Monitoring Analytics

MMU EMUSTF Phase 2: Solution Details

The Independent Market Monitor for PJM

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Solution Details

State of the Market Report Recommendations

Up-to Congestion Transactions

Up-to congestion transactions do not pay energy uplift charges. An up-to congestion transaction affects unit commitment and dispatch in the same way that increment offers and decrement bids affect unit commitment and dispatch in the Day-Ahead Energy Market. All such virtual transactions affect the results of the Day-Ahead Energy Market and contribute to energy uplift costs. Up-to congestion transactions are currently receiving preferential treatment, relative to increment offers and decrement bids and other transactions because they are not charged energy uplift.

The MMU calculated the impact on energy uplift rates if up-to congestion transactions had paid energy uplift charges based on deviations in the same way that increment offers and decrement bids do along with other recommendations that impact the total costs of energy uplift and its allocation.

The MMU recommends that up-to congestion transactions be required to pay energy uplift charges. Up-to congestion transactions would have paid an average rate between $0.215 and $0.879 per MWh in 2013 and between $1.037 and $1.270 per MWh in the first three months of 2014 if the MMU's recommendations regarding energy uplift had been in place.[1] [2]

Internal Bilateral Transactions

Market participants are allocated a portion of the costs of balancing operating reserves based on their deviations. Deviations are calculated in three categories, demand, supply and generation. Generators deviate when their real-time output is different than the desired output or their day-ahead scheduled output.[3] Load, interchange transactions,

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1 The range of operating reserve rates paid by up-to congestion transactions depends on the location of the transactions' source and sink.

2 This analysis assumes that not all costs associated with units providing support to the Con Edison – PSEG wheeling contracts would be reallocated under the MMU's proposal. The *2013 State of the Market Report for PJM* analysis assumed that all such costs would be reallocated. This analysis also assumes that only 50 percent of all cleared up-to congestion transactions would have cleared had this recommendation been in place. The *2013 State of the Market Report for PJM* analysis showed that more than 66.7 percent of up-to congestion transactions would have remained under the MMU proposal.

3 See OATT 3.2.3 (o) for a complete description of how generators deviate.

internal bilateral transactions, demand resources, increment offers and decrement bids also incur deviations. These transactions are grouped in the demand and supply categories.

Generators are allowed to offset their deviations with other generators at the same bus if the generators have the same electrical impact on the transmission system. Load, interchange transactions, internal bilateral transactions, demand resources, increment offers and decrement bids are also allowed to offset their deviations. These transactions are grouped into two categories, demand and supply and aggregated by location. A negative deviation from one transaction can offset a positive deviation from another transaction in the same category, as long as both transactions are in the same location at the same hour.[4] Demand transactions such as load, exports, internal bilateral sales and decrement bids may offset each other's deviations. The same applies to supply transactions such as imports, internal bilateral purchases and increment offers. Unlike all other transaction types, internal bilateral sales and purchases do not impact dispatch or market prices. Internal bilateral transactions are used by participants to transfer the financial responsibility or right of the energy withdrawn or injected into the system in the Day-Ahead and Real-Time Energy Markets.

The MMU recommends eliminating the use of internal bilateral transactions (IBTs) in the calculation of deviations used to allocate balancing operating reserve charges. IBTs should not pay for balancing operating reserves and should not be used to offset other transactions that deviate. IBTs shift the responsibility for an injection or withdrawal in PJM from one participant to another but IBTs are not part of the day-ahead unit commitment process, do not set energy prices and do not impact the energy flows in either the Day-Ahead or the Real-Time Energy Market, and thus IBTs should not be considered in the allocation of balancing operating reserve charges. The use of IBTs has been extended to offset deviations from other transactions that do impact the energy market. The elimination of the use of IBTs in the deviation calculation would eliminate the balancing operating reserve charges to participants that use IBTs only in real time. Such elimination would increase the balancing operating reserve charges to participants that use IBTs to offset deviations from day-ahead transactions.

The impact of eliminating the use of internal bilateral transactions in the calculation of deviations use to allocated balancing operating reserve charges has been aggregated with the impacts of other recommendations.

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[4] Locations can be control zones, hubs, aggregates and interfaces. See the *2013 State of the Market Report for PJM, Volume II*, Section 4, "Energy Uplift" at "Energy Uplift" pp. 124-129 for a description of balancing operating reserve locations.

Con Edison – PSEG Wheeling Contracts Support

It appears that certain units located near the boundary between New Jersey and New York City are frequently operated to support the wheeling contracts between Con-Ed and PSEG.[5] These units are often run out of merit and receive substantial day-ahead and balancing operating reserve credits. The MMU recommends that this issue be addressed by PJM in order to determine if the cost of running these units is being allocated properly.

Reactive Services Credits and Balancing Operating Reserve Credits

Energy uplift credits to resources providing reactive services are separate from balancing operating reserve credits.[6] Under the current rules regarding energy uplift credits for reactive services, units are not assured recovery of the entire offer including no load and startup costs as they are under the operating reserve credits rules. Units providing reactive services at the request of PJM are made whole through reactive service credits. But when the reactive services credits do not cover a unit's entire offer, the unit is made whole the balance through balancing operating reserves. The result is a misallocation of the costs of providing reactive services. Reactive services credits are paid by real-time load in the control zone or zones where the service is provided while balancing operating reserve charges are paid by deviations from day-ahead or real-time load plus exports in the RTO, Eastern or Western Region depending on the allocation process rather than by zone.

In the first three months of 2014, units providing reactive services were paid $0.9 million in balancing operating reserve credits in order to cover their total energy offer. In 2012 and 2013, this misallocation was $26.7 million, for a total of $27.6 million in the last two years and three months.

The MMU recommends that reactive services credits be calculated consistent with the balancing operating reserve credit calculation. The MMU also recommends including real-time exports in the allocation of the cost of providing reactive support to the 500 kV system or above.[7] Currently only real-time RTO load pays.[8]

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5 See the *2013 State of the Market Report for PJM, Volume II*, Section 9, "Interchange Transactions" at "Con Edison and PSE&G Wheeling Contracts" for a description of the contracts.

6 OATT Attachment K - Appendix § 3.2.3B (f).

7 Real-time exports would include the withdrawal side of real-time wheeling transactions.

Allocation Proposal

The day-ahead operating reserve category elimination and other MMU recommendations require enhancements to the current energy uplift allocation methodology.

The current methodology allocates day-ahead operating reserve charges to day-ahead load, day-ahead exports and decrement bids. The elimination of the day-ahead operating reserve category shifts these costs to the balancing operating reserve category which could be paid by deviations or by real-time load plus real-time exports depending on the balancing operating reserve allocation rules. The MMU recommends creating a new category for energy uplift payments to units scheduled in the Day-Ahead Energy Market (for reasons other than reactive or black start services), which would be allocated to day-ahead load, day-ahead interchange transactions and virtual transactions. All these transaction types have an impact on the outcome of the day-ahead scheduling process, so allocating these costs to all day-ahead transactions ensures that all transactions that affect the way the Day-Ahead Energy Market clears are responsible for any energy uplift credits paid to the units scheduled in the Day-Ahead Energy Market.

The MMU recommends allocating energy uplift payments to units not scheduled in the Day-Ahead Energy Market and committed in real time based on the current deviation categories with the addition of up-to congestion and wheeling transactions and the exclusion of offsets based on internal bilateral transactions. These costs should be allocated to the current deviation categories whenever the units receiving energy uplift payments are committed before the operating day.

The MMU recommends changing the allocation of lost opportunity cost and canceled resources. LOC paid to units scheduled in the Day-Ahead Energy Market and not committed in real-time should be allocated to deviations based on the proposed definition of deviations. LOC paid to units reduced for reliability in real time and payments to canceled resources should be allocated to physical deviations.

The MMU recommends allocating energy uplift payments to units committed during the operating day (CTs) to a new deviation category which would include physical transactions or resources (day-ahead minus real-time load, day-ahead minus real-time interchange transactions, generators and DR not following dispatch). This allocation would ensure that commitment changes that occur during the operating day and that

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[8] See the Day-Ahead Reliability and Reactive Cost Allocation Final Report (December 13, 2013) for a complete description of the issues discussed in that group. <http://www.pjm.com/~/media/committees-groups/task-forces/emustf/20131220/20131220-item-02b-darrca-final-report.ashx>.

result in energy uplift payments are paid by transactions or resources that result in the commitment of units during the operating day. For example, real-time load or interchange transactions that do not bid in the Day-Ahead Energy Market, generators and DR resources that do not follow dispatch would be allocated these costs. Any reliability commitment should be allocated to real-time load plus real-time exports independently of the timing of the commitment.[9]

Table 0-1 shows the current allocation by energy uplift reason. For example, energy uplift payments to units scheduled in the Day-Ahead Energy Market are called day-ahead operating reserves, these costs are paid by day-ahead load, day-ahead exports and decrement bids. Any additional payment resulting from the real time operation of these units are called balancing operating reserves, these costs are paid by either deviations or real-time load and real-time exports depending on the amount of intervals the units are economic.

Table 0-1 Current energy uplift allocation

Reason	Energy Uplift Category	Allocation Logic	Allocation
Units scheduled in the Day-Ahead Energy Market	Day-Ahead Operating Reserve	NA	Day-Ahead Load, Day-Ahead Exports and Decrement Bids
Units scheduled in the Day-Ahead Energy Market	Balancing Operating Reserve	LMP < Offer for at least four intervals	Real-Time Load and Real-Time Exports
		LMP > Offer for at least four intervals	Deviations
Unit Not Scheduled Day Ahead and Committed in Real Time	Balancing Operating Reserve	Committed before the operating day for reliability	Real-Time Load and Real-Time Exports
		Committed before the operating day to meet forecasted load and reserves	Deviations
		Committed during the operating day and LMP < Offer for at least four intervals	Real-Time Load and Real-Time Exports
		Committed during the operating day and LMP > Offer for at least four intervals	Deviations
Units scheduled in the Day-Ahead Energy Market	LOC Credit	NA	Deviations
Units reduced for reliability in real time	LOC Credit	NA	Deviations
Units canceled before coming online	Cancellation Credit	NA	Deviations

Table 0-2 shows the MMU allocation proposal by energy uplift reason. The proposal eliminates the day-ahead operating reserve category and creates a new category for any energy uplift payments to units scheduled in the Day-Ahead Energy Market and committed in real time. This new category would be allocated to day-ahead load, day-ahead interchange transactions and virtual transactions. The proposal also eliminates the need to determine the number of intervals that units are economic to determine if the energy uplift charge should be allocated to deviations or to real-time load and real-time exports. In the proposal, any commitment instruction before the operating day would be

[9] Real-time exports would include the withdrawal side of real-time wheeling transactions.

allocated based on the proposed definition of deviations; any commitment instruction during the operating day would be allocated to physical deviations.

Table 0-2 MMU energy uplift allocation proposal

Reason	Energy Uplift Category	Allocation Logic	Allocation
Units scheduled in the Day-Ahead Energy Market and committed in real time	Day-Ahead Segment Make Whole Credit	NA	Day-Ahead Load, Day-Ahead Interchange Transactions and Virtual Transactions
Units not scheduled in the Day-Ahead Energy Market and committed in real time	Real Time Segment Make Whole Credit	Committed before the operating day	Deviations
		Committed during the operating day	Physical Deviations
		Any commitment for reliability	Real-Time Load, Real-Time Exports and Withdrawal Side of Real-Time Wheels
Units scheduled in the Day-Ahead Energy Market not committed in real time	Day-Ahead LOC	NA	Deviations
Units reduced for reliability in real time	Real-Time LOC	NA	Physical Deviations
Units canceled before coming online	Cancellation Credit	NA	Physical Deviations

Quantifiable Recommendations Impact

The MMU calculated the rates that participants would have paid in 2013 and the first three months of 2014 if all the MMU's recommendations on energy uplift had been in place. In order to avoid the release of confidential information, these impacts cannot be disaggregated by issue. These recommendations have been included in the analysis: day-ahead operating reserve elimination; net regulation revenues offset; implementation of the proposed changes to lost opportunity cost calculations; reallocation of operating reserve credits paid to units supporting the Con Edison – PSEG wheeling contracts; elimination of internal bilateral transactions from the deviations calculation; allocation of energy uplift charges to up-to congestion transactions and the MMU energy uplift allocation proposal.

Table 0-3 shows the energy uplift cost of a 1 MW transaction if these recommendations had been implemented in 2013 and the first three months of 2014. For example, a decrement bid in the Eastern Region (if not offset by other transactions) would have paid an average rate of $0.439 and $0.635 per MWh in the 2013 and the first three months of 2014, $2.946 and $5.928 per MWh less than the actual average rate paid. Up-to congestion transactions sourced in the Eastern Region and sinking in the Western Region would have paid an average rate of $0.547 and $1.154 per MWh in 2013 and the first three months of 2014. Table 0-3 shows the current and proposed averages energy uplift rates for all transactions.

Table 0-3 Current and proposed average energy uplift rate by transaction: 2013 and January through March 2014 [10]

		2013		Jan - Mar 2014	
	Transaction	Current Rates ($/MWh)	Proposed Rates ($/MWh)	Current Rates ($/MWh)	Proposed Rates ($/MWh)
East	INC	3.283	0.439	6.351	0.635
	DEC	3.385	0.439	6.563	0.635
	DA Load	0.102	0.019	0.212	0.089
	RT Load	0.076	0.059	1.697	1.652
	Deviation	3.283	1.205	6.351	3.245
West	INC	1.650	0.107	5.593	0.518
	DEC	1.752	0.107	5.805	0.518
	DA Load	0.102	0.019	0.212	0.089
	RT Load	0.056	0.039	1.682	1.637
	Deviation	1.650	0.690	5.593	3.042
UTC	East to East	NA	0.879	NA	1.270
	West to West	NA	0.215	NA	1.037
	East to/from West	NA	0.547	NA	1.154

EMUSTF Recommendations

Emergency DR

Emergency DR receives two types of energy payments. An energy payment equal to the MWh of energy reduced times the real-time LMP, and another payment, the emergency DR make whole payment, equal to any shortfall between a resource's strike price and the energy payment. Both of these payments are allocated as charges to participants that are net purchasers in the Balancing Market during the hours the emergency DR was committed. A net purchaser in the Balancing Market could be an LSE with a real-time load greater than its day-ahead load, or a generator scheduled in the Day-Ahead Energy Market that trips offline in real time.

All emergency DR payments are out of market payments. Unlike the output provided by generators, the energy reduced by DR is not part of the power balance equation.[11] Therefore, any additional energy payments to emergency DR are out of market payments, regardless of the level of the real-time LMP and resources' offers. Under the current rules, all emergency DR commitment results in out of market payments.

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[10] The deviation transaction means load, interchange transactions, generators and DR deviations.

[11] Demand plus losses equal generation.

Emergency DR energy payments are unnecessary. These resources receive a capacity payment that reflects the fact that such resources do not want to pay for capacity and are willing to curtail load when the capacity that they do not pay for is needed by customers who do pay for capacity. Emergency DR capacity payments reflect their willingness to be curtailed in their capacity offer. The MMU recommends that all energy payments to all DR resources be eliminated.

But, absent the elimination of all energy payments to DR, the MMU recommends that these payments be allocated to all energy market transactions. DR payments are the result of policy decisions intended to benefit the market as a whole. The MMU recommends allocating the out of market payments of emergency DR to load, generation, interchange and virtual transactions.

Emergency Purchases

During emergency conditions, PJM may make emergency purchases from sellers with power in neighboring areas to meet the demand. These transactions are paid the real-time LMP and any shortfall between the transactions' offers and the real-time LMP is paid as an out of market payment. These payments are also allocated to net purchasers in the Balancing Market. In order to ensure that no market power is exercised by such sellers, there should be an overall offer cap on such emergency purchases and there should be limits on the parameters of such purchases.

The use of net purchasers is a simplified method of allocating these costs to deviations. The net purchaser concept is simply a deviation calculation across all transactions and resources in the entire RTO. A more precise method would be to allocate these costs to physical deviations as defined in the MMU's allocation proposal. Under this method, different transactions in different locations of the system would not be able to offset their deviations. The MMU recommends allocating the out of market payments of emergency purchases to physical deviations.