



Energy and Reserve Pricing & Interchange Volatility Final Proposal Report

May 7, 2014

Energy and Reserve Pricing

On peak days such as those experienced this past summer and winter, PJM operators schedule additional generation based on conditions that could reasonably materialize on the system. However, given the uncertainties that exist on such peak days such as load and interchange forecasts, all of the scheduled capacity on the system may not turn out to be economic and required to meet the demands on the system. When this occurs, the additional reserves created by generation commitments that turn out to be unneeded have the effect of reducing market prices. This produces prices which are counterintuitive given the operating conditions on a peak load day and do not reflect all of the actions taken by PJM's operators to maintain system reliability. In addition, the depressed prices contribute to the significant uplift payments that have become a focus of stakeholder concerns.

1. Recommended Proposal

The PJM proposal was the only solution package developed by the ERPIV for implementation prior to this summer. Other solutions were briefly discussed, but due to the need for tariff filings or time required for technical implementation, all other solutions were categorized as long-term implementation options (suitable for implementation post-summer 2014). The PJM proposal addresses the incorporation of more operator action in energy and reserve prices by increasing the Day-Ahead Scheduling Reserve (DASR), Primary Reserve (PR) and Synchronized Reserve (SR) requirements in the market clearing engines by a fixed amount under specified conditions. The increased reserve requirements would only be in place during peak conditions when significant additional generation has been scheduled, thereby creating the opportunity for some portion of the additional generation to set price and reduce uplift payments. This proposal should not influence the amount of generation scheduled by PJM operators. Instead, it would be a way to better reflect scheduling decisions that have already been made in both energy and reserve pricing results, due to the joint optimization of the energy and reserve markets.

By modeling the increased reserve requirement in the market clearing engines, the increased reserve requirements would be used when dispatching resources and in the declaration of shortage pricing. However, PJM operators will continue to initiate emergency procedures based on the reserve requirements defined in Manual 13: Emergency Operations (the default reserve requirements).

Entry Criteria: The reserve requirements will only be increased when all three of the following conditions are met:

- A Hot Weather Alert, Cold Weather Alert or Maximum Emergency Generation Alert has been issued for the operating day, as these are the conditions under which it is expected that the most additional generation will be scheduled



- The above alert(s) have been called for the RTO, Mid-Atlantic Dominion or Mid-Atlantic regions, so that the additional generation has been scheduled to address uncertainty in a large portion of the RTO or Mid-Atlantic Dominion reserve sub-zone
- Dispatchers have scheduled significant additional generation to account for operational uncertainty and they do not expect that increasing the reserve requirements in the market clearing engines will create operational control issues, such as issues controlling Area Control Error (ACE).

Exit Criteria: The DASR requirement will remain elevated until the Hot or Cold Weather Alert or Maximum Emergency Generation Alert has been cancelled for the operating day, or the alerts are anticipated to be cancelled. The anticipated cancellation of the alerts is included in the exit criteria, in addition to the actual cancellation, in recognition of the fact that the decision on the reserve requirement to include in the day-ahead market must be made prior to the execution of the market (noon the day prior to the operating day). If the alerts have not yet been cancelled by noon the day prior to the operating day, but it is anticipated that the alerts will be cancelled later that afternoon or evening, then the normal reserve requirement should be used so that the day-ahead market more closely resembles the anticipated real time conditions for the operating day.

The SR and PR requirements will remain elevated until the Hot or Cold Weather Alert or Maximum Emergency Generation Alert has been cancelled, or if the alerts are still in place but the increased reserve requirement is creating operational control issues such as difficulty controlling Area Control Error. In the event that the increased requirement is creating operational control issues, the reserve adder would be reduced to 50% of its initial value in an effort to alleviate the control issues but continue to incorporate some of the additionally scheduled generation into energy and reserve pricing. If control issues persist after reducing the reserve adder to 50%, the reserve adder may be reduced further.

Increased Reserve Requirements: For DASR, the fixed reserve adder is equal to 3% of the RFC plus EKPC forecasted load. Therefore, the increased DASR requirement would be based on 9.27% of forecasted load (the default requirement is currently based on 6.27% of the forecasted RFC plus EKPC load).

For SR and PR, the fixed reserve adder will be equal to the default Mid-Atlantic Dominion SR Requirement (presently 1300 MW).

If the Hot or Cold Weather Alert or Maximum Emergency Generation Alert is issued for the **Mid-Atlantic Dominion or Mid-Atlantic regions**, then both the Mid-Atlantic Dominion and RTO SR and PR requirements would be increased as follows:

- MAD SR = the greater of the following, but not to exceed 3600 MW (which is the size of the largest contingency that PJM operators screen for)
 - The default MAD SR requirement (1300 MW) + the reserve adder (1300 MW)
 - The current MAD SR requirement, which may be higher than the typical 1300 MW requirement due to transmission outages which temporarily increase the size of the largest single contingency on the system
- MAD PR = the greater of the following, but not to exceed 3600 MW



- The default MAD PR requirement (1700 MW) + the reserve adder (1300 MW)
- The current MAD PR requirement, which may be higher than the typical 1300 MW requirement due to transmission outages which temporarily increase the size of the largest single contingency on the system
- RTO SR = the updated MAD SR requirement
- RTO PR = the updated MAD PR requirement

Assuming that reserve requirements are equal to their default values (defined below) prior to the increase taking effect, this would result in the following increased reserve requirements:

Default Reserve Requirements		
	RTO	MAD
SR	1375	1300
PR	2063	1700

Increased Reserve Requirements for MAD / MA Alerts		
	RTO	MAD
SR	2600	2600
PR	3000	3000

If the Hot or Cold Weather Alert or Maximum Emergency Generation Alert is issued for the **RTO region**, then only the RTO SR and PR requirements would be increased. In this case, the updated RTO requirements are the same as what they would be if an alert was issued for the Mid-Atlantic Dominion or Mid-Atlantic regions. The MAD reserve requirements are not updated in this instance, however.

- MAD SR = no update
- MAD PR = no update
- RTO SR = the greater of the following, but not to exceed 3600 MW
 - The default **MAD** SR requirement (1300 MW) + the reserve adder (1300 MW)
 - The current **RTO** SR requirement, which may be higher than the typical 1300 MW requirement due to transmission outages which temporarily increase the size of the largest single contingency on the system
- RTO PR = the greater of the following, but not to exceed 3600 MW
 - The default **MAD** PR requirement (1700 MW) + the reserve adder (1300 MW)



- The current **RTO** PR requirement, which may be higher than the typical 1300 MW requirement due to transmission outages which temporarily increase the size of the largest single contingency on the system

Assuming that reserve requirements are equal to their default values prior to the increase taking effect, this would result in the following increased reserve requirements:

Increased Reserve Requirements for RTO Alerts		
	RTO	MAD
SR	2600	1300
PR	3000	1700

On Peak / Off Peak Differential:

In recognition of the fact that fewer reserves are necessary during off peak hours (00:00 – 05:00 Eastern Prevailing Time), the off peak SR and PR requirements will be increased by a smaller amount than the on peak requirements outlined above. When a Hot Weather Alert, Cold Weather Alert or Maximum Emergency Generation Alert has been issued and the reserve requirements are increased, the off peak requirements will be 75% of the on peak requirement. This discounting of the reserve requirement only applies to those requirements that were increased as a result of the alerts. For example, if an alert is issued for the RTO then only the RTO SR and PR requirements will be increased. In this case, only the RTO SR and PR off peak requirements will be calculated as 75% of the on peak requirement. The MAD off peak requirements would continue to be equal to the MAD on peak requirements, as is the case when the alerts are not in effect.

There will be no on peak / off peak differential in the DASR requirement.

Notification of Increased Reserve Requirements:

PJM will notify market participants of changes to the DASR, SR and PR reserve requirements in relation to a Hot or Cold Weather Alert or a Maximum Emergency Generation Alert via the Emergency Procedure Posting Application once the decision to change the reserve requirements is made. This applies to increases in the reserve requirements as well as a return to the typical reserve requirements upon cancellation of the alerts. The posting in the Emergency Procedure Posting Application will also trigger an alert in the eData application.

Method for Incorporating Long Lead Time Generation into the DA Market:

In anticipation of peak load conditions, PJM operators frequently schedule units with startup plus notification times that exceed 24 hours. In order to ensure that these units have the opportunity to be committed in the day-ahead



market if they are economic, the PJM proposal includes the following provision. Generation Capacity Resources that have notification plus startup times that exceed 24 hours and have been called on by PJM dispatch in advance of the close of the day-ahead market for the desired operating day must modify their notification and startup time prior to the close of the day-ahead market for that day. This creates the possibility for the units to be cleared in the day-ahead market and have these resources reflected in energy and reserve pricing. Updating the startup plus notification time after being scheduled by PJM operators is a practice that is currently recommended, but not required in the PJM manuals. The proposal aims to formalize this process by incorporating it in Manual 11.

Proposed Implementation Date: June 1, 2014

As the PJM Proposal was the only package proposed for implementation prior to this summer, no polling was conducted.

2. Appendix I: Supplemental Documents

- [ERPIV Options and Solutions Matrix](#)
- [Manual 11 Revisions Executive Summary](#)
- [Manual 11 Revisions](#)

3. Appendix II: Stakeholder Participation

Last Name	First Name	Company Name	Sector
Ainspan	Malcolm	Energy Curtailment Specialists, Inc.	Other Supplier
Anders	David	PJM Interconnection, LLC	Not Applicable
Avallone	Ethan	New York ISO	Not Applicable
Baran	Eric	Allegheny Electric Cooperative, Inc.	Electric Distributor
Barker	Jason	Exelon Business Services Company, LLC	Transmission Owner
Beck	David	Duke Energy Business Services LLC	Generation Owner
Berger (ES)	Ken	Dominion Virginia Power	Not Applicable
Binder	Gerry	SESCO Enterprises LLC	Other Supplier
Birnel	William	Westar Energy, Inc. (ED)	Electric Distributor
Blair	Tom	Monitoring Analytics, LLC	Not Applicable
Bleiweis	Bruce	DC Energy Mid-Atlantic, LLC	Other Supplier
Bloom	David	Baltimore Gas and Electric Company	Transmission Owner
Bolan	Martin	FirstEnergy Solutions Corporation	Transmission Owner
Borgatti	Michael	Gable and Associates	Not Applicable



Boyle	Glen	PJM Interconnection, LLC	Not Applicable
Brodbeck	John	Potomac Electric Power Company	Electric Distributor
Bryson	Mike	PJM Interconnection, LLC	Not Applicable
Butler	Jim	NiSource	Other Supplier
Buttner	Sarah	Division of the Public Advocate of State of Delaware	End User Customer
Campbell	Bruce	EnergyConnect, Inc.	Other Supplier
Canchi	Devendra	Other	Not Applicable
Canter	David	AEP Appalachian Transmssion Company, Inc.	Transmission Owner
Carl	Joseph	PJM Interconnection, LLC	Not Applicable
Carmean	Gregory	Organization of PJM States, Inc.	Not Applicable
Carretta	Kenneth	PSEG Energy Resources and Trade LLC	Transmission Owner
Carro	Dan	Dominion Virginia Power	Not Applicable
Carroll	Rebecca	PJM Interconnection, LLC	Not Applicable
Ciabattoni	Joseph	PJM Interconnection, LLC	Not Applicable
Citrolo	John	PSEG Energy Resources and Trade, LLC	Transmission Owner
Comeskey	Benjamin	Other	Not Applicable
Coyle	Billy	Dominion Virginia Power	Not Applicable
Cresson	Joe	Calpine Energy Services, L.P.	Generation Owner
Dadourian	John	Monitoring Analytics, LLC	Not Applicable
Desjardins	Gerry	Mercuria Energy America, Inc.	Other Supplier
Devon	Chris	MI Public Service Commission	Not Applicable
Drabant	Tracey	Duquesne Light Company	Transmission Owner
Dugan	Bill	Customized Energy Solutions, Ltd.*	Not Applicable
Dugan	Chuck	East Kentucky Power Cooperative, Inc.	Transmission Owner
Dugan	Bill	Customized Energy Solutions, Inc.	Not Applicable
Edington	Sean	Mercuria Energy America, Inc.	Other Supplier
Edstrom	Zac	Cargill Power Markets LLC	Other Supplier
Etnoyer	Scott	Newark Bay Cogeneration Partnership, L.P.	Generation Owner
Fabiano	Janell	PJM Interconnection, LLC	Not Applicable
Farber	John	DE Public Service Commission	Not Applicable
Fazio	Danielle	BTG Pactual Commodities (US) LLC	Other Supplier
Filomena	Guy	Customized Energy Solutions, Ltd.*	Not Applicable
Fitch	Neal A.	NRG Power Marketing, LLC	Generation Owner
Flaherty	Dale	Duquesne Light Company	Transmission Owner
Foladare	Kenneth	IMG Midstream LLC	Generation Owner
Freeman	Al	MI Public Service Commission	Electric Distributor



Frelich	Jessica	Integrus Energy Services, Inc. (BGS)	Other Supplier
Frost	Jodi	Moxie Liberty LLC	Other Supplier
Fuess	James	PBF Power Marketing LLC	Generation Owner
Garbini	Marj	Potomac Electric Power Company	Electric Distributor
Gardner	Michelle	NextEra Energy Power Marketing, LLC	Generation Owner
Gates	Terry	AEP Appalachian Transmission Company, Inc.	Transmission Owner
Gell	Richard	Ontario Power Generation Inc.	Other Supplier
Gilani	Rehan	Consolidated Edison Energy, Inc.	Other Supplier
Gondek	John	PSEG Energy Resources and Trade LLC	Transmission Owner
Greening	Michele	PPL EnergyPlus, L.L.C.	Transmission Owner
Gresh	Kevin	PJM Interconnection, LLC	Not Applicable
Guerry	Katie	EnerNOC, Inc.	Other Supplier
Guler	Teoman	J. Aron & Company	Other Supplier
Haney	Kara	Champion Energy Services, LLC	Other Supplier
Hastings	David	Cygnus Energy Futures, LLC	Other Supplier
Haynes	Greg	Energy Authority, Inc. (The)	Other Supplier
Heizer	Fred	Ohio PUC	Not Applicable
Helms	Joseph	Rainbow Energy Marketing Corporation	Other Supplier
Hoatson	Tom	Riverside Generating, LLC	Other Supplier
Holland	Risa	PJM Interconnection, LLC	Not Applicable
Horning	Lynn Marie	PJM Interconnection, LLC	Not Applicable
Horstmann	John	Dayton Power & Light Company (The)	Transmission Owner
Hubbard	Lance	Allegheny Electric Cooperative, Inc.	Electric Distributor
Hurwich	Mark	Elliott Bay Energy Trading, LLC	Other Supplier
Hyzinski	Tom	PPL EnergyPlus, L.L.C.	Transmission Owner
Jennings	Kenneth	Duke Energy Business Services LLC	Generation Owner
Johnson	Carl	Customized Energy Solutions, Ltd.	Not Applicable
Jostworth	Kimberly	RBC Energy Services LP	Other Supplier
Josyula	Siva	Monitoring Analytics, LLC	Not Applicable
Jwanier	David	Other	Not Applicable
Kazerooni	Hamid	PPL EnergyPlus, L.L.C.	Transmission Owner
Keech	Adam	PJM Interconnection, LLC	Not Applicable
Kerecman	Joe	Calpine Energy Services, L.P.	Generation Owner
Kerecman	Joseph	Calpine Energy Services, L.P.	Generation Owner
Koch	Karen	Morgan Stanley Capital Group, Inc.	Other Supplier
Kogut	George	New York Power Authority	Other Supplier



Kraemer	Neil	XO Energy MA, LP	Other Supplier
La Falce	Michael	PSEG Energy Resources and Trade LLC	Transmission Owner
Lacy	Catharine	Dominion Virginia Power	Not Applicable
Leonard	Ryan	IBERDROLA RENEWABLES, LLC	Generation Owner
Liang-Nicol	Cecilia	Allegheny Power (MonPwr Gen)	Not Applicable
Lieberman	Steven	Old Dominion Electric Cooperative	Electric Distributor
Luna	Joel	Monitoring Analytics, LLC	Not Applicable
Mabry	David	PJM Industrial Cost Coalition	Not Applicable
Mancuso	Maria	Baltimore Gas and Electric Company	Transmission Owner
Manek	Sameer	DC Energy Mid-Atlantic, LLC	Other Supplier
Marcino	Angelo	PJM Interconnection, LLC	Not Applicable
Mariam	Yohannes	DC Public Service Commission	Not Applicable
Marton	David	FirstEnergy Solutions Corp.	Transmission Owner
Maucher	Andrea	Division of the Public Advocate of the State of Delaware	End User Customer
McAlister	Lisa	American Municipal Power, Inc.	Electric Distributor
McNally	Stephen	Long Island Lighting Company d/b/a LIPA	Other Supplier
Methaprayoon	Kittipong	Mercuria Energy America, Inc.	Other Supplier
Mok	Alan	Duke Energy Kentucky, Inc.	Transmission Owner
Morelli	Lisa	PJM Interconnection, LLC	Not Applicable
Nivolianitis	Ted	TransAlta Energy Marketing (US) Inc. (Hudson)	Other Supplier
Norman	Jason	Tennessee Valley Authority	Other Supplier
Norton	Chris	American Municipal Power, Inc.	Electric Distributor
O'Connell	Robert	J.P. Morgan Ventures Energy Corporation	Other Supplier
Olaley	Michael	PJM Interconnection, LLC	Not Applicable
Ondayko	Brock	AEP Energy Partners, Inc.	Other Supplier
Pacella	Chris	PJM Interconnection, LLC	Not Applicable
Pakela	Greg	DTE Energy Trading, Inc.	Other Supplier
Park	Jinny	PJM Interconnection, LLC	Not Applicable
Parker	Seth	Long Island Lighting Company d/b/a LIPA	Other Supplier
Patel	Keyur	PJM Interconnection, LLC	Not Applicable
Patten	Kevin	AEP Energy Partners, Inc. (AEP Gen Resources)	Not Applicable
Peoples	John	Duquesne Light Company	Transmission Owner
Perera	Asanga	PJM Interconnection, LLC	Not Applicable
Philips	Marjorie	Hess Corporation	Other Supplier
Pilong	Chris	PJM Interconnection, LLC	Not Applicable
Plante	Matthieu	H.Q. Energy Services (U.S.), Inc.	Other Supplier



Pratzon	David	GT Power Group	Not Applicable
Rajan (ES)	Abhijit	Dominion Resources	Not Applicable
Ramsey	Todd	DC Energy LLC	Other Supplier
Reichert	Joshua	Other	Not Applicable
Robson	Matt	SESCO Enterprises LLC	Other Supplier
Rohrbach	John	Southern Maryland Electric Cooperative, Inc.	Electric Distributor
Rutigliano	Thomas	Achieving Equilibrium LLC	Other Supplier
Saini	Ishwar	Macquarie Energy LLC	Other Supplier
Scarpignato	David	Direct Energy Business, LLC	Other Supplier
Seth	Parker	Long Island Power Authority	Other Supplier
Shanker	Roy J.	H.O. Energy Services (U.S.), Inc.	Other Supplier
Sidhom	Noha	Cobalt Capital Partners, LLC	Other Supplier
Singh	Harry	J. Aron & Company (Real-Time Transacting)	Other Supplier
Slade Jr. (ES-vapwr)	Louis	Virginia Electric & Power Company	Transmission Owner
Smoots	Carol	Pierce Atwood	Not Applicable
Snow	Robert	The Federal Energy Regulatory Commission	Not Applicable
Snyder	Sue	PJM Interconnection, LLC	Not Applicable
Sock	Bryan	PSEG Energy Resources and Trade LLC	Transmission Owner
Souder	Rich	PJM Interconnection, LLC	Not Applicable
Stadelmeyer	Rebecca	Exelon Business Services Company, LLC	Transmission Owner
Sudhakara	Raghu	Rockland Electric Company	Transmission Owner
Summers	Theodore	PSEG Energy Resources and Trade LLC	Transmission Owner
Terry	Jonathan	Allegheny Electric Cooperative, Inc.	Electric Distributor
Thiemann	Tom	Duke Energy Business Services LLC	Generation Owner
Tigue	John	New York State Electric & Gas Corporation	Other Supplier
Trayers	Barry	Citigroup Energy, Inc.	Other Supplier
Tsikirayi	Edward	Long Island Lighting Company d/b/a LIPA	Other Supplier
Velasco	Cheryl Mae	PJM Interconnection, LLC	Not Applicable
Wadsworth	Joseph	Vitol Inc.	Other Supplier
Walter	Laura	PJM Interconnection, LLC	Not Applicable
Webster	John	Dyon	Other Supplier
Weghorst (pplep)	Bradley	PPL EnergyPlus, L.L.C.	Transmission Owner
Weiss	Glenn	PJM Interconnection, LLC	Not Applicable
Wellborn	Sam	Division of the Public Advocate of State of Delaware	End User Customer
Wetzel	Ray	Constellation Energy Commodities Group, Inc.	Other Supplier



Wharton	Matthew	PJM Interconnection, LLC	Not Applicable
Williams	Stanley	PJM Interconnection, LLC	Not Applicable
Wisersky	Megan	Madison Gas & Electric Company	Other Supplier
Wood	Gordon	ETC Endure Energy L.L.C.	Other Supplier
Xenopoulos	Damon	Other	Not Applicable

4. Appendix III: Proposals Not Meeting The Threshold

N/A

5. Standing Committee Results

N/A



DM# []