

Regulation Performance Senior Task Force (RPSTF) Consensus Proposal Report

December 21, 2011

Regulation Market Changes

The development of the RPSTF proposal coincided with [FERC Order 755-Frequency Regulation Compensation in the Organized Wholesale Power Markets](#) issued on the October 20, 2011. The Order requires a two-part offer comprised of Regulation Capability component and a Regulation Performance component that includes mileage.. For market clearing purposes, the Capability offer must include the price of the capability reservation, lost opportunity cost as determined by the RTO, cross product substitution also determined by the RTO, and inter-temporal opportunity cost determined by the RTO or the cleared offer. The Performance offer must also be used by the clearing engine to set the performance-based clearing price. Performance compensation must be based on accuracy relative to control signals and the absolute amount of regulation up and regulation down it provides in response to the system operator's dispatch signal. The methods used for performance calculations must be uniform for all resources. The RPSTF proposal aligns with all aspects of Order 755. Consensus was achieved using the Tier 1 decision-making method of the PJM stakeholder process.

1. Recommended Proposal

The RPSTF proposal concurs with Order 755. The proposal is broken into two phases (Appendix 2).

Phase 1 contains five elements. First, the Regulation Performance Score is calculated for each hour, or portion of an hour, that each resource regulates. Feedback will be provided to the resource owners via GPM or eMKT in near real time. The Performance Score will be used to determine hourly eligibility. Second, the threshold for hourly eligibility is set at 25%, when a Performance Score falls below 25% it will not receive regulation credits or Lost Opportunity Cost. Third, for continued poor Performance Score a resource will be disqualified from the Regulation market, if the rolling average of the last 100 operating hours falls below 40%. Once a resource is disqualified it must re-qualify to offer in Regulation market. Fourth, to minimize the conflict between ramping a resource for energy when it is needed for Regulation, the economic ramp rate will be reduced when a resource is regulating. Finally, the Regulation requirement would be reduced from 1.0% of peak/valley load to .9% of peak/valley load.

Phase 2 contains five elements in addition to a continuation of the Phase 1 elements. First, resources will make a two-part offer that includes a price for Regulation capability and a price for performance reflecting mileage. Second, historic Performance Score will be used to adjust the two offers to determine the hourly clearing based on lowest total expected production cost. Third, resources are settled with respect to the actual performance of the resource compared to the signal the resource is following. Fourth, the improved regulating resource performance due to performance scoring will reduce the Regulation procured to meet the CPS1 and BAAL standards. Fifth, to qualify for the Regulation market, resources will follow a dynamic shape instead of the square wave that they follow now.

2. Stakeholder Process Summary

The [RPSTF](#) was chartered in April to address the issue of PJM Regulation market lacking the ability to distinguish between various levels of performance. While PJM System Operations has the ability to send both fast and slow

regulation signals, there is no additional compensation for the resources to perform at a high level once they have qualified for the Regulation market.

The Task Force met 17 times between April 7, 2011 and December 12, 2011. The first two meetings were used for charter, work plan and education topic development. An additional three meetings were used for stakeholder education that covered a frequency regulation markets overview, the FERC NOPR RM-11-7, presentations about the regulation pilots conducted by PJM, presentations by Task Force participants Beacon Power and ENBALA, presentations from ERCOT, NYISO and ISO-NE, and the IMM.

The next 5 meetings were used to develop and fill out the matrix. Because Regulation performance is a large issue that touches all parts of the Regulation product, the discussion was separated into the operations and performance metrics. During the discussion, the Task Force pursued a special topic about the potential for using a signal that would be Up/Down to allow for resources who cannot reset to follow the signal with the determination that this was not feasible or desirable in the Regulation product.

The remaining six meetings were used to develop and refine the two-part proposal that introduced changes to Regulation performance measurement and verification in Phase 1 and Regulation market operation changes in Phase 2. As the group worked through proposal development, there was more education that included analysis of specific regulation events and the development of a calculator. The Energy Storage Association presented a proposal that was subsumed into the final proposal. To support the final proposal, the Task Force recommends changes to the [Tariff \(OATT\)](#), the [Operating Agreement \(OA\)](#), and [Manual changes for M11, M12 and M28](#) (Appendix 2). The Task Force endorsed the final proposal package and business rules (Appendix 2) on November 4, 2011. The proposal package is presented for information at the November 16th MRC and for voting at the December 22, 2011.

There are two areas of special note:

KEMA Studies- As part of the Task Force's charge, PJM engaged KEMA, an energy consulting firm, to 1) evaluate the operational impacts of various levels of resources following the RegA (traditional) and RegD (fast) signals, 2) establish if there is an optimum mix of resources following the fast or slow signal, 3) determine the associated Regulation requirement reduction under the various mixes of fast and slow, and 4) find any points of diminishing returns that may need to be considered in the Regulation clearing process. The results from the study may impact the performance offer. After running multiple scenarios, PJM has been able to approximate the level of reduction in regulation procured that will at least match today's CPS1 scores while reducing the Regulation requirement. Additionally, the study supports the idea that faster regulation can lead to a lower overall regulation requirement. However, the study identified a pattern of diminishing returns as the amount of regulation following the fast signal increased. The full report is posted on the RPSTF website and posted with the MRC materials. .

After the fact Opportunity Cost - FERC Order 755,

"The Commission also expressed concern that the manner in which some resources that provide frequency regulation service are compensated for their opportunity costs may be unduly discriminatory. For instance, while PJM provides an ex ante estimate of opportunity costs that is included in the uniform clearing price, it also provides ex post "make whole" payments based on individual unit opportunity costs, something that is not reflected in the uniform market clearing price calculation." Paragraph 31, Order 755.

The RPSTF proposal reflecting the new bidding, clearing, and settlements structures involved with two-part compensation, combined with the co-optimization of reserves (including Regulation) with energy proposed in the

PJM Shortage Pricing filing currently in front of FERC, will comply with this aspect of Order 755. PJM notes however, that the co-optimization of energy, regulation, and reserves is fundamental to proper pricing of each product. PJM is requesting stakeholder endorsement of the RPSTF proposal in its current form under the assumption that the Shortage Pricing changes will be in place prior to the implementation of the Order 755 compliance changes. If FERC does not approve the Shortage Pricing compliance filing prior to PJM's filing of the Order 755 compliance filing, PJM will include the co-optimization component of the Shortage Pricing filing in the Order 755 compliance filing in order to ensure compliance with the after-the-fact opportunity cost requirement in Order 755.

3. Appendix I: Committee Participation

A list is provided here of the RPSTF members who participated at the meeting where the final vetting of options/alternatives was completed, and those members who regularly participated at group meetings.

LAST NAME	FIRST NAME	COMPANY	SECTOR
Ogburn	Ruston	PJM Interconnection	Not applicable
Eichorn	Sarah	PJM Interconnection	Not applicable
Benner	Scott	PJM Interconnection	Not applicable
Keech	Adam	PJM Interconnection	Not applicable
Canter	David	AEP	Transmission Owner
Misbeck	Bob	Altairmano	Other Supplier
Norton	Chris	American Municipal Power, Inc.	Generation Owner
Judson	Judith	Beacon Power Corporation	Other Supplier
Berlinski	Michael	Beacon Power Corporation	Other Supplier
Sem	Nitin	BGE	Transmission Owner
Filomena	Guy	Customized Energy Solutions	Other Supplier
Bursaw	Chris	CP Energy Marketing (US), Inc.	Other Supplier
Shamash	Hertzel	Dayton Power & Light Company (The)	Transmission Owner
Renda	Michael	DC Energy	Other Supplier
Scarpignato	David	Direct Energy Business, LLC	Other Supplier
Burner, Jr.	Robert	Duke Energy Carolinas, LLC	Other Supplier
Flaherty	Dale	Duquesne Light Company	Transmission Owner
Ayers-Brasher	Jennifer	E.ON Climate & Renewables North America, Inc.	Generation Owner
Coulbeck	Rob	ENBALA Power Networks, Inc	Other Supplier
Gassner	Andy	ENBALA Power Networks, Inc	Other Supplier
Campbell	Bruce	EnergyConnect, Inc.	Other Supplier
Breidenbaugh	Aaron	EnerNOC, Inc.	Other Supplier
Pratzon	David	Exelon Generation Co., LLC	Transmission Owner
Benchek	James	FirstEnergy Solutions Corp.	Transmission Owner
Palcic	Ron	FirstEnergy Solutions Corp.	Transmission Owner
Decker	Jamie	Gridway Energy Partners, Inc.	Other Supplier
O'Connell	Robert	J.P. Morgan Ventures Energy Corp.	Other Supplier
Van Liere	Wayne	Louisville Gas and Electric Company/Kentucky Utilities Company	Other Supplier
Krauthamer	Michael	Maryland Public Service Commission	Not applicable
Freeman	Al	Michigan Public Service Commission	Not applicable
Bowring	Joe	Monitoring Analytics	Not applicable
Blair	Tom	Monitoring Analytics	Not applicable
Fisher	Scott	NRG Power Marketing, LLC	Generation Owner
Greening	Michele	PPL Energy Plus, LLC	Transmission Owner

Weghorst	Brad	PPL Energy Plus, LLC	Transmission Owner
Laface	Michael	PSEG Energy Resources and Trade, LLC	Transmission Owner
Summers	Ted	PSEG Energy Resources and Trade, LLC	Transmission Owner
Lepchenske	Herb	RTP Controls, Inc.	Other Supplier
Slade	Louis	Virginia Electric & Power Company	Transmission Owner
Morelock	Kevin	Viridity Energy, Inc.	Other Supplier
Wolfe	Samuel	Viridity Energy, Inc.	Other Supplier
Krajnik	Greg	Viridity Energy, Inc.	Other Supplier
Franklin	Cliff	Westar Energy, Inc.	Other Supplier
Jacos	Mike	Xtreme Power	Other Supplier

4. APPENDIX 2: BUSINESS RULES AND SUPPORTING DOCUMENTS

Documents are posted on the RPSTF page or under RPSTF Agenda item.

Tariff Language (Clean and Red-line)

KEMA Report

Manual Language

Proposal Overview and Timeline

[RPSTF Calculator](#) (Click on Calculator under the Key Document section of the linked page)

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Docs #671699, v12