

SECTION 7 – CONGESTION

Congestion occurs when available, least-cost energy cannot be delivered to all loads for a period because transmission facilities are not adequate to deliver that energy to some loads. When the least-cost available energy cannot be delivered to load in a transmission-constrained area, higher cost units in the constrained area must be dispatched to meet that load.¹ The result is that the price of energy in the constrained area is higher than in the unconstrained area because of the combination of transmission limitations and the cost of local generation. Locational marginal prices (LMPs) reflect the price of the lowest-cost resources available to meet loads, taking into account actual delivery constraints imposed by the transmission system. Thus LMP is an efficient way to price energy when transmission constraints exist. Congestion reflects this efficient pricing.

Congestion reflects the underlying characteristics of the power system including the nature and capability of transmission facilities and the cost and geographical distribution of generation facilities. Congestion is neither good nor bad but is a direct measure of the extent to which there are differences in the cost of generation that cannot be equalized because of transmission constraints. A complete set of markets would require direct competition between investments in transmission and generation. The transmission system provides a physical hedge against congestion. The transmission system is paid for by firm load and, as a result, firm load receives the corollary financial hedge in the form of Auction Revenue Rights (ARRs) and/or Financial Transmission Rights (FTRs). While the transmission system and, therefore, ARRs/FTRs are not guaranteed to be a complete hedge against congestion, ARRs/FTRs do provide a substantial offset to the cost of congestion to firm load.²

The Market Monitoring Unit (MMU) analyzed congestion and its influence on PJM markets during 2008.

Overview

Congestion Cost

- Total congestion.** Total congestion costs increased by \$271 million or 15 percent, from \$1.846 billion in calendar year 2007 to \$2.117 billion in calendar year 2008. Day-ahead congestion costs increased by \$586 million or 28 percent, from \$2.075 billion in calendar year 2007 to \$2.661 billion in calendar year 2008. Balancing congestion costs decreased by \$315.6 million or 137 percent, from -\$229 million in calendar year 2007 to -\$544.6 million in calendar year 2008. Total congestion costs have ranged from 6 percent to 9 percent of PJM annual total billings since 2003. Congestion costs were 6 percent of total PJM billings for 2008, as was the case in 2007. Total PJM billings for 2008 were \$34.306 billion, a 12 percent increase from the \$30.556 billion billed in 2007.

¹ This is referred to as dispatching units out of economic merit order. Economic merit order is the order of all generator offers from lowest to highest cost. Congestion occurs when loadings on transmission facilities mean the next unit in merit order cannot be used and a higher cost unit must be used in its place.

² See the 2008 *State of the Market Report*, Volume II, Section 8, "Financial Transmission and Auction Revenue Rights," at "ARR and FTR Revenue and Congestion."

- **Monthly Congestion.** Fluctuations in monthly congestion costs continued to be substantial. In 2008, these differences were driven by varying load and energy import levels, different patterns of generation, weather-induced changes in demand and variations in congestion frequency on constraints affecting large portions of PJM load.

Congestion Component of LMP and Facility or Zonal Congestion

- **Congestion Component of Locational Marginal Price (LMP).** To provide an indication of the geographic dispersion of congestion costs, the congestion component of LMP (CLMP) was calculated for control zones in PJM. Price separation between eastern, southern and western control zones in PJM was primarily a result of congestion on the AP South interface. This interface had the effect of increasing prices in eastern and southern control zones located on the constrained side of the affected facilities while reducing prices in the unconstrained western control zones.
- **Congested Facilities.** As was the case in 2007, congestion frequency was significantly higher in the Day-Ahead Market than in the Real-Time Market in 2008.³ Day-ahead congestion frequency increased in calendar year 2008 compared to 2007. In 2008, there were 74,742 day-ahead, congestion-event hours compared to 62,616 congestion-event hours in 2007. Day-ahead, congestion-event hours increased on PJM transmission lines, transformers and the flowgates between PJM and the Midwest Independent Transmission System Operator, Inc. (Midwest ISO) while congestion frequency on internal PJM interfaces decreased in 2008 compared to 2007. Real-time congestion frequency increased in calendar year 2008 compared to 2007. In 2008, there were 21,651 real-time, congestion-event hours compared to 19,527 congestion-event hours in 2007. Real-time, congestion-event hours increased on PJM transmission lines, transformers and on the flowgates between PJM and the Midwest ISO, while interfaces saw decreases. The AP South Interface was the largest contributor to congestion costs in 2008. With \$558 million in total congestion costs, it accounted for 26 percent of the total PJM congestion costs in 2008. The top five constraints in terms of congestion costs together contributed \$1.282 billion, or 61 percent, of the total PJM congestion costs in 2008. The top five constraints included the AP South Interface, the Cloverdale — Lexington line, the Mount Storm — Pruntytown line and the Bedington — Black Oak and West interface constraints.
- **Zonal Congestion.** In calendar year 2008, the AP Control Zone experienced the highest congestion costs of the control zones in PJM. The \$487.1 million in congestion costs in the AP Control Zone represented a 9 percent increase from the \$448.6 million in congestion costs the zone had experienced in 2007. The AP South Interface contributed \$145.3 million, or 30 percent of the total AP Control Zone congestion cost. The Dominion Control Zone had the second highest congestion cost in PJM in 2008. The \$322.6 million in congestion costs in the Dominion Control Zone represented an 11 percent increase from the \$290.8 million in congestion costs the zone had experienced in 2007. The AP South Interface contributed \$177.1 million, or 55 percent of the total Dominion Control Zone congestion cost.

³ Prior state of the market reports measured real-time congestion frequency using the convention that a congestion-event hour exists if the particular facility is constrained for four or more of the 12 five-minute intervals comprising that hour. In the 2008 *State of the Market Report*, in order to have a consistent metric for real-time and day-ahead congestion frequency, real-time congestion frequency is measured using the convention that an hour is constrained if any of its component five-minute intervals is constrained. Comparisons to previous periods use the new standard for both current and prior periods.

Economic Planning Process

- **Transmission and Markets.** As a general matter, transmission investments have not been fully incorporated into competitive markets. The construction of new transmission facilities can have significant impacts on energy and capacity markets, but there is no market mechanism in place that would require direct competition between transmission and generation to meet loads in an area. While the RPM construct does provide that qualifying transmission upgrades may be submitted as offers, there have been no such offers. More generally, network transmission is not built based directly on market signals because the owners of network transmission are compensated through a non market mechanism. PJM has taken a first step towards integrating transmission investments into the market through the use of economic evaluation metrics. Economic evaluation metrics can be used to determine whether there are positive economic benefits associated with an investment in transmission that might warrant the investment even when it is not required for reliability. The goal of transmission planning should ultimately be the incorporation of transmission investment decisions into market driven processes as much as possible.
- **Process Revision.** PJM has made multiple filings related to economic metrics for evaluating transmission investments. The United States Federal Energy Regulatory Commission (FERC) has required that PJM use an approach with predefined formulas for determining whether a defined transmission investment passes the cost-benefit test including explicit accounting for changes in production costs, the costs of complying with environmental regulations, generation availability trends and demand-response trends. The FERC has recently accepted the latest PJM filing in Docket No. ER06-1474.

Conclusion

Congestion reflects the underlying characteristics of the power system, including the nature and capability of transmission facilities and the cost and geographical distribution of generation facilities. Total congestion costs increased by \$271 million or 15 percent, from \$1.846 billion in calendar year 2007 to \$2.117 billion in calendar year 2008. Day-ahead congestion costs increased by \$586 million or 28 percent, from \$2.075 billion in calendar year 2007 to \$2.661 billion in calendar year 2008. Balancing congestion costs decreased by \$315.6 million or 138 percent, from -\$229 million in calendar year 2007 to -\$544.6 million in calendar year 2008. Congestion costs were significantly higher in the Day-Ahead Market than in the balancing market. Congestion frequency was also significantly higher in the Day-Ahead Market than in the Real-Time Market. In the Day-Ahead Market in 2008, there were 74,742 congestion-event hours compared to 62,616 congestion-event hours in 2007. In the Real-Time Energy Market in 2008, there were 21,651 congestion-event hours compared to 19,527 congestion-event hours in 2007.

As a result of the geographic growth of PJM, efficient redispatch displaced the less efficient management of power flows across multiple borders via transmission loading relief (TLR) procedures and ramp limits. (Power flows across the new, external borders continue to be managed, in part, via TLRs and ramp limits.) Redispatch is more efficient and, at the same time, revealed the underlying inability of the transmission system to transfer the lowest-cost energy on the system to all parts of the system for all hours. The details are revealed in the analysis of temporal patterns of congestion

and of congested facilities and zonal congestion. That information, made explicit over the broad PJM footprint, is an essential input to a rational market and planning process.

ARRs and FTRs served as an effective, but not total, hedge against congestion. ARR and FTR revenues hedged 97.4 percent of the total congestion costs in the Day-Ahead Energy Market and the balancing energy market within PJM for the 2007 to 2008 planning period. For the first seven months of the 2008 to 2009 planning period, ARR and FTR revenue hedged 97.2 percent of the total congestion costs within PJM.⁴ FTRs were paid at 100 percent of their target allocation for the planning year ended May 31, 2008, and at 99.6 percent of their target allocation for the first seven months of the current planning year.

One constraint accounted for over a quarter of total congestion costs in 2008 and the top five constraints accounted for nearly two-thirds of total congestion costs. The AP South interface displaced the Bedington – Black Oak interface as the largest contributor to congestion costs in 2008 due to system upgrades on the Bedington – Black Oak circuit in December 2007 and the associated redefinition of the AP South interface on September 1, 2008.⁵ The Bedington – Black Oak constraint has been a persistent source of large congestion costs for several years, but decreased in both congestion costs and frequency in 2008. The AP South interface is now the primary west to east transfer constraint.

The congestion metric requires careful review. Net congestion, which includes both load congestion payments and generation congestion credits, is not a good measure of the congestion costs paid by load from the perspective of the wholesale market.⁶ While total congestion costs represent the overall charge or credit to a zone, the components of congestion costs measure the extent to which load or generation bear total congestion costs. Load congestion payments, when positive, measure the total congestion cost to load in an area. Load congestion payments, when negative, measure the total congestion credit to load in an area. Negative load congestion payments result when load is on the lower priced side of a constraint or constraints. For example, congestion across the AP South interface means lower prices in western control zones and higher prices in eastern and southern control zones. Load in western control zones will benefit from lower prices and receive a congestion credit (negative load congestion payment). Load in the eastern and southern control zones will incur a congestion charge (positive load congestion payment). The reverse is true for generation congestion credits. Generation congestion credits, when positive, measure the total congestion credit to generation in an area. Generation congestion credits, when negative, measure the total congestion cost to generation in an area. Negative generation congestion credits result when generation is on the lower priced side of a constraint or constraints. For example, congestion across the AP South interface means lower prices in the western control zones and higher prices in the eastern and southern control zones. Generation in the western control zones will receive lower prices and incur a congestion charge (negative generation congestion credit). Generation in the eastern and southern control zones will receive higher prices and receive a congestion credit (positive generation congestion credit).

4 See the *2008 State of the Market Report*, Volume II, Section 8, "Financial Transmission and Auction Revenue Rights," at Table 8-28, "ARR and FTR congestion hedging: Planning periods 2007 to 2008 and 2008 to 2009."

5 See "APSouth Transfer Interface," PJM Presentation to the Markets Implementation Committee (July 23, 2008) <<http://www.pjm.com/~media/committees-groups/committees/mic/20080723-item-08-apsouth-interface-changes.ashx>> (554.44 kb)

6 The actual congestion payments by retail customers are a function of retail ratemaking policies and may or may not reflect an offset for congestion credits.

As an example, total congestion in 2008 in PJM was \$2.117 billion, which was comprised of load congestion payments of \$1.060 billion, negative generation credits of \$1.089 billion and explicit congestion of -\$31.1 million.

Congestion

Congestion Accounting

Transmission congestion can exist in PJM's Day-Ahead and Real-Time Energy Market. Transmission congestion charges in the Day-Ahead Energy Market can be directly hedged by FTRs. Balancing market congestion charges can be hedged by FTRs to the extent that a participant's energy flows in real time are consistent with those in the Day-Ahead Energy Market.⁷

Total congestion charges are equal to the net congestion bill plus explicit congestion charges, incurred in both the Day-Ahead Energy Market and the balancing energy market.

The net congestion bill is calculated by subtracting generating congestion credits from load congestion payments. The logic is that increased congestion payments by load are offset by increased congestion revenues to generation, for the area analyzed. Whether the net congestion bill is an appropriate measure of congestion for load depends on who pays the load congestion payments and who receives the generation congestion credits. The net congestion bill is an appropriate measure of congestion for a utility that charges load congestion payments to load and credits generation congestion credits to load. The net congestion bill is not an appropriate measure of congestion in situations where load pays the load congestion payments but does not receive the generation credits as an offset.

In the 2008 analysis of total congestion costs, load congestion payments are netted against generation congestion credits on an hourly basis, by billing organization, and then summed for the given period.⁸ A billing organization may offset load congestion payments with its generation portfolio or by purchasing supply from another entity via a bilateral transaction.

Load Congestion Payments and Generation Congestion Credits are calculated for both the Day-ahead and Balancing Energy Markets.

- **Day-Ahead Load Congestion Payments.** Day-ahead load congestion payments are calculated for all cleared demand, decrement bids and Day-Ahead Energy Market sale transactions. (Decrement bids and energy sales can be thought of as scheduled load.) Day-ahead load congestion payments are calculated using MW and the load bus CLMP, the decrement bid CLMP or the CLMP at the source of the sale transaction, as applicable.

⁷ The terms *congestion charges* and *congestion costs* are both used to refer to the costs associated with congestion. The term, congestion charges, is used in documents by PJM's Market Settlement Operations.

⁸ This analysis does not treat affiliated billing organizations as a single organization. Thus, the generation congestion credits from one organization will not offset the load payments of its affiliate. This may overstate or understate the actual load payments or generation credits of an organization's parent company.

- **Day-Ahead Generation Congestion Credits.** Day-ahead generation congestion credits are calculated for all cleared generation and increment offers and Day-Ahead Energy Market purchase transactions. (Increment offers and energy purchases can be thought of as scheduled generation.) Day-ahead generation congestion credits are calculated using MW and the generator bus CLMP, the increment offer's CLMP or the CLMP at the sink of the purchase transaction, as applicable.
- **Balancing Load Congestion Payments.** Balancing load congestion payments are calculated for all deviations between a PJM member's real-time load and energy sale transactions and their day-ahead cleared demand, decrement bids and energy sale transactions. Balancing load congestion payments are calculated using MW deviations and the real-time CLMP for each bus where a deviation exists.
- **Balancing Generation Congestion Credits.** Balancing generation congestion credits are calculated for all deviations between a PJM member's real-time generation and energy purchase transactions and the day-ahead cleared generation, increment offers and energy purchase transactions. Balancing generation congestion credits are calculated using MW deviations and the real-time CLMP for each bus where a deviation exists.
- **Explicit Congestion Charges.** Explicit congestion charges are the net congestion charges associated with point-to-point energy transactions. These charges equal the product of the transacted MW and CLMP differences between sources (origins) and sinks (destinations) in the Day-Ahead Energy Market. Balancing energy market explicit congestion charges equal the product of the deviations between the real-time and day-ahead transacted MW and the differences between the real-time CLMP at the transactions' sources and sinks.

The congestion charges associated with specific constraints are the sum of the total day-ahead and balancing congestion costs associated with those constraints. The congestion charges in each zone are the sum of the congestion charges associated with each constraint that affects prices in the zone. The network nature of the transmission system means that congestion costs in a zone are frequently the result of constrained facilities located outside that zone.

Congestion costs can be both positive and negative. The CLMP is calculated with respect to the system reference bus LMP, also called the system marginal price (SMP). When a transmission constraint occurs, the resulting CLMP is positive on one side of the constraint and negative on the other side of the constraint and the corresponding congestion costs are positive or negative. For each transmission constraint, the CLMP reflects the cost of a constraint at a pricing node and is equal to the product of the constraint shadow price and the distribution factor at the respective pricing node. The total CLMP at a pricing node is the sum of all constraint contributions to LMP and is equal to the difference between the actual LMP that results from transmission constraints, excluding losses, and the SMP. If an area experiences lower prices because of a constraint, the CLMP in that area is negative.⁹

⁹ For an example of the congestion accounting methods used in this section, see the *2008 State of the Market Report*, Volume II, Appendix G, "Financial Transmission and Auction Revenue Rights," at Table G-1, "Congestion revenue, FTR target allocations and FTR congestion credits: Illustration."

Total Calendar Year Congestion

Congestion charges have ranged from 6 percent to 9 percent of annual total PJM billings since 2003.¹⁰ Table 7-1 shows total congestion by year from 2003 through 2008. Total congestion charges were \$2.117 billion in calendar year 2008, a 15 percent increase from \$1.846 billion in calendar year 2007.

Table 7-1 Total annual PJM congestion (Dollars (Millions)): Calendar years 2003 to 2008

	Congestion Charges	Percent Change	Total PJM Billing	Percent of PJM Billing
2003	\$464	NA	\$6,900	7%
2004	\$750	62%	\$8,700	9%
2005	\$2,092	179%	\$22,630	9%
2006	\$1,603	(23%)	\$20,945	8%
2007	\$1,846	15%	\$30,556	6%
2008	\$2,117	15%	\$34,306	6%
Total	\$8,872		\$124,037	7%

Total congestion charges appearing in Table 7-1 include both congestion charges associated with PJM facilities and those associated with reciprocal, coordinated flowgates in the Midwest ISO whose operating limits are respected by PJM.¹¹

Monthly Congestion

Table 7-2 shows that during calendar year 2008, monthly congestion charges ranged from a maximum of \$436 million in June 2008 to a minimum of \$78 million in December 2008. Approximately 52 percent of all calendar year 2008 congestion occurred between the months of May and August.

¹⁰ Calculated values shown in Section 7, "Congestion," are based on unrounded, underlying data and may differ from calculations based on the rounded values in the tables.

¹¹ See "Joint Operating Agreement Between the Midwest Independent Transmission System Operator, Inc. And PJM Interconnection, L.L.C." (November 1, 2007) (Accessed February 23, 2009), Section 6.1 <<http://www.pjm.com/documents/agreements/~media/documents/agreements/joa-complete.ashx>>.

Table 7-2 Monthly PJM congestion charges (Dollars (Millions)): Calendar years 2007 to 2008

	2007	2008
Jan	\$112	\$231
Feb	\$175	\$168
Mar	\$160	\$86
Apr	\$109	\$126
May	\$90	\$183
Jun	\$188	\$436
Jul	\$205	\$360
Aug	\$207	\$127
Sept	\$136	\$125
Oct	\$122	\$102
Nov	\$117	\$93
Dec	\$226	\$78

Congestion Component of LMP

The congestion component of LMP was calculated for each PJM control zone, to provide an indication of the geographic dispersion of congestion costs. The congestion component of LMP for control zones is presented in Table 7-3 for calendar years 2007 and 2008.

Table 7-3 shows overall congestion patterns in 2008. Price separation between eastern and western control zones in PJM was primarily a result of congestion on the AP South interface. This constraint generally had a positive congestion component of LMP in eastern and southern control zones located on the constrained side of the affected facilities while the unconstrained western zones had a negative congestion component of LMP.

Table 7-3 Annual average congestion component of LMP: Calendar years 2007 to 2008

Control Zone	2007		2008	
	Day Ahead	Real Time	Day Ahead	Real Time
AECO	\$6.27	\$6.42	\$7.91	\$10.77
AEP	(\$7.59)	(\$8.80)	(\$9.58)	(\$10.45)
AP	\$0.77	\$1.33	(\$0.52)	\$0.29
BGE	\$9.50	\$12.08	\$10.94	\$11.07
ComEd	(\$7.80)	(\$9.42)	(\$11.39)	(\$13.45)
DAY	(\$8.12)	(\$9.54)	(\$10.06)	(\$11.18)
DLCO	(\$9.21)	(\$11.13)	(\$11.80)	(\$14.47)
Dominion	\$8.43	\$9.89	\$8.05	\$8.76
DPL	\$5.72	\$6.09	\$7.60	\$7.70
JCPL	\$6.49	\$7.36	\$7.90	\$8.64
Met-Ed	\$6.25	\$7.32	\$6.56	\$6.51
PECO	\$5.02	\$4.82	\$5.91	\$6.11
PENELEC	(\$1.13)	(\$1.46)	(\$0.93)	(\$2.33)
Pepco	\$10.84	\$13.00	\$12.26	\$12.40
PPL	\$4.75	\$4.89	\$5.60	\$5.51
PSEG	\$7.05	\$7.43	\$7.74	\$8.93
RECO	\$6.77	\$6.50	\$6.53	\$7.63

Congested Facilities

A congestion event exists when a unit or units must be dispatched out-of-merit order to control the impact of a contingency on a monitored facility or to control an actual overload. A congestion-event hour exists when a specific facility is constrained for one or more five-minute intervals within an hour. A congestion-event hour differs from a constrained hour, which is any hour during which one or more facilities are congested. Thus, if two facilities are constrained during an hour, the result is two congestion-event hours and one constrained hour. Constraints are often simultaneous, so the number of congestion-event hours exceeds the number of constrained hours and the number of congestion-event hours can exceed the number of hours in a year. In order to have a consistent metric for real-time and day-ahead congestion frequency, real-time congestion frequency is measured using the convention that an hour is constrained if any of its component five-minute intervals is constrained. This is also consistent with the way in which PJM reports real-time congestion. In 2008, there were 74,742 day-ahead, congestion-event hours, an increase of 20.1 percent from the 62,216 in 2007. In 2008, there were 21,651 real-time, congestion-event hours, a 10.9 percent increase from the 19,527 in 2007.

Congestion by Facility Type and Voltage

Both day-ahead and real-time, congestion-event hours increased on PJM transmission lines, transformers and the flowgates between PJM the Midwest ISO in 2008. Day-ahead and real-time, congestion-event hours decreased on PJM internal interfaces.

Day-ahead congestion costs increased on all facility types in 2008 except interfaces. Balancing congestion costs decreased on all facility types in 2008.

Table 7-4 provides congestion-event-hour subtotals and congestion cost subtotals comparing 2008 calendar year results by facility type: line, transformer, interface, flowgate and unclassified facilities.^{12,13} For comparison, this information is presented in Table 7-5 for calendar year 2007.¹⁴

Total congestion costs associated with the flowgates between PJM and the Midwest ISO decreased by \$13.9 million from 2007 to -\$19.9 million in 2008. The State Line – Wolf Lake flowgate accounted for \$5.3 million in congestion costs and was the largest contributor to positive congestion costs among flowgates in 2008. The largest contribution to negative congestion costs among flowgates came from the Pana North flowgate with -\$10.3 million in 2008 congestion costs.

Total congestion costs associated with interfaces decreased from \$992.3 million in 2007 to \$937.4 million in 2008. Interfaces typically include multiple transmission facilities and reflect power flows into or through a wider geographic area. Interface congestion constituted 44 percent of total PJM congestion costs in 2008. Among interfaces, the AP South and Bedington – Black Oak interfaces accounted for the largest contribution to positive congestion costs in 2008. The AP South interface, with \$558 million in congestion, had the highest congestion cost of any facility in PJM, accounting for 26 percent of the total PJM congestion costs in 2008. The AP South and Bedington – Black Oak interfaces together accounted for \$722.6 million or 34 percent of total PJM congestion costs in 2008.

Total congestion costs associated with transmission lines increased 61 percent from \$521.6 million in 2007 to \$837.4 million in 2008. Transmission line congestion accounted for 40 percent of the total PJM congestion costs for 2008. The Cloverdale – Lexington and Mount Storm – Pruntytown lines together accounted for \$453.4 million or 54 percent of all transmission line congestion costs and were the largest contributors to positive congestion among transmission lines in 2008. The largest contribution to negative congestion costs among transmission lines came from the Sammis – Wylie Ridge line with -\$59.5 million in 2008 congestion costs.

Total congestion costs associated with transformers increased 4 percent from \$325.4 million in 2007 to \$338.2 million in 2008. Congestion on transformers accounted for 16 percent of the total PJM congestion costs in 2008. The Kammer and Bedington transformers together accounted for

¹² Unclassified constraints appear in the Day-Ahead Market only and represent congestion costs incurred on market elements which are not posted by PJM.

Congestion frequency associated with these unclassified constraints is not presented in order to be consistent with the posting of constrained facilities by PJM.

¹³ The term *flowgate* refers to Midwest ISO flowgates in this context.

¹⁴ For 2008, the load congestion payments and generation congestion credits represent the net load congestion payments and net generation congestion credits for an organization, as this shows the extent to which each organization's load or generation was exposed to congestion costs. The results are then summed across facility type, voltage, and zone or region. In the *2007 State of the Market Report*, the load congestion payments and generation congestion credits were not netted against each other and therefore will not match the 2007 values reported in the following tables. The calculation of the net congestion bill was unaffected and remains the same as in prior years.

\$131.5 million or 39 percent of all transformer congestion costs and were the largest contributors to positive congestion costs among transformers in 2008.

Table 7-4 Congestion summary (By facility type): Calendar year 2008

Type	Congestion Costs (Millions)										Event Hours	
	Day Ahead				Balancing				Grand Total	Day Ahead	Real Time	
	Load Payments	Generation Credits	Explicit	Total	Load Payments	Generation Credits	Explicit	Total				
Flowgate	\$9.6	(\$14.3)	\$11.8	\$35.7	(\$7.2)	\$3.5	(\$44.8)	(\$55.5)	(\$19.9)	2,417	2,031	
Interface	\$368.3	(\$579.2)	\$44.7	\$992.2	(\$18.2)	\$20.3	(\$16.3)	(\$54.8)	\$937.4	8,866	2,196	
Line	\$597.5	(\$423.0)	\$120.0	\$1,140.6	(\$129.1)	\$27.6	(\$146.4)	(\$303.1)	\$837.4	50,637	12,710	
Transformer	\$299.9	(\$139.6)	\$29.9	\$469.4	(\$71.4)	\$27.7	(\$32.0)	(\$131.2)	\$338.2	12,822	4,714	
Unclassified	\$10.9	(\$10.6)	\$2.0	\$23.4	\$0.0	\$0.0	(\$0.0)	(\$0.0)	\$23.4	NA	NA	
Total	\$1,286.1	(\$1,166.7)	\$208.4	\$2,661.2	(\$225.9)	\$79.2	(\$239.5)	(\$544.6)	\$2,116.6	74,742	21,651	

Table 7-5 Congestion summary (By facility type): Calendar year 2007

Type	Congestion Costs (Millions)										Event Hours	
	Day Ahead				Balancing				Grand Total	Day Ahead	Real Time	
	Load Payments	Generation Credits	Explicit	Total	Load Payments	Generation Credits	Explicit	Total				
Flowgate	\$2.2	(\$2.4)	\$4.4	\$9.0	\$1.0	\$1.6	(\$14.4)	(\$15.0)	(\$6.0)	1,489	1,069	
Interface	\$949.3	(\$19.6)	\$58.8	\$1,027.7	\$6.8	\$23.4	(\$18.7)	(\$35.4)	\$992.3	9,798	2,856	
Line	\$401.5	(\$204.1)	\$67.6	\$673.1	(\$16.2)	\$33.9	(\$101.4)	(\$151.5)	\$521.6	39,071	10,916	
Transformer	\$400.9	\$80.6	\$32.1	\$352.4	(\$2.1)	\$0.6	(\$24.3)	(\$27.0)	\$325.4	11,858	4,686	
Unclassified	\$10.1	(\$1.0)	\$1.3	\$12.4	\$0.0	\$0.0	\$0.0	\$0.0	\$12.4	NA	NA	
Total	\$1,764.0	(\$146.4)	\$164.2	\$2,074.6	(\$10.5)	\$59.5	(\$158.9)	(\$228.9)	\$1,845.7	62,216	19,527	

Table 7-6 shows congestion costs by facility voltage class. In comparison to 2007 (shown in Table 7-7), congestion costs decreased across 765 kV, 345 kV, 115 kV, 34 kV and 12 kV class facilities in 2008. Congestion costs increased across 500 kV, 230 kV, 138 kV, 69 kV and unclassified class facilities in 2008.

Congestion costs associated with 765 kV facilities decreased 30 percent from \$7.0 million in 2007 to the \$4.9 million experienced in 2008. Congestion on 765 kV facilities comprised less than 1 percent of total 2008 PJM congestion costs.

Congestion costs associated with 500 kV facilities increased 19 percent from \$1.288 billion in 2007 to \$1.528 billion in 2008. Congestion on 500 kV facilities comprised 72 percent of total 2008 PJM congestion costs. The AP South interface, the Cloverdale – Lexington line, and the Mount Storm – Pruntytown line together accounted for \$1,011.4 million or 66 percent of all 500 kV congestion costs; they were the largest contributors to positive congestion among 500 kV facilities in 2008.

Congestion costs associated with 230 kV facilities increased 7 percent from \$227.0 million in 2007 to \$243.1 million in 2008. Congestion on 230 kV facilities comprised 11 percent of total 2008 PJM congestion costs. The Branchburg – Readington line accounted for \$30.9 million or 13 percent of all 230 kV congestion costs and was the largest contributor to positive congestion among 230 kV facilities in 2008.

Congestion costs associated with 138 kV facilities increased 18 percent from \$218.9 million in 2007 to \$257.3 million in 2008. Congestion on 138 kV facilities comprised 12 percent of total 2008 PJM congestion costs. The Bedington and Meadowbrook transformers together accounted for \$91.9 million or 36 percent of all 138 kV congestion costs and were the largest contributors to positive congestion among 138 kV facilities in 2008.

Table 7-6 Congestion summary (By facility voltage): Calendar year 2008

Voltage (kV)	Congestion Costs (Millions)										Day Ahead	Real Time
	Day Ahead				Balancing				Grand Total			
	Load Payments	Generation Credits	Explicit	Total	Load Payments	Generation Credits	Explicit	Total				
765	\$1.6	(\$3.0)	\$0.1	\$4.7	\$1.2	\$0.5	(\$0.4)	\$0.2	\$4.9	83	31	
500	\$718.1	(\$861.2)	\$90.1	\$1,669.4	(\$98.5)	(\$0.7)	(\$44.1)	(\$141.9)	\$1,527.5	19,171	6,793	
345	\$52.9	(\$62.6)	\$46.7	\$162.2	(\$38.6)	\$8.0	(\$118.6)	(\$165.1)	(\$2.9)	5,887	2,601	
230	\$213.8	(\$106.8)	\$28.8	\$349.4	(\$33.9)	\$49.7	(\$22.7)	(\$106.3)	\$243.1	14,817	3,927	
138	\$191.9	(\$121.0)	\$39.1	\$351.9	(\$38.5)	\$8.4	(\$47.7)	(\$94.7)	\$257.3	20,551	6,270	
115	\$62.3	(\$4.5)	\$1.4	\$68.2	(\$15.4)	\$11.4	(\$5.7)	(\$32.5)	\$35.7	8,042	1,445	
69	\$34.7	\$3.0	\$0.4	\$32.0	(\$2.3)	\$1.8	(\$0.2)	(\$4.3)	\$27.7	6,191	560	
34	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	(\$0.0)	(\$0.0)	(\$0.0)	0	24	
Unclassified	\$10.9	(\$10.6)	\$2.0	\$23.4	\$0.0	\$0.0	(\$0.0)	(\$0.0)	\$23.4	NA	NA	
Total	\$1,286.1	(\$1,166.7)	\$208.4	\$2,661.2	(\$225.9)	\$79.2	(\$239.5)	(\$544.6)	\$2,116.6	74,742	21,651	

Table 7-7 Congestion summary (By facility voltage): Calendar year 2007

Voltage (kV)	Congestion Costs (Millions)										Day Ahead	Real Time
	Day Ahead				Balancing				Grand Total			
	Load Payments	Generation Credits	Explicit	Total	Load Payments	Generation Credits	Explicit	Total				
765	\$5.8	(\$0.8)	\$1.3	\$7.8	\$0.0	\$0.2	(\$0.6)	(\$0.8)	\$7.0	422	17	
500	\$1,441.8	\$214.6	\$93.7	\$1,320.9	\$24.8	\$7.2	(\$50.2)	(\$32.6)	\$1,288.3	15,691	5,938	
345	\$146.0	\$71.9	\$18.1	\$92.2	(\$3.6)	\$15.4	(\$50.6)	(\$69.6)	\$22.6	3,719	1,973	
230	(\$96.1)	(\$359.2)	\$18.0	\$281.1	(\$13.8)	\$18.5	(\$21.8)	(\$54.1)	\$227.0	11,927	3,141	
138	\$186.7	(\$52.2)	\$30.0	\$268.9	(\$5.5)	\$6.5	(\$37.9)	(\$49.9)	\$218.9	16,569	5,313	
115	\$48.8	(\$10.8)	\$1.5	\$61.1	(\$9.6)	\$8.7	\$2.4	(\$16.0)	\$45.1	6,337	1,916	
69	\$21.0	(\$9.0)	\$0.2	\$30.2	(\$2.8)	\$2.9	(\$0.2)	(\$5.9)	\$24.3	7,434	1,229	
12	(\$0.1)	(\$0.1)	\$0.0	\$0.1	\$0.0	\$0.0	\$0.0	\$0.0	\$0.1	117	0	
Unclassified	\$10.1	(\$1.0)	\$1.3	\$12.4	\$0.0	\$0.0	\$0.0	\$0.0	\$12.4	NA	NA	
Total	\$1,764.0	(\$146.4)	\$164.2	\$2,074.6	(\$10.5)	\$59.5	(\$158.9)	(\$228.9)	\$1,845.7	62,216	19,527	

Constraint Duration

Table 7-8 lists calendar year 2007 and 2008 constraints that were most frequently in effect and shows changes in congestion-event hours from 2007 to 2008.¹⁵

The Bedington – Black Oak and AP South interface constraints saw the biggest decrease and increase in congestion-event hours, respectively. The Cloverdale – Lexington line decreased in congestion-event hours from 2007 to 2008, but still remained one of the most frequently occurring transmission constraints. The Mount Storm – Pruntytown line increased in day-ahead, congestion-event hours by 29 percent and six percent in real-time. The West interface constraint increased by 15 percent and one percent in day-ahead and real-time, congestion-event hours, respectively. These five constraints were also the top contributors to 2008 congestion costs.

Table 7-8 Top 25 constraints with frequent occurrence: Calendar years 2007 to 2008

No.	Constraint	Type	Event Hours						Percent of Annual Hours					
			Day Ahead			Real Time			Day Ahead			Real Time		
			2007	2008	Change	2007	2008	Change	2007	2008	Change	2007	2008	Change
1	Bedington - Black Oak	Interface	5,493	1,384	(4,109)	1,836	279	(1,557)	63%	16%	(47%)	21%	3%	(18%)
2	AP South	Interface	706	3,572	2,866	133	997	864	8%	41%	33%	2%	11%	10%
3	Mount Storm - Pruntytown	Line	33	2,559	2,526	151	722	571	0%	29%	29%	2%	8%	6%
4	Sammis - Wylie Ridge	Line	90	1,915	1,825	109	1,239	1,130	1%	22%	21%	1%	14%	13%
5	Trainer - Delco Tap	Line	0	2,218	2,218	0	0	0	0%	25%	25%	0%	0%	0%
6	Kammer	Transformer	2,005	3,069	1,064	947	1,567	620	23%	35%	12%	11%	18%	7%
7	Branchburg - Readington	Line	2,324	1,121	(1,203)	721	271	(450)	27%	13%	(14%)	8%	3%	(5%)
8	West	Interface	359	1,690	1,331	338	385	47	4%	19%	15%	4%	4%	1%
9	Krendale - Seneca	Line	89	1,389	1,300	16	24	8	1%	16%	15%	0%	0%	0%
10	Mount Storm	Transformer	0	935	935	0	373	373	0%	11%	11%	0%	4%	4%
11	Atlantic - Larrabee	Line	680	1,556	876	134	380	246	8%	18%	10%	2%	4%	3%
12	Pumphrey - Westport	Line	9	1,092	1,083	0	0	0	0%	12%	12%	0%	0%	0%
13	Monroe	Transformer	6	815	809	3	247	244	0%	9%	9%	0%	3%	3%
14	Leonia - New Milford	Line	0	919	919	0	84	84	0%	10%	10%	0%	1%	1%
15	East Frankfort - Crete	Line	38	1,002	964	0	0	0	0%	11%	11%	0%	0%	0%
16	Dickerson - Pleasant View	Line	34	844	810	68	218	150	0%	10%	9%	1%	2%	2%
17	Cedar Grove - Clifton	Line	145	793	648	69	372	303	2%	9%	7%	1%	4%	3%
18	Dunes Acres - Michigan City	Flowgate	150	687	537	96	435	339	2%	8%	6%	1%	5%	4%
19	5004/5005 Interface	Interface	1,512	736	(776)	386	411	25	17%	8%	(9%)	4%	5%	0%
20	East Towanda	Transformer	1,055	803	(252)	410	306	(104)	12%	9%	(3%)	5%	3%	(1%)
21	Cloverdale - Lexington	Line	3,704	3,529	(175)	1,885	1,739	(146)	42%	40%	(2%)	22%	20%	(2%)
22	Pinehill - Stratford	Line	3,274	3,088	(186)	0	0	0	37%	35%	(2%)	0%	0%	0%
23	State Line - Wolf Lake	Flowgate	1,241	1,342	101	590	341	(249)	14%	15%	1%	7%	4%	(3%)
24	Bedington	Transformer	928	1,192	264	429	299	(130)	11%	14%	3%	5%	3%	(1%)
25	Mahans Lane - Tidd	Line	727	847	120	210	211	1	8%	10%	1%	2%	2%	0%

¹⁵ Presented in descending order of absolute change between 2007 and 2008 day-ahead and real-time, congestion-event hours.

Constraint Costs

Table 7-9 and Table 7-10 present the top constraints affecting congestion costs by facility for calendar years 2007 and 2008.¹⁶ The AP South Interface was the largest contributor to congestion costs in 2008. With \$558 million in total congestion costs, it accounted for 26 percent of the total PJM congestion costs in 2008. The top five constraints in terms of congestion costs together comprised 61 percent of the total PJM congestion costs in 2008.

Table 7-9 Top 25 constraints affecting annual PJM congestion costs (By facility): Calendar year 2008

No.	Constraint	Type	Location	Congestion Costs (Millions)										Percent of Total PJM Congestion Costs 2008
				Load Payments	Day Ahead			Total	Load Payments	Balancing			Grand Total	
					Generation Credits	Explicit	Generation Credits			Explicit	Explicit	Total		
1	AP South	Interface	500	\$196.2	(\$367.1)	\$23.8	\$587.1	(\$11.9)	\$5.5	(\$11.7)	(\$29.1)	\$558.0	26%	
2	Cloverdale - Lexington	Line	AEP	\$153.8	(\$77.5)	\$9.0	\$240.3	(\$20.6)	(\$18.6)	(\$9.1)	(\$11.0)	\$229.3	11%	
3	Mount Storm - Pruntytown	Line	AP	\$60.1	(\$157.0)	\$15.8	\$232.8	(\$21.6)	(\$15.8)	(\$2.9)	(\$8.7)	\$224.1	11%	
4	Bedington - Black Oak	Interface	500	\$52.2	(\$106.2)	\$7.0	\$165.5	(\$1.3)	(\$0.6)	(\$0.2)	(\$0.9)	\$164.6	8%	
5	West	Interface	500	\$67.8	(\$42.5)	\$8.0	\$118.3	(\$2.0)	\$8.2	(\$2.2)	(\$12.4)	\$105.9	5%	
6	Kammer	Transformer	500	\$100.9	\$23.3	\$10.4	\$88.0	(\$17.0)	(\$3.7)	\$1.4	(\$11.9)	\$76.1	4%	
7	Sammis - Wylie Ridge	Line	AP	\$18.4	(\$5.9)	\$23.1	\$47.4	(\$29.7)	\$5.2	(\$71.9)	(\$106.9)	(\$59.5)	(3%)	
8	Bedington	Transformer	AP	\$21.5	(\$33.2)	\$2.2	\$56.9	(\$1.8)	(\$1.4)	(\$1.1)	(\$1.4)	\$55.4	3%	
9	5004/5005 Interface	Interface	500	\$16.5	(\$34.9)	\$3.0	\$54.4	(\$2.8)	\$6.9	(\$2.0)	(\$11.7)	\$42.7	2%	
10	Mount Storm	Transformer	AP	\$22.3	(\$61.3)	\$10.0	\$93.6	(\$20.9)	\$14.1	(\$15.9)	(\$50.9)	\$42.7	2%	
11	East	Interface	500	\$21.7	(\$17.5)	\$1.2	\$40.4	(\$0.1)	(\$0.0)	\$0.0	(\$0.0)	\$40.4	2%	
12	Atlantic - Larrabee	Line	JCPL	\$41.1	(\$15.4)	\$5.4	\$61.9	(\$9.7)	\$8.2	(\$4.8)	(\$22.7)	\$39.2	2%	
13	Meadow Brook	Transformer	AP	\$21.8	(\$17.5)	\$0.8	\$40.1	(\$4.4)	(\$1.2)	(\$0.4)	(\$3.6)	\$36.5	2%	
14	Branchburg - Readington	Line	PSEG	\$31.0	(\$12.2)	\$4.8	\$48.1	(\$6.4)	\$8.8	(\$2.0)	(\$17.2)	\$30.9	1%	
15	East Frankfort - Crete	Line	ComEd	\$7.7	(\$13.8)	\$6.7	\$28.2	\$0.0	\$0.0	\$0.0	\$0.0	\$28.2	1%	
16	Aqueduct - Doubs	Line	AP	\$23.7	(\$3.9)	\$0.5	\$28.0	\$0.0	(\$0.1)	(\$0.0)	\$0.1	\$28.1	1%	
17	Central	Interface	500	\$13.9	(\$11.1)	\$1.6	\$26.6	(\$0.1)	\$0.0	\$0.1	(\$0.0)	\$26.6	1%	
18	Axton	Transformer	AEP	\$9.1	(\$15.4)	\$1.6	\$26.2	\$0.0	\$0.0	\$0.0	\$0.0	\$26.2	1%	
19	Unclassified	Unclassified	Unclassified	\$10.9	(\$10.6)	\$2.0	\$23.4	\$0.0	\$0.0	(\$0.0)	(\$0.0)	\$23.4	1%	
20	Harwood - Susquehanna	Line	PPL	\$9.0	(\$19.9)	\$0.5	\$29.4	(\$2.6)	\$3.0	(\$0.7)	(\$6.3)	\$23.2	1%	
21	Krendale - Seneca	Line	AP	\$18.6	\$3.4	\$7.4	\$22.5	(\$0.1)	\$0.0	(\$0.1)	(\$0.3)	\$22.3	1%	
22	Dickerson - Pleasant View	Line	Pepco	\$41.5	\$24.9	\$2.2	\$18.8	(\$0.4)	(\$1.2)	(\$1.4)	(\$0.6)	\$18.3	1%	
23	Bristers - Ox	Line	Dominion	\$8.7	(\$7.4)	(\$0.9)	\$15.3	\$0.5	\$0.4	\$0.4	\$0.5	\$15.8	1%	
24	North Seaford - Pine Street	Line	DPL	\$21.2	\$5.4	\$0.1	\$16.0	(\$1.0)	(\$0.6)	(\$0.1)	(\$0.6)	\$15.4	1%	
25	Branchburg - Flagtown	Line	PSEG	\$12.2	(\$4.1)	\$0.2	\$16.4	\$0.5	\$1.0	(\$1.1)	(\$1.6)	\$14.8	1%	

¹⁶ Presented in descending order of annual total congestion costs.

Table 7-10 Top 25 constraints affecting annual PJM congestion costs (By facility): Calendar year 2007

No.	Constraint	Type	Location	Congestion Costs (Millions)										Percent of Total PJM Congestion Costs 2007
				Day Ahead				Balancing				Grand Total		
				Load Payments	Generation Credits	Explicit	Total	Load Payments	Generation Credits	Explicit	Total			
1	Bedington - Black Oak	Interface	500	\$865.4	\$171.2	\$43.4	\$737.6	\$3.0	\$10.3	(\$16.2)	(\$23.5)	\$714.0	39%	
2	Cloverdale - Lexington	Line	AEP	\$347.8	\$146.6	\$22.4	\$223.6	\$12.2	(\$13.7)	(\$22.5)	\$3.5	\$227.1	12%	
3	5004/5005 Interface	Interface	500	\$30.0	(\$85.3)	\$5.7	\$121.0	\$0.4	\$4.7	(\$0.3)	(\$4.6)	\$116.5	6%	
4	AP South	Interface	500	\$87.0	(\$7.0)	\$4.3	\$98.4	\$2.2	\$0.1	\$1.0	\$3.1	\$101.5	5%	
5	Kammer	Transformer	500	\$137.3	\$89.6	\$11.6	\$59.2	\$2.0	(\$6.7)	(\$3.7)	\$5.1	\$64.3	3%	
6	Branchburg - Readington	Line	PSEG	(\$187.3)	(\$278.7)	\$9.4	\$100.8	(\$16.4)	\$12.9	(\$8.4)	(\$37.6)	\$63.1	3%	
7	Bedington	Transformer	AP	\$39.2	(\$21.1)	\$2.9	\$63.1	(\$3.9)	(\$2.5)	(\$2.0)	(\$3.4)	\$59.7	3%	
8	Meadow Brook	Transformer	AP	\$20.4	(\$23.8)	\$0.7	\$44.9	(\$0.5)	(\$1.0)	(\$0.4)	\$0.0	\$44.9	2%	
9	Central	Interface	500	(\$29.9)	(\$59.7)	\$2.5	\$32.4	\$0.0	\$0.0	\$0.0	\$0.0	\$32.4	2%	
10	Atlantic - Larrabee	Line	JCPL	\$20.1	(\$8.5)	\$1.7	\$30.3	(\$3.2)	\$3.2	(\$0.8)	(\$7.2)	\$23.1	1%	
11	Branchburg - Flagtown	Line	PSEG	\$12.5	(\$8.7)	\$0.4	\$21.5	\$0.2	\$0.9	(\$1.3)	(\$2.0)	\$19.5	1%	
12	Wylie Ridge	Transformer	AP	\$68.4	\$47.1	\$10.1	\$31.3	(\$2.2)	\$0.6	(\$9.6)	(\$12.4)	\$18.9	1%	
13	Brunner Island - Yorkana	Line	Met-Ed	\$11.4	(\$3.4)	\$0.1	\$14.9	\$1.9	(\$1.7)	\$0.1	\$3.7	\$18.6	1%	
14	East	Interface	500	(\$8.9)	(\$25.6)	\$0.8	\$17.5	(\$0.0)	(\$0.0)	(\$0.0)	(\$0.0)	\$17.4	1%	
15	Amos	Transformer	AEP	\$9.7	(\$8.8)	\$0.5	\$18.9	\$3.5	\$2.1	(\$3.4)	(\$2.0)	\$17.0	1%	
16	Conastone	Transformer	BGE	\$7.5	(\$5.9)	\$0.4	\$13.8	\$1.6	\$0.3	(\$0.3)	\$1.0	\$14.8	1%	
17	Kanawha - Matt Funk	Line	AEP	\$16.0	\$2.2	\$1.8	\$15.5	\$0.1	\$0.6	(\$0.3)	(\$0.8)	\$14.7	1%	
18	Doubs	Transformer	AP	\$13.9	(\$0.9)	\$0.5	\$15.3	(\$0.5)	(\$0.7)	(\$0.7)	(\$0.5)	\$14.7	1%	
19	Beckett - Paulsboro	Line	AECO	\$11.7	(\$4.5)	\$0.1	\$16.3	(\$2.5)	(\$0.5)	(\$0.0)	(\$2.1)	\$14.2	1%	
20	Bedington - Nipetown	Line	AP	\$16.4	\$1.9	\$0.6	\$15.0	\$0.2	\$0.5	(\$0.8)	(\$1.1)	\$13.9	1%	
21	Cloverdale	Transformer	AEP	\$14.5	\$1.5	\$1.5	\$14.5	(\$0.4)	(\$0.0)	(\$0.7)	(\$1.0)	\$13.5	1%	
22	Darwin - Eugene	Line	AEP	(\$0.1)	(\$3.4)	\$0.1	\$3.3	\$0.6	\$6.6	(\$9.9)	(\$16.0)	(\$12.6)	(1%)	
23	Unclassified	Unclassified	Unclassified	\$10.1	(\$1.0)	\$1.3	\$12.4	\$0.0	\$0.0	\$0.0	\$0.0	\$12.4	1%	
24	West	Interface	500	\$5.5	(\$12.0)	\$2.0	\$19.4	\$0.3	\$5.1	(\$3.6)	(\$8.4)	\$11.0	1%	
25	Axton	Transformer	AEP	\$10.2	\$0.8	\$1.1	\$10.5	\$0.0	\$0.0	\$0.0	\$0.0	\$10.5	1%	

Congestion-Event Summary for Midwest ISO Flowgates

PJM and the Midwest ISO have a joint operating agreement (JOA) which defines a coordinated methodology for congestion management. This agreement establishes reciprocal, coordinated flowgates in the combined footprint whose operating limits are respected by the operators of both organizations.¹⁷ A flowgate is a representative modeling of facilities or groups of facilities that may act as constraint points on the regional system.¹⁸ PJM models these coordinated flowgates and controls for them in its security-constrained, economic dispatch. Table 7-11 and Table 7-12 show the Midwest ISO flowgates which PJM took dispatch action to control during 2008 and 2007, respectively, and which had the greatest congestion cost impact on PJM. Total congestion costs are the sum of the day-ahead and balancing congestion cost components. Total congestion costs associated with a given constraint may be positive or negative in value. The top congestion cost impacts for Midwest ISO flowgates affecting PJM dispatch are presented by constraint, in descending order of the absolute value of total congestion costs. Among Midwest ISO flowgates in 2008, the State Line – Wolf Lake flowgate made the most significant contribution to positive congestion while the Pana North flowgate made the most significant contribution to negative congestion. Among Midwest ISO flowgates in 2007, the Crete – St. Johns Tap and Tower Road flowgates made the most significant contributions to positive congestion, while the State Line – Wolf Lake flowgate made the most significant negative contribution.

Table 7-11 Top congestion cost impacts from Midwest ISO flowgates affecting PJM dispatch (By facility): Calendar year 2008

Constraint	Type	Location	Congestion Costs (Millions)										Grand Total	Day Ahead	Real Time
			Day Ahead				Balancing				Event Hours				
			Load Payments	Generation Credits	Explicit	Total	Load Payments	Generation Credits	Explicit	Total					
Pana North	Flowgate	Midwest ISO	\$0.7	(\$1.8)	\$0.6	\$3.1	(\$0.7)	\$1.4	(\$11.5)	(\$13.5)	(\$10.5)	190	639		
Pleasant Prairie - Zion	Flowgate	Midwest ISO	\$0.0	\$0.0	\$0.0	\$0.0	(\$0.7)	\$0.2	(\$5.3)	(\$6.2)	(\$6.2)	0	67		
Lanesville	Flowgate	Midwest ISO	\$0.2	(\$0.4)	\$0.3	\$0.9	(\$0.2)	\$0.8	(\$5.7)	(\$6.7)	(\$5.8)	60	153		
State Line - Wolf Lake	Flowgate	Midwest ISO	\$2.2	(\$4.4)	\$5.0	\$11.7	(\$1.0)	\$1.2	(\$4.1)	(\$6.3)	\$5.3	1,342	341		
Schahfer - Burr Oak	Flowgate	Midwest ISO	\$0.2	(\$0.4)	\$0.1	\$0.7	(\$1.2)	(\$0.7)	(\$2.3)	(\$2.7)	(\$2.0)	38	160		
Rising	Flowgate	Midwest ISO	\$0.0	(\$0.0)	\$0.0	\$0.1	(\$0.2)	\$0.0	(\$1.8)	(\$2.0)	(\$1.9)	16	89		
Crete - St Johns Tap	Flowgate	Midwest ISO	\$0.9	(\$1.3)	\$0.3	\$2.5	(\$0.2)	\$0.1	(\$0.4)	(\$0.7)	\$1.8	84	14		
Dunes Acres - Michigan City	Flowgate	Midwest ISO	\$5.3	(\$6.0)	\$5.5	\$16.8	(\$2.9)	\$0.2	(\$13.0)	(\$16.1)	\$0.7	687	435		
Breed - Wheatland	Flowgate	Midwest ISO	\$0.0	\$0.0	\$0.0	\$0.0	\$0.1	\$0.2	(\$0.3)	(\$0.5)	(\$0.5)	0	11		
State Line - Roxana	Flowgate	Midwest ISO	\$0.0	\$0.0	\$0.0	\$0.0	(\$0.0)	\$0.1	(\$0.3)	(\$0.4)	(\$0.4)	0	30		
Ontario Hydro - NYISO	Flowgate	Midwest ISO	\$0.0	\$0.0	\$0.0	\$0.0	(\$0.3)	(\$0.1)	(\$0.0)	(\$0.2)	(\$0.2)	0	15		
Krendale - Seneca	Flowgate	Midwest ISO	\$0.0	\$0.0	\$0.0	\$0.0	(\$0.1)	\$0.0	(\$0.0)	(\$0.2)	(\$0.2)	0	23		
Eugene - Bunsonville	Flowgate	Midwest ISO	\$0.0	\$0.0	\$0.0	\$0.0	(\$0.0)	(\$0.0)	(\$0.1)	(\$0.1)	(\$0.1)	0	12		
Salem	Flowgate	Midwest ISO	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.1	\$0.1	0	1		
DC Cook - Palisades	Flowgate	Midwest ISO	\$0.0	\$0.0	\$0.0	\$0.0	(\$0.0)	\$0.0	\$0.1	\$0.0	\$0.0	0	3		

17 See "Joint Operating Agreement Between the Midwest Independent Transmission System Operator, Inc. And PJM Interconnection, L.L.C." (November 1, 2007) (Accessed February 23, 2009) <<http://www.pjm.com/documents/agreements/~media/documents/agreements/joa-complete.ashx>>.

18 See "Joint Operating Agreement Between the Midwest Independent Transmission System Operator, Inc. And PJM Interconnection, L.L.C." (November 1, 2007) (Accessed February 23, 2009) <<http://www.pjm.com/documents/agreements/~media/documents/agreements/joa-complete.ashx>>.

**Table 7-12 Top congestion cost impacts from Midwest ISO flowgates affecting PJM dispatch (By facility):
Calendar year 2007**

Constraint	Type	Location	Congestion Costs (Millions)										Event Hours	
			Day Ahead				Balancing				Grand Total	Day Ahead	Real Time	
			Load Payments	Generation Credits	Explicit	Total	Load Payments	Generation Credits	Explicit	Total				
State Line - Wolf Lake	Flowgate	Midwest ISO	\$1.3	(\$2.2)	\$3.9	\$7.3	\$0.6	\$1.4	(\$8.7)	(\$9.5)	(\$2.2)	1,241	590	
Lanesville	Flowgate	Midwest ISO	\$1.2	\$0.4	(\$0.0)	\$0.7	(\$0.1)	\$0.3	(\$2.1)	(\$2.4)	(\$1.7)	48	50	
Pana North	Flowgate	Midwest ISO	\$0.0	(\$0.0)	\$0.0	\$0.1	\$0.1	\$0.1	(\$1.8)	(\$1.8)	(\$1.7)	20	152	
Salem	Flowgate	Midwest ISO	\$0.0	\$0.0	\$0.0	\$0.0	(\$0.2)	\$0.1	(\$0.1)	(\$0.4)	(\$0.4)	0	19	
Crete - St Johns Tap	Flowgate	Midwest ISO	\$0.2	(\$0.0)	\$0.1	\$0.3	\$0.0	\$0.0	(\$0.1)	(\$0.1)	\$0.3	20	4	
Tower Road	Flowgate	Midwest ISO	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	(\$0.0)	\$0.2	\$0.2	\$0.2	0	11	
Dunes Acres - Michigan City	Flowgate	Midwest ISO	(\$0.5)	(\$0.6)	\$0.4	\$0.5	\$0.5	(\$0.5)	(\$1.7)	(\$0.7)	(\$0.2)	150	96	
Coffeen - Pana North	Flowgate	Midwest ISO	\$0.0	\$0.0	\$0.0	\$0.0	(\$0.0)	\$0.0	\$0.3	\$0.2	\$0.2	0	6	
Seneca - Krendale	Flowgate	Midwest ISO	\$0.0	\$0.0	\$0.0	\$0.0	(\$0.0)	\$0.0	(\$0.1)	(\$0.2)	(\$0.2)	0	16	
Queenston Flow West	Flowgate	Midwest ISO	\$0.0	\$0.0	\$0.0	\$0.0	(\$0.0)	\$0.0	(\$0.1)	(\$0.1)	(\$0.1)	0	16	
NE Ohio	Flowgate	Midwest ISO	\$0.0	\$0.0	\$0.0	\$0.0	(\$0.1)	\$0.2	\$0.1	(\$0.1)	(\$0.1)	0	8	
Breed - West Casey	Flowgate	Midwest ISO	\$0.0	\$0.0	\$0.0	\$0.0	(\$0.0)	\$0.0	(\$0.1)	(\$0.1)	(\$0.1)	0	2	
Rising	Flowgate	Midwest ISO	\$0.0	\$0.0	\$0.0	\$0.0	(\$0.0)	(\$0.0)	(\$0.1)	(\$0.0)	(\$0.0)	0	6	
Eau Claire - Arpin	Flowgate	Midwest ISO	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	(\$0.0)	(\$0.0)	(\$0.0)	(\$0.0)	0	35	
Pierce	Flowgate	Midwest ISO	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	(\$0.0)	(\$0.0)	(\$0.0)	\$0.0	0	43	

Congestion-Event Summary for the 500 kV System

Constraints on the 500 kV system generally have a regional impact. Table 7-13 and Table 7-14 show the 500 kV constraints impacting congestion costs in PJM. Total congestion costs are the sum of the day-ahead and balancing congestion cost components. Total congestion costs associated with a given constraint may be positive or negative in value. The 500 kV constraints impacting congestion costs in PJM are presented by constraint, in descending order of the absolute value of total congestion costs. In 2008, the AP South and Bedington – Black Oak interface constraints contributed to positive congestion while the Juniata – Keystone and Cabot – Wylie Ridge lines contributed to negative congestion. In 2007, the Bedington – Black Oak and 5004/5005 interface constraints contributed to positive congestion. In 2007, the Conemaugh – Hunterstown line was the largest contributor to negative congestion.

Table 7-13 Regional constraints summary (By facility): Calendar year 2008

Constraint	Type	Location	Congestion Costs (Millions)											Grand Total	Day Ahead	Real Time
			Day Ahead				Balancing				Event Hours					
			Load Payments	Generation Credits	Explicit	Total	Load Payments	Generation Credits	Explicit	Total						
AP South	Interface	500	\$196.2	(\$367.1)	\$23.8	\$587.1	(\$11.9)	\$5.5	(\$11.7)	(\$29.1)	\$558.0	3,572	997			
Bedington - Black Oak	Interface	500	\$52.2	(\$106.2)	\$7.0	\$165.5	(\$1.3)	(\$0.6)	(\$0.2)	(\$0.9)	\$164.6	1,384	279			
West	Interface	500	\$67.8	(\$42.5)	\$8.0	\$118.3	(\$2.0)	\$8.2	(\$2.2)	(\$12.4)	\$105.9	1,690	385			
Kammer	Transformer	500	\$100.9	\$23.3	\$10.4	\$88.0	(\$17.0)	(\$3.7)	\$1.4	(\$11.9)	\$76.1	3,069	1,567			
5004/5005 Interface	Interface	500	\$16.5	(\$34.9)	\$3.0	\$54.4	(\$2.8)	\$6.9	(\$2.0)	(\$11.7)	\$42.7	736	411			
East	Interface	500	\$21.7	(\$17.5)	\$1.2	\$40.4	(\$0.1)	(\$0.0)	\$0.0	(\$0.0)	\$40.4	758	12			
Central	Interface	500	\$13.9	(\$11.1)	\$1.6	\$26.6	(\$0.1)	\$0.0	\$0.1	(\$0.0)	\$26.6	726	42			
Fort Martin - Harrison	Line	500	\$2.0	(\$0.3)	\$0.4	\$2.7	\$0.0	\$0.0	\$0.0	\$0.0	\$2.7	45	0			
Juniata - Keystone	Line	500	\$0.0	\$0.0	\$0.0	\$0.0	(\$0.8)	\$0.4	\$0.2	(\$1.0)	(\$1.0)	0	21			
Conemaugh - Keystone	Line	500	\$0.4	(\$0.2)	\$0.2	\$0.8	\$0.9	\$0.8	(\$0.1)	\$0.1	\$0.9	16	41			
Cabot - Wylie Ridge	Line	500	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.7	(\$0.1)	(\$0.8)	(\$0.8)	0	6			
AEP/DOM	Interface	500	\$0.0	\$0.0	\$0.0	\$0.0	(\$0.1)	\$0.2	(\$0.2)	(\$0.5)	(\$0.5)	0	49			
Doubs - Mount Storm	Line	500	\$0.0	\$0.0	\$0.0	\$0.0	(\$0.0)	(\$0.1)	\$0.1	\$0.1	\$0.1	0	6			
Conemaugh - Hunterstown	Line	500	\$1.6	(\$1.6)	\$0.4	\$3.6	(\$0.5)	\$1.3	(\$1.9)	(\$3.6)	(\$0.1)	62	98			
Harrison - Pruntytown	Line	500	\$0.0	\$0.0	\$0.0	\$0.0	(\$0.0)	(\$0.1)	(\$0.0)	\$0.0	\$0.0	0	2			

Table 7-14 Regional constraints summary (By facility): Calendar year 2007

Constraint	Type	Location	Congestion Costs (Millions)										Event Hours	
			Day Ahead				Balancing				Grand Total	Day Ahead	Real Time	
			Load Payments	Generation Credits	Explicit	Total	Load Payments	Generation Credits	Explicit	Total				
Bedington - Black Oak	Interface	500	\$865.4	\$171.2	\$43.4	\$737.6	\$3.0	\$10.3	(\$16.2)	(\$23.5)	\$714.0	5,493	1,836	
5004/5005 Interface	Interface	500	\$30.0	(\$85.3)	\$5.7	\$121.0	\$0.4	\$4.7	(\$0.3)	(\$4.6)	\$116.5	1,512	386	
AP South	Interface	500	\$87.0	(\$7.0)	\$4.3	\$98.4	\$2.2	\$0.1	\$1.0	\$3.1	\$101.5	706	133	
Kammer	Transformer	500	\$137.3	\$89.6	\$11.6	\$59.2	\$2.0	(\$6.7)	(\$3.7)	\$5.1	\$64.3	2,005	947	
Central	Interface	500	(\$29.9)	(\$59.7)	\$2.5	\$32.4	\$0.0	\$0.0	\$0.0	\$0.0	\$32.4	1,334	25	
East	Interface	500	(\$8.9)	(\$25.6)	\$0.8	\$17.5	(\$0.0)	(\$0.0)	(\$0.0)	(\$0.0)	\$17.4	304	5	
West	Interface	500	\$5.5	(\$12.0)	\$2.0	\$19.4	\$0.3	\$5.1	(\$3.6)	(\$8.4)	\$11.0	359	338	
Conemaugh - Hunterstown	Line	500	\$0.0	\$0.0	\$0.0	\$0.0	(\$0.1)	\$0.5	(\$0.0)	(\$0.7)	(\$0.7)	0	9	
MAAC - Scarcity	Interface	500	\$0.0	\$0.0	\$0.0	\$0.0	\$1.0	\$2.1	\$1.0	(\$0.1)	(\$0.1)	0	3	
Alburtis - Branchburg	Line	500	\$0.0	\$0.0	\$0.0	\$0.0	(\$0.1)	(\$0.1)	\$0.0	\$0.1	\$0.1	0	4	
Doubs - Mount Storm	Line	500	\$0.0	\$0.0	\$0.0	\$0.0	(\$0.1)	(\$0.1)	(\$0.0)	(\$0.1)	(\$0.1)	0	4	
Harrison - Pruntytown	Line	500	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	(\$0.0)	(\$0.0)	\$0.0	\$0.0	0	3	
Harrison Tap - Kammer	Line	500	\$0.0	\$0.0	\$0.0	\$0.0	(\$0.0)	(\$0.0)	(\$0.0)	(\$0.0)	(\$0.0)	0	2	

Congestion on the Bedington — Black Oak and AP South Interfaces

The AP extra-high-voltage (EHV) system is the primary conduit for energy transfers from the AP and midwestern generating resources to southwestern PJM and eastern Virginia load and, to a lesser extent, to the central and eastern portion of the PJM Mid-Atlantic Region. Two AP interface constraints, AP South and Bedington – Black Oak, often restrict west-to-east energy transfers across the AP EHV system. In December 2007, transmission system upgrades were completed at the Bedington – Black Oak circuit and have since made the AP South interface the primary west to east transfer constraint. These upgrades shifted both congestion costs and frequency from the Bedington – Black Oak interface to the AP South interface. In addition, the AP South interface definition was updated to include the Mount Storm – Valley 500 kV transmission line in September 2008. Table 7-15 shows a monthly breakdown of congestion-event hours and congestion costs. After August 2008, congestion frequency on the Bedington – Black Oak interface was much less than the AP South interface and congestion costs reflect this.

Table 7-15 Monthly congestion cost and frequency summary for the Bedington – Black Oak and AP South interfaces: Calendar years 2007 to 2008

Month	Event Hours						Congestion Costs (Millions)					
	Bedington - Black Oak			AP South			Bedington - Black Oak			AP South		
	2007	2008	Change	2007	2008	Change	2007	2008	Change	2007	2008	Change
Jan	724	349	(375)	37	292	255	\$47.2	\$55.5	\$8.4	\$6.6	\$40.0	\$33.4
Feb	1,006	216	(790)	62	379	317	\$79.4	\$16.4	(\$63.0)	\$5.7	\$60.2	\$54.6
Mar	759	85	(674)	29	144	115	\$64.2	\$5.4	(\$58.9)	\$1.2	\$12.9	\$11.6
Apr	450	46	(404)	204	343	139	\$44.2	\$2.9	(\$41.3)	\$11.8	\$39.5	\$27.7
May	175	399	224	79	302	223	\$13.1	\$36.2	\$23.1	\$9.4	\$34.1	\$24.7
Jun	357	260	(97)	33	436	403	\$38.0	\$31.0	(\$7.0)	\$3.0	\$154.4	\$151.3
Jul	771	107	(664)	132	425	293	\$88.3	\$9.4	(\$78.9)	\$23.7	\$98.2	\$74.5
Aug	906	70	(836)	22	304	282	\$110.6	\$2.4	(\$108.2)	\$2.0	\$20.7	\$18.7
Sept	636	33	(603)	62	326	264	\$64.2	\$3.9	(\$60.3)	\$8.8	\$15.0	\$6.2
Oct	504	41	(463)	5	549	544	\$51.1	(\$0.1)	(\$51.2)	\$0.3	\$18.8	\$18.5
Nov	775	13	(762)	8	545	537	\$76.1	(\$0.7)	(\$76.8)	\$0.2	\$29.9	\$29.7
Dec	266	44	(222)	166	524	358	\$37.6	\$2.2	(\$35.4)	\$28.7	\$34.4	\$5.6
Total	7,329	1,663	(5,666)	839	4,569	3,730	\$714.0	\$164.6	(\$549.4)	\$101.5	\$558.0	\$456.5

The AP South interface was the largest contributor to congestion costs of any facility in PJM in calendar year 2008. In 2008, congestion costs associated with the AP South and Bedington – Black Oak interface constraints were \$558 million and \$164.6 million, respectively. In 2008, the AP South and Bedington – Black Oak interfaces were constrained 4,569 hours and 1,663 hours, respectively. In 2007, congestion costs associated with Bedington – Black Oak and AP South were \$714.0 million and \$101.5 million, respectively. In 2007, Bedington – Black Oak and AP South were constrained 7,329 hours and 839 hours, respectively.

Zonal Congestion

Summary

Day-ahead and balancing congestion costs within specific zones for calendar years 2008 and 2007 are presented in Table 7-16 and Table 7-17. While total congestion costs represent the overall charge or credit to a zone, the components of congestion costs measure the extent to which load or generation bear total congestion costs. Load congestion payments, when positive, measure the total congestion cost to load in an area. Load congestion payments, when negative, measure the total congestion credit to load in an area. Negative load congestion payments result when load is on the lower priced side of a constraint or constraints. For example, congestion across the AP South interface means lower prices in western control zones and higher prices in eastern and southern control zones. Load in western control zones will benefit from lower prices and receive a congestion credit (negative load congestion payment). Load in the eastern and southern control zones will incur a congestion charge (positive load congestion payment). The reverse is true for

generation congestion credits. Generation congestion credits, when positive, measure the total congestion credit to generation in an area. Generation congestion credits, when negative, measure the total congestion cost to generation in an area. Negative generation congestion credits result when generation is on the lower priced side of a constraint or constraints. For example, congestion across the AP South interface means lower prices in the western control zones and higher prices in the eastern and southern control zones. Generation in the western control zones will receive lower prices and incur a congestion charge (negative generation congestion credit). Generation in the eastern and southern control zones will receive higher prices and receive a congestion credit (positive generation congestion credit).

PJM congestion accounting nets load congestion payments against generation congestion credits by billing organization. The net congestion bill for a zone or constraint may be either positive or negative, depending on the relative size and sign of load congestion payments and generation congestion credits. When summed across a zone, the net congestion bill shows the overall congestion charge or credit for an area, not including explicit congestion, but the net congestion bill is not a good measure of whether load is paying higher prices in the form of congestion.

The AP Control Zone, the Dominion Control Zone and the ComEd Control Zone are good examples of how a positive net congestion bill can result from very different combinations of load payments and generation credits. The AP Control Zone had the highest congestion charges, \$487.1 million, of any control zone in 2008. This positive total congestion cost was the result, in large part, of substantial negative generation congestion credits, which added to the total congestion costs for AP rather than offsetting the positive load congestion payments. The Dominion Control Zone had the second highest congestion charges, \$322.6 million, of any control zone in 2008. The large positive congestion costs in the Dominion Control Zone were the result of large positive load congestion payments offset in small part by relatively low positive generation congestion credits. The ComEd Control Zone had the third highest congestion charges, \$283.2 million, of any control zone in 2008. The large positive congestion costs in the ComEd Control Zone were the result of large negative load congestion payments offset by even larger negative generation congestion credits.

Table 7-16 Congestion cost summary (By control zone): Calendar year 2008

Control Zone	Congestion Costs (Millions)								Grand Total
	Day Ahead				Balancing				
	Load Payments	Generation Credits	Explicit	Total	Load Payments	Generation Credits	Explicit	Total	
AECO	\$111.1	\$31.8	\$1.2	\$80.5	(\$12.9)	\$8.1	(\$2.0)	(\$23.0)	\$57.5
AEP	(\$367.1)	(\$671.0)	\$15.7	\$319.6	(\$85.2)	\$4.0	(\$6.9)	(\$96.1)	\$223.6
AP	\$124.4	(\$391.6)	\$38.7	\$554.7	(\$13.6)	\$21.5	(\$32.6)	(\$67.7)	\$487.1
BGE	\$314.3	\$245.3	\$3.2	\$72.2	\$10.1	(\$14.2)	(\$4.5)	\$19.8	\$92.0
ComEd	(\$480.9)	(\$820.9)	\$4.8	\$344.8	(\$54.9)	\$0.4	(\$5.2)	(\$60.6)	\$284.2
DAY	(\$45.5)	(\$56.5)	\$0.2	\$11.1	\$3.5	\$2.6	(\$0.3)	\$0.6	\$11.8
DLCO	(\$159.2)	(\$249.2)	\$1.1	\$91.2	(\$49.4)	\$22.2	\$0.3	(\$71.3)	\$19.9
Dominion	\$337.2	\$5.2	\$33.0	\$364.9	(\$9.3)	(\$0.9)	(\$33.9)	(\$42.3)	\$322.6
DPL	\$149.5	\$54.1	\$1.1	\$96.5	\$8.0	\$6.2	(\$1.8)	(\$0.1)	\$96.4
External	(\$59.5)	(\$51.5)	\$35.6	\$27.5	(\$31.6)	(\$36.4)	(\$107.5)	(\$102.7)	(\$75.2)
JCPL	\$260.6	\$72.1	\$9.1	\$197.6	(\$0.0)	(\$0.4)	(\$8.9)	(\$8.5)	\$189.0
Met-Ed	\$104.9	\$104.5	\$3.3	\$3.8	\$2.3	\$0.8	\$10.4	\$12.0	\$15.7
PECO	\$70.9	\$118.1	\$0.5	(\$46.8)	(\$0.5)	\$15.5	(\$0.7)	(\$16.8)	(\$63.5)
PENELEC	(\$43.2)	(\$224.3)	\$4.8	\$186.0	(\$4.8)	\$13.6	(\$1.4)	(\$19.9)	\$166.1
Pepco	\$642.4	\$436.2	\$8.4	\$214.7	\$6.6	(\$3.7)	(\$9.1)	\$1.2	\$215.9
PPL	\$29.0	\$39.9	\$12.7	\$1.8	\$0.2	\$5.6	(\$5.2)	(\$10.6)	(\$8.8)
PSEG	\$287.3	\$190.9	\$33.3	\$129.7	\$5.2	\$34.5	(\$27.9)	(\$57.3)	\$72.5
RECO	\$10.0	\$0.1	\$1.5	\$11.4	\$0.5	(\$0.2)	(\$2.2)	(\$1.5)	\$9.9
Total	\$1,286.1	(\$1,166.7)	\$208.4	\$2,661.2	(\$225.9)	\$79.2	(\$239.5)	(\$544.6)	\$2,116.6

Table 7-17 Congestion cost summary (By control zone): Calendar year 2007

Control Zone	Congestion Costs (Millions)								Grand Total
	Day Ahead				Balancing				
	Load Payments	Generation Credits	Explicit	Total	Load Payments	Generation Credits	Explicit	Total	
AECO	\$77.4	\$31.9	\$0.3	\$45.8	\$5.0	\$3.3	(\$0.4)	\$1.3	\$47.1
AEP	(\$299.8)	(\$589.5)	\$12.8	\$302.6	(\$90.1)	\$24.9	(\$2.0)	(\$117.1)	\$185.5
AP	\$92.8	(\$368.0)	\$43.1	\$503.9	(\$18.1)	\$22.2	(\$15.0)	(\$55.3)	\$448.6
BGE	\$338.9	\$290.2	\$8.9	\$57.7	\$26.2	(\$12.1)	(\$12.5)	\$25.8	\$83.4
ComEd	(\$323.0)	(\$426.7)	(\$1.1)	\$102.6	\$44.1	(\$34.0)	\$0.3	\$78.3	\$180.9
DAY	(\$36.3)	(\$54.1)	(\$0.1)	\$17.8	(\$3.9)	\$2.6	(\$0.0)	(\$6.6)	\$11.2
DLCO	(\$134.9)	(\$220.2)	(\$0.0)	\$85.2	(\$30.0)	\$12.3	\$0.0	(\$42.2)	\$43.0
Dominion	\$801.0	\$525.1	\$30.8	\$306.7	\$9.1	\$3.4	(\$21.6)	(\$15.9)	\$290.8
DPL	\$108.8	\$43.5	\$1.3	\$66.6	\$11.5	\$6.4	(\$2.2)	\$2.9	\$69.5
External	(\$69.6)	(\$17.6)	\$11.0	(\$40.9)	(\$6.9)	(\$27.0)	(\$74.3)	(\$54.2)	(\$95.2)
JCPL	\$214.4	\$60.4	\$4.0	\$158.0	\$4.1	(\$4.8)	(\$4.0)	\$4.9	\$162.9
Met-Ed	\$106.0	\$75.2	\$5.1	\$35.9	(\$4.9)	\$6.1	\$17.3	\$6.3	\$42.2
PECO	\$70.6	\$98.4	\$0.7	(\$27.2)	(\$2.3)	\$23.8	(\$0.9)	(\$27.0)	(\$54.2)
PENELEC	(\$72.3)	(\$237.3)	\$4.5	\$169.5	(\$5.3)	\$14.0	(\$1.3)	(\$20.6)	\$148.9
Pepco	\$577.9	\$439.4	\$13.5	\$152.0	\$35.4	(\$20.8)	(\$18.6)	\$37.7	\$189.6
PPL	\$26.8	\$37.3	\$7.9	(\$2.6)	\$6.0	\$9.8	\$1.8	(\$2.0)	(\$4.6)
PSEG	\$275.1	\$165.3	\$21.1	\$130.9	\$9.3	\$29.3	(\$24.9)	(\$44.9)	\$86.0
RECO	\$10.2	\$0.4	\$0.5	\$10.3	\$0.4	\$0.1	(\$0.6)	(\$0.3)	\$9.9
Total	\$1,764.0	(\$146.4)	\$164.2	\$2,074.6	(\$10.5)	\$59.5	(\$158.9)	(\$228.9)	\$1,845.7

Details of Regional and Zonal Congestion

Constraints were examined by zone and categorized by their effect on regions. Zones correspond to regulated utility franchise areas. Regions generally comprise two or more zones. PJM is comprised of three regions: the PJM Mid-Atlantic Region with 11 control zones (the AECO, BGE, DPL, JCPL, Met-Ed, PECO, PENELEC, Pepco, PPL, PSEG and RECO control zones); the PJM Western Region with five control zones (the AP, ComEd, AEP, DLCO and DAY control zones); and the PJM Southern Region with one control zone (the Dominion Control Zone).

Table 7-18 through Table 7-51 present the top constraints affecting zonal congestion costs by control zone and demonstrate the influence of individual constraints on zonal congestion costs in calendar years 2007 and 2008. For each of these constraints, the zonal cost impacts are decomposed into their Day-Ahead Energy Market and balancing market components. Total congestion costs are the sum of the day-ahead and balancing congestion cost components. Total congestion costs associated with a given constraint may be positive or negative in value. The top constraints affecting zonal congestion costs are presented by constraint, in descending order of the absolute value of total congestion costs. Both day-ahead and real-time, congestion-event hours are presented for each of the highlighted constraints. Constraints can have wide-ranging effects, influencing prices across multiple zones.

Mid-Atlantic Region Congestion-Event Summaries

AECO Control Zone

Table 7-18 and Table 7-19 show the constraints with the largest impacts on total congestion cost in the AECO Control Zone for 2008 and 2007, respectively. In 2008, the Monroe transformer and West and AP South interface constraints were the largest contributors to positive congestion while the Atlantic – Larrabee line contributed to negative congestion. All of these constraints are located outside of the AECO Control Zone except for the Monroe transformer. In 2007, the Beckett – Paulsboro line and Bedington – Black Oak interface constraints had been the largest contributors to positive congestion while the Branchburg – Readington and the Atlantic – Larrabee constraints contributed to negative congestion.

Table 7-18 AECO Control Zone top congestion cost impacts (By facility): Calendar year 2008

Constraint	Type	Location	Congestion Costs (Millions)								Event Hours		
			Day Ahead				Balancing				Grand Total	Day Ahead	Real Time
			Load Payments	Generation Credits	Explicit	Total	Load Payments	Generation Credits	Explicit	Total			
Monroe	Transformer	AECO	\$34.4	\$3.6	\$0.2	\$31.0	(\$14.5)	\$4.3	(\$0.7)	(\$19.5)	\$11.5	815	247
West	Interface	500	\$12.6	\$5.6	\$0.1	\$7.2	\$0.5	(\$0.0)	(\$0.1)	\$0.4	\$7.6	1,690	385
AP South	Interface	500	\$13.0	\$5.6	\$0.3	\$7.7	\$0.1	\$0.1	(\$0.2)	(\$0.1)	\$7.6	3,572	997
Cloverdale - Lexington	Line	AEP	\$8.0	\$4.2	\$0.0	\$3.8	\$0.7	(\$0.1)	(\$0.1)	\$0.7	\$4.5	3,529	1,739
Atlantic - Larrabee	Line	JCPL	(\$6.5)	(\$2.9)	(\$0.0)	(\$3.6)	(\$0.4)	\$0.4	\$0.0	(\$0.8)	(\$4.4)	1,556	380
Kammer	Transformer	500	\$7.2	\$3.4	\$0.1	\$3.9	\$0.4	\$0.1	(\$0.1)	\$0.3	\$4.1	3,069	1,567
Churchtown	Transformer	AECO	(\$0.3)	(\$3.0)	\$0.0	\$2.7	\$0.4	\$0.3	(\$0.0)	\$0.1	\$2.8	179	104
East	Interface	500	\$5.3	\$2.8	\$0.0	\$2.6	\$0.0	(\$0.0)	\$0.0	\$0.0	\$2.6	758	12
Quinton - Roadstown	Line	AECO	\$6.3	\$1.0	\$0.0	\$5.3	(\$1.3)	\$1.4	(\$0.1)	(\$2.8)	\$2.5	288	124
5004/5005 Interface	Interface	500	\$4.2	\$1.8	\$0.0	\$2.3	\$0.1	\$0.0	(\$0.0)	\$0.0	\$2.4	736	411
Central	Interface	500	\$4.5	\$2.4	\$0.0	\$2.1	\$0.0	(\$0.0)	(\$0.0)	\$0.0	\$2.1	726	42
Sammis - Wylie Ridge	Line	AP	\$2.4	\$1.3	\$0.0	\$1.1	\$0.6	\$0.1	(\$0.1)	\$0.4	\$1.5	1,915	1,239
Dickerson - Pleasant View	Line	Pepco	\$2.6	\$1.3	\$0.0	\$1.3	\$0.0	(\$0.0)	(\$0.0)	\$0.0	\$1.4	844	218
Mount Storm - Pruntytown	Line	AP	\$2.7	\$1.2	\$0.2	\$1.6	(\$0.1)	\$0.0	(\$0.2)	(\$0.3)	\$1.4	2,559	722
Bedington - Black Oak	Interface	500	\$2.5	\$1.2	\$0.0	\$1.3	\$0.0	\$0.0	(\$0.0)	(\$0.0)	\$1.3	1,384	279

Table 7-19 AECO Control Zone top congestion cost impacts (By facility): Calendar year 2007

Constraint	Type	Location	Congestion Costs (Millions)								Event Hours		
			Day Ahead				Balancing				Grand Total	Day Ahead	Real Time
			Load Payments	Generation Credits	Explicit	Total	Load Payments	Generation Credits	Explicit	Total			
Beckett - Paulsboro	Line	AECO	\$21.5	\$5.7	\$0.1	\$15.9	(\$2.3)	(\$0.1)	(\$0.0)	(\$2.2)	\$13.7	768	417
Bedington - Black Oak	Interface	500	\$17.9	\$10.2	\$0.0	\$7.8	\$1.6	(\$0.0)	(\$0.0)	\$1.6	\$9.4	5,493	1,836
Branchburg - Readington	Line	PSEG	(\$9.3)	(\$5.5)	(\$0.0)	(\$3.9)	(\$1.4)	\$0.4	\$0.1	(\$1.7)	(\$5.6)	2,324	721
5004/5005 Interface	Interface	500	\$10.8	\$5.9	\$0.1	\$4.9	\$0.4	(\$0.0)	(\$0.0)	\$0.4	\$5.3	1,512	386
Cloverdale - Lexington	Line	AEP	\$8.8	\$5.3	\$0.0	\$3.6	\$1.6	\$0.1	(\$0.0)	\$1.4	\$5.0	3,704	1,885
Kammer	Transformer	500	\$6.3	\$3.6	\$0.0	\$2.8	\$0.8	\$0.1	(\$0.0)	\$0.7	\$3.5	2,005	947
Central	Interface	500	\$6.3	\$3.7	\$0.0	\$2.7	(\$0.0)	(\$0.0)	(\$0.0)	\$0.0	\$2.7	1,334	25
Wylie Ridge	Transformer	AP	\$4.4	\$2.4	\$0.1	\$2.1	\$0.7	(\$0.0)	(\$0.2)	\$0.5	\$2.6	1,486	685
Churchtown	Transformer	AECO	(\$0.7)	(\$3.4)	(\$0.2)	\$2.6	\$0.3	\$0.6	\$0.2	(\$0.1)	\$2.5	328	194
Atlantic - Larrabee	Line	JCPL	(\$2.8)	(\$1.2)	(\$0.0)	(\$1.5)	(\$0.3)	\$0.2	\$0.0	(\$0.5)	(\$2.0)	680	134
AP South	Interface	500	\$3.0	\$1.5	\$0.0	\$1.5	\$0.2	\$0.0	(\$0.1)	\$0.2	\$1.7	706	133
West	Interface	500	\$1.8	\$1.0	\$0.0	\$0.8	\$0.5	\$0.1	(\$0.0)	\$0.4	\$1.2	359	338
East	Interface	500	\$1.9	\$1.0	\$0.0	\$1.0	\$0.0	(\$0.0)	\$0.0	\$0.0	\$1.0	304	5
Cardiff	Transformer	AECO	\$0.4	\$0.1	\$0.0	\$0.4	\$0.6	\$0.1	(\$0.0)	\$0.5	\$0.9	26	27
Carlis Corner - Sherman Ave	Line	AECO	\$0.4	\$0.0	\$0.0	\$0.4	(\$0.4)	\$0.8	(\$0.0)	(\$1.2)	(\$0.8)	182	82

BGE Control Zone

Table 7-20 and Table 7-21 show the constraints with the largest impacts on total congestion cost in the BGE Control Zone for 2008 and 2007, respectively. In 2008, the AP South interface constraint was the largest contributor to positive congestion. In 2007, the Bedington – Black Oak interface constraint had been the largest contributor to positive congestion while the Branchburg – Readington constraint contributed to negative congestion.

Table 7-20 BGE Control Zone top congestion cost impacts (By facility): Calendar year 2008

Congestion Costs (Millions)													
Constraint	Type	Location	Day Ahead				Balancing				Grand Total	Event Hours	
			Load Payments	Generation Credits	Explicit	Total	Load Payments	Generation Credits	Explicit	Total		Day Ahead	Real Time
AP South	Interface	500	\$86.9	\$68.9	\$0.6	\$18.6	\$4.6	(\$3.8)	(\$0.9)	\$7.6	\$26.2	3,572	997
Mount Storm - Pruntytown	Line	AP	\$38.9	\$32.3	\$0.3	\$6.9	\$0.1	(\$2.3)	(\$0.1)	\$2.3	\$9.2	2,559	722
West	Interface	500	\$21.7	\$15.9	\$0.4	\$6.2	\$1.1	(\$0.8)	(\$0.6)	\$1.3	\$7.5	1,690	385
Kammer	Transformer	500	\$18.9	\$15.4	\$0.4	\$4.0	\$1.2	(\$1.4)	(\$0.4)	\$2.2	\$6.2	3,069	1,567
Dickerson - Pleasant View	Line	Pepco	\$12.5	\$8.1	\$0.4	\$4.8	\$0.7	(\$0.5)	(\$0.2)	\$1.0	\$5.8	844	218
Aqueduct - Doubs	Line	AP	\$12.2	\$7.0	\$0.0	\$5.2	(\$0.0)	(\$0.0)	(\$0.0)	\$0.0	\$5.2	307	7
Pumphrey - Westport	Line	Pepco	\$4.3	(\$0.4)	\$0.0	\$4.7	\$0.0	\$0.0	\$0.0	\$0.0	\$4.7	1,092	0
Bedington - Black Oak	Interface	500	\$24.8	\$22.7	\$0.3	\$2.4	\$1.0	(\$0.6)	(\$0.1)	\$1.5	\$3.9	1,384	279
Conastone	Transformer	BGE	\$4.4	\$1.4	(\$0.0)	\$3.1	\$0.1	(\$0.0)	\$0.0	\$0.1	\$3.2	95	15
Sammis - Wylie Ridge	Line	AP	\$5.2	\$4.3	\$0.1	\$1.0	\$1.1	(\$0.8)	(\$0.4)	\$1.5	\$2.5	1,915	1,239
Mount Storm	Transformer	AP	\$12.7	\$11.0	\$0.1	\$1.8	(\$0.3)	(\$1.0)	(\$0.1)	\$0.7	\$2.5	935	373
Green Street - Westport	Line	BGE	\$2.3	(\$0.0)	\$0.0	\$2.3	\$0.0	\$0.0	\$0.0	\$0.0	\$2.3	346	0
Cloverdale - Lexington	Line	AEP	\$40.5	\$41.6	\$0.5	(\$0.7)	\$2.1	(\$1.0)	(\$0.4)	\$2.8	\$2.2	3,529	1,739
5004/5005 Interface	Interface	500	\$3.4	\$1.9	\$0.1	\$1.6	\$0.2	(\$0.3)	(\$0.1)	\$0.3	\$1.9	736	411
Brandon Shores - Riverside	Line	BGE	\$1.3	(\$0.8)	\$0.0	\$2.1	(\$0.6)	\$0.2	(\$0.0)	(\$0.9)	\$1.2	150	56

Table 7-21 BGE Control Zone top congestion cost impacts (By facility): Calendar year 2007

Congestion Costs (Millions)													
Constraint	Type	Location	Day Ahead				Balancing				Grand Total	Event Hours	
			Load Payments	Generation Credits	Explicit	Total	Load Payments	Generation Credits	Explicit	Total		Day Ahead	Real Time
Bedington - Black Oak	Interface	500	\$190.5	\$165.8	\$4.1	\$28.8	\$11.8	(\$5.2)	(\$4.0)	\$13.0	\$41.8	5,493	1,836
Branchburg - Readington	Line	PSEG	(\$25.7)	(\$21.0)	(\$0.6)	(\$5.3)	(\$1.0)	\$0.9	\$0.6	(\$1.3)	(\$6.6)	2,324	721
Conastone	Transformer	BGE	\$10.2	\$4.5	(\$0.1)	\$5.6	\$0.8	\$0.0	\$0.0	\$0.8	\$6.4	172	55
Kammer	Transformer	500	\$22.9	\$18.6	\$1.0	\$5.3	\$1.4	(\$0.8)	(\$1.2)	\$1.0	\$6.3	2,005	947
AP South	Interface	500	\$22.3	\$18.5	\$0.4	\$4.2	\$1.4	(\$0.3)	(\$0.2)	\$1.4	\$5.6	706	133
5004/5005 Interface	Interface	500	\$12.4	\$7.8	\$0.7	\$5.4	\$0.1	(\$0.2)	(\$0.3)	(\$0.0)	\$5.4	1,512	386
Cloverdale - Lexington	Line	AEP	\$55.9	\$59.0	\$1.8	(\$1.3)	\$4.6	(\$3.0)	(\$1.7)	\$5.9	\$4.6	3,704	1,885
Wylie Ridge	Transformer	AP	\$11.5	\$9.3	\$0.6	\$2.8	\$0.6	(\$0.5)	(\$0.8)	\$0.4	\$3.2	1,486	685
Brunner Island - Yorkana	Line	Met-Ed	\$4.8	\$3.3	\$0.0	\$1.5	\$0.5	(\$0.3)	(\$0.2)	\$0.6	\$2.1	172	196
Bedington	Transformer	AP	\$8.0	\$6.7	\$0.2	\$1.6	\$0.2	(\$0.2)	(\$0.2)	\$0.2	\$1.8	928	429
Aqueduct - Doubs	Line	AP	\$4.3	\$2.8	\$0.0	\$1.5	\$0.0	(\$0.0)	(\$0.0)	\$0.1	\$1.6	262	21
West	Interface	500	\$4.6	\$3.3	\$0.3	\$1.7	\$0.5	(\$0.6)	(\$1.4)	(\$0.3)	\$1.4	359	338
Doubs	Transformer	AP	\$3.0	\$1.7	\$0.0	\$1.2	\$0.0	(\$0.2)	(\$0.1)	\$0.1	\$1.3	135	99
Bedington - Nipetown	Line	AP	\$2.9	\$2.1	\$0.1	\$0.9	\$0.2	(\$0.2)	(\$0.1)	\$0.3	\$1.2	841	175
Mount Storm - Pruntytown	Line	AP	\$0.5	\$0.4	\$0.0	\$0.0	\$0.7	(\$0.4)	(\$0.1)	\$1.1	\$1.1	33	151

DPL Control Zone

Table 7-22 and Table 7-23 show the constraints with the largest impacts on total congestion cost in the DPL Control Zone for 2008 and 2007, respectively. In 2008, the North Seaford – Pine Street line and the West interface constraints were the largest contributors to positive congestion while the Atlantic – Larrabee and the Branchburg – Readington constraints contributed to negative congestion. In 2007, the Bedington – Black Oak and Cloverdale – Lexington constraints had been the largest contributors to positive congestion while the Branchburg – Readington constraint contributed to negative congestion.

Table 7-22 DPL Control Zone top congestion cost impacts (By facility): Calendar year 2008

Constraint	Type	Location	Congestion Costs (Millions)										Event Hours	
			Day Ahead				Balancing				Grand Total	Day Ahead	Real Time	
			Load Payments	Generation Credits	Explicit	Total	Load Payments	Generation Credits	Explicit	Total				
North Seaford - Pine Street	Line	DPL	\$21.2	\$5.4	\$0.1	\$16.0	(\$1.0)	(\$0.6)	(\$0.1)	(\$0.6)	\$15.4	690	142	
West	Interface	500	\$20.0	\$7.3	\$0.2	\$12.9	\$1.0	\$1.0	(\$0.0)	\$0.0	\$12.9	1,690	385	
AP South	Interface	500	\$23.0	\$11.0	\$0.2	\$12.2	\$1.5	\$1.2	(\$0.1)	\$0.2	\$12.4	3,572	997	
Cloverdale - Lexington	Line	AEP	\$14.4	\$4.7	\$0.1	\$9.9	\$1.0	(\$0.0)	(\$0.1)	\$0.9	\$10.8	3,529	1,739	
Kammer	Transformer	500	\$12.1	\$4.3	\$0.1	\$7.9	\$1.1	\$0.7	(\$0.1)	\$0.3	\$8.2	3,069	1,567	
East	Interface	500	\$9.2	\$3.4	\$0.1	\$5.9	\$0.0	(\$0.0)	(\$0.0)	\$0.0	\$5.9	758	12	
Central	Interface	500	\$7.6	\$3.4	\$0.0	\$4.3	\$0.1	(\$0.0)	(\$0.0)	\$0.1	\$4.3	726	42	
5004/5005 Interface	Interface	500	\$6.6	\$2.6	\$0.0	\$4.0	\$0.6	\$0.6	(\$0.1)	(\$0.1)	\$4.0	736	411	
Mount Storm - Pruntytown	Line	AP	\$5.6	\$2.3	\$0.1	\$3.5	\$0.3	\$0.2	(\$0.1)	\$0.0	\$3.5	2,559	722	
Sammis - Wylie Ridge	Line	AP	\$4.3	\$1.2	\$0.0	\$3.1	\$1.0	\$0.6	(\$0.1)	\$0.2	\$3.3	1,915	1,239	
Bedington - Black Oak	Interface	500	\$5.1	\$2.0	\$0.0	\$3.1	\$0.2	\$0.0	(\$0.0)	\$0.1	\$3.2	1,384	279	
Atlantic - Larrabee	Line	JCPL	(\$4.4)	(\$1.9)	(\$0.0)	(\$2.6)	(\$0.5)	(\$0.1)	\$0.1	(\$0.4)	(\$2.9)	1,556	380	
Dickerson - Pleasant View	Line	Pepco	\$4.7	\$2.2	\$0.1	\$2.6	\$0.1	(\$0.0)	(\$0.1)	(\$0.0)	\$2.6	844	218	
Red Lion At5n	Transformer	DPL	\$3.8	\$1.4	\$0.1	\$2.5	\$0.0	(\$0.1)	\$0.0	\$0.1	\$2.5	53	3	
Branchburg - Readington	Line	PSEG	(\$3.3)	(\$1.4)	(\$0.1)	(\$2.0)	(\$0.2)	\$0.3	\$0.1	(\$0.4)	(\$2.4)	1,121	271	

Table 7-23 DPL Control Zone top congestion cost impacts (By facility): Calendar year 2007

Constraint	Type	Location	Congestion Costs (Millions)										Event Hours	
			Day Ahead				Balancing				Grand Total	Day Ahead	Real Time	
			Load Payments	Generation Credits	Explicit	Total	Load Payments	Generation Credits	Explicit	Total				
Bedington - Black Oak	Interface	500	\$36.6	\$15.8	\$0.3	\$21.1	\$3.5	\$0.9	(\$0.2)	\$2.3	\$23.4	5,493	1,836	
Cloverdale - Lexington	Line	AEP	\$16.8	\$6.1	\$0.2	\$10.9	\$2.5	\$0.2	(\$0.2)	\$2.1	\$13.0	3,704	1,885	
Branchburg - Readington	Line	PSEG	(\$17.8)	(\$7.5)	(\$0.1)	(\$10.4)	(\$2.1)	(\$0.2)	\$0.3	(\$1.6)	(\$12.0)	2,324	721	
5004/5005 Interface	Interface	500	\$18.4	\$8.5	\$0.2	\$10.1	\$0.7	\$0.5	(\$0.1)	\$0.1	\$10.2	1,512	386	
Kammer	Transformer	500	\$11.3	\$4.9	\$0.2	\$6.6	\$1.5	\$0.6	(\$0.2)	\$0.7	\$7.3	2,005	947	
Central	Interface	500	\$11.5	\$5.2	\$0.1	\$6.5	\$0.0	(\$0.0)	(\$0.0)	\$0.0	\$6.5	1,334	25	
Wylie Ridge	Transformer	AP	\$7.8	\$3.2	\$0.1	\$4.7	\$1.0	\$0.2	(\$0.1)	\$0.7	\$5.4	1,486	685	
AP South	Interface	500	\$5.7	\$2.5	\$0.0	\$3.2	\$0.4	\$0.1	(\$0.0)	\$0.3	\$3.6	706	133	
West	Interface	500	\$3.3	\$1.4	\$0.0	\$1.9	\$1.1	\$0.1	(\$0.2)	\$0.7	\$2.7	359	338	
East	Interface	500	\$3.7	\$1.4	\$0.0	\$2.2	\$0.0	(\$0.0)	(\$0.0)	\$0.0	\$2.3	304	5	
North Seaford	Transformer	DPL	\$2.4	\$0.4	\$0.0	\$2.0	\$0.1	\$0.0	\$0.0	\$0.0	\$2.0	149	7	
Atlantic - Larrabee	Line	JCPL	(\$2.2)	(\$1.0)	(\$0.0)	(\$1.3)	(\$0.2)	\$0.3	\$0.1	(\$0.3)	(\$1.6)	680	134	
Elrama - Mitchell	Line	AP	\$2.1	\$0.9	\$0.0	\$1.2	\$0.3	\$0.0	(\$0.0)	\$0.2	\$1.4	1,883	784	
Conastone	Transformer	BGE	(\$2.9)	(\$1.4)	(\$0.0)	(\$1.5)	(\$0.2)	(\$0.3)	\$0.0	\$0.1	(\$1.4)	172	55	
Cedar Grove - Roseland	Line	PSEG	(\$2.1)	(\$0.7)	(\$0.0)	(\$1.4)	(\$0.0)	(\$0.0)	\$0.0	(\$0.0)	(\$1.4)	1,677	133	

JCPL Control Zone

Table 7-24 and Table 7-25 show the constraints with the largest impacts on total congestion cost in the JCPL Control Zone for 2008 and 2007, respectively. In both 2007 and 2008, the Atlantic – Larrabee and Branchburg – Readington constraints were the largest contributors to positive congestion while the Cedar Grove – Roseland constraint contributed to negative congestion.

Table 7-24 JCPL Control Zone top congestion cost impacts (By facility): Calendar year 2008

Congestion Costs (Millions)													
Constraint	Type	Location	Day Ahead				Balancing				Grand Total	Event Hours	
			Load Payments	Generation Credits	Explicit	Total	Load Payments	Generation Credits	Explicit	Total		Day Ahead	Real Time
Atlantic - Larrabee	Line	JCPL	\$47.5	\$2.2	\$2.2	\$47.5	(\$3.0)	\$2.8	(\$2.4)	(\$8.2)	\$39.3	1,556	380
Branchburg - Readington	Line	PSEG	\$27.7	\$4.5	\$2.2	\$25.4	(\$2.2)	(\$0.8)	(\$1.8)	(\$3.3)	\$22.2	1,121	271
West	Interface	500	\$29.5	\$11.9	\$0.3	\$17.9	\$0.1	(\$0.2)	(\$0.6)	(\$0.4)	\$17.6	1,690	385
Cloverdale - Lexington	Line	AEP	\$18.8	\$5.2	\$0.7	\$14.4	\$0.6	(\$0.2)	(\$0.5)	\$0.3	\$14.6	3,529	1,739
AP South	Interface	500	\$22.6	\$9.2	\$0.8	\$14.1	\$0.2	(\$0.4)	(\$1.0)	(\$0.4)	\$13.7	3,572	997
Kammer	Transformer	500	\$18.0	\$6.3	\$0.4	\$12.2	\$0.5	(\$0.0)	(\$0.4)	\$0.2	\$12.4	3,069	1,567
Central	Interface	500	\$12.2	\$3.6	\$0.5	\$9.0	\$0.0	(\$0.1)	(\$0.0)	\$0.0	\$9.1	726	42
Branchburg - Flagtown	Line	PSEG	\$11.2	\$3.0	\$0.1	\$8.3	\$1.4	\$0.6	(\$0.1)	\$0.7	\$9.0	284	61
5004/5005 Interface	Interface	500	\$11.7	\$4.2	\$0.3	\$7.8	\$0.4	(\$0.1)	(\$0.2)	\$0.3	\$8.1	736	411
East	Interface	500	\$11.4	\$3.5	\$0.0	\$8.0	(\$0.0)	(\$0.0)	(\$0.0)	(\$0.0)	\$7.9	758	12
Cedar Grove - Roseland	Line	PSEG	(\$9.4)	(\$1.7)	(\$0.2)	(\$7.9)	(\$0.4)	(\$0.4)	\$0.1	\$0.1	(\$7.8)	627	168
Buckingham - Pleasant Valley	Line	PECO	\$10.7	\$3.8	\$0.2	\$7.1	(\$0.1)	(\$0.1)	(\$0.1)	(\$0.1)	\$6.9	647	74
Sammis - Wylie Ridge	Line	AP	\$5.9	\$1.8	\$0.1	\$4.2	\$0.6	\$0.0	(\$0.3)	\$0.3	\$4.4	1,915	1,239
Dickerson - Pleasant View	Line	Pepco	\$6.0	\$2.3	\$0.2	\$3.9	\$0.0	(\$0.2)	(\$0.1)	\$0.1	\$4.0	844	218
Redoak - Sayreville	Line	JCPL	\$0.2	(\$2.3)	\$0.0	\$2.5	\$0.2	(\$0.5)	\$0.4	\$1.1	\$3.6	254	30

Table 7-25 JCPL Control Zone top congestion cost impacts (By facility): Calendar year 2007

Congestion Costs (Millions)													
Constraint	Type	Location	Day Ahead				Balancing				Grand Total	Event Hours	
			Load Payments	Generation Credits	Explicit	Total	Load Payments	Generation Credits	Explicit	Total		Day Ahead	Real Time
Branchburg - Readington	Line	PSEG	\$31.8	\$4.1	\$1.5	\$29.2	(\$3.5)	(\$5.8)	(\$1.9)	\$0.4	\$29.6	2,324	721
Atlantic - Larrabee	Line	JCPL	\$25.2	\$2.3	\$0.5	\$23.4	\$0.0	\$0.9	(\$0.3)	(\$1.1)	\$22.3	680	134
Bedington - Black Oak	Interface	500	\$32.8	\$12.8	\$0.6	\$20.6	\$0.3	(\$0.1)	(\$0.5)	(\$0.0)	\$20.6	5,493	1,836
5004/5005 Interface	Interface	500	\$29.2	\$10.7	\$0.4	\$19.0	\$0.7	(\$0.2)	(\$0.1)	\$0.9	\$19.8	1,512	386
Cloverdale - Lexington	Line	AEP	\$21.7	\$6.4	\$0.4	\$15.8	\$0.7	(\$0.1)	(\$0.3)	\$0.5	\$16.3	3,704	1,885
Kammer	Transformer	500	\$16.2	\$5.9	\$0.2	\$10.5	\$0.7	(\$0.1)	(\$0.1)	\$0.6	\$11.1	2,005	947
Central	Interface	500	\$15.7	\$5.1	\$0.1	\$10.7	\$0.0	(\$0.0)	(\$0.0)	\$0.1	\$10.8	1,334	25
Cedar Grove - Roseland	Line	PSEG	(\$12.9)	(\$3.3)	(\$0.8)	(\$10.4)	(\$0.2)	(\$0.1)	\$0.3	\$0.1	(\$10.3)	1,677	133
Branchburg - Flagtown	Line	PSEG	\$16.4	\$6.7	\$0.2	\$10.0	\$0.6	\$0.4	(\$0.4)	(\$0.1)	\$9.8	580	104
Wylie Ridge	Transformer	AP	\$11.2	\$4.2	\$0.1	\$7.1	\$0.8	\$0.1	(\$0.1)	\$0.6	\$7.7	1,486	685
AP South	Interface	500	\$6.2	\$2.6	\$0.2	\$3.8	\$0.1	\$0.0	(\$0.1)	\$0.0	\$3.8	706	133
Redoak - Sayreville	Line	JCPL	\$0.4	(\$2.2)	(\$0.0)	\$2.6	(\$0.1)	\$0.3	\$1.4	\$1.1	\$3.6	139	33
West	Interface	500	\$4.6	\$1.7	\$0.0	\$2.9	\$0.6	(\$0.2)	(\$0.1)	\$0.7	\$3.6	359	338
Unclassified	Unclassified	Unclassified	\$3.2	\$0.3	\$0.0	\$2.9	\$0.0	\$0.0	\$0.0	\$0.0	\$2.9	NA	NA
East	Interface	500	\$4.2	\$1.5	\$0.0	\$2.7	(\$0.0)	(\$0.0)	(\$0.0)	\$0.0	\$2.7	304	5

Met-Ed Control Zone

Table 7-26 and Table 7-27 show the constraints with the largest impacts on total congestion cost in the Met-Ed Control Zone for 2008 and 2007, respectively. In 2008, the AP South and Cloverdale – Lexington constraints were the largest contributors to positive congestion while the Conemaugh – Hunterstown and West interface constraints contributed to negative congestion. In 2007, the Brunner Island - Yorkana and Bedington – Black Oak constraints had been the largest contributors to positive congestion while the Branchburg – Readington line and Central interface constraints contributed to negative congestion.

Table 7-26 Met-Ed Control Zone top congestion cost impacts (By facility): Calendar year 2008

Congestion Costs (Millions)													
Constraint	Type	Location	Day Ahead				Balancing				Grand Total	Event Hours	
			Load Payments	Generation Credits	Explicit	Total	Load Payments	Generation Credits	Explicit	Total		Day Ahead	Real Time
AP South	Interface	500	\$17.9	\$19.3	\$0.7	(\$0.8)	\$0.5	(\$0.2)	\$3.4	\$4.1	\$3.3	3,572	997
Cloverdale - Lexington	Line	AEP	\$12.5	\$11.7	\$0.7	\$1.5	\$0.2	\$0.3	\$0.5	\$0.4	\$1.9	3,529	1,739
Bedington	Transformer	AP	\$1.8	\$0.3	\$0.0	\$1.5	(\$0.0)	\$0.0	\$0.2	\$0.2	\$1.7	1,192	299
Bedington - Black Oak	Interface	500	\$4.3	\$3.5	\$0.1	\$0.9	\$0.0	(\$0.0)	\$0.6	\$0.7	\$1.6	1,384	279
Kammer	Transformer	500	\$10.4	\$11.1	\$0.5	(\$0.2)	\$0.2	(\$0.3)	\$1.3	\$1.8	\$1.5	3,069	1,567
Brunner Island - Yorkana	Line	Met-Ed	\$0.5	(\$0.9)	\$0.0	\$1.4	\$0.1	\$0.1	(\$0.0)	(\$0.0)	\$1.4	57	27
Conemaugh - Hunterstown	Line	500	\$0.6	\$1.5	\$0.0	(\$0.9)	(\$0.1)	(\$0.1)	(\$0.4)	(\$0.3)	(\$1.2)	62	98
Middletown Jct	Transformer	Met-Ed	\$1.0	(\$0.1)	\$0.0	\$1.1	\$0.0	\$0.0	\$0.0	\$0.0	\$1.1	59	1
Collins - Middletown Jct	Line	Met-Ed	\$1.0	(\$0.0)	\$0.0	\$1.1	(\$0.0)	\$0.2	\$0.1	(\$0.1)	\$1.0	272	31
West	Interface	500	\$15.1	\$18.3	\$0.6	(\$2.6)	\$0.3	(\$0.2)	\$1.3	\$1.8	(\$0.9)	1,690	385
Conastone	Transformer	BGE	\$0.4	(\$0.3)	(\$0.1)	\$0.7	\$0.0	\$0.1	\$0.1	\$0.0	\$0.7	95	15
East Towanda	Transformer	PENELEC	\$0.3	\$0.4	\$0.0	\$0.0	\$0.1	(\$0.1)	\$0.4	\$0.6	\$0.6	803	306
Aqueduct - Doubs	Line	AP	(\$0.8)	(\$0.2)	\$0.0	(\$0.6)	\$0.0	\$0.0	\$0.0	\$0.0	(\$0.6)	307	7
Harwood - Susquehanna	Line	PPL	\$1.2	\$0.4	\$0.0	\$0.8	\$0.0	\$0.3	(\$0.0)	(\$0.2)	\$0.6	117	99
Mount Storm - Pruntytown	Line	AP	\$4.6	\$4.4	\$0.2	\$0.4	(\$0.0)	\$0.0	\$0.2	\$0.2	\$0.6	2,559	722

Table 7-27 Met-Ed Control Zone top congestion cost impacts (By facility): Calendar year 2007

Congestion Costs (Millions)													
Constraint	Type	Location	Day Ahead				Balancing				Grand Total	Event Hours	
			Load Payments	Generation Credits	Explicit	Total	Load Payments	Generation Credits	Explicit	Total		Day Ahead	Real Time
Brunner Island - Yorkana	Line	Met-Ed	\$4.1	(\$3.3)	\$0.0	\$7.4	(\$0.3)	(\$0.3)	\$0.6	\$0.6	\$8.1	172	196
Bedington - Black Oak	Interface	500	\$29.5	\$26.1	\$1.8	\$5.2	(\$1.6)	\$0.3	\$4.1	\$2.3	\$7.5	5,493	1,836
Hunterstown	Transformer	Met-Ed	\$7.4	\$1.4	\$0.3	\$6.3	(\$0.4)	\$0.7	\$1.0	(\$0.1)	\$6.2	345	139
Jackson	Transformer	Met-Ed	\$5.3	(\$0.1)	\$0.1	\$5.5	(\$0.5)	\$1.4	\$1.1	(\$0.7)	\$4.8	155	114
Gardners - Hunterstown	Line	Met-Ed	\$2.1	(\$1.2)	\$0.1	\$3.4	(\$0.4)	\$0.4	\$0.4	(\$0.4)	\$3.0	953	271
5004/5005 Interface	Interface	500	\$15.1	\$13.7	\$0.6	\$2.0	(\$0.3)	\$0.4	\$1.3	\$0.5	\$2.5	1,512	386
Kammer	Transformer	500	\$9.5	\$9.9	\$0.9	\$0.5	(\$0.4)	(\$0.2)	\$1.7	\$1.5	\$2.0	2,005	947
Bedington	Transformer	AP	\$1.8	\$0.6	\$0.0	\$1.3	(\$0.1)	\$0.1	\$0.8	\$0.6	\$1.9	928	429
Branchburg - Readington	Line	PSEG	(\$10.8)	(\$8.3)	(\$0.0)	(\$2.5)	\$1.3	\$0.3	\$0.1	\$1.0	(\$1.5)	2,324	721
Conastone	Transformer	BGE	\$0.1	(\$0.9)	\$0.0	\$1.1	\$0.0	\$0.2	(\$0.1)	(\$0.2)	\$0.9	172	55
Cloverdale - Lexington	Line	AEP	\$14.8	\$12.9	\$0.2	\$2.1	(\$1.2)	\$0.5	\$0.4	(\$1.3)	\$0.8	3,704	1,885
Central	Interface	500	\$4.2	\$5.0	\$0.1	(\$0.7)	(\$0.0)	(\$0.0)	\$0.0	\$0.0	(\$0.7)	1,334	25
AP South	Interface	500	\$4.5	\$4.7	\$0.3	\$0.1	(\$0.0)	\$0.2	\$0.9	\$0.6	\$0.7	706	133
MAAC - Scarcity	Interface	500	\$0.0	\$0.0	\$0.0	\$0.0	(\$0.0)	(\$0.0)	\$0.6	\$0.6	\$0.6	0	3
Doubs	Transformer	AP	\$0.5	\$0.2	\$0.1	\$0.4	(\$0.1)	\$0.0	\$0.2	\$0.2	\$0.5	135	99

PECO Control Zone

Table 7-28 and Table 7-29 show the constraints with the largest impacts on total congestion cost in the PECO Control Zone for 2008 and 2007, respectively. In 2008, the East interface was the largest contributor to positive congestion while the AP South and West interface constraints were the largest contributors to negative congestion. In 2007, the Branchburg – Readington and East interface constraints were the largest contributors to positive congestion while the Bedington – Black Oak and Cloverdale – Lexington constraints contributed to negative congestion.

Table 7-28 PECO Control Zone top congestion cost impacts (By facility): Calendar year 2008

Congestion Costs (Millions)													
Constraint	Type	Location	Day Ahead				Balancing				Event Hours		
			Load Payments	Generation Credits	Explicit	Total	Load Payments	Generation Credits	Explicit	Total	Grand Total	Day Ahead	Real Time
AP South	Interface	500	\$8.2	\$27.7	\$0.0	(\$19.5)	\$0.0	\$1.2	\$0.0	(\$1.2)	(\$20.7)	3,572	997
West	Interface	500	\$9.4	\$23.1	\$0.1	(\$13.6)	\$0.1	\$1.7	\$0.0	(\$1.5)	(\$15.1)	1,690	385
East	Interface	500	\$10.0	\$0.4	(\$0.0)	\$9.7	(\$0.0)	(\$0.1)	\$0.0	\$0.1	\$9.7	758	12
Kammer	Transformer	500	\$6.7	\$13.9	\$0.0	(\$7.1)	\$0.4	\$1.1	\$0.0	(\$0.6)	(\$7.7)	3,069	1,567
Cloverdale - Lexington	Line	AEP	\$8.6	\$14.5	\$0.1	(\$5.8)	\$0.1	\$1.4	(\$0.0)	(\$1.4)	(\$7.1)	3,529	1,739
Mount Storm - Pruntytown	Line	AP	\$1.4	\$6.8	\$0.0	(\$5.4)	(\$0.1)	\$0.2	(\$0.0)	(\$0.3)	(\$5.7)	2,559	722
Bedington - Black Oak	Interface	500	\$1.6	\$6.2	\$0.0	(\$4.6)	(\$0.0)	\$0.2	\$0.0	(\$0.1)	(\$4.7)	1,384	279
5004/5005 Interface	Interface	500	\$3.5	\$7.3	\$0.0	(\$3.8)	\$0.2	\$0.7	(\$0.0)	(\$0.5)	(\$4.3)	736	411
Dickerson - Pleasant View	Line	Pepco	\$2.1	\$6.0	\$0.0	(\$3.9)	(\$0.1)	\$0.0	\$0.0	(\$0.1)	(\$4.0)	844	218
Sammis - Wylie Ridge	Line	AP	\$2.8	\$4.1	\$0.0	(\$1.2)	(\$0.1)	\$1.8	\$0.0	(\$1.9)	(\$3.1)	1,915	1,239
Branchburg - Readington	Line	PSEG	(\$1.9)	(\$4.6)	(\$0.0)	\$2.6	(\$0.0)	\$0.2	(\$0.0)	(\$0.3)	\$2.4	1,121	271
Conastone	Transformer	BGE	(\$0.2)	(\$2.4)	(\$0.0)	\$2.2	\$0.0	(\$0.0)	(\$0.0)	\$0.0	\$2.3	95	15
Unclassified	Unclassified	Unclassified	\$2.0	\$0.2	\$0.0	\$1.8	(\$0.0)	\$0.0	\$0.0	(\$0.0)	\$1.8	NA	NA
Bradford - Planebrook	Line	PECO	\$0.7	(\$1.1)	(\$0.0)	\$1.8	\$0.0	\$0.1	\$0.0	(\$0.1)	\$1.7	124	24
Whitpain	Transformer	PECO	\$3.8	(\$1.4)	\$0.1	\$5.2	(\$0.4)	\$2.8	(\$0.3)	(\$3.5)	\$1.7	89	68

Table 7-29 PECO Control Zone top congestion cost impacts (By facility): Calendar year 2007

Congestion Costs (Millions)													
Constraint	Type	Location	Day Ahead				Balancing				Event Hours		
			Load Payments	Generation Credits	Explicit	Total	Load Payments	Generation Credits	Explicit	Total	Grand Total	Day Ahead	Real Time
Bedington - Black Oak	Interface	500	\$17.0	\$38.1	\$0.2	(\$20.9)	(\$1.4)	\$5.6	\$0.0	(\$6.9)	(\$27.9)	5,493	1,836
Cloverdale - Lexington	Line	AEP	\$11.9	\$15.9	\$0.1	(\$3.9)	(\$0.2)	\$4.7	(\$0.1)	(\$5.0)	(\$8.9)	3,704	1,885
5004/5005 Interface	Interface	500	\$13.5	\$19.6	\$0.1	(\$6.0)	(\$0.0)	\$2.3	(\$0.0)	(\$2.4)	(\$8.3)	1,512	386
Branchburg - Readington	Line	PSEG	(\$12.9)	(\$17.5)	(\$0.0)	\$4.6	\$1.3	(\$2.2)	(\$0.2)	\$3.2	\$7.8	2,324	721
Kammer	Transformer	500	\$8.5	\$11.9	\$0.1	(\$3.3)	(\$0.4)	\$3.3	(\$0.1)	(\$3.8)	(\$7.1)	2,005	947
East	Interface	500	\$4.7	(\$0.5)	(\$0.0)	\$5.2	(\$0.0)	(\$0.0)	\$0.0	(\$0.0)	\$5.2	304	5
AP South	Interface	500	\$2.4	\$6.5	\$0.0	(\$4.1)	(\$0.1)	\$0.9	\$0.0	(\$1.0)	(\$5.0)	706	133
Wylie Ridge	Transformer	AP	\$5.4	\$7.7	\$0.0	(\$2.2)	(\$0.3)	\$2.2	(\$0.1)	(\$2.6)	(\$4.8)	1,486	685
Plymouth Meeting - Whitpain	Line	PECO	\$6.2	\$1.4	\$0.0	\$4.8	(\$0.1)	\$0.6	\$0.0	(\$0.6)	\$4.1	55	34
Central	Interface	500	\$7.4	\$11.2	\$0.1	(\$3.7)	(\$0.0)	\$0.1	(\$0.0)	(\$0.1)	(\$3.8)	1,334	25
West	Interface	500	\$1.9	\$3.2	\$0.0	(\$1.3)	(\$0.5)	\$1.8	(\$0.0)	(\$2.3)	(\$3.6)	359	338
Conastone	Transformer	BGE	(\$0.4)	(\$3.2)	(\$0.0)	\$2.8	\$0.3	\$0.1	\$0.0	\$0.3	\$3.1	172	55
Elrama - Mitchell	Line	AP	\$1.2	\$2.2	\$0.0	(\$0.9)	\$0.0	\$0.7	(\$0.0)	(\$0.7)	(\$1.6)	1,883	784
Loudoun - Morrisville	Line	Dominion	\$0.3	\$0.6	\$0.0	(\$0.3)	(\$0.3)	\$0.9	(\$0.0)	(\$1.2)	(\$1.5)	74	93
Brunner Island - Yorkana	Line	Met-Ed	(\$0.9)	(\$1.2)	(\$0.0)	\$0.3	\$0.3	(\$0.8)	\$0.0	\$1.0	\$1.4	172	196

PENELEC Control Zone

Table 7-30 and Table 7-31 show the constraints with the largest impacts on total congestion cost in the PENELEC Control Zone for 2008 and 2007, respectively. In 2008, the AP South and West interface constraints, along with the Mount Storm – Pruntytown constraint, contributed to positive congestion while the Kammer transformer and Sammis – Wylie Ridge constraints contributed to negative congestion. In 2007, the Bedington – Black Oak and 5004/5005 interface constraints were the largest contributors to positive congestion while the Wylie Ridge and Kammer transformer constraints contributed to negative congestion.

Table 7-30 PENELEC Control Zone top congestion cost impacts (By facility): Calendar year 2008

Congestion Costs (Millions)													
Constraint	Type	Location	Day Ahead				Balancing				Grand Total	Event Hours	
			Load Payments	Generation Credits	Explicit	Total	Load Payments	Generation Credits	Explicit	Total		Day Ahead	Real Time
AP South	Interface	500	(\$35.4)	(\$69.6)	\$0.3	\$34.5	\$3.1	\$0.7	\$0.7	\$3.1	\$37.6	3,572	997
West	Interface	500	(\$7.9)	(\$46.5)	(\$0.3)	\$38.2	\$0.1	\$1.5	\$0.3	(\$1.1)	\$37.1	1,690	385
Mount Storm - Pruntytown	Line	AP	(\$27.4)	(\$55.5)	\$0.1	\$28.1	\$0.9	(\$0.3)	\$0.0	\$1.2	\$29.3	2,559	722
Kammer	Transformer	500	\$10.1	\$33.1	\$0.8	(\$22.2)	(\$0.8)	(\$1.3)	\$0.2	\$0.7	(\$21.6)	3,069	1,567
Bedington - Black Oak	Interface	500	(\$16.6)	(\$37.5)	\$0.1	\$20.9	\$0.6	\$0.3	\$0.1	\$0.4	\$21.4	1,384	279
5004/5005 Interface	Interface	500	(\$3.8)	(\$23.7)	(\$0.1)	\$19.8	(\$0.7)	\$1.3	\$0.1	(\$1.8)	\$18.0	736	411
Seward	Transformer	PENELEC	\$33.2	\$20.4	\$0.1	\$12.8	\$0.9	\$1.0	(\$0.1)	(\$0.1)	\$12.7	363	50
Sammis - Wylie Ridge	Line	AP	\$6.2	\$17.6	\$0.6	(\$10.8)	(\$0.4)	(\$0.4)	(\$1.1)	(\$1.1)	(\$11.8)	1,915	1,239
Mount Storm	Transformer	AP	(\$8.2)	(\$17.9)	\$0.1	\$9.7	(\$0.8)	\$0.0	(\$0.0)	(\$0.9)	\$8.8	935	373
Krendale - Seneca	Line	AP	\$4.7	\$13.2	\$0.3	(\$8.3)	\$0.0	\$0.0	(\$0.0)	\$0.0	(\$8.2)	1,389	24
Central	Interface	500	(\$0.5)	(\$8.6)	(\$0.0)	\$8.0	\$0.0	(\$0.0)	\$0.0	\$0.0	\$8.0	726	42
East Towanda	Transformer	PENELEC	\$14.1	(\$8.8)	\$1.0	\$23.8	(\$9.2)	\$8.4	(\$0.5)	(\$18.1)	\$5.7	803	306
East	Interface	500	(\$1.4)	(\$6.3)	(\$0.1)	\$4.9	\$0.0	(\$0.0)	\$0.0	\$0.0	\$4.9	758	12
Bedington	Transformer	AP	(\$0.5)	(\$4.4)	\$0.0	\$3.9	\$0.0	\$0.1	\$0.0	(\$0.0)	\$3.9	1,192	299
Altoona - Bear Rock	Line	PENELEC	(\$4.9)	(\$8.5)	(\$0.0)	\$3.6	\$0.1	\$0.1	(\$0.0)	(\$0.0)	\$3.6	221	30

Table 7-31 PENELEC Control Zone top congestion cost impacts (By facility): Calendar year 2007

Congestion Costs (Millions)													
Constraint	Type	Location	Day Ahead				Balancing				Grand Total	Event Hours	
			Load Payments	Generation Credits	Explicit	Total	Load Payments	Generation Credits	Explicit	Total		Day Ahead	Real Time
Bedington - Black Oak	Interface	500	(\$63.6)	(\$146.9)	\$0.0	\$83.4	(\$3.9)	\$4.6	\$0.4	(\$8.1)	\$75.2	5,493	1,836
5004/5005 Interface	Interface	500	(\$11.5)	(\$59.0)	(\$1.0)	\$46.6	(\$0.3)	\$1.0	\$0.4	(\$0.9)	\$45.6	1,512	386
Wylie Ridge	Transformer	AP	\$9.0	\$28.8	\$1.0	(\$18.9)	\$1.9	(\$1.1)	(\$0.9)	\$2.1	(\$16.9)	1,486	685
Kammer	Transformer	500	\$11.4	\$32.3	\$1.5	(\$19.3)	\$1.2	(\$1.8)	(\$0.5)	\$2.5	(\$16.8)	2,005	947
Branchburg - Readington	Line	PSEG	(\$11.6)	(\$30.5)	(\$0.0)	\$18.8	(\$3.6)	\$1.5	\$0.2	(\$4.8)	\$14.0	2,324	721
Central	Interface	500	(\$2.3)	(\$15.2)	(\$0.1)	\$12.8	(\$0.0)	\$0.0	\$0.0	(\$0.0)	\$12.8	1,334	25
Bedington	Transformer	AP	(\$3.6)	(\$10.1)	\$0.0	\$6.5	\$0.1	\$0.0	\$0.1	\$0.3	\$6.8	928	429
Elrama - Mitchell	Line	AP	\$2.4	\$8.6	\$0.3	(\$5.9)	\$0.5	(\$0.4)	(\$0.2)	\$0.7	(\$5.1)	1,883	784
AP South	Interface	500	(\$4.1)	(\$8.8)	\$0.3	\$4.9	\$0.3	\$0.3	(\$0.1)	(\$0.1)	\$4.9	706	133
Cloverdale - Lexington	Line	AEP	\$0.5	\$6.1	\$1.7	(\$3.8)	\$0.9	(\$0.4)	(\$1.6)	(\$0.3)	(\$4.0)	3,704	1,885
Seward	Transformer	PENELEC	\$8.5	\$5.0	\$0.0	\$3.5	\$0.2	\$0.1	\$0.0	\$0.1	\$3.6	110	3
West	Interface	500	(\$1.8)	(\$7.7)	\$0.0	\$5.9	(\$0.7)	\$1.7	\$0.1	(\$2.3)	\$3.6	359	338
East Towanda	Transformer	PENELEC	\$8.1	(\$3.8)	\$0.3	\$12.1	(\$2.8)	\$6.1	\$0.1	(\$8.9)	\$3.3	1,055	410
East	Interface	500	(\$1.7)	(\$4.5)	(\$0.0)	\$2.8	(\$0.0)	\$0.0	(\$0.0)	(\$0.0)	\$2.8	304	5
Bear Rock - Johnstown	Line	PENELEC	(\$2.5)	(\$4.6)	(\$0.0)	\$2.1	\$0.0	\$0.1	\$0.0	(\$0.1)	\$2.0	212	21

Pepco Control Zone

Table 7-32 and Table 7-33 show the constraints with the largest impacts on total congestion cost in the Pepco Control Zone for 2008 and 2007, respectively. In 2008, the AP South interface, Cloverdale – Lexington and Pruntytown – Mount Storm constraints were the top 3 contributors to positive congestion while the Central interface and Branchburg – Readington constraints contributed to negative congestion. In 2007, the Bedington – Black Oak and Cloverdale – Lexington constraints were the largest contributors to positive congestion while the Branchburg – Readington and Central interface constraints contributed to negative congestion.

Table 7-32 Pepco Control Zone top congestion cost impacts (By facility): Calendar year 2008

Congestion Costs (Millions)														
Constraint	Type	Location	Day Ahead				Balancing				Event Hours			
			Load Payments	Generation Credits	Explicit	Total	Load Payments	Generation Credits	Explicit	Total	Grand Total	Day Ahead	Real Time	
AP South	Interface	500	\$186.4	\$129.8	\$1.8	\$58.4	(\$2.6)	(\$1.4)	(\$1.8)	(\$2.9)	\$55.5	3,572	997	
Cloverdale - Lexington	Line	AEP	\$91.0	\$64.8	\$1.8	\$28.1	\$5.9	(\$1.2)	(\$1.7)	\$5.4	\$33.5	3,529	1,739	
Mount Storm - Pruntytown	Line	AP	\$86.7	\$61.8	\$0.6	\$25.5	\$0.8	(\$1.5)	(\$0.3)	\$2.0	\$27.5	2,559	722	
Bedington - Black Oak	Interface	500	\$58.9	\$40.0	\$0.6	\$19.5	(\$0.3)	\$0.0	(\$0.3)	(\$0.7)	\$18.8	1,384	279	
Aqueduct - Doubs	Line	AP	\$38.5	\$23.5	\$0.2	\$15.2	\$0.1	(\$0.0)	(\$0.0)	\$0.1	\$15.3	307	7	
Kammer	Transformer	500	\$36.9	\$24.5	\$0.7	\$13.1	(\$0.3)	(\$0.9)	(\$0.7)	(\$0.0)	\$13.1	3,069	1,567	
Dickerson - Pleasant View	Line	Pepco	\$34.0	\$23.1	\$1.2	\$12.1	(\$0.2)	(\$0.1)	(\$1.1)	(\$1.1)	\$11.0	844	218	
West	Interface	500	\$25.0	\$15.6	\$0.6	\$10.0	(\$0.3)	(\$0.5)	(\$0.6)	(\$0.4)	\$9.6	1,690	385	
Mount Storm	Transformer	AP	\$25.8	\$19.0	\$0.1	\$6.9	\$2.0	(\$0.5)	(\$0.1)	\$2.5	\$9.3	935	373	
Brighton	Transformer	Pepco	\$11.7	\$7.4	\$0.2	\$4.5	(\$0.7)	(\$0.3)	(\$0.8)	(\$1.2)	\$3.3	116	78	
Sammis - Wylie Ridge	Line	AP	\$9.3	\$6.3	\$0.1	\$3.1	\$0.7	\$0.2	(\$0.4)	\$0.1	\$3.2	1,915	1,239	
Dickerson - Quince Orchard	Line	Pepco	\$3.4	\$1.1	\$0.0	\$2.4	(\$0.0)	(\$0.0)	\$0.0	(\$0.0)	\$2.4	46	2	
Black Oak	Transformer	AP	\$6.8	\$4.6	\$0.0	\$2.2	(\$0.0)	(\$0.1)	(\$0.0)	\$0.1	\$2.3	386	29	
Central	Interface	500	(\$8.1)	(\$6.0)	(\$0.1)	(\$2.1)	\$0.0	(\$0.0)	(\$0.0)	\$0.0	(\$2.1)	726	42	
Branchburg - Readington	Line	PSEG	(\$5.4)	(\$3.6)	(\$0.2)	(\$2.0)	\$0.3	\$0.2	\$0.2	\$0.2	(\$1.8)	1,121	271	

Table 7-33 Pepco Control Zone top congestion cost impacts (By facility): Calendar year 2007

Congestion Costs (Millions)														
Constraint	Type	Location	Day Ahead				Balancing				Event Hours			
			Load Payments	Generation Credits	Explicit	Total	Load Payments	Generation Credits	Explicit	Total	Grand Total	Day Ahead	Real Time	
Bedington - Black Oak	Interface	500	\$339.2	\$265.1	\$5.6	\$79.7	\$17.6	(\$10.4)	(\$5.1)	\$22.9	\$102.6	5,493	1,836	
Cloverdale - Lexington	Line	AEP	\$102.1	\$80.2	\$2.0	\$23.9	\$9.0	(\$7.1)	(\$2.3)	\$13.8	\$37.7	3,704	1,885	
Kammer	Transformer	500	\$35.5	\$26.6	\$0.7	\$9.6	\$1.5	(\$2.0)	(\$0.9)	\$2.6	\$12.3	2,005	947	
AP South	Interface	500	\$38.0	\$28.8	\$0.7	\$9.9	\$1.2	(\$0.4)	(\$0.2)	\$1.4	\$11.3	706	133	
Branchburg - Readington	Line	PSEG	(\$36.9)	(\$31.4)	(\$0.2)	(\$5.8)	(\$2.8)	\$3.0	\$0.4	(\$5.3)	(\$11.1)	2,324	721	
Wylie Ridge	Transformer	AP	\$15.2	\$12.1	\$0.6	\$3.7	\$1.3	(\$1.0)	(\$0.6)	\$1.6	\$5.4	1,486	685	
Bedington	Transformer	AP	\$15.3	\$11.3	\$1.2	\$5.3	\$0.3	(\$0.6)	(\$1.0)	(\$0.1)	\$5.1	928	429	
Aqueduct - Doubs	Line	AP	\$12.1	\$8.0	\$0.3	\$4.3	(\$0.0)	(\$0.1)	(\$0.1)	(\$0.0)	\$4.3	262	21	
5004/5005 Interface	Interface	500	\$8.8	\$6.2	\$0.3	\$2.9	\$0.1	(\$0.1)	(\$0.1)	\$0.1	\$3.0	1,512	386	
Central	Interface	500	(\$14.8)	(\$12.0)	(\$0.1)	(\$2.9)	\$0.0	\$0.0	\$0.0	(\$0.0)	(\$3.0)	1,334	25	
Doubs	Transformer	AP	\$9.0	\$6.2	\$0.2	\$3.1	(\$0.2)	(\$0.2)	(\$0.6)	(\$0.7)	\$2.4	135	99	
Brunner Island - Yorkana	Line	Met-Ed	\$4.8	\$3.5	\$0.3	\$1.6	\$0.7	(\$0.5)	(\$0.8)	\$0.5	\$2.1	172	196	
Bedington - Nipetown	Line	AP	\$5.3	\$4.1	\$0.1	\$1.3	\$0.4	(\$0.3)	(\$0.0)	\$0.7	\$1.9	841	175	
Mount Storm - Pruntytown	Line	AP	\$0.9	\$0.7	\$0.0	\$0.2	\$1.1	(\$0.7)	(\$0.3)	\$1.5	\$1.7	33	151	
Elrama - Mitchell	Line	AP	\$4.3	\$3.2	\$0.2	\$1.3	\$0.4	(\$0.3)	(\$0.4)	\$0.4	\$1.7	1,883	784	

PPL Control Zone

Table 7-34 and Table 7-35 show the constraints with the largest impacts on total congestion cost in the PPL Control Zone for 2008 and 2007, respectively. In 2008, the Harwood – Susquehanna constraints was the largest contributor to positive congestion while the West interface and several other constraints contributed to negative congestion. In 2007, the Bedington – Black Oak and Brunner Island – Yorkana constraints were the largest contributors to positive congestion while the 5004/5005 Interface and Cloverdale – Lexington constraints contributed to negative congestion.

Table 7-34 PPL Control Zone top congestion cost impacts (By facility): Calendar year 2008

Congestion Costs (Millions)													
Constraint	Type	Location	Day Ahead				Balancing				Event Hours		
			Load Payments	Generation Credits	Explicit	Total	Load Payments	Generation Credits	Explicit	Total	Grand Total	Day Ahead	Real Time
Harwood - Susquehanna	Line	PPL	\$2.7	(\$14.5)	(\$0.1)	\$17.1	(\$1.2)	\$2.0	\$0.2	(\$3.0)	\$14.1	117	99
West	Interface	500	\$2.7	\$13.2	\$1.6	(\$8.9)	\$0.2	\$1.0	(\$0.2)	(\$1.0)	(\$9.9)	1,690	385
Cloverdale - Lexington	Line	AEP	\$1.4	\$9.0	\$1.7	(\$5.8)	(\$0.2)	\$0.0	(\$0.1)	(\$0.3)	(\$6.2)	3,529	1,739
East Towanda	Transformer	PENELEC	\$0.4	\$1.8	\$0.0	(\$1.4)	\$0.1	\$1.1	(\$2.9)	(\$3.8)	(\$5.2)	803	306
East	Interface	500	\$0.2	(\$4.6)	(\$0.0)	\$4.8	\$0.0	(\$0.0)	\$0.0	\$0.0	\$4.8	758	12
Kammer	Transformer	500	\$1.9	\$7.4	\$1.4	(\$4.1)	\$0.2	\$0.4	(\$0.3)	(\$0.5)	(\$4.7)	3,069	1,567
Sammis - Wylie Ridge	Line	AP	\$0.3	\$4.1	\$0.6	(\$3.2)	\$0.0	\$0.1	(\$0.8)	(\$0.9)	(\$4.1)	1,915	1,239
Central	Interface	500	\$0.8	\$4.9	\$0.4	(\$3.7)	(\$0.0)	(\$0.1)	(\$0.0)	\$0.1	(\$3.6)	726	42
5004/5005 Interface	Interface	500	\$1.5	\$5.6	\$0.8	(\$3.3)	(\$0.2)	(\$0.2)	(\$0.3)	(\$0.3)	(\$3.6)	736	411
Mount Storm - Pruntytown	Line	AP	\$1.8	(\$0.8)	\$1.0	\$3.5	\$0.1	\$0.2	(\$0.1)	(\$0.1)	\$3.4	2,559	722
Krendale - Seneca	Line	AP	\$0.4	\$2.4	\$0.3	(\$1.7)	(\$0.0)	\$0.0	\$0.0	(\$0.0)	(\$1.7)	1,389	24
Bedington - Black Oak	Interface	500	\$1.6	\$0.6	\$0.5	\$1.5	\$0.1	\$0.0	\$0.1	\$0.1	\$1.6	1,384	279
Branchburg - Readington	Line	PSEG	\$0.7	(\$0.8)	(\$0.1)	\$1.4	\$0.0	(\$0.1)	\$0.1	\$0.2	\$1.6	1,121	271
Conastone	Transformer	BGE	\$0.1	(\$1.2)	(\$0.0)	\$1.2	\$0.0	(\$0.0)	\$0.0	\$0.1	\$1.3	95	15
Burnham - Munster	Line	ComEd	\$0.3	\$1.5	(\$0.0)	(\$1.3)	\$0.0	(\$0.1)	\$0.0	\$0.2	(\$1.1)	476	140

Table 7-35 PPL Control Zone top congestion cost impacts (By facility): Calendar year 2007

Congestion Costs (Millions)													
Constraint	Type	Location	Day Ahead				Balancing				Event Hours		
			Load Payments	Generation Credits	Explicit	Total	Load Payments	Generation Credits	Explicit	Total	Grand Total	Day Ahead	Real Time
5004/5005 Interface	Interface	500	\$3.1	\$13.9	\$1.2	(\$9.6)	\$0.3	\$0.8	(\$0.2)	(\$0.7)	(\$10.3)	1,512	386
Bedington - Black Oak	Interface	500	\$10.9	\$7.6	\$2.2	\$5.6	\$1.6	\$2.1	\$1.1	\$0.6	\$6.3	5,493	1,836
Cloverdale - Lexington	Line	AEP	\$1.6	\$9.5	\$1.5	(\$6.5)	\$1.0	\$1.0	\$0.5	\$0.5	(\$6.0)	3,704	1,885
Central	Interface	500	\$1.2	\$6.3	\$0.5	(\$4.6)	\$0.0	(\$0.0)	\$0.0	\$0.0	(\$4.6)	1,334	25
Brunner Island - Yorkana	Line	Met-Ed	(\$0.2)	(\$5.1)	(\$0.1)	\$4.7	(\$0.4)	\$0.8	(\$0.0)	(\$1.3)	\$3.5	172	196
Branchburg - Readington	Line	PSEG	(\$1.1)	(\$6.2)	(\$0.2)	\$4.9	(\$0.6)	(\$0.2)	(\$1.2)	(\$1.6)	\$3.2	2,324	721
Kammer	Transformer	500	\$1.8	\$6.0	\$0.8	(\$3.4)	\$0.9	\$1.1	\$0.4	\$0.3	(\$3.1)	2,005	947
Manor - Safe Harbor	Line	Met-Ed	\$2.1	(\$0.7)	\$0.0	\$2.8	\$0.0	\$0.0	\$0.0	\$0.0	\$2.8	95	0
Conastone	Transformer	BGE	\$0.2	(\$2.5)	(\$0.0)	\$2.7	\$0.1	\$0.1	(\$0.0)	(\$0.0)	\$2.7	172	55
Wylie Ridge	Transformer	AP	\$1.1	\$4.9	\$0.6	(\$3.2)	\$0.8	\$0.2	(\$0.0)	\$0.5	(\$2.7)	1,486	685
East	Interface	500	(\$0.1)	(\$2.2)	(\$0.0)	\$2.1	\$0.0	\$0.0	(\$0.0)	(\$0.0)	\$2.1	304	5
Cedar Grove - Roseland	Line	PSEG	(\$0.4)	(\$2.2)	(\$0.1)	\$1.7	(\$0.1)	(\$0.0)	\$0.0	(\$0.1)	\$1.6	1,677	133
West	Interface	500	\$0.6	\$1.7	\$0.2	(\$0.9)	\$0.4	\$1.2	\$0.2	(\$0.6)	(\$1.5)	359	338
Elrama - Mitchell	Line	AP	\$0.3	\$1.5	\$0.2	(\$1.1)	\$0.1	\$0.3	\$0.0	(\$0.2)	(\$1.3)	1,883	784
Middletown Jct - Brunner Island	Line	PPL	(\$0.0)	(\$0.1)	(\$0.0)	\$0.1	\$0.0	(\$1.1)	\$0.0	\$1.1	\$1.2	4	9

PSEG Control Zone

Table 7-36 and Table 7-37 show the constraints with the largest impacts on total congestion cost in the PSEG Control Zone for 2008 and 2007, respectively. In 2008, the Atlantic – Larrabee and Branchburg – Readington constraints were the largest contributors to positive congestion while the AP South interface and Mount Storm – Pruntytown constraints were the largest contributors to negative congestion costs. In 2007, the Branchburg – Readington and Cedar Grove – Roseland constraints were the largest contributors to positive congestion while the Bedington – Black Oak and South Mahwah – Waldwick constraints contributed to negative congestion.

Table 7-36 PSEG Control Zone top congestion cost impacts (By facility): Calendar year 2008

			Congestion Costs (Millions)											Event Hours	
Constraint	Type	Location	Day Ahead				Balancing				Grand Total	Day Ahead	Real Time		
			Load Payments	Generation Credits	Explicit	Total	Load Payments	Generation Credits	Explicit	Total					
Atlantic - Larrabee	Line	JCPL	\$13.3	(\$6.0)	\$0.4	\$19.7	\$0.5	\$2.7	(\$0.9)	(\$3.1)	\$16.6	1,556	380		
Branchburg - Readington	Line	PSEG	\$17.0	\$0.8	\$0.8	\$17.0	\$0.2	\$2.9	(\$0.7)	(\$3.3)	\$13.6	1,121	271		
Buckingham - Pleasant Valley	Line	PECO	\$11.4	\$2.4	\$0.6	\$9.6	(\$0.1)	\$0.4	(\$0.1)	(\$0.6)	\$9.0	647	74		
Cedar Grove - Roseland	Line	PSEG	\$12.6	\$1.9	\$0.5	\$11.3	(\$0.0)	\$2.7	(\$0.9)	(\$3.6)	\$7.7	627	168		
Branchburg - Flagtown	Line	PSEG	\$6.9	\$0.1	\$0.2	\$6.9	\$0.4	(\$0.0)	(\$0.4)	(\$0.0)	\$6.9	284	61		
Unclassified	Unclassified	Unclassified	\$3.7	(\$2.9)	\$0.2	\$6.8	(\$0.0)	\$0.0	\$0.0	(\$0.0)	\$6.8	NA	NA		
AP South	Interface	500	\$25.3	\$31.6	\$3.9	(\$2.4)	(\$0.1)	\$1.0	(\$2.2)	(\$3.3)	(\$5.7)	3,572	997		
Brunswick - Edison	Line	PSEG	\$5.6	\$0.3	\$0.3	\$5.6	(\$0.0)	\$0.6	(\$0.3)	(\$0.9)	\$4.6	535	264		
Mount Storm - Pruntytown	Line	AP	\$1.7	\$6.6	\$1.9	(\$2.9)	\$0.1	(\$0.2)	(\$1.5)	(\$1.2)	(\$4.1)	2,559	722		
Trainer - Delco Tap	Line	PECO	(\$2.2)	(\$5.9)	(\$0.1)	\$3.6	\$0.0	\$0.0	\$0.0	\$0.0	\$3.6	2,218	0		
Cloverdale - Lexington	Line	AEP	\$22.1	\$24.9	\$2.8	(\$0.0)	\$0.4	\$1.9	(\$2.0)	(\$3.5)	(\$3.5)	3,529	1,739		
Sammis - Wylie Ridge	Line	AP	\$7.5	\$8.1	\$1.0	\$0.4	\$0.8	\$1.9	(\$2.7)	(\$3.7)	(\$3.3)	1,915	1,239		
Bedington - Black Oak	Interface	500	\$3.8	\$7.3	\$1.0	(\$2.4)	\$0.0	(\$0.0)	(\$0.4)	(\$0.4)	(\$2.8)	1,384	279		
Leonia - New Milford	Line	PSEG	\$1.7	\$0.4	\$2.5	\$3.8	(\$0.2)	\$0.7	(\$0.5)	(\$1.3)	\$2.5	919	84		
Athenia - Fairlawn	Line	PSEG	\$2.0	\$0.3	\$0.7	\$2.4	(\$0.0)	\$0.0	(\$0.3)	(\$0.3)	\$2.1	428	36		

Table 7-37 PSEG Control Zone top congestion cost impacts (By facility): Calendar year 2007

			Congestion Costs (Millions)											Event Hours	
Constraint	Type	Location	Day Ahead				Balancing				Grand Total	Day Ahead	Real Time		
			Load Payments	Generation Credits	Explicit	Total	Load Payments	Generation Credits	Explicit	Total					
Branchburg - Readington	Line	PSEG	\$37.7	(\$13.1)	\$0.3	\$51.2	\$2.8	\$11.7	(\$2.5)	(\$11.4)	\$39.8	2,324	721		
Cedar Grove - Roseland	Line	PSEG	\$13.9	\$0.0	(\$0.3)	\$13.6	\$0.3	\$0.5	(\$0.1)	(\$0.4)	\$13.2	1,677	133		
Branchburg - Flagtown	Line	PSEG	\$10.2	\$0.3	\$0.3	\$10.2	(\$0.0)	(\$0.3)	(\$0.7)	(\$0.5)	\$9.7	580	104		
Bedington - Black Oak	Interface	500	\$40.8	\$49.1	\$5.0	(\$3.3)	\$0.0	\$2.1	(\$3.2)	(\$5.3)	(\$8.6)	5,493	1,836		
Atlantic - Larrabee	Line	JCPL	\$6.6	(\$2.8)	\$0.2	\$9.6	\$0.3	\$1.0	(\$0.6)	(\$1.4)	\$8.2	680	134		
South Mahwah - Waldwick	Line	PSEG	\$2.7	\$1.1	(\$0.9)	\$0.7	(\$1.6)	\$1.5	(\$4.9)	(\$8.0)	(\$7.3)	304	58		
5004/5005 Interface	Interface	500	\$33.4	\$29.6	\$2.0	\$5.7	\$1.1	\$0.7	(\$0.7)	(\$0.3)	\$5.4	1,512	386		
Brunswick - Edison	Line	PSEG	\$4.6	\$0.4	\$0.2	\$4.4	\$0.2	\$0.1	(\$0.1)	(\$0.0)	\$4.4	667	125		
Edison - Meadow Rd	Line	PSEG	\$3.8	\$0.4	\$0.3	\$3.7	\$0.1	\$0.1	(\$0.2)	(\$0.2)	\$3.5	438	143		
Wylie Ridge	Transformer	AP	\$14.7	\$12.1	\$1.0	\$3.6	\$0.6	\$1.3	(\$0.9)	(\$1.7)	\$1.9	1,486	685		
Linden - North Ave	Line	PSEG	\$1.1	(\$0.5)	\$0.1	\$1.7	\$0.0	(\$0.0)	(\$0.0)	\$0.0	\$1.7	421	1		
Cloverdale - Lexington	Line	AEP	\$28.1	\$27.6	\$2.3	\$2.7	\$0.5	\$2.9	(\$1.9)	(\$4.3)	(\$1.6)	3,704	1,885		
Central	Interface	500	\$18.9	\$18.2	\$0.9	\$1.6	\$0.0	\$0.0	(\$0.0)	\$0.0	\$1.6	1,334	25		
Bergen - Hoboken	Line	PSEG	\$0.4	(\$0.3)	\$0.7	\$1.5	(\$0.0)	(\$0.0)	(\$0.0)	\$0.0	\$1.5	210	9		
Athenia - Saddlebrook	Line	PSEG	\$0.9	\$0.6	\$0.9	\$1.2	(\$0.1)	(\$0.1)	\$0.0	\$0.0	\$1.2	173	15		

RECO Control Zone

Table 7-38 and Table 7-39 show the constraints with the largest impacts on total congestion cost in the RECO Control Zone for 2008 and 2007, respectively. In 2008, the West interface and Branchburg – Readington constraints were the largest contributors to positive congestion. No constraints were significant contributors to negative congestion during 2008. In 2007, the Branchburg – Readington and 5004/5005 interface constraints were the largest contributors to positive congestion while the South Mahwah – Waldwick and Brunner Island – Yorkana constraints contributed to negative congestion.

Table 7-38 RECO Control Zone top congestion cost impacts (By facility): Calendar year 2008

Constraint	Type	Location	Congestion Costs (Millions)										Event Hours	
			Day Ahead				Balancing				Grand Total	Day Ahead	Real Time	
			Load Payments	Generation Credits	Explicit	Total	Load Payments	Generation Credits	Explicit	Total				
West	Interface	500	\$1.4	\$0.0	\$0.2	\$1.6	\$0.1	(\$0.0)	(\$0.4)	(\$0.3)	\$1.3	1,690	385	
Branchburg - Readington	Line	PSEG	\$1.0	\$0.0	\$0.0	\$1.0	\$0.0	(\$0.0)	(\$0.0)	\$0.0	\$1.0	1,121	271	
Cedar Grove - Roseland	Line	PSEG	\$0.8	\$0.0	\$0.0	\$0.8	\$0.1	(\$0.0)	(\$0.0)	\$0.1	\$0.9	627	168	
Kammer	Transformer	500	\$0.8	\$0.0	\$0.1	\$0.9	\$0.0	(\$0.0)	(\$0.1)	(\$0.0)	\$0.9	3,069	1,567	
Cloverdale - Lexington	Line	AEP	\$0.7	\$0.0	\$0.2	\$0.8	\$0.0	(\$0.0)	(\$0.1)	(\$0.1)	\$0.8	3,529	1,739	
AP South	Interface	500	\$0.7	\$0.0	\$0.1	\$0.7	\$0.0	(\$0.0)	(\$0.1)	(\$0.1)	\$0.6	3,572	997	
Atlantic - Larrabee	Line	JCPL	\$0.6	\$0.0	\$0.0	\$0.6	\$0.0	(\$0.0)	(\$0.1)	(\$0.0)	\$0.5	1,556	380	
Central	Interface	500	\$0.5	\$0.0	\$0.0	\$0.5	(\$0.0)	(\$0.0)	(\$0.0)	(\$0.0)	\$0.5	726	42	
East	Interface	500	\$0.5	\$0.0	\$0.0	\$0.5	(\$0.0)	(\$0.0)	(\$0.0)	(\$0.0)	\$0.5	758	12	
Buckingham - Pleasant Valley	Line	PECO	\$0.5	\$0.0	\$0.0	\$0.5	\$0.0	(\$0.0)	(\$0.0)	\$0.0	\$0.5	647	74	
5004/5005 Interface	Interface	500	\$0.5	\$0.0	\$0.1	\$0.6	\$0.0	(\$0.0)	(\$0.3)	(\$0.3)	\$0.3	736	411	
Krendale - Seneca	Line	AP	\$0.2	\$0.0	\$0.1	\$0.3	(\$0.0)	(\$0.0)	\$0.0	\$0.0	\$0.3	1,389	24	
Dickerson - Pleasant View	Line	Pepco	\$0.3	\$0.0	\$0.0	\$0.3	(\$0.0)	(\$0.0)	(\$0.0)	(\$0.0)	\$0.3	844	218	
Cedar Grove - Clifton	Line	PSEG	\$0.2	\$0.0	\$0.0	\$0.2	\$0.1	(\$0.0)	(\$0.0)	\$0.1	\$0.3	793	372	
Burnham - Munster	Line	ComEd	\$0.2	\$0.0	\$0.0	\$0.2	\$0.0	(\$0.0)	\$0.0	\$0.0	\$0.2	476	140	

Table 7-39 RECO Control Zone top congestion cost impacts (By facility): Calendar year 2007

Constraint	Type	Location	Congestion Costs (Millions)										Event Hours	
			Day Ahead				Balancing				Grand Total	Day Ahead	Real Time	
			Load Payments	Generation Credits	Explicit	Total	Load Payments	Generation Credits	Explicit	Total				
Branchburg - Readington	Line	PSEG	\$2.9	\$0.1	\$0.2	\$3.1	(\$0.1)	(\$0.2)	(\$0.3)	(\$0.2)	\$2.9	2,324	721	
5004/5005 Interface	Interface	500	\$1.3	\$0.0	\$0.0	\$1.2	\$0.1	(\$0.0)	(\$0.0)	\$0.1	\$1.3	1,512	386	
Cedar Grove - Roseland	Line	PSEG	\$1.1	\$0.0	\$0.0	\$1.0	\$0.0	(\$0.0)	(\$0.0)	\$0.1	\$1.1	1,677	133	
Cloverdale - Lexington	Line	AEP	\$0.8	\$0.0	\$0.0	\$0.8	\$0.1	(\$0.0)	(\$0.0)	\$0.1	\$0.9	3,704	1,885	
Bedington - Black Oak	Interface	500	\$1.0	\$0.0	\$0.0	\$0.9	(\$0.0)	(\$0.0)	(\$0.1)	(\$0.1)	\$0.9	5,493	1,836	
South Mahwah - Waldwick	Line	PSEG	(\$0.1)	(\$0.0)	(\$0.0)	(\$0.2)	(\$0.1)	\$0.6	\$0.0	(\$0.7)	(\$0.8)	304	58	
Kammer	Transformer	500	\$0.7	\$0.0	\$0.0	\$0.7	\$0.1	(\$0.0)	(\$0.0)	\$0.1	\$0.8	2,005	947	
Central	Interface	500	\$0.7	\$0.0	\$0.0	\$0.7	\$0.0	(\$0.0)	\$0.0	\$0.0	\$0.7	1,334	25	
Wylie Ridge	Transformer	AP	\$0.6	\$0.0	\$0.0	\$0.6	\$0.0	(\$0.0)	(\$0.0)	\$0.0	\$0.6	1,486	685	
Atlantic - Larrabee	Line	JCPL	\$0.3	\$0.0	\$0.0	\$0.3	\$0.0	(\$0.0)	\$0.0	\$0.0	\$0.3	680	134	
West	Interface	500	\$0.2	\$0.0	\$0.0	\$0.2	\$0.0	(\$0.0)	(\$0.0)	\$0.0	\$0.3	359	338	
AP South	Interface	500	\$0.2	\$0.1	\$0.0	\$0.2	\$0.0	(\$0.0)	(\$0.0)	\$0.0	\$0.2	706	133	
East	Interface	500	\$0.2	\$0.0	\$0.0	\$0.2	\$0.0	(\$0.0)	\$0.0	\$0.0	\$0.2	304	5	
Brunner Island - Yorkana	Line	Met-Ed	(\$0.2)	(\$0.0)	\$0.0	(\$0.2)	(\$0.0)	\$0.0	\$0.0	(\$0.0)	(\$0.2)	172	196	
Branchburg - Flagtown	Line	PSEG	\$0.2	\$0.0	\$0.0	\$0.2	\$0.0	(\$0.0)	(\$0.0)	\$0.0	\$0.2	580	104	

Western Region Congestion-Event Summaries

AEP Control Zone

Table 7-40 and Table 7-41 show the constraints with the largest impacts on total congestion cost in the AEP Control Zone for 2008 and 2007, respectively. In 2008, the AP South, Mount Storm – Pruntytown, Kammer, and Bedington – Black Oak constraints were the largest contributors to positive congestion while the Sammis – Wylie Ridge and Cloverdale – Lexington constraints contributed to negative congestion. In 2007, the Bedington – Black Oak and Kammer transformer constraints were the largest contributors to positive congestion while the Cloverdale – Lexington and Darwin – Eugene constraints contributed to negative congestion.

Table 7-40 AEP Control Zone top congestion cost impacts (By facility): Calendar year 2008

Congestion Costs (Millions)													
Constraint	Type	Location	Day Ahead				Balancing				Grand Total	Event Hours	
			Load Payments	Generation Credits	Explicit	Total	Load Payments	Generation Credits	Explicit	Total		Day Ahead	Real Time
AP South	Interface	500	(\$88.3)	(\$149.7)	\$2.4	\$63.8	(\$15.1)	\$0.6	\$0.3	(\$15.4)	\$48.4	3,572	997
Mount Storm - Pruntytown	Line	AP	(\$28.8)	(\$71.8)	\$3.8	\$46.9	(\$9.2)	\$0.4	(\$0.4)	(\$9.9)	\$36.9	2,559	722
Kammer	Transformer	500	(\$31.2)	(\$80.1)	(\$0.5)	\$48.3	(\$10.1)	\$3.9	\$0.4	(\$13.5)	\$34.8	3,069	1,567
Bedington - Black Oak	Interface	500	(\$21.7)	(\$47.4)	\$2.1	\$27.8	(\$2.5)	\$0.9	\$0.0	(\$3.4)	\$24.4	1,384	279
Axton	Transformer	AEP	\$2.8	(\$13.0)	\$2.2	\$18.1	\$0.0	\$0.0	\$0.0	\$0.0	\$18.1	425	0
West	Interface	500	(\$23.8)	(\$41.1)	\$0.2	\$17.5	(\$3.3)	\$0.9	\$0.1	(\$4.1)	\$13.4	1,690	385
Sammis - Wylie Ridge	Line	AP	(\$17.1)	(\$9.7)	(\$0.3)	(\$7.7)	(\$4.3)	(\$0.5)	(\$1.4)	(\$5.2)	(\$12.9)	1,915	1,239
Mount Storm	Transformer	AP	(\$8.9)	(\$23.7)	\$1.4	\$16.2	(\$5.2)	(\$1.6)	(\$0.2)	(\$3.8)	\$12.5	935	373
Cloverdale - Lexington	Line	AEP	(\$96.5)	(\$104.8)	(\$6.0)	\$2.3	(\$16.0)	(\$3.7)	\$0.9	(\$11.4)	(\$9.1)	3,529	1,739
Amos	Transformer	AEP	\$5.9	(\$1.6)	\$0.2	\$7.7	\$0.4	\$0.6	\$0.1	(\$0.2)	\$7.5	31	19
Mahans Lane - Tidd	Line	AEP	(\$2.0)	(\$4.8)	\$2.8	\$5.6	\$0.1	\$0.2	\$0.0	(\$0.0)	\$5.6	847	211
Bedington	Transformer	AP	(\$4.7)	(\$8.9)	\$0.3	\$4.5	(\$0.5)	\$0.1	(\$0.0)	(\$0.6)	\$3.9	1,192	299
Breed - Wheatland	Line	AEP	\$0.1	(\$3.9)	(\$0.4)	\$3.5	\$0.0	(\$0.0)	\$0.0	\$0.0	\$3.5	338	1
Central	Interface	500	(\$6.3)	(\$9.8)	(\$0.0)	\$3.4	(\$0.0)	\$0.1	\$0.0	(\$0.1)	\$3.3	726	42
Aqueduct - Doubs	Line	AP	(\$5.6)	(\$8.7)	\$0.1	\$3.3	(\$0.1)	(\$0.0)	\$0.0	(\$0.1)	\$3.2	307	7

Table 7-41 AEP Control Zone top congestion cost impacts (By facility): Calendar year 2007

Congestion Costs (Millions)													
Constraint	Type	Location	Day Ahead				Balancing				Grand Total	Event Hours	
			Load Payments	Generation Credits	Explicit	Total	Load Payments	Generation Credits	Explicit	Total		Day Ahead	Real Time
Bedington - Black Oak	Interface	500	(\$69.4)	(\$183.1)	\$7.3	\$120.9	(\$24.1)	\$10.7	(\$0.3)	(\$35.2)	\$85.7	5,493	1,836
Kammer	Transformer	500	(\$32.1)	(\$68.3)	(\$0.2)	\$36.0	(\$9.8)	\$2.8	\$0.0	(\$12.6)	\$23.4	2,005	947
Amos	Transformer	AEP	\$14.3	(\$3.3)	\$0.3	\$17.8	\$3.0	\$2.6	(\$0.2)	\$0.2	\$18.0	311	132
5004/5005 Interface	Interface	500	(\$24.6)	(\$41.3)	\$0.5	\$17.3	(\$2.9)	\$0.1	(\$0.1)	(\$3.1)	\$14.2	1,512	386
Cloverdale - Lexington	Line	AEP	(\$87.9)	(\$91.3)	(\$5.3)	(\$2.0)	(\$16.5)	(\$5.1)	\$0.2	(\$11.2)	(\$13.1)	3,704	1,885
Axton	Transformer	AEP	\$1.8	(\$5.5)	\$1.0	\$8.3	\$0.0	\$0.0	\$0.0	\$0.0	\$8.3	238	0
AP South	Interface	500	(\$15.2)	(\$26.0)	\$0.3	\$11.0	(\$3.3)	\$0.8	\$0.0	(\$4.1)	\$6.9	706	133
Wylie Ridge	Transformer	AP	(\$13.4)	(\$27.4)	\$1.3	\$15.3	(\$6.7)	\$2.4	(\$0.2)	(\$9.2)	\$6.1	1,486	685
Central	Interface	500	(\$13.2)	(\$19.0)	\$0.0	\$5.8	(\$0.1)	(\$0.0)	\$0.0	(\$0.0)	\$5.8	1,334	25
Bedington	Transformer	AP	(\$6.3)	(\$13.5)	\$0.4	\$7.6	(\$1.7)	\$0.4	(\$0.0)	(\$2.1)	\$5.5	928	429
Kanawha - Matt Funk	Line	AEP	\$0.6	(\$6.0)	\$0.9	\$7.5	(\$1.5)	\$1.2	(\$0.2)	(\$2.8)	\$4.7	90	95
Axton - Jacksons Ferry	Line	AEP	\$1.0	(\$3.2)	\$0.6	\$4.8	(\$0.0)	\$0.1	(\$0.0)	(\$0.2)	\$4.6	238	5
Kanawha River	Transformer	AEP	\$2.1	(\$0.7)	\$0.6	\$3.5	\$0.1	\$0.1	\$0.0	(\$0.0)	\$3.5	63	12
Darwin - Eugene	Line	AEP	(\$0.0)	(\$3.0)	(\$0.1)	\$2.9	\$0.6	\$6.6	(\$0.1)	(\$6.1)	(\$3.3)	109	227
Cloverdale	Transformer	AEP	(\$1.6)	(\$5.6)	\$0.2	\$4.2	(\$1.5)	\$0.6	(\$0.0)	(\$2.1)	\$2.2	233	152

AP Control Zone

Table 7-42 and Table 7-43 show the constraints with the largest impacts on total congestion cost in the AP Control Zone for 2008 and 2007, respectively. In 2008, the AP South interface was the largest contributor to positive congestion while the Sammis – Wylie Ridge line, Aqueduct – Doubs line, and the Kammer transformer constraints contributed to negative congestion. In 2007, the Bedington – Black Oak and Cloverdale – Lexington constraints were the largest contributors to positive congestion while the Kammer and Wylie Ridge transformer constraints contributed to negative congestion.

Table 7-42 AP Control Zone top congestion cost impacts (By facility): Calendar year 2008

Congestion Costs (Millions)													
Constraint	Type	Location	Day Ahead				Balancing				Grand Total	Event Hours	
			Load Payments	Generation Credits	Explicit	Total	Load Payments	Generation Credits	Explicit	Total		Day Ahead	Real Time
AP South	Interface	500	\$9.2	(\$141.1)	(\$0.3)	\$150.0	\$2.8	\$8.7	\$1.2	(\$4.6)	\$145.3	3,572	997
Mount Storm - Pruntytown	Line	AP	(\$8.2)	(\$94.1)	(\$0.4)	\$85.5	(\$0.3)	\$3.7	(\$0.1)	(\$4.1)	\$81.4	2,559	722
Bedington - Black Oak	Interface	500	(\$3.8)	(\$57.5)	(\$1.3)	\$52.5	\$0.7	\$0.3	\$0.8	\$1.2	\$53.7	1,384	279
Cloverdale - Lexington	Line	AEP	\$21.4	(\$27.6)	\$6.2	\$55.2	(\$3.1)	(\$0.5)	(\$7.8)	(\$10.5)	\$44.8	3,529	1,739
Bedington	Transformer	AP	\$32.9	(\$7.7)	\$1.3	\$41.9	(\$0.6)	(\$0.6)	(\$0.5)	(\$0.6)	\$41.4	1,192	299
Meadow Brook	Transformer	AP	\$28.4	(\$1.5)	\$0.6	\$30.5	(\$3.1)	(\$0.2)	(\$0.1)	(\$3.1)	\$27.4	774	173
Mount Storm	Transformer	AP	\$0.8	(\$28.2)	\$1.1	\$30.2	(\$2.0)	\$2.3	(\$0.9)	(\$5.2)	\$25.0	935	373
Sammis - Wylie Ridge	Line	AP	\$11.5	\$7.8	\$5.7	\$9.4	(\$7.1)	\$1.0	(\$15.0)	(\$23.1)	(\$13.7)	1,915	1,239
Kammer	Transformer	500	\$26.7	\$39.9	\$7.1	(\$6.2)	(\$3.5)	(\$2.7)	(\$6.4)	(\$7.1)	(\$13.3)	3,069	1,567
Aqueduct - Doubs	Line	AP	(\$17.0)	(\$6.0)	(\$0.4)	(\$11.3)	\$0.1	\$0.1	\$0.0	\$0.0	(\$11.3)	307	7
Krendale - Seneca	Line	AP	\$7.8	(\$0.1)	\$2.2	\$10.1	(\$0.0)	\$0.0	(\$0.0)	(\$0.1)	\$10.0	1,389	24
West	Interface	500	(\$18.7)	(\$25.4)	(\$0.7)	\$6.0	\$2.0	\$1.0	\$0.7	\$1.7	\$7.7	1,690	385
Cedar Grove - Roseland	Line	PSEG	\$5.7	\$1.8	\$2.0	\$5.9	\$0.0	\$0.0	\$0.4	\$0.4	\$6.3	627	168
5004/5005 Interface	Interface	500	(\$6.9)	(\$12.0)	(\$0.4)	\$4.8	\$1.7	\$1.3	\$0.8	\$1.2	\$6.0	736	411
Kingwood - Pruntytown	Line	AP	\$5.2	(\$0.0)	\$0.1	\$5.3	\$0.0	\$0.0	(\$0.0)	\$0.0	\$5.3	360	13

Table 7-43 AP Control Zone top congestion cost impacts (By facility): Calendar year 2007

Congestion Costs (Millions)													
Constraint	Type	Location	Day Ahead				Balancing				Grand Total	Event Hours	
			Load Payments	Generation Credits	Explicit	Total	Load Payments	Generation Credits	Explicit	Total		Day Ahead	Real Time
Bedington - Black Oak	Interface	500	(\$18.0)	(\$275.2)	\$4.3	\$261.5	(\$9.3)	\$15.3	\$3.4	(\$21.3)	\$240.2	5,493	1,836
Cloverdale - Lexington	Line	AEP	\$27.5	(\$19.8)	\$7.0	\$54.3	(\$1.6)	\$1.6	(\$4.4)	(\$7.6)	\$46.7	3,704	1,885
Meadow Brook	Transformer	AP	\$32.6	\$0.2	\$0.6	\$33.0	(\$0.4)	(\$0.6)	(\$0.2)	(\$0.1)	\$32.9	868	233
Bedington	Transformer	AP	\$20.6	(\$13.6)	(\$0.1)	\$34.1	(\$3.0)	(\$0.4)	(\$0.5)	(\$3.1)	\$31.0	928	429
AP South	Interface	500	\$3.0	(\$21.7)	\$0.6	\$25.3	(\$0.6)	\$1.2	\$0.2	(\$1.6)	\$23.7	706	133
Branchburg - Readington	Line	PSEG	(\$20.6)	(\$24.4)	\$8.9	\$12.6	\$0.7	\$1.9	\$0.6	(\$0.6)	\$12.0	2,324	721
5004/5005 Interface	Interface	500	(\$22.6)	(\$32.2)	\$0.2	\$9.7	\$0.1	\$0.4	\$0.2	(\$0.1)	\$9.6	1,512	386
Kammer	Transformer	500	\$28.3	\$40.7	\$4.4	(\$8.0)	(\$0.6)	(\$2.9)	(\$3.8)	(\$1.5)	(\$9.5)	2,005	947
Elrama - Mitchell	Line	AP	\$10.9	\$3.2	\$3.4	\$11.0	(\$0.9)	\$0.5	(\$2.2)	(\$3.6)	\$7.4	1,883	784
Bedington - Nipetown	Line	AP	\$5.0	(\$2.7)	\$0.2	\$7.9	(\$0.3)	\$0.8	\$0.1	(\$1.1)	\$6.9	841	175
Wylie Ridge	Transformer	AP	\$10.0	\$13.4	\$3.0	(\$0.4)	(\$1.5)	\$0.4	(\$3.6)	(\$5.5)	(\$5.9)	1,486	685
Doubs	Transformer	AP	\$4.1	(\$1.5)	\$0.1	\$5.7	\$0.1	(\$0.0)	(\$0.2)	(\$0.0)	\$5.7	135	99
Cedar Grove - Roseland	Line	PSEG	\$1.8	(\$2.2)	\$1.3	\$5.3	\$0.0	\$0.0	\$0.1	\$0.1	\$5.4	1,677	133
Central	Interface	500	(\$11.5)	(\$14.4)	\$1.3	\$4.1	(\$0.0)	\$0.0	\$0.0	(\$0.0)	\$4.1	1,334	25
Aqueduct - Doubs	Line	AP	(\$6.1)	(\$3.1)	(\$0.3)	(\$3.4)	\$0.1	\$0.0	\$0.0	\$0.1	(\$3.2)	262	21

ComEd Control Zone

Table 7-44 and Table 7-45 show the constraints with the largest impacts on total congestion cost in the ComEd Control Zone for 2008 and 2007, respectively. In 2008, the Cloverdale – Lexington line and the AP South interface constraints were the largest contributors to positive congestion. The Crete – East Frankfort line contributed to negative congestion in 2008. In 2007, the Bedington – Black Oak and Cloverdale – Lexington constraints were the largest contributors to positive congestion while the South Mahwah – Waldwick constraint contributed to negative congestion.

Table 7-44 ComEd Control Zone top congestion cost impacts (By facility): Calendar year 2008

Congestion Costs (Millions)														
Constraint	Type	Location	Day Ahead				Balancing				Event Hours			
			Load Payments	Generation Credits	Explicit	Total	Load Payments	Generation Credits	Explicit	Total	Grand Total	Day Ahead	Real Time	
Cloverdale - Lexington	Line	AEP	(\$68.5)	(\$129.4)	\$0.6	\$61.5	(\$5.5)	(\$1.3)	(\$0.2)	(\$4.4)	\$57.2	3,529	1,739	
AP South	Interface	500	(\$94.4)	(\$145.2)	\$1.1	\$51.9	(\$5.2)	(\$1.2)	(\$0.1)	(\$4.2)	\$47.7	3,572	997	
Kammer	Transformer	500	(\$41.3)	(\$72.2)	(\$0.0)	\$30.8	(\$5.1)	\$2.9	(\$0.1)	(\$8.1)	\$22.7	3,069	1,567	
East Frankfort - Crete	Line	ComEd	(\$14.4)	(\$32.9)	(\$0.1)	\$18.4	\$0.0	\$0.0	\$0.0	\$0.0	\$18.4	1,002	0	
Mount Storm - Pruntytown	Line	AP	(\$45.5)	(\$70.9)	\$0.0	\$25.5	(\$6.5)	\$1.1	(\$0.2)	(\$7.9)	\$17.6	2,559	722	
Bedington - Black Oak	Interface	500	(\$25.4)	(\$42.0)	\$0.2	\$16.8	(\$0.2)	(\$0.4)	\$0.0	\$0.2	\$17.0	1,384	279	
West	Interface	500	(\$26.9)	(\$42.8)	\$0.1	\$16.0	(\$0.3)	(\$0.7)	(\$0.0)	\$0.4	\$16.4	1,690	385	
Burnham - Munster	Line	ComEd	(\$23.6)	(\$38.2)	\$2.2	\$16.8	(\$2.6)	(\$2.6)	(\$0.5)	(\$0.5)	\$16.3	476	140	
Dunes Acres - Michigan City	Flowgate	Midwest ISO	(\$9.5)	(\$17.3)	\$0.0	\$7.8	(\$2.1)	\$0.1	(\$0.2)	(\$2.4)	\$5.4	687	435	
Krendale - Seneca	Line	AP	(\$6.1)	(\$11.0)	(\$0.0)	\$4.8	\$0.0	(\$0.0)	\$0.0	\$0.0	\$4.9	1,389	24	
Crete - East Frankfort	Line	ComEd	\$0.0	\$0.0	\$0.0	\$0.0	(\$5.0)	(\$1.1)	(\$0.7)	(\$4.6)	(\$4.6)	0	334	
Central	Interface	500	(\$5.6)	(\$10.0)	(\$0.0)	\$4.4	(\$0.1)	(\$0.1)	(\$0.0)	(\$0.1)	\$4.3	726	42	
Axton	Transformer	AEP	(\$7.2)	(\$11.4)	\$0.1	\$4.3	\$0.0	\$0.0	\$0.0	\$0.0	\$4.3	425	0	
Dickerson - Pleasant View	Line	Pepco	(\$6.4)	(\$10.2)	\$0.0	\$3.8	(\$0.2)	(\$0.4)	\$0.0	\$0.2	\$4.0	844	218	
5004/5005 Interface	Interface	500	(\$10.3)	(\$15.6)	(\$0.0)	\$5.3	(\$1.4)	(\$0.0)	(\$0.0)	(\$1.4)	\$3.9	736	411	

Table 7-45 ComEd Control Zone top congestion cost impacts (By facility): Calendar year 2007

Congestion Costs (Millions)														
Constraint	Type	Location	Day Ahead				Balancing				Event Hours			
			Load Payments	Generation Credits	Explicit	Total	Load Payments	Generation Credits	Explicit	Total	Grand Total	Day Ahead	Real Time	
Bedington - Black Oak	Interface	500	(\$99.4)	(\$126.5)	(\$0.6)	\$26.5	\$10.8	(\$8.0)	\$0.2	\$19.1	\$45.5	5,493	1,836	
Cloverdale - Lexington	Line	AEP	(\$53.5)	(\$80.0)	(\$0.1)	\$26.4	\$8.5	(\$8.8)	(\$0.1)	\$17.2	\$43.6	3,704	1,885	
Kammer	Transformer	500	(\$32.9)	(\$44.5)	(\$0.1)	\$11.5	\$6.6	(\$4.1)	(\$0.0)	\$10.7	\$22.2	2,005	947	
Branchburg - Readington	Line	PSEG	(\$19.0)	(\$19.5)	\$0.0	\$0.5	\$6.2	(\$3.2)	\$0.0	\$9.5	\$10.0	2,324	721	
Wylie Ridge	Transformer	AP	(\$14.6)	(\$17.3)	(\$0.0)	\$2.8	\$3.0	(\$3.4)	\$0.0	\$6.5	\$9.2	1,486	685	
5004/5005 Interface	Interface	500	(\$23.3)	(\$28.6)	(\$0.0)	\$5.2	\$1.3	(\$0.9)	\$0.0	\$2.2	\$7.5	1,512	386	
AP South	Interface	500	(\$14.7)	(\$17.3)	(\$0.0)	\$2.5	\$0.8	(\$1.0)	\$0.0	\$1.9	\$4.4	706	133	
Central	Interface	500	(\$10.5)	(\$13.4)	\$0.0	\$3.0	\$0.0	(\$0.0)	(\$0.0)	\$0.0	\$3.0	1,334	25	
West	Interface	500	(\$4.2)	(\$4.3)	(\$0.0)	\$0.1	\$1.5	(\$0.8)	\$0.0	\$2.3	\$2.5	359	338	
Kanawha - Matt Funk	Line	AEP	(\$4.5)	(\$6.3)	(\$0.0)	\$1.8	\$0.3	(\$0.3)	\$0.0	\$0.6	\$2.3	90	95	
Cloverdale	Transformer	AEP	(\$3.0)	(\$4.8)	(\$0.0)	\$1.7	\$0.3	(\$0.2)	\$0.0	\$0.5	\$2.2	233	152	
Elrama - Mitchell	Line	AP	(\$4.0)	(\$5.5)	(\$0.0)	\$1.6	\$0.2	(\$0.3)	\$0.0	\$0.5	\$2.1	1,883	784	
State Line - Wolf Lake	Flowgate	Midwest ISO	(\$4.9)	(\$7.7)	(\$0.1)	\$2.7	\$0.5	\$1.1	\$0.0	(\$0.6)	\$2.1	1,241	590	
Dresden	Transformer	ComEd	\$1.7	(\$0.6)	\$0.0	\$2.3	(\$0.1)	\$0.3	(\$0.0)	(\$0.5)	\$1.8	77	22	
South Mahwah - Waldwick	Line	PSEG	\$1.4	\$1.5	\$0.0	(\$0.1)	(\$0.7)	\$0.8	(\$0.0)	(\$1.5)	(\$1.6)	304	58	

DAY Control Zone

Table 7-46 and Table 7-47 show the constraints with the largest impacts on total congestion cost in the DAY Control Zone for 2008 and 2007, respectively. In 2008, the Cloverdale – Lexington line was the largest contributor to positive congestion while the Mount Storm – Pruntytown line contributed to negative congestion. In 2007, the Cloverdale – Lexington and Kammer transformer constraints were the largest contributors to positive congestion while the Amos transformer constraint contributed to negative congestion.

Table 7-46 DAY Control Zone top congestion cost impacts (By facility): Calendar year 2008

Congestion Costs (Millions)														
Constraint	Type	Location	Day Ahead				Balancing				Grand Total	Event Hours		
			Load Payments	Generation Credits	Explicit	Total	Load Payments	Generation Credits	Explicit	Total		Day Ahead	Real Time	
Cloverdale - Lexington	Line	AEP	(\$8.4)	(\$10.9)	\$0.1	\$2.5	\$0.3	(\$0.6)	\$0.0	\$1.0	\$3.5	3,529	1,739	
Kammer	Transformer	500	(\$5.0)	(\$6.4)	(\$0.0)	\$1.3	\$1.1	\$0.3	\$0.0	\$0.9	\$2.2	3,069	1,567	
AP South	Interface	500	(\$9.5)	(\$12.0)	(\$0.0)	\$2.5	\$0.4	\$0.8	(\$0.0)	(\$0.4)	\$2.1	3,572	997	
Bedington - Black Oak	Interface	500	(\$2.9)	(\$4.2)	(\$0.0)	\$1.3	\$0.1	\$0.3	(\$0.0)	(\$0.3)	\$1.0	1,384	279	
West	Interface	500	(\$2.5)	(\$3.9)	\$0.0	\$1.4	\$0.2	\$0.6	(\$0.0)	(\$0.5)	\$0.9	1,690	385	
Mount Storm - Pruntytown	Line	AP	(\$5.2)	(\$4.7)	\$0.0	(\$0.5)	\$0.1	\$0.4	(\$0.0)	(\$0.3)	(\$0.8)	2,559	722	
5004/5005 Interface	Interface	500	(\$0.9)	(\$1.6)	\$0.0	\$0.7	\$0.1	\$0.1	(\$0.0)	(\$0.0)	\$0.7	736	411	
Axton	Transformer	AEP	(\$0.7)	(\$1.1)	(\$0.0)	\$0.4	\$0.0	\$0.0	\$0.0	\$0.0	\$0.4	425	0	
Central	Interface	500	(\$0.6)	(\$1.0)	\$0.0	\$0.4	\$0.0	\$0.0	\$0.0	\$0.0	\$0.4	726	42	
Conemaugh - Keystone	Line	500	(\$0.0)	(\$0.0)	\$0.0	\$0.0	\$0.3	\$0.0	(\$0.0)	\$0.3	\$0.3	16	41	
Dickerson - Pleasant View	Line	Pepco	(\$0.6)	(\$0.9)	\$0.0	\$0.3	(\$0.0)	\$0.0	\$0.0	(\$0.0)	\$0.3	844	218	
Sammis - Wylie Ridge	Line	AP	(\$1.5)	(\$1.2)	(\$0.0)	(\$0.4)	\$0.8	(\$0.0)	(\$0.2)	\$0.6	\$0.2	1,915	1,239	
Mount Storm	Transformer	AP	(\$1.8)	(\$1.3)	\$0.0	(\$0.4)	(\$0.0)	(\$0.2)	(\$0.0)	\$0.1	(\$0.2)	935	373	
Axton - Jacksons Ferry	Line	AEP	(\$0.1)	(\$0.3)	(\$0.0)	\$0.2	\$0.0	\$0.0	\$0.0	\$0.0	\$0.2	83	0	
Whitpain	Transformer	PECO	(\$0.0)	(\$0.1)	\$0.0	\$0.1	\$0.0	(\$0.0)	(\$0.0)	\$0.1	\$0.2	89	68	

Table 7-47 DAY Control Zone top congestion cost impacts (By facility): Calendar year 2007

Congestion Costs (Millions)														
Constraint	Type	Location	Day Ahead				Balancing				Grand Total	Event Hours		
			Load Payments	Generation Credits	Explicit	Total	Load Payments	Generation Credits	Explicit	Total		Day Ahead	Real Time	
Cloverdale - Lexington	Line	AEP	(\$5.0)	(\$10.9)	\$0.1	\$6.0	(\$0.6)	(\$0.5)	(\$0.0)	(\$0.1)	\$6.0	3,704	1,885	
Kammer	Transformer	500	(\$3.3)	(\$6.1)	(\$0.0)	\$2.8	(\$0.2)	\$0.9	(\$0.0)	(\$1.1)	\$1.7	2,005	947	
Bedington - Black Oak	Interface	500	(\$11.7)	(\$15.2)	(\$0.1)	\$3.3	(\$1.5)	\$0.8	(\$0.0)	(\$2.3)	\$1.0	5,493	1,836	
Central	Interface	500	(\$1.0)	(\$1.9)	\$0.0	\$0.9	(\$0.0)	\$0.0	\$0.0	(\$0.0)	\$0.9	1,334	25	
5004/5005 Interface	Interface	500	(\$2.7)	(\$4.0)	(\$0.0)	\$1.3	(\$0.2)	\$0.2	(\$0.0)	(\$0.4)	\$0.9	1,512	386	
Branchburg - Readington	Line	PSEG	(\$1.8)	(\$2.8)	\$0.0	\$1.0	(\$0.3)	\$0.4	(\$0.0)	(\$0.7)	\$0.3	2,324	721	
Axton	Transformer	AEP	(\$0.3)	(\$0.5)	\$0.0	\$0.2	\$0.0	\$0.0	\$0.0	\$0.0	\$0.2	238	0	
Wylie Ridge	Transformer	AP	(\$2.0)	(\$2.3)	(\$0.0)	\$0.3	(\$0.2)	(\$0.1)	\$0.0	(\$0.1)	\$0.2	1,486	685	
East	Interface	500	(\$0.3)	(\$0.5)	\$0.0	\$0.2	(\$0.0)	\$0.0	\$0.0	(\$0.0)	\$0.2	304	5	
AP South	Interface	500	(\$1.8)	(\$2.3)	(\$0.0)	\$0.5	(\$0.1)	\$0.2	(\$0.0)	(\$0.3)	\$0.2	706	133	
Eureka - Willow Island	Line	AP	(\$0.0)	(\$0.2)	\$0.0	\$0.2	(\$0.0)	\$0.0	(\$0.0)	(\$0.0)	\$0.2	239	34	
Cloverdale	Transformer	AEP	(\$0.3)	(\$0.6)	\$0.0	\$0.4	(\$0.1)	\$0.1	(\$0.0)	(\$0.2)	\$0.2	233	152	
South Mahwah - Waldwick	Line	PSEG	\$0.1	\$0.2	(\$0.0)	(\$0.1)	\$0.1	(\$0.1)	(\$0.0)	\$0.2	\$0.1	304	58	
Amos	Transformer	AEP	(\$0.2)	(\$0.1)	(\$0.0)	(\$0.2)	(\$0.0)	(\$0.0)	\$0.0	\$0.0	(\$0.1)	311	132	
Homer City - Shelocla	Line	PENELEC	\$0.1	\$0.1	(\$0.0)	\$0.0	\$0.1	(\$0.0)	\$0.0	\$0.1	\$0.1	200	99	

DLCO Control Zone

Table 7-48 and Table 7-49 show the constraints with the largest impacts on total congestion cost in the DLCO Control Zone for 2008 and 2007, respectively. In 2008, the AP South constraint was the largest contributor to positive congestion while the Sammis – Wylie Ridge constraint contributed to negative congestion. In 2007, the Bedington – Black Oak and Beaver – Clinton constraints were the largest contributors to positive congestion while the Elrama – Mitchell and Sammis – Wylie Ridge constraints contributed to negative congestion.

Table 7-48 DLCO Control Zone top congestion cost impacts (By facility): Calendar year 2008

Congestion Costs (Millions)													
Constraint	Type	Location	Day Ahead				Balancing				Grand Total	Event Hours	
			Load Payments	Generation Credits	Explicit	Total	Load Payments	Generation Credits	Explicit	Total		Day Ahead	Real Time
AP South	Interface	500	(\$37.3)	(\$53.7)	\$0.7	\$17.1	(\$7.7)	\$2.0	\$0.0	(\$9.7)	\$7.4	3,572	997
Sammis - Wylie Ridge	Line	AP	(\$15.5)	(\$33.8)	(\$0.1)	\$18.2	(\$16.9)	\$7.3	\$0.2	(\$24.0)	(\$5.8)	1,915	1,239
Bedington - Black Oak	Interface	500	(\$13.3)	(\$19.0)	\$0.3	\$6.0	(\$1.2)	\$0.7	\$0.0	(\$1.9)	\$4.1	1,384	279
Krendale - Seneca	Line	AP	(\$5.2)	(\$8.8)	(\$0.0)	\$3.7	(\$0.1)	\$0.0	\$0.0	(\$0.1)	\$3.6	1,389	24
Cloverdale - Lexington	Line	AEP	(\$11.3)	(\$17.8)	\$0.2	\$6.7	(\$2.8)	\$1.0	(\$0.0)	(\$3.9)	\$2.8	3,529	1,739
Cheswick - Universal	Line	DLCO	(\$1.3)	(\$3.7)	\$0.0	\$2.4	\$0.1	\$0.3	(\$0.0)	(\$0.2)	\$2.3	411	158
Beaver - Clinton	Line	DLCO	\$0.8	(\$1.1)	\$0.0	\$1.9	\$0.0	\$0.0	\$0.0	\$0.0	\$1.9	184	0
Mount Storm	Transformer	AP	(\$6.9)	(\$10.1)	(\$0.0)	\$3.2	(\$3.1)	\$1.7	\$0.0	(\$4.8)	(\$1.6)	935	373
Central	Interface	500	(\$2.0)	(\$3.3)	(\$0.0)	\$1.3	(\$0.1)	\$0.0	\$0.0	(\$0.1)	\$1.2	726	42
Cheswick - Evergreen	Line	DLCO	\$0.4	(\$1.3)	\$0.0	\$1.7	(\$0.2)	\$0.4	\$0.0	(\$0.5)	\$1.1	94	130
Crescent	Transformer	DLCO	\$0.0	\$0.0	\$0.0	\$0.0	\$0.7	(\$0.3)	(\$0.0)	\$1.0	\$1.0	0	33
East	Interface	500	(\$1.3)	(\$2.2)	\$0.0	\$0.9	(\$0.0)	\$0.0	\$0.0	(\$0.0)	\$0.9	758	12
Mount Storm - Pruntytown	Line	AP	(\$21.6)	(\$31.3)	\$0.1	\$9.8	(\$5.6)	\$3.3	\$0.0	(\$9.0)	\$0.8	2,559	722
Kammer	Transformer	500	(\$4.7)	(\$6.7)	\$0.0	\$2.0	(\$1.2)	\$0.0	(\$0.0)	(\$1.2)	\$0.8	3,069	1,567
West	Interface	500	(\$10.2)	(\$13.5)	\$0.1	\$3.3	(\$1.6)	\$1.0	\$0.0	(\$2.5)	\$0.8	1,690	385

Table 7-49 DLCO Control Zone top congestion cost impacts (By facility): Calendar year 2007

Congestion Costs (Millions)													
Constraint	Type	Location	Day Ahead				Balancing				Grand Total	Event Hours	
			Load Payments	Generation Credits	Explicit	Total	Load Payments	Generation Credits	Explicit	Total		Day Ahead	Real Time
Bedington - Black Oak	Interface	500	(\$59.8)	(\$83.1)	(\$0.1)	\$23.2	(\$7.4)	\$4.9	\$0.0	(\$12.3)	\$10.9	5,493	1,836
Beaver - Clinton	Line	DLCO	\$1.5	(\$5.3)	\$0.1	\$6.8	\$0.4	(\$0.1)	\$0.0	\$0.5	\$7.3	451	43
Elrama - Mitchell	Line	AP	(\$14.3)	(\$15.0)	(\$0.1)	\$0.6	(\$3.5)	\$3.3	\$0.1	(\$6.7)	(\$6.2)	1,883	784
Carson - Homestead	Line	DLCO	\$2.9	(\$1.7)	\$0.0	\$4.7	(\$0.0)	\$0.0	\$0.0	(\$0.0)	\$4.6	253	2
Cloverdale - Lexington	Line	AEP	(\$6.6)	(\$13.1)	\$0.0	\$6.6	(\$1.9)	\$0.2	(\$0.0)	(\$2.0)	\$4.5	3,704	1,885
Wylie Ridge	Transformer	AP	(\$11.5)	(\$20.0)	(\$0.0)	\$8.6	(\$3.9)	\$0.5	\$0.0	(\$4.4)	\$4.2	1,486	685
5004/5005 Interface	Interface	500	(\$11.5)	(\$16.4)	(\$0.0)	\$4.9	(\$1.0)	\$0.4	\$0.0	(\$1.4)	\$3.5	1,512	386
Branchburg - Readington	Line	PSEG	(\$6.5)	(\$9.8)	(\$0.0)	\$3.3	(\$1.0)	\$0.1	\$0.0	(\$1.0)	\$2.3	2,324	721
Sammis - Wylie Ridge	Line	AP	(\$0.3)	(\$1.0)	\$0.0	\$0.7	(\$2.3)	\$0.6	\$0.0	(\$2.9)	(\$2.2)	90	109
Central	Interface	500	(\$3.8)	(\$5.9)	(\$0.0)	\$2.1	(\$0.0)	\$0.0	\$0.0	(\$0.0)	\$2.1	1,334	25
Cheswick - Evergreen	Line	DLCO	(\$0.4)	(\$2.6)	\$0.0	\$2.3	\$0.1	\$0.2	\$0.0	(\$0.2)	\$2.1	300	102
Brunot Island - Montour	Line	DLCO	\$1.6	(\$0.6)	\$0.0	\$2.2	(\$0.1)	\$0.1	(\$0.0)	(\$0.3)	\$1.9	88	42
Crescent - Neville Tap	Line	DLCO	\$0.8	(\$0.9)	\$0.0	\$1.7	(\$0.1)	(\$0.1)	(\$0.0)	\$0.1	\$1.8	100	44
Kammer	Transformer	500	(\$1.0)	(\$3.3)	\$0.0	\$2.3	(\$0.7)	(\$0.1)	(\$0.0)	(\$0.6)	\$1.7	2,005	947
Unclassified	Unclassified	Unclassified	\$1.2	(\$0.3)	\$0.0	\$1.5	\$0.0	\$0.0	\$0.0	\$0.0	\$1.5	NA	NA

Southern Region Congestion-Event Summaries

Dominion Control Zone

Table 7-50 and Table 7-51 show the constraints with the largest impacts on total congestion cost in the Dominion Control Zone for 2008 and 2007, respectively. In 2008, the AP South interface, the Cloverdale – Lexington line and the Bedington – Black Oak interface constraints were the largest contributors to positive congestion while the Mount Storm transformer, the Dickerson – Pleasant View line and the East interface constraints were the largest contributors to negative congestion. In 2007, the Bedington – Black Oak interface, the Cloverdale – Lexington line and the AP South interface constraints had been the largest contributors to positive congestion while the Branchburg – Readington constraint contributed to negative congestion.

Table 7-50 Dominion Control Zone top congestion cost impacts (By facility): Calendar year 2008

Congestion Costs (Millions)														
Constraint	Type	Location	Day Ahead				Balancing				Grand Total	Event Hours		
			Load Payments	Generation Credits	Explicit	Total	Load Payments	Generation Credits	Explicit	Total		Day Ahead	Real Time	
AP South	Interface	500	\$82.8	(\$94.7)	\$4.6	\$182.2	\$6.3	\$7.8	(\$3.6)	(\$5.1)	\$177.1	3,572	997	
Cloverdale - Lexington	Line	AEP	\$111.7	\$45.7	\$11.5	\$77.5	(\$0.4)	(\$8.5)	(\$10.3)	(\$2.1)	\$75.3	3,529	1,739	
Bedington - Black Oak	Interface	500	\$34.0	\$18.4	\$1.9	\$17.5	\$0.3	(\$1.0)	(\$0.8)	\$0.6	\$18.1	1,384	279	
Mount Storm	Transformer	AP	\$21.4	\$8.6	\$3.9	\$16.7	(\$8.8)	\$16.4	(\$4.4)	(\$29.6)	(\$12.9)	935	373	
Aqueduct - Doubs	Line	AP	\$9.3	(\$2.8)	\$0.2	\$12.3	\$0.0	(\$0.0)	(\$0.0)	\$0.0	\$12.3	307	7	
Bristers - Ox	Line	Dominion	(\$1.2)	(\$12.4)	(\$0.6)	\$10.7	\$0.8	\$1.1	\$0.4	\$0.1	\$10.8	77	34	
Dickerson - Pleasant View	Line	Pepco	(\$12.6)	(\$4.6)	(\$0.3)	(\$8.2)	(\$0.2)	\$0.9	\$0.3	(\$0.7)	(\$8.9)	844	218	
Mount Storm - Pruntytown	Line	AP	\$60.1	\$62.2	\$6.9	\$4.8	(\$4.3)	(\$14.8)	(\$6.7)	\$3.9	\$8.7	2,559	722	
Meadow Brook	Transformer	AP	(\$0.7)	(\$6.8)	(\$0.1)	\$6.1	(\$0.1)	\$0.3	\$0.1	(\$0.3)	\$5.8	774	173	
Kammer	Transformer	500	\$16.7	\$14.0	\$1.8	\$4.5	(\$0.1)	(\$3.2)	(\$1.9)	\$1.1	\$5.6	3,069	1,567	
Danville - East Danville	Line	Dominion	\$4.9	\$2.0	\$0.2	\$3.1	(\$0.2)	(\$0.2)	\$0.3	\$0.3	\$3.4	692	141	
East	Interface	500	(\$5.6)	(\$2.7)	(\$0.4)	(\$3.3)	\$0.0	\$0.0	\$0.0	(\$0.0)	(\$3.3)	758	12	
Brighton	Transformer	Pepco	\$3.8	\$1.0	\$0.2	\$3.1	(\$0.2)	(\$0.8)	(\$0.5)	\$0.2	\$3.3	116	78	
Unclassified	Unclassified	Unclassified	\$2.1	(\$0.9)	\$0.2	\$3.3	(\$0.0)	(\$0.0)	(\$0.0)	(\$0.0)	\$3.3	NA	NA	
Pleasantville - Ashburn	Line	Dominion	\$3.2	\$0.2	\$0.0	\$3.1	\$0.0	\$0.0	\$0.0	\$0.0	\$3.1	10	0	

Table 7-51 Dominion Control Zone top congestion cost impacts (By facility): Calendar year 2007

Congestion Costs (Millions)														
Constraint	Type	Location	Day Ahead				Balancing				Grand Total	Event Hours		
			Load Payments	Generation Credits	Explicit	Total	Load Payments	Generation Credits	Explicit	Total		Day Ahead	Real Time	
Bedington - Black Oak	Interface	500	\$499.0	\$414.5	\$11.1	\$95.6	\$0.7	(\$10.7)	(\$8.0)	\$3.4	\$99.0	5,493	1,836	
Cloverdale - Lexington	Line	AEP	\$217.3	\$134.9	\$10.9	\$93.3	\$5.1	\$4.6	(\$7.3)	(\$6.8)	\$86.5	3,704	1,885	
AP South	Interface	500	\$37.3	\$2.4	\$0.4	\$35.2	\$1.5	(\$0.4)	\$0.4	\$2.3	\$37.5	706	133	
Meadow Brook	Transformer	AP	(\$5.1)	(\$14.4)	(\$0.2)	\$9.0	\$0.1	(\$0.1)	\$0.0	\$0.2	\$9.2	868	233	
Kammer	Transformer	500	\$39.7	\$34.4	\$1.6	\$6.8	\$0.2	(\$1.3)	(\$1.2)	\$0.3	\$7.1	2,005	947	
Bedington	Transformer	AP	\$19.1	\$13.3	\$0.5	\$6.3	(\$0.1)	(\$1.1)	(\$0.4)	\$0.6	\$6.9	928	429	
Branchburg - Readington	Line	PSEG	(\$58.4)	(\$52.1)	(\$0.3)	(\$6.5)	\$1.4	\$2.1	\$0.6	(\$0.0)	(\$6.6)	2,324	721	
5004/5005 Interface	Interface	500	(\$13.6)	(\$18.7)	\$0.4	\$5.4	\$0.2	\$0.4	\$0.2	\$0.1	\$5.5	1,512	386	
Central	Interface	500	(\$28.0)	(\$23.8)	(\$0.2)	(\$4.4)	(\$0.0)	\$0.0	\$0.0	(\$0.0)	(\$4.4)	1,334	25	
Cloverdale	Transformer	AEP	\$9.8	\$6.3	\$0.4	\$3.9	\$0.6	(\$0.2)	(\$0.4)	\$0.4	\$4.3	233	152	
Wylie Ridge	Transformer	AP	\$14.4	\$11.0	\$0.8	\$4.3	(\$0.1)	(\$0.3)	(\$0.3)	(\$0.1)	\$4.2	1,486	685	
Halifax - Clover	Line	Dominion	(\$0.2)	(\$4.2)	(\$0.0)	\$4.0	\$0.0	\$0.0	\$0.0	\$0.0	\$4.0	130	5	
Ox	Transformer	Dominion	\$2.2	(\$1.9)	(\$0.0)	\$4.1	\$0.6	\$0.7	\$0.0	(\$0.1)	\$4.0	39	43	
Aqueduct - Doubs	Line	AP	\$4.4	\$1.1	\$0.1	\$3.4	\$0.1	(\$0.1)	(\$0.0)	\$0.1	\$3.5	262	21	
Doubs	Transformer	AP	\$2.0	(\$1.3)	(\$0.0)	\$3.3	\$0.2	\$0.2	\$0.0	\$0.0	\$3.3	135	99	

Economic Planning Process

Transmission system investments can be evaluated on a reliability basis or on an economic basis. The reliability evaluation examines whether a transmission upgrade is required in order to maintain reliability on the system in a particular area or areas, using specific planning and reliability criteria.¹⁹ The economic evaluation examines whether a transmission upgrade, including reliability upgrades, results in positive economic benefits. The economic evaluation is more complex than a reliability evaluation because there is more judgment involved in the choice of relevant metrics for both benefits and costs. PJM's responsibility as an RTO requires PJM to constantly evaluate the need for transmission investments related to reliability and to help ensure that the responsible transmission owner constructs needed facilities. As the operator and designer of markets, PJM also needs to consider the appropriate role for the economic evaluation of transmission system investments. Investments in transmission are currently compensated under the FERC's traditional cost of service regulatory approach. Although PJM's Tariff permits merchant projects, the significant merchant transmission projects have been direct current (DC) tie lines to export power rather than investments in network facilities. As a general matter, transmission investments have not been fully incorporated into competitive markets. The construction of new transmission facilities can have significant impacts on energy and capacity markets, but there is no market mechanism in place that would require competition between transmission and generation to meet loads in an area. While the RPM construct does provide that qualifying transmission upgrades may be submitted as offers, there have been no such offers. More generally, network transmission is not built based directly on market signals because the owners of network transmission are compensated through a non-market mechanism. Although the PJM Tariff does not yet comprehensively address the issue of competition between transmission and generation projects to solve congestion problems, PJM has taken a first step towards integrating transmission investments into the market through the use of economic evaluation metrics. Economic evaluation metrics can be used to determine whether there are positive economic benefits associated with an investment in transmission that might warrant the investment even when it is not required for reliability.

PJM has made multiple filings in a proceeding still pending before the Commission that seeks to implement economic metrics for evaluating transmission investments in its Tariff. On September 8, 2006, PJM filed to modify its Regional Transmission Expansion Plan ("RTEP") protocol.²⁰ PJM proposed to replace its economic planning process with processes that would evaluate the economic benefits of accelerating or modifying planned reliability-based upgrades or of constructing new enhancements or expansions to relieve costly congestion. In its initial order, the FERC conditionally accepted PJM's proposed changes to the economic transmission planning process component of the RTEP, including the requisite amendments to Schedule 6 of the OA and the PJM OATT. The Commission also directed PJM to make a compliance filing that would: (i) explain how PJM considers and weighs the various metrics used to evaluate whether to recommend including an upgrade in the RTEP for economic reasons; (ii) clarify the role of demand response, generation and merchant transmission in the process; and (iii) provide additional information regarding the advanced technologies currently assessed.²¹

¹⁹ See PJM OA Schedule 6.

²⁰ PJM Initial Filing, Docket No. ER06-1474-000.

²¹ 117 FERC ¶ 61, 218 (2006).

On March 21, 2007, PJM submitted its first compliance filing, providing further explanation of its metrics.²² By order issued June 11, 2007, the Commission determined that PJM's proposal was still inadequate and directed PJM to file a formulaic approach to choosing economic projects proposed to reduce congestion that describes exactly how any metrics will be calculated, weighed, considered and combined.²³

On October 9, 2007, PJM submitted its second compliance filing to address these issues, proposing a formulaic approach modeled on one developed by the Midwest ISO.²⁴ By order issued April 17, 2008, the FERC largely accepted PJM's proposed formulaic approach, but it required that PJM revise its proposal to (i) calculate load payments net of the change in the value of transmission rights, (ii) include more specific descriptions of the method of determining the discount rate and recovery period, and (iii) either reinstate provisions for sensitivity analyses or explain why such analyses are unnecessary.²⁵ PJM's third compliance filing, submitted June 16, 2008,²⁶ addressed each of the three issues identified by the Commission in its 2006 order. In addressing the third item, PJM filed a new approach to perform sensitivity analyses. The new approach provides that PJM will perform a sensitivity analysis for projects included in the RTEP on the basis of certain objective criteria, including, but not limited to, the discount rate used to determine the present value of the Total Annual Enhancement Benefit and Total Enhancement Cost, and the annual revenue requirement, including the recovery period, used to determine the Total Enhancement Cost. Such analyses will consider key inputs used in market simulations performed by PJM (such as price forecasts and expected levels of demand response) in order to determine a "Benefit/Cost Ratio." PJM proposes to provide these results to the Transmission Expansion Advisory Committee (TEAC) in order to assist its evaluation. On February 20, 2009, the FERC issued an order accepting PJM's third compliance filing and denying requests for rehearing of its second order on compliance.²⁷

The economic planning process creates market based signals for transmission investment and incorporates improvements over the prior process. The most significant improvements are the inclusion of less discretionary metrics and the evaluation of demand side response and generation resources as alternatives to transmission investment. New transmission projects, and the limits of the existing transmission system, can and do have significant impacts on PJM energy and capacity markets. The goal of transmission planning should ultimately be the incorporation of transmission investment decisions into market driven processes as much as possible.

²² PJM submitted its first compliance filing in Subdocket No. ER06-1474-003.

²³ 119 FERC ¶ 61,265.

²⁴ PJM submitted its second compliance filing in Subdocket No. ER06-1474-004.

²⁵ 123 FERC ¶ 61,051.

²⁶ PJM submitted its third compliance filing in Subdocket No. ER06-1474-006.

²⁷ 126 FERC ¶ 61,152.