

TABLE OF CONTENTS

PREFACE	I	Market Structure	14
SECTION 1 - INTRODUCTION	1	Market Performance: Load and Locational Marginal Price	15
<i>PJM Market Background</i>	<i>1</i>	Demand-Side Response	15
<i>Conclusions</i>	<i>1</i>	Conclusion	16
<i>Role of MMU</i>	<i>4</i>	<i>Market Structure</i>	<i>17</i>
Reporting	5	Supply	17
Monitoring	5	Market Concentration	18
Market Design	6	Local Market Structure and Offer Capping	19
<i>Recommendations</i>	<i>6</i>	Local Market Structure	20
<i>Highlights</i>	<i>6</i>	Frequently Mitigated Unit and Associated Unit Adders	21
Section 2, Energy Market, Part 1	6	<i>Market Performance: Load and LMP</i>	<i>22</i>
Section 3, Energy Market, Part 2	7	Load	22
Section 4, Interchange Transactions	8	Locational Marginal Price (LMP)	28
Section 5, Capacity Markets	8	Load and Spot Market	51
Section 6, Ancillary Services	9	<i>Demand-Side Response (DSR)</i>	<i>53</i>
Section 7, Congestion	10	PJM Load Response Programs Overview	53
Section 8, Financial Transmission Rights and Auction Revenue Rights	10	SECTION 3 - ENERGY MARKET, PART 2	61
<i>Total Price of Wholesale Power</i>	<i>11</i>	<i>Highlights</i>	<i>61</i>
Components of Total Price	11	<i>Recommendations</i>	<i>61</i>
SECTION 2 – ENERGY MARKET, PART 1	13	<i>Overview</i>	<i>62</i>
<i>Highlights</i>	<i>13</i>	Existing and Planned Generation	62
<i>Recommendations</i>	<i>14</i>	Environmental Impact and Renewables	62
<i>Overview</i>	<i>14</i>	Credits and Charges for Operating Reserve	62
		Conclusion	63



<i>Existing and Planned Generation</i>	64	<i>Interactions with Bordering Areas</i>	105
Installed Capacity and Fuel Mix	64	PJM Interface Pricing with Organized Markets	105
Energy Production by Fuel Source	64	Operating Agreements with Bordering Areas	109
Planned Generation Additions	65	Other Agreements/Protocols with Bordering Areas	109
<i>Environmental Impact and Renewables</i>	69	<i>Interchange Transaction Issues</i>	109
Characteristics of Wind Units	69	Loop Flows	109
Environmental Regulatory Impacts	72	TLR's	111
Renewable Portfolio Standards	73	Up-To Congestion	111
<i>Operating Reserve</i>	77	Interface Pricing Agreements with Individual Balancing Authorities	113
Credit and Charge Results	77	Willing to Pay Congestion and Not Willing to Pay Congestion	116
Characteristics of Credits and Charges	81	Spot Import	116
Impacts of Revised Operating Reserve Rules	82	SECTION 5 – CAPACITY MARKET	117
Impact on Decrement Bids and Incremental Offers	84	<i>Highlights</i>	117
Issues in Operating Reserves	86	<i>Recommendations</i>	118
Parameter Limited Schedules	90	<i>Overview</i>	118
SECTION 4 - INTERCHANGE TRANSACTIONS	91	RPM Capacity Market	118
<i>Highlights</i>	91	Generator Performance	119
<i>Recommendations</i>	91	Conclusion	120
<i>Overview</i>	91	<i>RPM Capacity Market</i>	121
Interchange Transaction Activity	91	Market Structure	121
Interactions with Bordering Areas	92	Market Performance	125
Conclusion	98	<i>Generator Performance</i>	130
<i>Interchange Transaction Activity</i>	99	Generator Performance Factors	130
Aggregate Imports and Exports	99	Generator Forced Outage Rates	131
Interface Imports and Exports	101		
<i>Interface Pricing</i>	104		

SECTION 6 - ANCILLARY SERVICE MARKETS 137

Highlights 138

Recommendations 139

Overview 139

 Regulation Market 139

 Synchronized Reserve Market 140

 DASR 142

 Black Start Service 143

 Ancillary Services costs per MW of load: 2001 - 2011 143

 Conclusion 144

Regulation Market 144

 Market Structure 144

 Market Conduct 146

 Market Performance 146

 Analysis of Regulation Market Changes 148

Synchronized Reserve Market 150

 Market Structure 150

 Market Conduct 151

 Market Performance 153

Day Ahead Scheduling Reserve (DASR) 155

 Market Performance 155

Black Start Service 156

SECTION 7 – CONGESTION 157

Highlights 157

Recommendations 157

Overview 158

Congestion Cost 158

Congestion Component of LMP and Facility or Zonal Congestion 158

Key Backbone Facilities 159

Conclusion 159

Congestion 160

 Total Calendar Year Congestion 160

 Monthly Congestion 161

 Congestion Component of LMP 161

Congested Facilities 162

 Congestion by Facility Type and Voltage 162

 Constraint Duration 165

 Constraint Costs 167

 Congestion-Event Summary for MISO Flowgates 170

 Congestion-Event Summary for the 500 kV System 172

Zonal Congestion 174

 Summary 174

 Details of Regional and Zonal Congestion 176

SECTION 8 – FINANCIAL TRANSMISSION AND AUCTION REVENUE RIGHTS 211

Highlights 211

Recommendations 212

Overview 212

 Financial Transmission Rights 212

 Auction Revenue Rights 214

 Conclusion 215

Financial Transmission Rights 216



TABLE OF CONTENTS

2011 Quarterly State of the Market Report for PJM: January through June

Market Structure	216	<i>ARR and FTR Revenue and Congestion</i>	233
Market Performance	217	FTR Prices and Zonal Price Differences	233
<i>Auction Revenue Rights</i>	230	Effectiveness of ARRs as a Hedge against Congestion	234
Market Structure	230	Effectiveness of ARRs and FTRs as a Hedge against Congestion . . .	235
Market Performance	232	ARRs and FTRs as a Hedge against Total Real Time Energy Charges .	236

TABLES

SECTION 1 - INTRODUCTION 1

Table 1-1 The Energy Market results were competitive	2
Table 1-2 The Capacity Market results were competitive	3
Table 1-3 The Regulation Market results were not competitive	3
Table 1-4 The Synchronized Reserve Markets results were competitive	4
Table 1-5 The Day-Ahead Scheduling Reserve Market results were competitive ...	4
Table 1-6 The FTR Auction Markets results were competitive	4
Table 1-7 Total price per MWh by category and total revenues by category: January through March of 2010 and 2011 (See 2010 SOM, Table 1-7)	12

SECTION 2 – ENERGY MARKET, PART 1 13

Table 2-1 The Energy Market results were competitive	13
Table 2-2 Frequency distribution of unit offer prices: April through June 2011 (See 2010 SOM, Table 2-3)	17
Table 2-3 Actual PJM footprint peak loads: April through June of 2003 to 2011 (See 2010 SOM, Table 2-4)	18
Table 2-4 PJM hourly Energy Market HHI: January through June 2011 (See 2010 SOM, Table 2-5)	18
Table 2-5 PJM hourly Energy Market HHI (By segment): January through June 2011 (See 2010 SOM, Table 2-6)	19
Table 2-6 Annual offer-capping statistics: Calendar years 2007 through June 2011 (See 2010 SOM, Table 2-7)	19
Table 2-7 Real-time offer-capped unit statistics: January through June 2011 (See 2010 SOM, Table 2-8)	19
Table 2-8 Three pivotal supplier results summary for regional constraints: January through June 2011 (See 2010 SOM, Table 2-9)	20
Table 2-9 Three pivotal supplier test details for regional constraints: January through June 2011 (See 2010 SOM, Table 2-10)	20
Table 2-10 Summary of three pivotal supplier tests applied to uncommitted units for regional constraints: January through June 2011 (See 2010 SOM, Table 2-11)	21
Table 2-11 Frequently mitigated units and associated units (By month): January through June 2011 (See 2010 SOM, Table 2-26)	21
Table 2-12 Frequently mitigated units and associated units total months eligible: January through June 2011 (See 2010 SOM, Table 2-27)	22
Table 2-13 PJM real-time average hourly load: January through June 1998 through 2011 (See 2010 SOM, Table 2-28)	23
Table 2-14 PJM annual Summer THI, Winter WWP and average temperature (Degrees F): cooling, heating and shoulder months of 2007 through June 2011 (See 2010 SOM, Table 2-30)	24
Table 2-15 PJM day-ahead average load: January through June 2000 through 2011 (See 2010 SOM, Table 2-31)	25
Table 2-16 Cleared day-ahead and real-time load (MWh): January through June 2011 (See 2010 SOM, Table 2-32)	26

Table 2-17 Day-ahead and real-time generation (MWh): January through June 2011 (See 2010 SOM, Table 2-33)	27
Table 2-18 PJM real-time, simple average LMP (Dollars per MWh): January through June 1998 through 2011 (See 2010 SOM, Table 2-34)	29
Table 2-19 Zonal real-time, simple average LMP (Dollars per MWh): January through June 2010 and 2011 (See 2010 SOM, Table 2-35)	30
Table 2-20 Jurisdiction real-time, simple average LMP (Dollars per MWh): January through June 2010 and 2011 (See 2010 SOM, Table 2-36)	30
Table 2-21 Hub real-time, simple average LMP (Dollars per MWh): January through June 2010 and 2011 (See 2010 SOM, Table 2-37)	31
Table 2-22 PJM real-time, annual, load-weighted, average LMP (Dollars per MWh): January through June 1998 through 2011 (See 2010 SOM, Table 2-38)	31
Table 2-23 Zonal real-time, annual, load-weighted, average LMP (Dollars per MWh): January through June 2010 and 2011 (See 2010 SOM, Table 2-39)	32
Table 2-24 Jurisdiction real-time, annual, load-weighted, average LMP (Dollars per MWh): January through June 2010 and 2011 (See 2010 SOM, Table 2-40)	33
Table 2-25 PJM day-ahead, simple average LMP (Dollars per MWh): January through June 2000 through 2011 (See 2010 SOM, Table 2-43)	34
Table 2-26 Zonal day-ahead, simple average LMP (Dollars per MWh): January through June 2010 and 2011 (See 2010 SOM, Table 2-44)	35
Table 2-27 Jurisdiction day-ahead, simple average LMP (Dollars per MWh): January through June 2010 and 2011 (See 2010 SOM, Table 2-45) ...	35
Table 2-28 PJM day-ahead, load-weighted, average LMP (Dollars per MWh): January through June 2000 through 2011 (See 2010 SOM, Table 2-46)	36
Table 2-29 Zonal day-ahead, load-weighted, average LMP (Dollars per MWh): January through June 2010 and 2011 (See 2010 SOM, Table 2-47)	37
Table 2-30 Jurisdiction day-ahead, load weighted LMP (Dollars per MWh): January through June 2010 and 2011 (See 2010 SOM, Table 2-48)	37
Table 2-31 PJM real-time, simple average LMP components (Dollars per MWh): January through June 2008 to 2011 (See 2010 SOM, Table 2-50)	37
Table 2-32 Zonal real-time, simple average LMP components (Dollars per MWh): January through June 2010 and 2011 (See 2010 SOM, Table 2-51)	38
Table 2-33 Hub real-time, simple average LMP components (Dollars per MWh): January through June 2010 and 2011 (See 2010 SOM, Table 2-52)	39
Table 2-34 Zonal and PJM real-time, annual, load-weighted, average LMP components (Dollars per MWh): January through June 2010 and 2011 (See 2010 SOM, Table 2-53)	40



Table 2-35 PJM day-ahead, simple average LMP components (Dollars per MWh): January through June 2008 to 2011 (See 2010 SOM, Table 2-54). 40

Table 2-36 Zonal day-ahead, simple average LMP components (Dollars per MWh): January through June 2010 and 2011 (See 2010 SOM, Table 2-55). 41

Table 2-37 Zonal and PJM day-ahead, load-weighted, average LMP components (Dollars per MWh): January through June 2010 and 2011 (See 2010 SOM, Table 2-56). 42

Table 2-38 Marginal loss costs and loss credits: January through June 2008 to 2011 (See 2010 SOM, Table 2-57) 43

Table 2-39 Marginal loss costs by type (Dollars (Millions)): January through June 2011 (See 2010 SOM, Table 2-58). 43

Table 2-40 Marginal loss costs by control zone and type (Dollars (Millions)): January through June 2011 (See 2010 SOM, Table 2-59) 44

Table 2-41 Monthly marginal loss costs by control zone (Dollars (Millions)): January through June 2011 (See 2010 SOM, Table 2-60) 45

Table 2-42 Monthly volume of cleared and submitted INCs, DECs: January through June 2011 (See 2010 SOM, Table 2-61) 46

Table 2-43 PJM virtual bids by type of bid parent organization (MW): January through June 2011 (See 2010 SOM, Table 2-63) 46

Table 2-44 PJM virtual offers and bids by top ten aggregates (MW): January through June 2011 (See 2010 SOM, Table 2-64). 46

Table 2-45 Day-ahead and real-time simple annual average LMP (Dollars per MWh): January through June 2011 (See 2010 SOM, Table 2-65) 47

Table 2-46 Day-ahead and real-time simple annual average LMP (Dollars per MWh): January through June 2000 through 2011 (See 2010 SOM, Table 2-66). 47

Table 2-47 Frequency distribution by hours of PJM real-time and day-ahead load-weighted hourly LMP difference (Dollars per MWh): Calendar years 2007 through June 2011 (See 2010 SOM, Table 2-67). 48

Table 2-48 Zonal day-ahead and real-time simple annual average LMP (Dollars per MWh): January through June 2011 (See 2010 SOM, Table 2-68). 49

Table 2-49 Jurisdiction day-ahead and real-time simple annual average LMP (Dollars per MWh): January through June 2011 (See 2010 SOM, Table 2-69). 50

Table 2-50 Monthly average percentage of real-time self-supply load, bilateral-supply load and spot-supply load based on parent companies: Calendar years 2010 through June 2011 (See 2010 SOM, Table 2-70) 51

Table 2-51 Monthly average percentage of day-ahead self-supply load, bilateral supply load, and spot-supply load based on parent companies: Calendar years 2010 through June 2011 (See 2010 SOM, Table 2-71) 52

Table 2-52 Overview of Demand Side Programs (See 2010 SOM, Table 2-72) 53

Table 2-53 Economic Program registration on peak load days: Calendar years 2002 to 2010 and January through June 2011 (See 2010 SOM, Table 2-73). 54

Table 2-54 Economic Program registrations on the last day of the month: January 2008 through June 2011 (See 2010 SOM, Table 2-74) 54

Table 2-55 Distinct registrations and sites in the Economic Program: June 8, 2011 (See 2010 SOM, Table 2-75) 55

Table 2-56 PJM Economic Program participation by zone: January through June 2010 and 2011 (See 2010 SOM, Table 2-78) 56

Table 2-57 Settlement days submitted by month in the Economic Program: Calendar years 2007 through 2010 and January through June 2011 (See 2010 SOM, Table 2-79) 56

Table 2-58 Distinct customers and CSPs submitting settlements in the Economic Program by month: Calendar years 2008 through 2010 and January through June 2011 (See 2010 SOM, Table 2-80) 57

Table 2-59 Hourly frequency distribution of Economic Program MWh reductions and credits: January through June 2011 (See 2010 SOM, Table 2-81). 58

Table 2-60 Frequency distribution of Economic Program zonal, load-weighted, average LMP (By hours): January through June 2011 (See 2010 SOM, Table 2-82) 59

Table 2-61 Zonal monthly capacity credits: January through June 2011 (See 2010 SOM, Table 2-85) 60

SECTION 3 - ENERGY MARKET, PART 2 61

Table 3-1 PJM installed capacity (By fuel source): January 1, May 31, June 1, and June 30, 2011 (See 2010 SOM, Table 3-42). 64

Table 3-2 PJM generation (By fuel source (GWh)): January through June 2010 and 2011 (See 2010 SOM, Table 3-43) 64

Table 3-3 PJM capacity factor (By unit type (GWh)); January through June 2010 and 2011 (New table) 65

Table 3-4 Year-to-year capacity additions from PJM generation queue: Calendar years 2000 through June 30, 2011 (See 2010 SOM, Table 3-44) 65

Table 3-5 Queue comparison (MW): June 30, 2011 vs. December 31, 2010 (See 2010 SOM, Table 3-44). 65

Table 3-6 Capacity in PJM queues (MW): At June 30, 2011: (See 2010 SOM, Table 3-46). 66

Table 3-7 Average project queue times (days): At June 30, 2011 (See 2010 SOM, Table 3-47) 66

Table 3-8 Capacity additions in active or under-construction queues by control zone (MW): At June 30, 2011 (See 2010 SOM, Table 3-48) 66

Table 3-9 Capacity additions in active or under-construction queues by LDA (MW): At June 30, 2011 (See 2010 SOM, Table 3-49) 67

Table 3-10 Existing PJM capacity: At June 30, 2011 (By zone and unit type (MW)) (See 2010 SOM, Table 3-50) 67

Table 3-11 PJM capacity (MW) by age: at June 30, 2011 (See 2010 SOM, Table 3-51). 68

Table 3-12 Comparison of generators 40 years and older with slated capacity additions (MW): Through 2018 (See 2010 SOM, Table 3-52). 68

Table 3-13 Capacity factor of wind units in PJM, January through June 2011 (See 2010 SOM, Table 3-53) 69

Table 3-14 Wind resources in real time offering at a negative price in PJM, January through June 2011 (See 2010 SOM, Table 3-54) 70

Table 3-15 Capacity factor of wind units in PJM by month, 2010 and 2011 (See 2010 SOM, Table 3-55)	70	Table 3-38 Economic vs. noneconomic hours: January through June 2011 (See SOM 2010, Table 3-82)	82
Table 3-16 Peak and off-peak seasonal capacity factor, average wind generation (MWh), and PJM load (MWh): January through June 2011 (See 2010 SOM, Table 3-56)	70	Table 3-39 Regional balancing operating reserve credits: January through June 2011 (See SOM 2010, Table 3-86)	82
Table 3-17 RGGI CO ₂ allowance auction prices and quantities: 2009-2011 Compliance Period (See 2010 SOM, Table 3-57)	72	Table 3-40 Total deviations: January through June 2011 (See SOM 2010, Table 3-87)	82
Table 3-18 SO ₂ emission controls (FGD) by unit type (MW), as of June 30, 2011 (See 2010 SOM, Table 3-58)	72	Table 3-41 Charge allocation under old operating reserve construct: January through June 2011 (See SOM 2010, Table 3-88)	82
Table 3-19 NO _x emission controls by unit type (MW), as of June 30, 2011 (See 2010 SOM, Table 3-59)	72	Table 3-42 Actual regional credits, charges, rates and charge allocation (MWh): January through June 2011 (See SOM 2010, Table 3-89)	83
Table 3-20 Particulate emission controls by unit type (MW), as of June 30, 2011 (See 2010 SOM, Table 3-60)	72	Table 3-43 Difference in total operating reserve charges between old rules and new rules: January through June 2011 (See SOM 2010, Table 3-90)	83
Table 3-21 Renewable standards of PJM jurisdictions to 2021 (See 2010 SOM, Table 3-61)	73	Table 3-44 Total virtual bids and amount of virtual bids paying balancing operating charges (MWh): Calendar years, 2010 and 2011 (See SOM 2010, Table 3-91)	84
Table 3-22 Solar renewable standards of PJM jurisdictions to 2021 (See 2010 SOM, Table 3-62)	73	Table 3-45 Comparison of balancing operating reserve charges to virtual bids: Calendar years, 2010 and 2011 (See SOM 2010, Table 3-92)	85
Table 3-23 Additional renewable standards of PJM jurisdictions to 2021 (See 2010 SOM, Table 3-63)	74	Table 3-46 Summary of impact on virtual bids under balancing operating reserve allocation: January through June, 2010 and 2011 (See SOM 2010, Table 3-93)	85
Table 3-24 Renewable alternative compliance payments in PJM jurisdictions: 2011 (See 2010 SOM, Table 3-64)	74	Table 3-47 Impact of segmented make whole payments: Calendar years, 2010 and 2011 (See SOM 2010, Table 3-94)	85
Table 3-25 Renewable generation by jurisdiction and renewable resource type (GWh): January through June 2011 (See 2010 SOM, Table 3-65)	75	Table 3-48 Share of balancing operating reserve increases for segmented make whole payments (By unit type): January through June 2011 (See SOM 2010, Table 3-96)	86
Table 3-26 PJM renewable capacity by jurisdiction (MW), on June 30, 2011 (See 2010 SOM, Table 3-66)	75	Table 3-49 Units receiving credits from a parameter limited schedule: January through June 2011 (See SOM 2010, Table 3-98)	86
Table 3-27 Renewable capacity by jurisdiction, non-PJM units registered in GATS (MW), on June 30, 2011 (See 2010 SOM, Table 3-67)	76	Table 3-50 Unit operating reserve credits (By zone): January through June 2011 (See SOM 2010, Table 3-100)	86
Table 3-28 Monthly operating reserve charges: Calendar years 2010 and 2011 (See SOM 2010, Table 3-72)	77	Table 3-51 Top 10 units and organizations receiving total operating reserve credits: January through June 2011 (See SOM 2010, Table 3-101)	87
Table 3-29 Regional balancing operating reserve charges allocation: January through June 2011 (See SOM 2010, Table 3-73)	78	Table 3-52 Top 10 units and organizations receiving day-ahead generator credits: January through June 2011 (See SOM 2010, Table 3-102)	87
Table 3-30 Monthly balancing operating reserve deviations (MWh): Calendar years 2010 and 2011 (See SOM 2010, Table 3-74)	78	Table 3-53 Top 10 units and organizations receiving synchronous condensing credits: January through June 2011 (See SOM 2010, Table 3-103)	88
Table 3-31 Regional operating reserve charges determinants (MWh): January through June 2011 (See SOM 2010, Table 3-75)	79	Table 3-54 Top 10 units and organizations receiving balancing generator credits: January through June 2011 (See SOM 2010, Table 3-104)	88
Table 3-32 Monthly impacts on netting deviations: January through June 2011 (See SOM 2010, Table 3-76)	79	Table 3-55 Top 10 units and organizations receiving lost opportunity cost credits: January through June 2011 (See SOM 2010, Table 3-105)	88
Table 3-33 Summary of impact on netting deviations: January through June 2011 (See SOM 2010, Table 3-77)	79	Table 3-56 Cold notification and cold startup hours (By percentile): Since November 2007 (New table)	89
Table 3-34 Regional balancing operating reserve rates (\$/MWh): January through June 2011 (See SOM 2010, Table 3-78)	80	Table 3-57 Time-To-Start hours (By percentile): Since November 2007 (New table)	90
Table 3-35 Credits by month (By operating reserve market): Calendar year 2011 (See SOM 2010, Table 3-79)	81		
Table 3-36 Operating reserve credits by unit types (By operating reserve market): January through June 2011 (See SOM 2010, Table 3-80)	81		
Table 3-37 Operating reserve credits by operating reserve market (By unit type): January through June 2011 (See SOM 2010, Table 3-81)	82		

SECTION 4 - INTERCHANGE TRANSACTIONS 91

Table 4-1 Real-time scheduled net interchange volume by interface (GWh): January through June 2011 (See 2010 SOM, Table 4-1)	101
Table 4-2 Real-time scheduled gross import volume by interface (GWh): January through June 2011 (See 2010 SOM, Table 4-2)	101
Table 4-3 Real-time scheduled gross export volume by interface (GWh): January through June 2011 (See 2010 SOM, Table 4-3)	102
Table 4-4 Day-ahead net interchange volume by interface (GWh): January through June 2011 (See 2010 SOM, Figure 4-4)	102
Table 4-5 Day-ahead gross import volume by interface (GWh): January through June 2011 (See 2010 SOM, Figure 4-5)	103
Table 4-6 Day-ahead gross export volume by interface (GWh): January through June 2011 (See 2010 SOM, Figure 4-6)	103
Table 4-7 Active interfaces: January through June 2011 (See 2010 SOM, Figure 4-7)	104
Table 4-8 Active pricing points: 2011 (See 2010 SOM, Table 4-8)	105
Table 4-9 Con Edison and PSE&G wheeling settlement data: January through June 2011 (See 2010 SOM, Table 4-9)	109
Table 4-10 Net scheduled and actual PJM interface flows (GWh): January through June 2011 (See 2010 SOM, Table 4-10)	109
Table 4-11 PJM and MISO TLR procedures: Calendar year 2010 and January through June 2011 (See 2010 SOM, Figure 4-16, Figure 4-17 and Figure 4-18)	111
Table 4-12 Number of TLRs by TLR level by reliability coordinator: January through June 2011 (See 2010 SOM, Table 4-11)	111
Table 4-13 Up-to congestion MW by Import, Export and Wheels: January through June 2006 through 2011 (See 2010 SOM, Table 4-12)	112
Table 4-14 Real-time average hourly LMP comparison for southeast, southwest, SouthIMP and SouthEXP Interface pricing points: January through June 2007 through 2011 (See 2010 SOM, Table 4-13)	113
Table 4-15 Real-time average hourly LMP comparison for Duke, PEC and NCMPA: January through June 2011 (See 2010 SOM, Table 4-14)	113
Table 4-16 Day-ahead average hourly LMP comparison for southeast, southwest, SouthIMP and SouthEXP Interface pricing points: January through June 2007 through 2011 (See 2010 SOM, Table 4-15)	115
Table 4-17 Day-ahead average hourly LMP comparison for Duke, PEC and NCMPA: January through June 2011 (See 2010 SOM, Table 4-16)	115
Table 4-18 Monthly uncollected congestion charges: Calendar year 2010 and January through June 2011 (See 2010 SOM, Figure 4-26)	116

SECTION 5 – CAPACITY MARKET 117

Table 5-1 The Capacity Market results were competitive	117
Table 5-2 RPM generation capacity additions: 2007/2008 through 2014/2015 (See 2010 SOM, Table 5-3)	121
Table 5-3 Preliminary market structure screen results: 2011/2012 through 2014/2015 RPM Auctions (See 2010 SOM, Table 5-5)	122

Table 5-4 RSI results: 2011/2012 through 2014/2015 RPM Auctions (See 2010 SOM, Table 5-6)	122
Table 5-5 RPM load management statistics by LDA: June 1, 2010 to June 1, 2014 (See 2010 SOM, Table 5-8)	123
Table 5-6 RPM load management cleared capacity and ILR: 2007/2008 through 2014/2015 (See 2010 SOM, Table 5-9)	124
Table 5-7 RPM load management statistics: June 1, 2007 to June 1, 2014 (See 2010 SOM, Table 5-10)	124
Table 5-8 Capacity prices: 2007/2008 through 2014/2015 RPM Auctions (See 2010 SOM, Table 5-14)	125
Table 5-9 RPM revenue by type: 2007/2008 through 2014/2015 (See 2010 SOM, Table 5-15)	126
Table 5-10 RPM cost to load: 2011/2012 through 2014/2015 (See 2010 SOM, Table 5-16)	127
Table 5-11 RTO offer statistics: 2014/2015 RPM Base Residual Auction (See 2010 SOM, Table 5-19)	128
Table 5-12 PJM EFORd data: January through June 2007 to 2011 (See 2010 SOM, Table 5-20)	131
Table 5-13 Contribution to EFORd for specific unit types (Percentage points): January through June 2007 to 2011 (See 2010 SOM, Figure 5-21)	132
Table 5-14 Contribution to EFOF by unit type by cause: January through June 2011 (See 2010 SOM, Table 5-22)	133
Table 5-15 Contributions to Economic Outages: January through June 2011 (See 2010 SOM, Table 5-23)	134
Table 5-16 Contribution to EFOF by unit type: January through June 2011 (See 2010 SOM, Table 5-24)	134
Table 5-17 OMC Outages: January through June 2011 (See 2010 SOM, Table 5-25)	134
Table 5-18 PJM EFORd vs. XEFORd: January through June 2011 (See 2010 SOM, Table 5-26)	134
Table 5-19 Contribution to EFORp by unit type (Percentage points): January through June 2010 and 2011 (See 2010 SOM, Table 5-27)	134
Table 5-20 PJM EFORp data by unit type: January through June 2010 and 2011 (See 2010 SOM, Table 5-28)	134
Table 5-21 Contribution to PJM EFORd, XEFORd and EFORp by unit type: January through June 2011 (See 2010 SOM, Table 5-29)	135
Table 5-22 PJM EFORd, XEFORd and EFORp data by unit type: January through June 2011 (See 2010 SOM, Table 5-30)	135

SECTION 6 - ANCILLARY SERVICE MARKETS 137

Table 6-1 The Regulation Market results were not competitive	137
Table 6-2 The Synchronized Reserve Markets results were competitive	138
Table 6-3 The Day-Ahead Scheduling Reserve Market results were competitive	138
Table 6-4 Synchronized Reserve Market required MW, RFC zone and Mid-Atlantic subzone, December, 2008 through June 2011 (New table)	141

Table 6-5 History of ancillary services costs per MW of Load: January through June of 2001 through 2011 (See 2010 SOM, Table 6-4)	144	Table 7-3 Monthly PJM congestion charges (Dollars (Millions)): Calendar year 2010 through June 2011 (See 2010 SOM, Table 7-3)	161
Table 6-6 PJM regulation capability, daily offer and hourly eligible: January through June 2011 (See 2010 SOM, Table 6-5)	144	Table 7-4 Annual average congestion component of LMP: January through June 2010 and 2011 (See 2010 SOM, Table 7-4)	161
Table 6-7 PJM Regulation Market required MW and ratio of eligible supply to requirement: January through June 2011 (See 2010 SOM, Table 6-6)	145	Table 7-5 Congestion summary (By facility type): January through June 2011 (See 2010 SOM, Table 7-5)	162
Table 6-8 PJM cleared regulation HHI: January through June 2011 (See 2010 SOM, Table 6-7)	145	Table 7-6 Congestion summary (By facility type): January through June 2010 (See 2011 SOM, Table 7-6)	162
Table 6-9 Highest annual average hourly Regulation Market shares: January through June, 2011 (See 2010 SOM, Table 6-8)	145	Table 7-7 Congestion Event Hours (Day Ahead against Real Time): January through June 2010 and 2011 (See 2010 SOM, Table 7-7)	163
Table 6-10 Regulation market monthly three pivotal supplier results: January through June, 2011 (See 2010 SOM, Table 6-9)	145	Table 7-8 Congestion Event Hours (Real Time against Day Ahead): January through June 2010 and 2011 (See 2010 SOM, Table 7-8)	163
Table 6-11 Regulation sources: spot market, self-scheduled, bilateral purchases: January through June, 2011 (See 2010 SOM, Table 6-10)	146	Table 7-9 Congestion summary (By facility voltage): January through June 2011 (See 2010 SOM, Table 7-9)	164
Table 6-12 Total regulation charges: January through June, 2011 (See 2010 SOM, Table 6-11)	147	Table 7-10 Congestion summary (By facility voltage): January through June 2010 (See 2010 SOM, Table 7-10)	164
Table 6-13 Comparison of load weighted price and cost for PJM Regulation, August 2005 through June 2011 (See 2010 SOM, Table 6-12)	147	Table 7-11 Top 25 constraints with frequent occurrence: January through June 2010 to 2011 (See 2010 SOM, Table 7-11)	165
Table 6-14 Summary of changes to Regulation Market design (See 2010 SOM, Table 6-13)	148	Table 7-12 Top 25 constraints with largest year-to-year change in occurrence: January through June 2010 to 2011 (See 2010 SOM, Table 7-12)	166
Table 6-15 Impact of \$12 adder to cost based regulation offer: December 2008 through June 2011 (See 2010 SOM, Table 6-14)	148	Table 7-13 Top 25 constraints affecting annual PJM congestion costs (By facility): January through June 2011 (See 2010 SOM, Table 7-13)	167
Table 6-16 Additional credits paid to regulating units from no longer netting credits above RMCP against operating reserves: December 2008 through June 2011 (See 2010 SOM, Table 6-15)	150	Table 7-14 Top 25 constraints affecting annual PJM congestion costs (By facility): January through June 2010 (See 2010 SOM, Table 7-14)	168
Table 6-17 Mid-Atlantic Subzone Tier 2 Synchronized Reserve Market cleared market shares: January through June, 2011 (See 2010 SOM, Table 6-16)	151	Table 7-15 Congestion cost by the type of the participant: January through June 2011 (New table)	169
Table 6-18 Average SRMCP when all cleared synchronized reserve is DSR, average SRMCP, and percent of all cleared hours that all cleared synchronized reserve is DSR: January through June 2010 and 2011 (See 2010 SOM, Table 6-17)	152	Table 7-16 Congestion cost by the type of the participant: January through June 2010 (New table)	169
Table 6-19 Comparison of load weighted price and cost for PJM Synchronized Reserve, January through June 2005 through 2011 (See 2010 SOM, Table 6-18)	155	Table 7-17 Top congestion cost impacts from MISO flowgates affecting PJM dispatch (By facility): January through June 2011 (See 2010 SOM, Table 7-15)	170
Table 6-20 PJM, Day-Ahead Scheduling Reserve Market MW and clearing prices: January through June, 2011 (See 2010 SOM, Table 6-20)	155	Table 7-18 Top congestion cost impacts from MISO flowgates affecting PJM dispatch (By facility): January through June 2010 (See 2010 SOM, Table 7-16)	171
Table 6-21 Black start yearly zonal charges for network transmission use: January through June, 2011 (See 2010 SOM, Table 6-21)	156	Table 7-19 Regional constraints summary (By facility): January through June 2011 (See 2010 SOM, Table 7-17)	172
SECTION 7 – CONGESTION	157	Table 7-20 Regional constraints summary (By facility): January through June 2010 (See 2010 SOM, Table 7-18)	173
Table 7-1 Total annual PJM congestion (Dollars (Millions)): Calendar years 2003 through June 2011 (See 2010 SOM, Table 7-1)	160	Table 7-21 Congestion cost summary (By control zone): January through June 2011 (See 2010 SOM, Table 7-19)	174
Table 7-2 Total annual PJM congestion costs by category (Dollars (Millions)): January through June, 2010 and 2011 (See 2010 SOM, Table 7-2)	160	Table 7-22 Congestion cost summary (By control zone): January through June 2010 (See 2010 SOM, Table 7-20)	175
		Table 7-23 AECO Control Zone top congestion cost impacts (By facility): January through June 2011 (See 2010 SOM, Table 7-21)	176
		Table 7-24 AECO Control Zone top congestion cost impacts (By facility): January through June 2010 (See 2010 SOM, Table 7-22)	177



Table 7-25 BGE Control Zone top congestion cost impacts (By facility):
January through June 2011 (See 2010 SOM, Table 7-23) 178

Table 7-26 BGE Control Zone top congestion cost impacts (By facility):
January through June 2010 (See 2010 SOM, Table 7-24). 179

Table 7-27 DPL Control Zone top congestion cost impacts (By facility):
January through June 2011 (See 2010 SOM, Table 7-25). 180

Table 7-28 DPL Control Zone top congestion cost impacts (By facility):
January through June 2010 (See 2010 SOM, Table 7-26). 181

Table 7-29 JCPL Control Zone top congestion cost impacts (By facility):
January through June 2011 (See 2010 SOM, Table 7-27) 182

Table 7-30 JCPL Control Zone top congestion cost impacts (By facility):
January through June 2010 (See 2010 SOM, Table 7-28) 183

Table 7-31 Met-Ed Control Zone top congestion cost impacts (By facility):
January through June 2011 (See 2010 SOM, Table 7-29) 184

Table 7-32 Met-Ed Control Zone top congestion cost impacts (By facility):
January through June 2010 (See 2010 SOM, Table 7-30) 185

Table 7-33 PECO Control Zone top congestion cost impacts (By facility):
January through June 2011 (See 2010 SOM, Table 7-31) 186

Table 7-34 PECO Control Zone top congestion cost impacts (By facility):
January through June 2010 (See 2010 SOM, Table 7-32) 187

Table 7-35 PENELEC Control Zone top congestion cost impacts (By facility):
January through June 2011 (See 2010 SOM, Table 7-33) 188

Table 7-36 PENELEC Control Zone top congestion cost impacts (By facility):
January through June 2010 (See 2010 SOM, Table 7-34) 189

Table 7-37 Pepco Control Zone top congestion cost impacts (By facility):
January through June 2011 (See 2010 SOM, Table 7-35) 190

Table 7-38 Pepco Control Zone top congestion cost impacts (By facility):
January through June 2010 (See 2010 SOM, Table 7-36) 191

Table 7-39 PPL Control Zone top congestion cost impacts (By facility):
January through June 2011 (See 2010 SOM, Table 7-37) 192

Table 7-40 PPL Control Zone top congestion cost impacts (By facility):
January through June 2010 (See 2010 SOM, Table 7-38) 193

Table 7-41 PSEG Control Zone top congestion cost impacts (By facility):
January through June 2011 (See 2010 SOM, Table 7-39) 194

Table 7-42 PSEG Control Zone top congestion cost impacts (By facility):
January through June 2010 (See 2010 SOM, Table 7-40) 195

Table 7-43 RECO Control Zone top congestion cost impacts (By facility):
January through June 2011 (See 2010 SOM, Table 7-41) 196

Table 7-44 RECO Control Zone top congestion cost impacts (By facility):
January through June 2010 (See 2010 SOM, Table 7-42) 197

Table 7-45 AEP Control Zone top congestion cost impacts (By facility):
January through June 2011 (See 2010 SOM, Table 7-43) 198

Table 7-46 AEP Control Zone top congestion cost impacts (By facility):
January through June 2010 (See 2010 SOM, Table 7-44) 199

Table 7-47 AP Control Zone top congestion cost impacts (By facility):
January through June 2011 (See 2010 SOM, Table 7-45). 200

Table 7-48 AP Control Zone top congestion cost impacts (By facility):
January through June 2010 (See 2010 SOM, Table 7-46). 201

Table 7-49 ATSI Control Zone top congestion cost impacts (By facility):
June 2011 (New table). 202

Table 7-50 ComEd Control Zone top congestion cost impacts (By facility):
January through June 2011 (See 2010 SOM, Table 7-47) 203

Table 7-51 ComEd Control Zone top congestion cost impacts (By facility):
January through June 2010 (See 2010 SOM, Table 7-48) 204

Table 7-52 DAY Control Zone top congestion cost impacts (By facility):
January through June 2011 (See 2010 SOM, Table 7-49). 205

Table 7-53 DAY Control Zone top congestion cost impacts (By facility):
January through June 2010 (See 2010 SOM, Table 7-50). 206

Table 7-54 DLCO Control Zone top congestion cost impacts (By facility):
January through June 2011 (See 2010 SOM, Table 7-51) 207

Table 7-55 DLCO Control Zone top congestion cost impacts (By facility):
January through June 2010 (See 2010 SOM, Table 7-52) 208

Table 7-56 Dominion Control Zone top congestion cost impacts (By facility):
January through June 2011 (See 2010 SOM, Table 7-53) 209

Table 7-57 Dominion Control Zone top congestion cost impacts (By facility):
January through June 2010 (See 2010 SOM, Table 7-54) 210

SECTION 8 – FINANCIAL TRANSMISSION AND AUCTION REVENUE RIGHTS 211

Table 8-1 The FTR Auction Markets results were competitive. 211

Table 8-2 Top 10 principal binding transmission constraints limiting the Annual FTR Auction: Planning period 2011 to 2012 (See 2010 SOM, Table 8-3). 216

Table 8-3 Annual FTR Auction patterns of ownership by FTR direction: Planning period 2011 to 2012 (See 2010 SOM, Table 8-5) 216

Table 8-4 Monthly Balance of Planning Period FTR Auction patterns of ownership by FTR direction: January through June 2011 (See 2010 SOM, Table 8-6). 216

Table 8-5 Daily FTR net position ownership by FTR direction: January through June 2011 (See 2010 SOM, Table 8-7) 216

Table 8-6 Annual FTR Auction market volume: Planning period 2011 to 2012 (See 2010 SOM, Table 8-9). 217

Table 8-7 Comparison of self scheduled FTRs: Planning periods from 2008 to 2009 through 2011 to 2012 (See 2010 SOM, Table 8-10). 218

Table 8-8 Monthly Balance of Planning Period FTR Auction market volume: January through June 2011 (See 2010 SOM, Table 8-11) 219

Table 8-9 Monthly Balance of Planning Period FTR Auction buy-bid bid and cleared volume (MW per period): January through June 2011 (See 2010 SOM, Table 8-12) 220

Table 8-10 Secondary bilateral FTR market volume: Planning periods 2010 to 2011 and 2011 to 2012 (See 2010 SOM, Table 8-13). 220

Table 8-11 Annual FTR Auction weighted-average cleared prices (Dollars per MWh): Planning period 2011 to 2012 (See 2010 SOM, Table 8-15). 221

Table 8-12 Monthly Balance of Planning Period FTR Auction cleared, weighted-average, buy-bid price per period (Dollars per MWh): January through June 2011 (See 2010 SOM, Table 8-16) 222

Table 8-13 Annual FTR Auction revenue: Planning period 2011 to 2012 (See 2010 SOM, Table 8-18) 223

Table 8-14 Monthly Balance of Planning Period FTR Auction revenue: January through June 2011 (See 2010 SOM, Table 8-19) 225

Table 8-15 Total annual PJM FTR revenue detail (Dollars (Millions)): Planning periods 2010 to 2011 and 2011 to 2012 (See 2010 SOM, Table 8-20). 227

Table 8-16 Monthly FTR accounting summary (Dollars (Millions)): Planning periods 2010 to 2011 and 2011 to 2012 through June 30, 2011 (See 2010 SOM, Table 8-21) 228

Table 8-17 FTR payout ratio by planning period (See 2010 SOM, Table 8-22) 229

Table 8-18 FTR profits by organization type and FTR direction: January through June 2011 (See 2010 SOM, Table 8-23). 230

Table 8-19 Monthly FTR profits by organization type: January through June 2011 (See 2010 SOM, Table 8-24) 230

Table 8-20 Incremental ARR allocation volume: Planning periods 2008 to 2009 through 2011 to 2012 (See 2010 SOM, Table 8-25) 230

Table 8-21 IARRs allocated for 2011 to 2012 Annual ARR Allocation for RTEP upgrades (See 2010 SOM, Table 8-26) 230

Table 8-22 Top 10 principal binding transmission constraints limiting the annual ARR allocation: Planning period 2011 to 2012 (See 2010 SOM, Table 8-27). 231

Table 8-23 ARRs and ARR revenue automatically reassigned for network load changes by control zone: June 1, 2009, through June 30, 2011 (See 2010 SOM, Table 8-28) 231

Table 8-24 Annual ARR allocation volume: Planning periods 2010 to 2011 and 2011 to 2012 (See 2010 SOM, Table 8-29) 232

Table 8-25 Table 8-25 ARR volume for ATSI Control Zone: 2011 to 2012 planning period (New Table) 232

Table 8-26 Direct allocation of FTR volume for ATSI Control Zone: 2011 to 2012 planning period (New Table) 232

Table 8-27 ARR revenue adequacy (Dollars (Millions)): Planning periods 2010 to 2011 and 2011 to 2012 (See 2010 SOM, Table 8-30). 233

Table 8-28 ARR and self scheduled FTR congestion hedging by control zone: Planning period 2010 to 2011 (See 2010 SOM, Table 8-31). 234

Table 8-29 ARR and FTR congestion hedging by control zone: Planning period 2010 to 2011 (See 2010 SOM, Table 8-32) 235

Table 8-30 ARR and FTR congestion hedging: Planning periods 2009 to 2010 and 2010 to 2011 (See 2010 SOM, Table 8-33). 236

Table 8-31 ARRs and FTRs as a hedge against energy charges by control zone: January through June 2011 (See 2010 SOM, Table 8-34). 236

FIGURES

SECTION 1 - INTRODUCTION 1

Figure 1-1 PJM's footprint and its 18 control zones 1

SECTION 2 – ENERGY MARKET, PART 1 13

Figure 2-1 Average PJM day-ahead aggregate supply curves: April through June, 2010 and 2011 (See 2010 SOM, Figure 2-1). 17

Figure 2-2 Actual PJM footprint peak loads: April through June of 2003 to 2011 (See 2010 SOM, Figure 2-2). 18

Figure 2-3 PJM second quarter peak-load comparison: Wednesday, June 8, 2011, and Wednesday, June 23, 2010 (See 2010 SOM, Figure 2-3). 18

Figure 2-4 PJM hourly Energy Market HHI: January through June 2011 (See 2010 SOM, Figure 2-4) 19

Figure 2-5 PJM real-time load duration curves: January through June 2007 through 2011 (See 2010 SOM, Figure 2-5). 22

Figure 2-6 PJM real-time load histogram: January through June 2007 through 2011 (New Figure) 22

Figure 2-7 PJM real-time average hourly load: Calendar years 2010 through June 2011 (See 2010 SOM, Figure 2-6). 23

Figure 2-8 PJM day-ahead load duration curves: January through June 2007 through 2011 (See 2010 SOM, Figure 2-7). 24

Figure 2-9 PJM day-ahead load histogram: January through June 2007 through 2011 (New Figure) 24

Figure 2-10 PJM day-ahead average load: Calendar years 2010 through June 2011 (See 2010 SOM, Figure 2-8). 25

Figure 2-11 Day-ahead and real-time loads (Average hourly volumes): January through June 2011 (See 2010 SOM, Figure 2-9). 26

Figure 2-12 Difference between day-ahead and real-time loads (Average daily volumes): January through June 2011 (See 2010 SOM, Figure 2-10). 26

Figure 2-13 Day-ahead and real-time generation (Average hourly volumes): January through June 2011 (See 2010 SOM, Figure 2-11) 28

Figure 2-14 Difference between day-ahead and real-time generation (Average daily volumes): January through June 2011 (See 2010 SOM, Figure 2-12). 28

Figure 2-15 Price duration curves for the PJM Real-Time Energy Market during hours above the 95th percentile: January through June 2007 through 2011 (See 2010 SOM, Figure 2-13) 28

Figure 2-16 Price histogram for the PJM Real-Time Energy Market: January through June 2007 through 2011 (New Figure) 29

Figure 2-17 PJM real-time, monthly, load-weighted, average LMP: Calendar years 2007 through June 2011 (See 2010 SOM, Figure 2-14) 32

Figure 2-18 Spot average fuel price comparison: Calendar years 2010 through June 2011 (See 2010 SOM, Table 2-15). 33

Figure 2-19 Price duration curves for the PJM Day-Ahead Energy Market during hours above the 95th percentile: January through June 2007 through 2011 (See 2010 SOM, Figure 2-16) 34

Figure 2-20 Price histogram for the PJM Day-Ahead Energy Market: January through June 2007 through 2011 (New Figure) 34

Figure 2-21 Day-ahead, monthly, load-weighted, average LMP: Calendar years 2007 through June 2011 (See 2010 SOM, Table 2-17) 36

Figure 2-22 PJM day-ahead aggregate supply curves: 2011 example day (See 2010 SOM, Figure 2-18) 47

Figure 2-23 Real-time load-weighted hourly LMP minus day-ahead load-weighted hourly LMP: January through June 2011 (See 2010 SOM, Figure 2-19) 48

Figure 2-24 Monthly simple average of real-time minus day-ahead LMP: January through June 2011 (See 2010 SOM, Figure 2-20). 49

Figure 2-25 PJM system simple hourly average LMP: January through June 2011 (See 2010 SOM, Figure 2-21) 49

Figure 2-26 Demand Response revenue by market: Calendar years 2002 through 2010 and January through June 2011 (See 2010 SOM, Figure 2-22). 53

Figure 2-27 Economic Program payments by month: Calendar years 2007 through 2010 and January through June 2011 (See 2010 SOM, Figure 2-23). 55

SECTION 3 - ENERGY MARKET, PART 2 61

Figure 3-1 Average hourly real-time generation of wind units in PJM, January through June 2011 (See 2010 SOM, Figure 3-13) 70

Figure 3-2 Average hourly day-ahead generation of wind units in PJM, January through June 2011 (See 2010 SOM, Figure 3-14) 71

Figure 3-3 Marginal fuel at time of wind generation in PJM, January through June 2011 (See 2010 SOM, Figure 3-15) 71

Figure 3-4 Spot monthly average emission price comparison: 2010 and 2011 (See 2010 SOM, Figure 3-16) 72

Figure 3-5 Daily RTO reliability and deviation balancing operating reserve rates (\$/MWh): January through June 2011 (See SOM 2010, Figure 3-20). 80

Figure 3-6 Daily regional reliability and deviation rates (\$/MWh): January through June 2011 (See SOM 2010, Figure 3-21) 80

Figure 3-7 Operating reserve credits: January through June 2011 (See SOM 2010, Figure 3-22) 81

SECTION 4 - INTERCHANGE TRANSACTIONS 91

Figure 4-1 PJM real-time scheduled imports and exports: January through June 2011 (See 2010 SOM, Figure 4-1) 99



Figure 4-2 PJM day-ahead scheduled imports and exports: January through June 2011 (See 2010 SOM, Figure 4-2) 100

Figure 4-3 PJM scheduled import and export transaction volume history: 1999 through June 2011 (See 2010 SOM, Figure 4-3) 100

Figure 4-4 PJM scheduled import and export transaction volume history: June 2000 through June 2011 (New Figure) 100

Figure 4-5 PJM's footprint and its external interfaces (See 2010 SOM, Figure 4-4) 104

Figure 4-6 Real-time daily hourly average price difference (MISO Interface minus PJM/MISO): January through June 2011 (See 2010 SOM, Figure 4-5) 105

Figure 4-7 Day-ahead daily hourly average price difference (MISO interface minus PJM/MISO): January through June 2011 (See 2010 SOM, Figure 4-6) 106

Figure 4-8 Real-time daily hourly average price difference (NY proxy minus PJM/NYIS): January through June 2011 (See 2010 SOM, Figure 4-7) 106

Figure 4-9 Day-ahead daily hourly average price difference (NY proxy minus PJM/NYIS): January through June 2011 (See 2010 SOM, Figure 4-8) 107

Figure 4-10 PJM, NYISO and MISO real-time border price averages: January through June 2011 (See 2010 SOM, Figure 4-9) 107

Figure 4-11 PJM, NYISO and MISO day-ahead border price averages: January through June 2011 (See 2010 SOM, Figure 4-10) 107

Figure 4-12 Neptune hourly average flow: January through June 2011 (See 2010 SOM, Figure 4-11) 108

Figure 4-13 Linden hourly average flow: January through June 2011 (See 2010 SOM, Figure 4-12) 108

Figure 4-14 Credits for coordinated congestion management: January through June 2011 (See 2010 SOM, Figure 4-13) 109

Figure 4-15 Southwest actual and scheduled flows: January 2006 through June 2011 (See 2010 SOM, Figure 4-14) 110

Figure 4-16 Southeast actual and scheduled flows: January 2006 through June 2011 (See 2010 SOM, Figure 4-15) 110

Figure 4-17 Monthly up-to congestion bids in MWh: January 2006 through June 2011 (See 2010 SOM, Figure 4-19) 111

Figure 4-18 Unique up-to congestion bids with approved MWh: March 2009 through June 2011 (New Figure) 112

Figure 4-19 Total settlements showing positive, negative and net gains for up-to congestion bids with a matching Real-Time Energy Market transaction: January through June 2011 (See 2010 SOM, Figure 4-20) 112

Figure 4-20 Total settlements showing positive, negative and net gains for up-to congestion bids without a matching Real-Time Energy Market transaction: January through June 2011 (See 2010 SOM, Figure 4-21) 113

Figure 4-21 Real-time interchange volume vs. average hourly LMP available for Duke and PEC imports: January through June 2011 (See 2010 SOM, Figure 4-22) 114

Figure 4-22 Real-time interchange volume vs. average hourly LMP available for Duke and PEC exports: January through June 2011 (See 2010 SOM, Figure 4-23) 114

Figure 4-23 Day-ahead interchange volume vs. average hourly LMP available for Duke and PEC imports: January through June 2011 (See 2010 SOM, Figure 4-24) 115

Figure 4-24 Day-ahead interchange volume vs. average hourly LMP available for Duke and PEC exports: January through June 2011 (See 2010 SOM, Figure 4-25) 116

Figure 4-25 Spot import service utilization: January 2009 through June 2011 (See 2010 SOM, Figure 4-27) 116

SECTION 5 – CAPACITY MARKET 117

Figure 5-1 History of capacity prices: Calendar year 1999 through 2014 (See 2010 SOM, Figure 5-1) 127

Figure 5-2 PJM equivalent outage and availability factors: January through June 2007 to 2011 (See 2010 SOM, Figure 5-4) 130

Figure 5-3 Generator performance factors: January through June 2011 (See 2010 SOM, Figure 5-10) 130

Figure 5-4 Trends in the PJM equivalent demand forced outage rate (EFORd): January through June 2007 to 2011 (See 2010 SOM, Figure 5-5) 131

Figure 5-5 Distribution of EFORd data by unit type: January through June 2011 (See 2010 SOM, Figure 5-6) 131

Figure 5-6 Contribution to EFORd by duty cycle: January through June 2007 to 2011 (See 2010 SOM, Figure 5-7) 132

Figure 5-7 Distribution of EFORd data by unit type: January through June 2011 (See 2010 SOM, Figure 5-8) 136

Figure 5-8 EFORd, XEFORd and EFORp: January through June 2011 (See 2010 SOM, Figure 5-9) 136

SECTION 6 - ANCILLARY SERVICE MARKETS 137

Figure 6-1 PJM Regulation Market HHI distribution: January through June 2011 (See 2010 SOM, Figure 6-1) 145

Figure 6-2 Off peak and on peak regulation levels: January through June, 2011 (See 2010 SOM, Figure 6-2) 146

Figure 6-3 PJM Regulation Market daily average market-clearing price, opportunity cost and offer price (Dollars per MWh): January through June, 2011 (See 2010 SOM, Figure 6-3) 146

Figure 6-4 Monthly average regulation demand (required) vs. price: January through June, 2011 (See 2010 SOM, Figure 6-4) 147

Figure 6-5 Monthly load weighted, average regulation cost and price: January through June, 2011 (See 2010 SOM, Figure 6-5) 147

Figure 6-6 Mid-Atlantic Subzone average hourly synchronized reserve supplied by Tier 1 estimate and Tier 2 scheduled: January through June, 2011 (See 2010 SOM, Figure 6-7) 150

Figure 6-7 Mid-Atlantic Subzone daily average hourly synchronized reserve required, Tier 2 MW scheduled, and Tier 1 MW estimated: January through June, 2011 (See 2010 SOM, Figure 6-8) 151

Figure 6-8 Tier 2 synchronized reserve average hourly offer volume (MW): January through June, 2011 (See 2010 SOM, Figure 6-9) 151

Figure 6-9 Average daily Tier 2 synchronized reserve offer by unit type (MW): January through June, 2011 (See 2010 SOM, Table 6-10). 152

Figure 6-10 PJM RFC Zone Tier 2 synchronized reserve scheduled MW: January through June, 2011 (See 2010 SOM, Figure 6-11). 153

Figure 6-11 Required Tier 2 synchronized reserve, Synchronized Reserve Market clearing price, and DSR percent of Tier 2: January through June, 2011 (See 2010 SOM, Figure 6-12) 153

Figure 6-12 Tier 2 synchronized reserve purchases by month for the Mid-Atlantic Subzone: January through June, 2011 (See 2010 SOM, Figure 6-13). 154

Figure 6-13 Impact of Tier 2 synchronized reserve added MW to the Mid-Atlantic Subzone: January through June, 2011 (See 2010 SOM, Figure 6-14). 154

Figure 6-14 Comparison of Mid-Atlantic Subzone Tier 2 synchronized reserve price and cost (Dollars per MW): January through June, 2011 (See 2010 SOM, Figure 6-15). 155

SECTION 8 – FINANCIAL TRANSMISSION AND AUCTION REVENUE RIGHTS 211

Figure 8-1 Annual FTR auction clearing price duration curves: Planning period 2011 to 2012 (See 2010 SOM, Figure 8-2). 222

Figure 8-2 Ten largest positive and negative revenue producing FTR sinks purchased in the Annual FTR Auction: Planning period 2011 to 2012 (See 2010 SOM, Figure 8-5) 224

Figure 8-3 Ten largest positive and negative revenue producing FTR sources purchased in the Annual FTR Auction: Planning period 2011 to 2012 (See 2010 SOM, Figure 8-6). 224

Figure 8-4 Ten largest positive and negative revenue producing FTR sinks purchased in the Monthly Balance of Planning Period FTR Auctions: Planning period 2010 to 2011 (See 2010 SOM, Figure 8-7) 226

Figure 8-5 Ten largest positive and negative revenue producing FTR sources purchased in the Monthly Balance of Planning Period FTR Auctions: Planning period 2010 to 2011 (See 2010 SOM, Figure 8-8). 226

Figure 8-6 FTR payout ratio by month: June 2003 to June 2011 (See 2010 SOM, Figure 8-9) 229

Figure 8-7 Ten largest positive and negative FTR target allocations summed by sink: Planning period 2010 to 2011 (See 2010 SOM, Figure 8-10). 229

Figure 8-8 Ten largest positive and negative FTR target allocations summed by source: Planning period 2010 to 2011 (See 2010 SOM, Figure 8-11). 229

Figure 8-9 Annual FTR Auction prices vs. average day-ahead and real-time congestion for all control zones relative to the Western Hub: Planning period 2010 to 2011 (See 2010 SOM, Figure 8-12) 233

