/27/2015	FTRSTF ODEC	Yes	Rockland Electric Company	Transmission Owner	Transmission Owner
8/27/2015	FTRSTF ODEC	Yes	Virginia Electric & Power Company	Transmission Owner	Transmission Owner
10/22/2015	1a CAPS	Abstain	Allegheny Electric Cooperative, Inc.	Electric Distributor	Transmission Owner
10/22/2015	1a CAPS	Abstain	Borough of Chambersburg	Electric Distributor	Muni/Co-op
10/22/2015	1a CAPS	Abstain	Buckeye Power, Inc.	Electric Distributor	Muni/Co-op
10/22/2015	1a CAPS	Abstain	Illinois Municipal Electric Agency	Electric Distributor	Muni/Co-op
10/22/2015	1a CAPS	Abstain	Town of Williamsport (The)	Electric Distributor	Muni/Co-op
10/22/2015	1a CAPS	Abstain	Covanta Energy Group, LLC	Generation Owner	Generation
10/22/2015	1a CAPS	Abstain	IMG Midstream LLC	Generation Owner	Generation
10/22/2015	1a CAPS	Abstain	Indiana Municipal Power Agency	Generation Owner	Muni/Co-op
10/22/2015	1a CAPS	Abstain	NRG Power Marketing, LLC	Generation Owner	Generation
10/22/2015	1a CAPS	Abstain	RC Cape May Holdings, LLC	Generation Owner	Generation
10/22/2015	1a CAPS	Abstain	Direct Energy Business, LLC	Other Supplier	Retail Energy Supplier
10/22/2015	1a CAPS	Abstain	Madison Gas & Electric Co.	Other Supplier	Power Marketer
10/22/2015	1a CAPS	Abstain	New York Power Authority	Other Supplier	Financial Trader

10/22/2015	1a CAPS	Abstain	WPPI Energy	Other Supplier	Power Marketer
10/22/2015	1a CAPS	Abstain	Appalachian Power Company	Transmission Owner	Transmission Owner
10/22/2015	1a CAPS	Abstain	Duke Energy Business Services LLC	Transmission Owner	Transmission Owner
10/22/2015	1a CAPS	Abstain	FirstEnergy Solutions Corp.	Transmission Owner	Transmission Owner
10/22/2015	1a CAPS	Abstain	PPL Electric Utilities Corporation d/b/a PPL Utilities	Transmission Owner	Transmission Owner
10/22/2015	1a CAPS	Abstain	Public Service Electric & Gas Company	Transmission Owner	Transmission Owner
10/22/2015	1a CAPS	No	American Municipal Power, Inc.	Electric Distributor	Muni/Co-op
10/22/2015	1a CAPS	No	City of Dover, Delaware	Electric Distributor	Muni/Co-op
10/22/2015	1a CAPS	No	Delaware Municipal Electric Corporation, Inc.	Electric Distributor	Muni/Co-op
10/22/2015	1a CAPS	No	Hagerstown Light Department	Electric Distributor	Muni/Co-op
10/22/2015	1a CAPS	No	Wabash Valley Power Association, Inc.	Electric Distributor	Muni/Co-op
10/22/2015	1a CAPS	No	Calpine Energy Services, L.P.	Generation Owner	Generation
10/22/2015	1a CAPS	No	Dynegy Marketing and Trade, LLC	Generation Owner	Generation
10/22/2015	1a CAPS	No	PPGI Fund A/B Development, LLC	Generation Owner	Generation
10/22/2015	1a CAPS	No	Talen Energy Marketing, LLC	Generation Owner	Generation
10/22/2015	1a CAPS	No	Brookfield Energy Marketing LP	Other Supplier	Power Marketer
10/22/2015	1a CAPS	No	Elliott Bay Energy Trading, LLC	Other Supplier	Financial Trader
10/22/2015	1a CAPS	No	GDF Suez Energy Marketing NA, Inc.	Other Supplier	Power Marketer
10/22/2015	1a CAPS	No	Texas Retail Energy, LLC	Other Supplier	Retail Energy Supplier
10/22/2015	1a CAPS	No	Westar Energy, Inc.	Other Supplier	Power Marketer
10/22/2015	1a CAPS	No	Dayton Power & Light Company (The)	Transmission Owner	Transmission Owner
10/22/2015	1a CAPS	No	Essential Power Rock Springs, LLC	Transmission Owner	Transmission Owner
10/22/2015	1a CAPS	Yes	Blue Ridge Power Agency, Inc.	Electric Distributor	Muni/Co-op
10/22/2015	1a CAPS	Yes	Borough of Butler, Butler Electric Division	Electric Distributor	Retail Energy Supplier
10/22/2015	1a CAPS	Yes	Borough of Lavallette, New Jersey	Electric Distributor	Muni/Co-op
10/22/2015	1a CAPS	Yes	Borough of Madison, New Jersey	Electric Distributor	Muni/Co-op
10/22/2015	1a CAPS	Yes	Borough of Milltown, New Jersey	Electric Distributor	Muni/Co-op
10/22/2015	1a CAPS	Yes	Borough of Park Ridge, New Jersey	Electric Distributor	Muni/Co-op
10/22/2015	1a CAPS	Yes	Borough of Pemberton, New Jersey	Electric Distributor	Muni/Co-op

10/22/2015	1a CAPS	Yes	Borough of Seaside Heights, New Jersey	Electric Distributor	Muni/Co-op
10/22/2015	1a CAPS	Yes	Borough of South River, New Jersey	Electric Distributor	Muni/Co-op
10/22/2015	1a CAPS	Yes	Central Virginia Electric Cooperative	Electric Distributor	Muni/Co-op
10/22/2015	1a CAPS	Yes	Easton Utilities Commission	Electric Distributor	Muni/Co-op
10/22/2015	1a CAPS	Yes	Letterkenny Industrial Development Authority - PA	Electric Distributor	Muni/Co-op
10/22/2015	1a CAPS	Yes	North Carolina Electric Membership Corporation	Electric Distributor	Muni/Co-op
10/22/2015	1a CAPS	Yes	Northern Virginia Electric Cooperative (NOVEC)	Electric Distributor	Muni/Co-op
10/22/2015	1a CAPS	Yes	Old Dominion Electric Cooperative	Electric Distributor	Muni/Co-op
10/22/2015	1a CAPS	Yes	Potomac Electric Power Company	Electric Distributor	Transmission Owner
10/22/2015	1a CAPS	Yes	Potomac Electric Power Company	Electric Distributor	Transmission Owner
10/22/2015	1a CAPS	Yes	Potomac Electric Power Company	Electric Distributor	Transmission Owner
10/22/2015	1a CAPS	Yes	Southern Maryland Electric Cooperative, Inc.	Electric Distributor	Muni/Co-op
10/22/2015	1a CAPS	Yes	Vineland Municipal Electric Utility	Electric Distributor	Muni/Co-op
10/22/2015	1a CAPS	Yes	Wellsboro Electric Company	Electric Distributor	Muni/Co-op
10/22/2015	1a CAPS	Yes	Air Liquide Industrials U.S., L.P.	End User Customer	Industrial
10/22/2015	1a CAPS	Yes	Air Products & Chemicals, Inc.	End User Customer	Industrial
10/22/2015	1a CAPS	Yes	Division of the Public Advocate of the State of Delaware	End User Customer	Consumer Advocate
10/22/2015	1a CAPS	Yes	Illinois Citizen Utility Board	End User Customer	Consumer Advocate
10/22/2015	1a CAPS	Yes	Indiana Office of Utility Consumer Counselor (IN OUCC)	End User Customer	Consumer Advocate
10/22/2015	1a CAPS	Yes	Lehigh Portland Cement Company	End User Customer	Industrial
10/22/2015	1a CAPS	Yes	Linde, LLC	End User Customer	Industrial
10/22/2015	1a CAPS	Yes	Maryland Office of People's Counsel	End User Customer	Consumer Advocate
10/22/2015	1a CAPS	Yes	MeadWestvaco Corporation	End User Customer	Generation
10/22/2015	1a CAPS	Yes	New Jersey Division of Rate Counsel	End User Customer	Consumer Advocate
10/22/2015	1a CAPS	Yes	Office of the Attorney General, Kentucky	End User Customer	Consumer Advocate

10/22/2015	1a CAPS	Yes	Office of the People's Counsel for the District of Columbia	End User Customer	Consumer Advocate
10/22/2015	1a CAPS	Yes	Pennsylvania Office of Consumer Advocate	End User Customer	Consumer Advocate
10/22/2015	1a CAPS	Yes	Praxair, Inc.	End User Customer	Industrial
10/22/2015	1a CAPS	Yes	Procter & Gamble Paper Products Company (The)	End User Customer	Industrial
10/22/2015	1a CAPS	Yes	Property Endeavors, LLC	End User Customer	Power Marketer
10/22/2015	1a CAPS	Yes	The Trustees of the University of Pennsylvania, a Pennsylvania Non-Profit Corporation d/b/a University of Pennsylvania	End User Customer	Retail Energy Supplier
10/22/2015	1a CAPS	Yes	Virginia Division of Consumer Counsel	End User Customer	Consumer Advocate
10/22/2015	1a CAPS	Yes	West Virginia Consumer Advocate Division	End User Customer	Consumer Advocate
10/22/2015	1a CAPS	Yes	Church Hill Solar Farm, LLC	Generation Owner	Generation Owner Service Provider
10/22/2015	1a CAPS	Yes	CPV Maryland, LLC	Generation Owner	Generation
10/22/2015	1a CAPS	Yes	Diamond State Generation Partners, LLC	Generation Owner	Generation
10/22/2015	1a CAPS	Yes	Iberdrola Renewables, LLC	Generation Owner	Generation
10/22/2015	1a CAPS	Yes	Kimberly-Clark Corporation	Generation Owner	Generation
10/22/2015	1a CAPS	Yes	NextEra Energy Power Marketing, LLC	Generation Owner	Generation
10/22/2015	1a CAPS	Yes	Northampton Generating Company, L.P.	Generation Owner	Generation
10/22/2015	1a CAPS	Yes	PBF Power Marketing, LLC	Generation Owner	Generation
10/22/2015	1a CAPS	Yes	West Deptford Energy, LLC	Generation Owner	Generation
10/22/2015	1a CAPS	Yes	York County Solid Waste and Refuse Authority	Generation Owner	Generation
10/22/2015	1a CAPS	Yes	Achieving Equilibrium LLC	Other Supplier	Curtailment Service Provider
10/22/2015	1a CAPS	Yes	Alphataraxia Palladium LLC	Other Supplier	Power Marketer
10/22/2015	1a CAPS	Yes	Apple Group, LLC	Other Supplier	Financial Trader
10/22/2015	1a CAPS	Yes	Atlantic Grid Operations A, LLC	Other Supplier	Transmission Owner
10/22/2015	1a CAPS	Yes	Community Energy, Inc.	Other Supplier	Generation

10/22/2015	1a CAPS	Yes	Demansys Energy, LLC	Other Supplier	Curtailment Service Provider
10/22/2015	1a CAPS	Yes	DTE Energy Trading, Inc.	Other Supplier	Power Marketer
10/22/2015	1a CAPS	Yes	Dufossat Capital I, LLC	Other Supplier	Financial Trader
10/22/2015	1a CAPS	Yes	Dyon, LLC	Other Supplier	Power Marketer
10/22/2015	1a CAPS	Yes	E Minus LLC	Other Supplier	Financial Trader
10/22/2015	1a CAPS	Yes	EMC Development Company, Inc.	Other Supplier	Curtailment Service Provider
10/22/2015	1a CAPS	Yes	Energy Consulting Services, LLC	Other Supplier	Power Marketer
10/22/2015	1a CAPS	Yes	Energy Cooperative Association of Pennsylvania (The)	Other Supplier	Muni/Co-op
10/22/2015	1a CAPS	Yes	EnergyConnect, Inc.	Other Supplier	Curtailment Service Provider
10/22/2015	1a CAPS	Yes	EnerNOC, Inc.	Other Supplier	Curtailment Service Provider
10/22/2015	1a CAPS	Yes	Enerwise Global Technologies, Inc.	Other Supplier	Curtailment Service Provider
10/22/2015	1a CAPS	Yes	Falcon Energy, LLC	Other Supplier	Power Marketer
10/22/2015	1a CAPS	Yes	Galt Power, Inc.	Other Supplier	Power Marketer
10/22/2015	1a CAPS	Yes	Gerdau Ameristeel Energy, Inc.	Other Supplier	Financial Trader
10/22/2015	1a CAPS	Yes	Great Bay Energy I, LLC	Other Supplier	Power Marketer
10/22/2015	1a CAPS	Yes	Greene Energy, LLC	Other Supplier	Financial Trader
10/22/2015	1a CAPS	Yes	Hexis Energy Trading, LLC	Other Supplier	Financial Trader
10/22/2015	1a CAPS	Yes	Icetec.com, Inc.	Other Supplier	Curtailment Service Provider
10/22/2015	1a CAPS	Yes	Industrial Energy Users-Ohio	Other Supplier	Retail Energy Supplier
10/22/2015	1a CAPS	Yes	ITC Mid-Atlantic Development LLC	Other Supplier	Transmission Owner
10/22/2015	1a CAPS	Yes	Jersey Green Energy, LLC	Other Supplier	Financial Trader
10/22/2015	1a CAPS	Yes	Kuehne Chemical Company, Inc.	Other Supplier	Retail Energy Supplier
10/22/2015	1a CAPS	Yes	Liberty Hill Power, LLC	Other Supplier	Power Marketer
10/22/2015	1a CAPS	Yes	Mac Trading, Inc.	Other Supplier	Financial Trader
10/22/2015	1a CAPS	Yes	MET MA, LLC	Other Supplier	Power Marketer
10/22/2015	1a CAPS	Yes	Monterey MA, LLC	Other Supplier	Power Marketer

10/22/2015	1a CAPS	Yes	Pure Energy, Inc.	Other Supplier	Financial Trader
10/22/2015	1a CAPS	Yes	Red Wolf Energy Trading, LLC	Other Supplier	Financial Trader
10/22/2015	1a CAPS	Yes	RJUMR Energy Partners Corp.	Other Supplier	Financial Trader
10/22/2015	1a CAPS	Yes	Solea Energy, LLC	Other Supplier	Power Marketer
10/22/2015	1a CAPS	Yes	Southard Energy Partners LLC	Other Supplier	Power Marketer
10/22/2015	1a CAPS	Yes	Tangent Energy Solutions, Inc.	Other Supplier	Curtailment Service Provider
10/22/2015	1a CAPS	Yes	Velocity American Energy Master I, L.P.	Other Supplier	Power Marketer
10/22/2015	1a CAPS	Yes	Yasmin Partners LLC	Other Supplier	Financial Trader
10/22/2015	1a CAPS	Yes	Duquesne Light Company	Transmission Owner	Transmission Owner
10/22/2015	1a CAPS	Yes	Exelon Business Services Company, LLC	Transmission Owner	Transmission Owner
10/22/2015	1a CAPS	Yes	Rockland Electric Company	Transmission Owner	Transmission Owner
10/22/2015	1a CAPS	Yes	Virginia Electric & Power Company	Transmission Owner	Transmission Owner

Kyungjin Yoo

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EDUCATION

Ph.D. candidate in Energy Management and Policy, Pennsylvania State University, 2019
M.S. in Energy, Environment and Engineering Economics, Seoul National University, 2013
B.S. in Energy and Resources Engineering, Seoul National University, 2011

PUBLICATIONS (selected)

Yoo, K. & Blumsack, S. (2018). The Political Complexity of Regional Electricity Policy Formation. *Complexity*

Yoo, K. & Blumsack, S. (2018). Can Capacity Markets be Designed by Democracy?. *Journal of Regulatory Economics*, Volume 53, No. 2, Pages 127-151.

Blumsack, S., Yoo, K., & Johnson, N. (2017). Can Capacity Markets Be Designed by Democracy?. *Proceedings of the 50th Hawaii International Conference on System Sciences* (pp. 3075 – 3084).

Yoo, K., & Blumsack, S. (2016, October). Voting behavior in the PJM regional transmission organization. *In 34th USAEE/IAEE North American Conference*.

Yoo, K., Lee, Y., & Heo, E. (2013). Economic Effects by M&A Types in the Renewable Energy Sector: An Event Study Approach. *Renewable & Sustainable Energy Reviews*, Volume 26, Pages 694-701.

WORKING EXPERIENCE (selected)

Summer Intern at PJM Interconnection LLC., Audubon, PA, Jun. 2018 – Aug. 2018

- Assisting development of quadrennial review of the capacity market
- Evaluated financial assumptions (on ATWACC) for Quadrennial Review
- Created a list of gas hubs, where gas-fired generators in PJM procure their gas

Teaching Assistant for of Global Finance for the Earth, Energy, and Materials Industries; Geo-Resources Evaluation and Investment analysis; Corporate Finance for the Energy Industry, Pennsylvania State University, May. 2015 – present

- Assisted organizing class materials and grading assignments/exams on capital budgeting, project evaluation, NPV, IRR, LCOE, CAPM, WACC, futures, options, etc.
- Taught regression tutorial session (Fall, 2018)

SKILLS

Program	R, Matlab, STATA, GAMS, Gephi, IMPLAN, Datastream, Microsoft office. Learning SAS
Methods	Econometrics (published a paper using *GARCH*, took three econometric classes at graduate level), Matpower (took a class and did projects of economic dispatch using matpower), Network analysis (with knowledge of statistics and visualization, wrote a paper using community detection method/network measures)
Language	Korean (native), English (fluent), French (beginner)

AWARDS & SCHOLARSHIP

34th USAEE/IAEE Best Student Paper Award Competition, Tulsa, OK, Oct. 2016
The Energy Business and Finance Scholarship in Honor of Dr. Richard L. Gordon, Department of Energy and Mineral Engineering, Pennsylvania State University, 2015 – 2017
The Wesley C. Pickard Graduate Fellowship, College of Earth and Mineral Sciences, Pennsylvania State University, 2013 – 2014
Global Korea Scholarship, South Korean Government, 2013 – 2015
The 8th Korea Resource Economics Student Paper competition, Best prize, Dec. 2012
National Science Scholarship, South Korean Government, 2007 – 2011