Public Service Commission of Maryland

PJM Status Reports

(1) 2011/2012 Base Residual Auction Results Summary

(2) "Gap" Generation Analysis Estimates w/o 502 Junction – Loudoun 500 kV Line in 2011

(3) 2010 Update / Expectations

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May 2008 PJM RPM Base Residual Auction: Results and Comparison

	RTO			EMAAC			SWMAAC		
Auction Results	**2009 / 2010**	**2010 / 2011**	**2011 / 2012**	**2009 / 2010**	**2010 / 2011**	**2011 / 2012**	**2009 / 2010**	**2010 / 2011**	**2011 / 2012**
NEW Demand Response Offered [MW]	221.0	31.1	684.5	0.0	0.0	0.0	42.2	162.7	260.2
NEW Demand Response Cleared [MW]	356.7 *	46.1 *	425.9	0.0	0.0	0.0	47.1 *	162.7	221.6
DIFERENCE -- NEW Demand Response that did not clear [MW]	(135.7) *	(15.0) *	258.6	0.0	0.0	0.0	(4.9) *	0.0	38.6
TOTAL Demand Response Offered [MW]	936.8	967.9	1,652.4	376.6	318.9	306.9	356.3	519.0	779.2
TOTAL Demand Response Cleared [MW]	892.9	939.0	1,364.9	372.4	306.4	231.2	356.3	519.0	740.6
DIFFERENCE – all Demand Response that did not clear [MW]	43.9	28.9	287.5	4.2	12.5	75.7	0.0	0.0	38.6

* NOTE: DR values appear counter-intuitive, but are correct. In previous year, not all “new” DR cleared; current year new cleared thus exceeds new offered

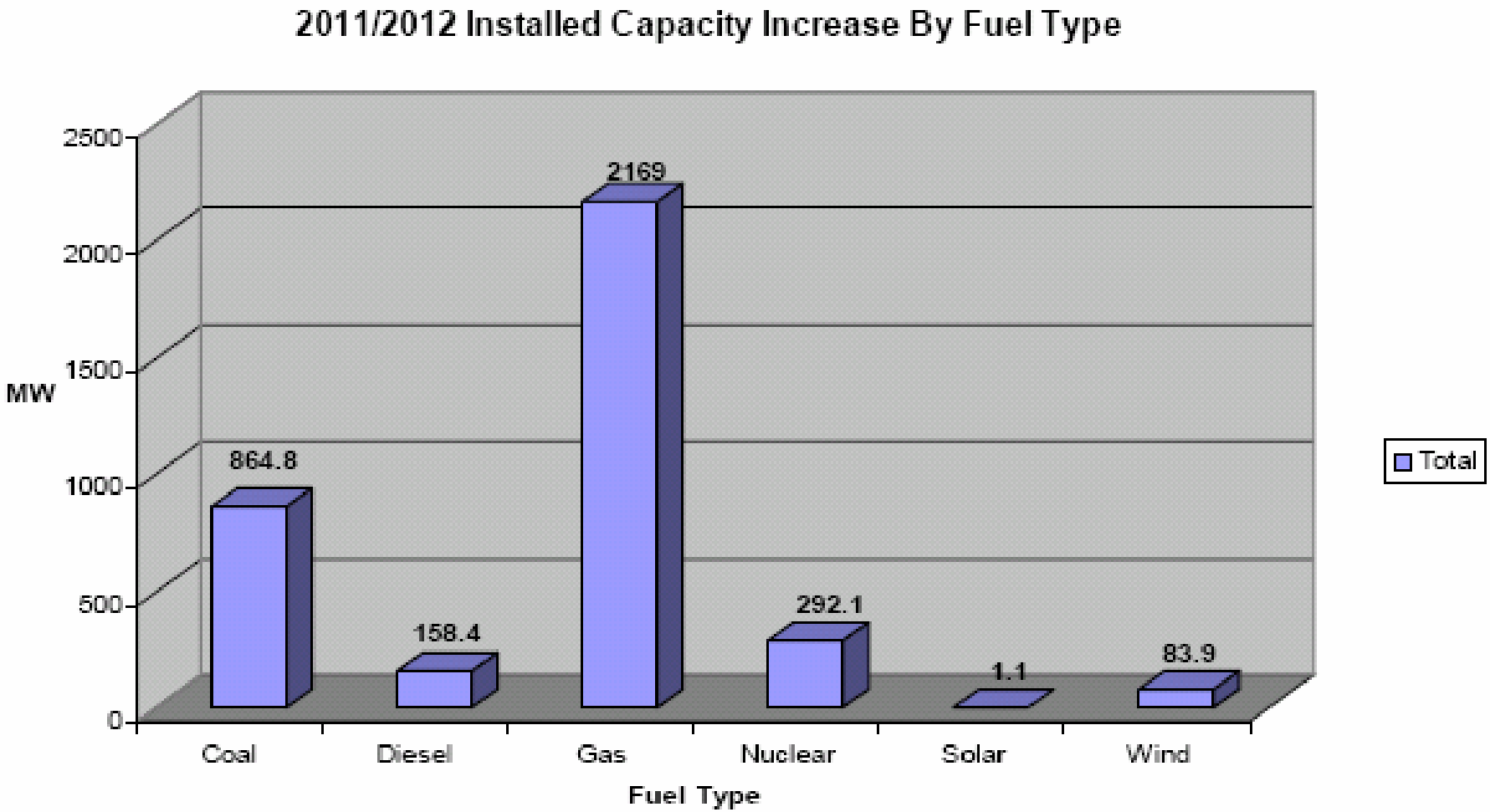
May 2008 PJM RPM Base Residual Auction: Results and Comparison

	RTO			EMAAC			SWMAAC		
Auction Results	**2009 / 2010**	**2010 / 2011**	**2011 / 2012**	**2009 / 2010**	**2010 / 2011**	**2011 / 2012**	**2009 / 2010**	**2010 / 2011**	**2011 / 2012**
Resource Clearing Price [$/MW-Day]	102.04	174.29	110.00	191.32	174.29	110.00	237.33	174.29	110.00
NEW Generation Offered [MW]	439.2	403.6	2,203.7	92.9	124.5	693.2	0.0	0.0	220.8
NEW Generation Cleared [MW]	300.3	285.1	1,916.1	92.9	6.0	535.2	0.0	0.0	0.0
DIFFERENCE -- NEW Generation that did not clear [MW]	138.9	118.5	287.6	0.0	118.5	158.0	0.0	0.0	220.8
UPRATES & REACTIVATED Generation Offered [MW]	590.1	727.3	1,243.8	128.6	178.0	205.1	32.0	0.8	186.9
UPRATES & REACTIVATED Generation Cleared [MW]	590.1	727.3	1,002.3	128.6	178.0	198.5	32. 0	0.8	106.5
DIFFERENCE -- Uprates & Reactivated Generation that did not clear [MW]	0.0	0.0	241.5	0.0	0.0	6.6	0.0	0.0	80.4
ALL Generation Offered [MW]	132,614.2	132,124.8	136,067.9	31,307.6	30,926.9	31,740.2	9,955.4	10,409.2	10,871.9
ALL Generation Cleared [MW]	131,338.9	131,251.4	130,856.6	31,278.2	30,508.6	29,146.4	9,558.3	10,354.4	10,039.3
DIFFERENCE – All Generation that did not clear [MW]	1,257.3	873.4	5,211.3	29.4	418.3	2,953.8	397.1	54.8	832.6

May 2008 PJM RPM Base Residual Auction: Incremental Capacity Resource Additions Comparison by Fuel Type

Generation	Delivery Year	CT/GT	Combined Cycle	Diesel	Hydro	Steam	Nuclear	Solar	Wind	TOTAL
New Capacity Units (ICAP MW)	2009/2010	399.5		23.8		53.0				476.3
	2010/2011	283.3		23.0					141.4	447.7
	2011/2012	416.4	1,135.0			704.8		1.1	75.2	2,332.5
Capacity From Reactivated Units (ICAP MW)	2009/2010									0.0
	2010/2011	160.0		10.7						170.7
	2011/2012	80.0				101.0				181.0
Uprates to Existing Capacity Resources (ICAP MW)	2009/2010	152.2	209.0		162.5	61.4	194.4		16.5	796.0
	2010/2011	117.3	743.0		48.0	89.2	160.3			1,157.8
	2011/2012	369.2	148.6	57.4		186.8	292.1		8.7	1,062.8
TOTAL		1977.9	2235.6	114.9	210.5	1196.2	646.8	1.1	241.8	6624.8

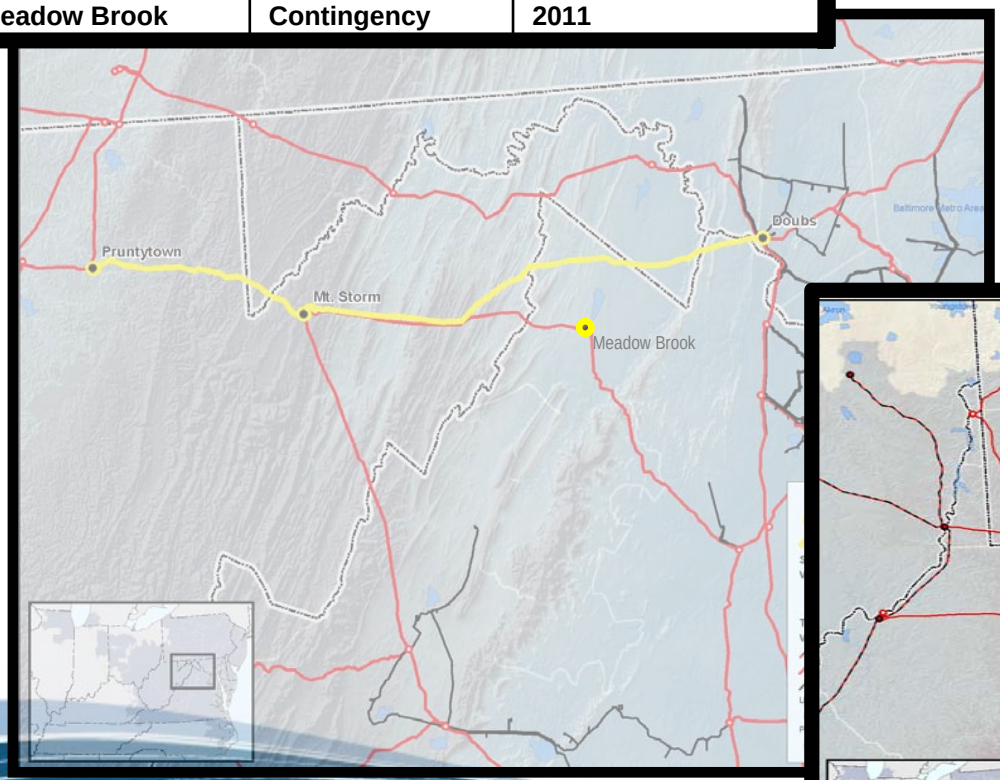
May 2008 PJM RPM Base Residual Auction: 2011 / 2012 Comparison by Fuel Type

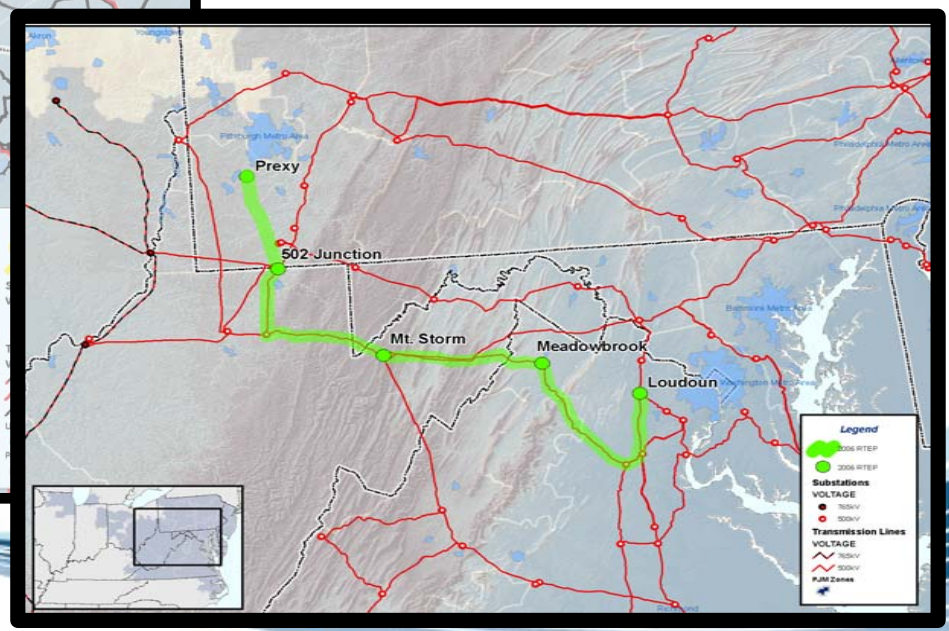


PJM 2006 RTEP

Overloaded Facility	Test Resulting in Highest Overload	Year that Facility Loading Exceeds Conductor Rating
Mt. Storm – Doubs 500 kV Line	Load Deliverability	2011
Pruntytown – Mt. Storm 500 kV Line	Generator Deliverability	2014
Meadow Brook	'N – 2' Contingency	2011

- **PJM identifies reliability criteria violations, need for additional transmission capability**
- **PJM Board approves new Loudoun Line**





PJM Approach to MD-PSC Gap Analysis Request

- With Loudoun line in service, PJM system reliability criteria are within limits.
- Presently, PJM has no indication that the Loudoun cannot be completed by 2011 when reliability criteria violations driving the need for the line are first observed.
- PJM's October 2007 initial gap estimate for Mid-Atlantic PJM of 6,500 MW included approximately 1,500 MW for Maryland. PJM's gap estimate represents that amount of area load in excess of area generation that exceeds the transmission capability needed to transfer power into an area to serve that load at risk.
- PJM interprets MD-PSC's request as comprising a set of sensitivity studies to estimate worse case scenarios for gap in light of the October 2007 initial estimate, updated case numbers, and May 2008 PJM RPM Base Residual Auction (BRA) results.

Quantifying Resource "Gap"

- Mid-Atlantic Load Deliverability…ability of transmission to import power into a specific area when sufficient generation is NOT available in that area to supply load.

- Resource "Gap"…two ways of understanding the concept:
  - Generation Resource Perspective… PJM's estimate of that generation necessary in 2011 - if the Loudoun and Kemptown lines are not in-service - to reduce loading on the most limiting transmission facility down to 100 %, based on reliability criteria violations identified during RTEP analysis.

  - Load-Serving Perspective… PJM's estimate of area load at risk; i.e., area load - in excess of area generation - that exceeds an area's transmission capability to transfer needed power into an area.

- Key Factors impacting Gap:
  - Generation availability
  - Load growth
  - Demand side response

Summary of Gap Analysis Scenarios Studied

Scenario	Short Description	Gap Approximations	PJM Assessment
1	October 2007 PJM analysis on 2012 case results without Loudoun (2011) or Kemptown (2012) lines	Mid-Atlantic = 6,500 MW Maryland = 1,500 MW	Would require remedial action by PJM.
2	March 2008 VA results…Gap analysis on updated 2012 PJM RTEP case	Mid-Atlantic = 2,000 - 5,000 MW Maryland = 460 - 1,200 MW	Would require remedial action by PJM.
3	PJM 2011 case with **ONLY** that generation and DR that **cleared** in the 2011/2012 RPM BRA.	Mid-Atlantic = 2,600 – 3,000 MW Maryland = 600 – 690 MW	Would require remedial action by PJM.
4	PJM 2011 case with **all that generation (new AND existing) expected to bid, and that DR forecasted to bid** into the 2011/2012 RPM BRA.	Approximately, line loading under limiting reliability criteria test at 99% of facility rating.	Virtually no remaining line loading capability; virtually no reliability margin.
5	PJM 2011 case with 2011/2012 RPM BRA Gens/DR that **cleared + any existing gen that did not clear;** (i.e., does not include new generation that did not clear)	Approximately, line loading under limiting reliability criteria test at 100% of facility rating.	No remaining line loading capability; no reliability margin.

Scenario 1

Scenario	Short Description	Gap Approximations	PJM Assessment
1	October 2007 PJM analysis on 2012 case results without Loudoun (2011) or Kemptown (2012) lines	Mid-Atlantic = 6,500 MW Maryland = 1,500 MW	Would require remedial action by PJM.

Load Growth…January 2007 Forecast for 2007 – 2017
(10-year load growth rates)

- BGE… 1.2%, 7,745 MW in 2011
- PEPCo… 1.4%, 7,439 MW in 2011
- Mid-Atlantic PJM… 1.5%, 63,887 MW in 2011
- Dominion… 1.9%, 20,746 MW in 2011
- PJM RTO… 1.6%, 146,404 MW in 2011

Demand Response… January 2007 Load Forecast

- BGE… 227 MW modeled
- PEPCo… 0 MW modeled
- Mid-Atlantic… 794 MW modeled

Most Limiting Reliability Criteria Violation

- Mt. Storm-Doubs 500 kV line

Generation Highlights

- RTEP07 model.
- Existing generation + that with signed ISAs through January 2007.

Status of Key Generators

- Catoctin - not modeled.
- Benning 15, 16 – not modeled.
- Buzzard (all units) – not modeled.

Scenario 2

Scenario	Short Description	Gap Approximations	PJM Assessment
2	March 2008 VA results…Gap analysis on updated 2012 PJM RTEP case	Mid-Atlantic = 2,000 - 5,000 MW Maryland = 460 - 1,200 MW	Would require remedial action by PJM.

Load Growth…January 2008 Forecast for 2008 – 2018:
(10-year load growth rates…January 2008 vs January 2007)

- BGE… down 0.2% to 1.0%...-119 MW in 2011
- PEPCo… down 0.1% to 1.3%...-104 MW in 2011
- Mid-Atlantic PJM… no change; …1.5%...+33 MW in 2011
- Dominion… down 0.1% to 1.8%... -208 MW in 2011
- PJM RTO… down 0.1 % to 1.5%... -1,343 MW in 2011

Demand Response… January 2008 Load Forecast

- BGE… 260 MW modeled
- PEPCo… 28 MW modeled
- Mid-Atlantic… 1,018 MW modeled

Most Limiting Reliability Criteria Violation

- Mt Storm-Doubs

Generation Highlights

- RTEP07 2012 model.
- Existing generation + that with signed ISAs as of February 29, 2008

Status of Key Generators

- Catoctin – in model.
- Benning 15, 16 – not modeled.
- Buzzard (all units) – not modeled.
- Indian River 1,2 – not modeled.
- Bergen 2 – not modeled.
- Parlin – in model.
- B. L. England 1, 2, 3 – in model.
- Sewaren 1-4 – in model.

Scenario 3

Scenario	Short Description	Gap Approximations	PJM Assessment
3	PJM 2011 case with **ONLY** that generation and DR that **cleared** in the 2011/2012 RPM BRA.	Mid-Atlantic = 2,600 – 3,000 MW Maryland = 600 – 690 MW	Would require remedial action by PJM.

Load Growth…January 2008 Forecast for 2008 – 2018:
(10-year load growth rates…January 2008 vs January 2007)

- BGE… down 0.2% to 1.0%...-119 MW in 2011
- PEPCo… down 0.1% to 1.3%...-104 MW in 2011
- Mid-Atlantic PJM… no change; …1.5%...+33 MW in 2011
- Dominion… down 0.1% to 1.8%... -208 MW in 2011
- PJM RTO… down 0.1 % to 1.5%... -1,343 MW in 2011

Demand Response

- BGE… 655 MW modeled
- PEPCo… 154 MW modeled
- Mid-Atlantic… 1,635 MW modeled

Most Limiting Reliability Criteria Violation

- Mt. Storm – Doubs 500 kV line

Generation Highlights

- 2011 model.
- All generation (both existing and new) that CLEARED in the 2011/2012 BRA

Status of Key Generators

- Catoctin – not modeled
- Benning (all units) – in model
- Buzzard 15, 16 – in model
- Indian River 1, 2 – not modeled
- Bergen 2 – in model
- B. L. England 1, 2, 3 – in model
- Sewaren 1-4 – in model
- Parlin – in model

Scenario 4

Scenario	Short Description	Gap Approximations	PJM Assessment
4	PJM 2011 case with **all that generation (new AND existing) expected to bid, and that DR forecasted to bid** into the 2011/2012 RPM BRA.	Approximately, line loading under limiting reliability criteria test at 99% of facility rating.	Virtually no remaining line loading capability; virtually no reliability margin.

Load Growth…January 2008 Forecast for 2008 – 2018:
(10-year load growth rates…January 2008 vs January 2007)
- BGE… down 0.2% to 1.0%...-119 MW in 2011
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Demand Response… January 2008 Load Forecast
- BGE… 260 MW modeled
- PEPCo… 28 MW modeled
- Mid-Atlantic… 1,018 MW modeled

Most Limiting Reliability Criteria Violation
- Mt Storm – Doubs 500 kV Line

(line loading at 99% of rating)

Generation Highlights
- 2011 model.
- All generation – new AND existing – expected to bid into the 2011/2012 RPM BRA.

Status of Key Generators
- Catoctin – not modeled
- Benning (all units) – in model
- Buzzard 15, 16 – in model
- Indian River 1, 2 – not modeled
- Bergen 2 – in model
- B. L. England 1, 2, 3 – in model
- Sewaren 1-4 – in model
- Parlin – in model

Scenario 5

Scenario	Short Description	Gap Approximations	PJM Assessment
5	PJM 2011 case with 2011/2012 RPM BRA Gens/DR that **cleared + any existing gen that did not clear;** (i.e., does not include new generation that did not clear)	Approximately, line loading under limiting reliability criteria test at 100% of facility rating.	No remaining line loading capability; no reliability margin.

Load Growth…January 2008 Forecast for 2008 – 2018:
(10-year load growth rates…January 2008 vs January 2007)

- BGE… down 0.2% to 1.0%...-119 MW in 2011
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Demand Response

- BGE… 655 MW modeled
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Most Limiting Reliability Criteria Violation

- Mt Storm – Doubs 500 kV Line

(line loading at 100% of rating)

Generation Highlights

- 2011 model.
- Generation (both existing and new) that CLEARED in the 2011/2012 BRA + that existing gen that did not clear

Status of Key Generators

- Catoctin – not modeled
- Benning (all units) – in model
- Buzzard 15, 16 – in model
- Indian River 1, 2 – not modeled
- Bergen 2 – in model
- B. L. England 1, 2, 3 – in model
- Sewaren 1-4 – in model
- Parlin – in model

Addressing Reliability in Maryland if Lines are Delayed

- Absent lines, options include:
  - Incremental enhancements with 1 to 3 years needed
    - Upgrades to lower voltage facilities
    - Flexible AC flow shifting control devices & other new technologies
  - Incremental RPM auction concept under consideration for planning parameter changes (i.e., proposed lines delayed)
  - Reliability Must Run contracts on requested deactivations
  - Operating procedures / system reconfigurations to minimize risk

- Options depend on several factors:
  - Length of line delay
  - Available time to implement incremental transmission enhancements
  - Expected generation availability
  - Expected demand response over delay period
  - Expected load over delay period; impacts of slowing US/regional economy and how it rebounds

Status of Major Upgrades in BGE and PEPCo

Location	Equipment	Upgrade Description	Projected Completion Date
Palmers Corner - Blue Plains	Circuits	Two new 230kV circuits	In-service
Waugh Chapel	Capacitor Bank	Install Waugh Chapel 230kV 360MVAR capacitor bank	In-service
Various Substations, 138 kV and below	Capacitor Banks	Add 275+ MVAR of capacitors on underlying system, 138 kV and below.	In-service
Doubs - Dickerson and Doubs - Aqueduct - Dickerson	Lines	Upgrade 230kV lines to 1200MVA	5/2009
Waugh Chapel	Transformer	Add 4th 500/230kV transformer in a new 500kV transformer bay. Operate the existing in-service spare transformer on standby and other associated configuration changes.	6/2009
Brighton Substation	Transformer	Add 2nd 1000 MVA 500/230kV transformer; 2, 500kV circuit breakers and miscellaneous bus work	6/2009
Conastone	Transformer	Upgrade both 500/230kV transformer banks with larger transformers, replace breakers #4 & #7 and other configuration changes	5/2009
Burches Hill	Transformer	Burches Hill Substation - Add 2nd 1000 MVA 500/230kV Transformer	6/2011
Bells Mill	Capacitor	Add 100 MVAR of reactive capability.	6/2010
Bells Mill	Capacitor	Add 100 MVAR of reactive capability.	6/2010
Mt. Storm - 502 Junction	Circuit	Build new 500 kV line.	6/2011
Doubs	Transformer	Replace Transformer #2.	5/2011
Doubs	Transformer	Replace Transformer #3.	12/2010
Doubs	Transformer	Replace Transformer #4.	6/2010

Status of Major Upgrades in BGE and PEPCo, continued…

Location	Equipment	Upgrade Description	Projected Completion Date
Dickerson - Pleasant View	Circuit	Reconductor 230kV line.	6/2011
Dickerson - Pleasant View	Circuit	Reconductor 230kV line.	6/2011
Brighton	Transformer	Replace existing 500/230 kV transformer at Brighton	6/2012
Conastone and Graceton	Second Circuit and Circuit Breaker	Install a second Conastone - Graceton 230 kV circuit and replace Conastone 230 kV breaker 2323/2302	6/2012
Burches Hill	Transformer	Install third Burches Hill 500/230 kV transformer	6/2012
Ritchie & Benning Sta. "A"	Circuits	Two new 230 kV circuits between Ritchie - Benning Sta. "A"	6/2012
Bedington - Kemptown	Circuit	Bedington to Kemptown 500 kV lines (twin circuit) and associated 765/500 kV terminal upgrades at Bedington and 500 kV station establishment at Kemptown -- (APS portion)	6/2012
Possom Point - Calvert Cliffs	New transmission line and associated equipment	MAPP Project Phase 1: install new Possum Point to Calvert Cliffs 500 kV	6/2013
Possom Point - Calvert Cliffs	New transmission line and associated equipment	MAPP Project Phase 1: install new Possum Point to Calvert Cliffs 500 kV	6/2013
Calvert Cliffs - Salem	New transmission line and associated equipment	MAPP Project Phase 2: install new Calvert Cliffs - Salem 500 kV	6/2013
Calvert Cliffs - Salem	New transmission line and associated equipment	MAPP Project Phase 2: install new Calvert Cliffs - Salem 500 kV	6/2013