Monitoring Analytics

UTC Activity Pre and Post 162 FERC ¶ 61,139: January 1, 2017 through March 8, 2018

The Independent Market Monitor for PJM

April 3, 2018

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Introduction

On February 20, 2018, FERC issued an order in Docket No. ER18-88 (February 20th Order) accepting PJM's request to limit the number of bidding points at which virtual transactions may be submitted by market participants.[1]

The February 20th Order aligned the eligible trading points for INCs and DECs with locations where generation, load, or interchange transactions are settled, or at trading hubs where forward positions can be taken.

The February 20th Order limited UTC trading to hubs, residual metered load, and interfaces.

This report examines UTC activity, and PJM day-ahead and real-time market results, before and after the February 20th Order was implemented on February 22, 2018.

Background

The IMM has previously identified the negative impacts of UTCs on the performance of the day-ahead market and on the interaction between the day-ahead and real-time markets. Almost all UTCs profit while creating a divergence between day-ahead and real-time prices at either the source or sink location. UTCs have profited from false arbitrage opportunities created by systematic modeling differences between the day-ahead and real-time market. UTCs have contributed to consistent, substantive differences in the number of binding transmission constraints in the day-ahead market and the real-time market and consistently contributed to balancing congestion.

The day-ahead market model is, by necessity, only an approximation of the real-time model. A primary example of the difference between the day-ahead and real-time models is that the number of transmission constraints enforced in the day-ahead market is very different from that enforced in the real-time market.

As a result of the impact on the day-ahead market solution time, PJM only models an average of about 25 percent of the physical transmission elements in the day-ahead market. The modeled day-ahead constraints and their limits can change daily and hourly. PJM's selection of constraints in the day-ahead market is explicitly designed to converge the day-ahead and real-time market results. PJM selects the constraints it enforces in the day-ahead market based on its expectations regarding real-time prices, real-time congestion and the set of generating units PJM believes it will require in the real-time market.

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1 162 FERC ¶ 61,139.

The PJM market models differ between day-ahead and real-time by design. It is not a mistake. PJM does not require UTC traders to profit from these differences to bring the differences to PJM's attention. These are not modeling mistakes that require fixing.

Profitable nodal trading opportunities caused by these modeling differences do not improve the efficiency of the market. These are false arbitrage opportunities. If the price differences between the day-ahead and real-time market within a zone result from the exclusion of a constraint in the day-ahead market, no amount of virtual activity will align the market results. The only outcome will be a wealth transfer to UTC traders from other market participants.

The effect of systematic modeling differences on day-ahead and real-time prices are minimized at interfaces, residual metered load and hubs. If UTCs are to continue, limiting UTC bidding to these aggregates should reduce the opportunities for false arbitrage and should allow better alignment of the day-ahead and real-time market solutions.

Market Activity Before and After February 20th Order

UTC Volume

Figure 1 shows daily cleared UTC transactions from January 1, 2005, through March 8, 2018. Figure 1 shows a prior reduction in UTC transactions that followed a FERC order setting September 8, 2014, as the effective date for the retroactive liability of market participants for any uplift charges subsequently assigned to UTCs and the corresponding increase in UTC transactions at the expiration of the 15 month refund period.[2] Figure 1 also shows a significant reduction in UTC activity following the February 22, 2018, effective date for the February 20th Order.

[2] See 159 FERC ¶ 61,038 at P 89.

Figure 1 PJM monthly cleared up to congestion transactions by type (MW): January 1, 2005 through March 8, 2018

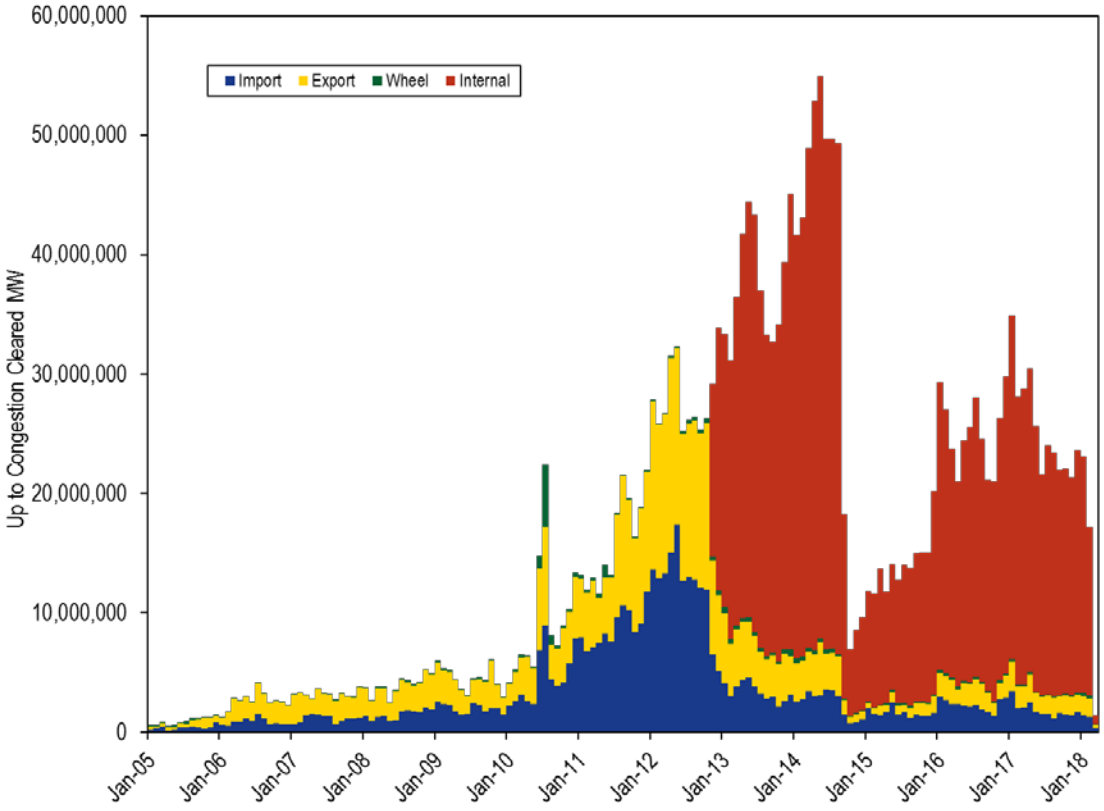
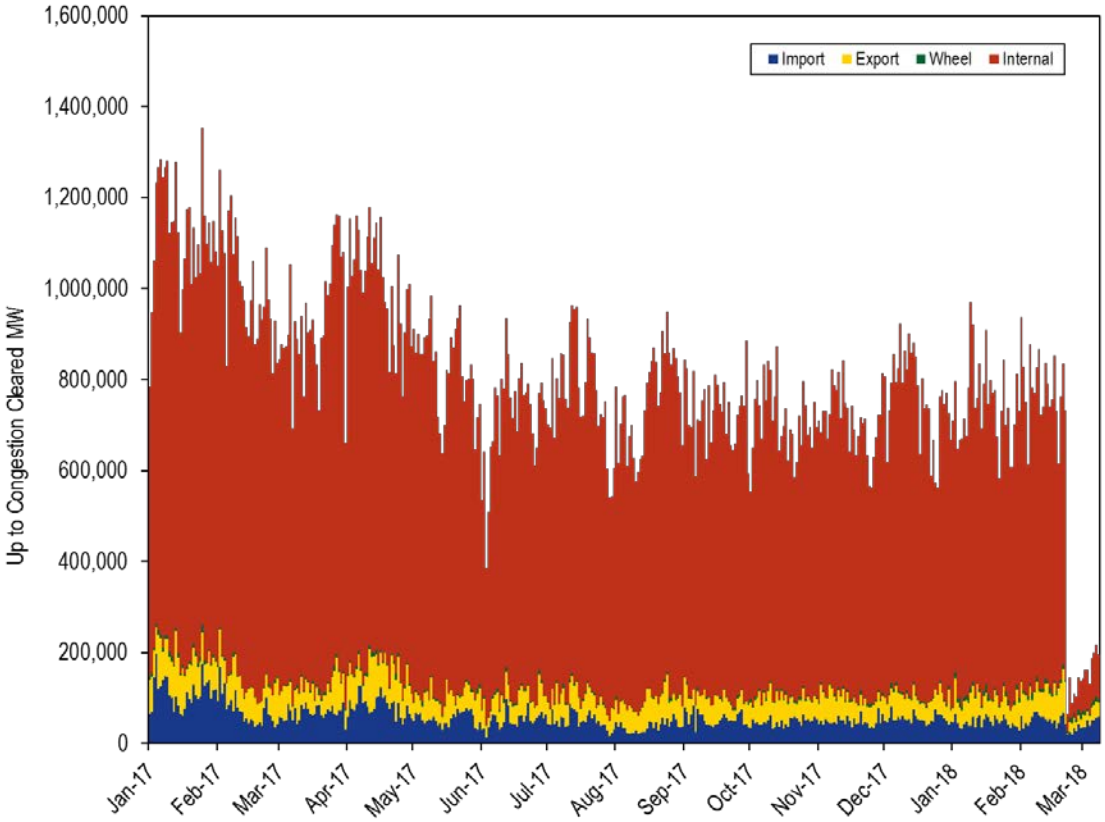


Figure 2 shows daily cleared UTC transactions for the shorter January 1, 2017, through March 8, 2018 period. Figure 2 also shows the significant reduction in UTC activity following the February 22, 2018, effective date for the February 20th Order.

Figure 2 PJM daily cleared UTC transactions by type (MW): January 1, 2017, through March 8, 2018



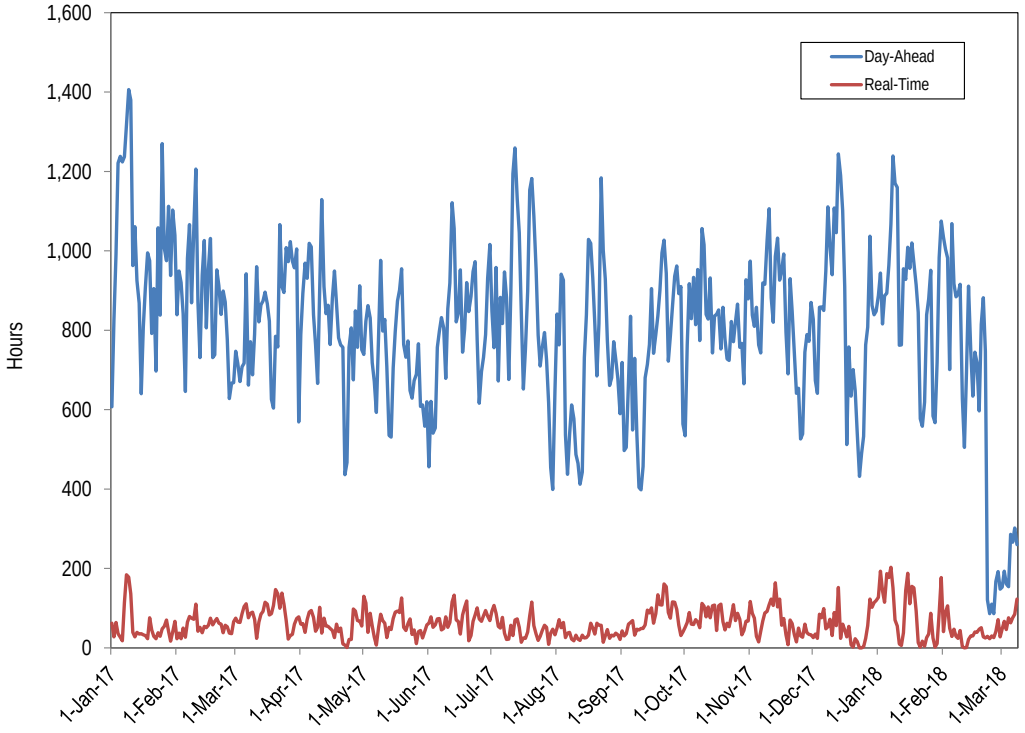
Day-Ahead and Real-Time Congestion Event Hours

UTCs have contributed to the significant differences in the number of binding constraints in the day-ahead market and the real-time market. UTCs have caused significant flows in the day-ahead market which did not occur in the real-time market. UTCs have resulted in significantly more binding constraints in the day-ahead market than in the real-time market. The reduction in UTC bid locations effective February 22, 2018, resulted in a significant reduction in day-ahead congestion event hours. A congestion event hour exists when a specific transmission facility is constrained for one or more five-minute intervals within an hour in the real-time market or for an hour in the day-ahead market. A congestion event hour differs from a constrained hour, which is any hour during which one or more facilities are congested. Thus, if two facilities are constrained during an hour, the result is two congestion event hours and one constrained hour. Constraints are often simultaneous, so the number of congestion event

hours usually exceeds the number of constrained hours and the number of congestion event hours usually exceeds the number of hours in a year.[3]

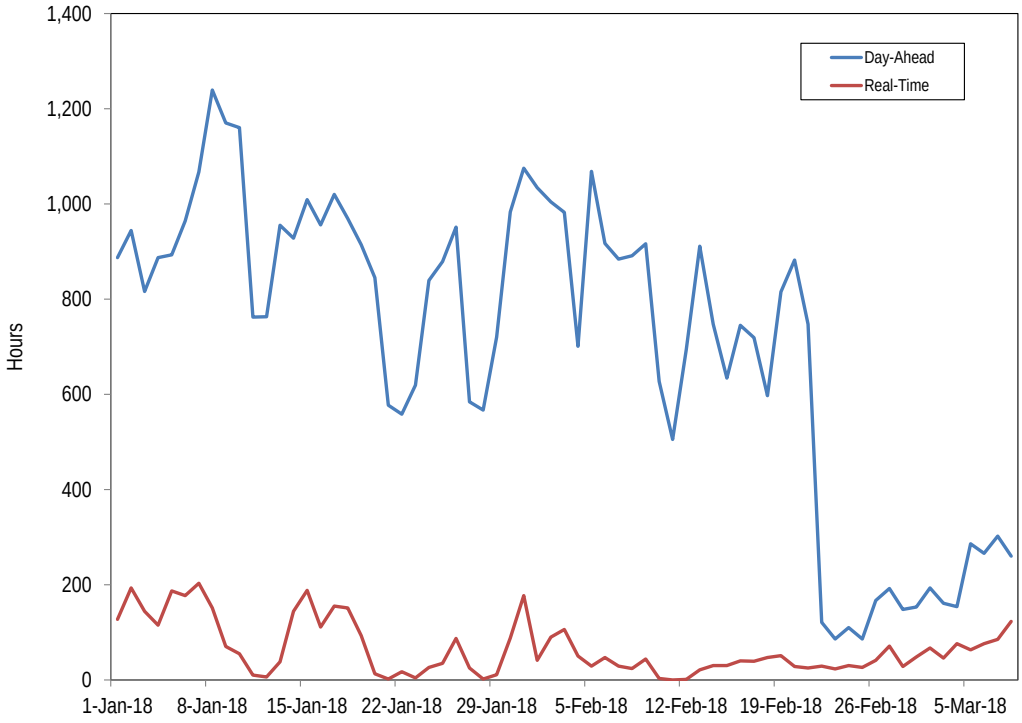
Figure 3 shows day-ahead and real-time total congestion event hours by day for the January 1, 2017, through March 8, 2018, period. Figure 4 shows day-ahead and real-time total congestion event hours by day for the shorter January 1, 2018, through March 8, 2018 period. Both figures show that the reduction in bid locations and UTC bid activity dramatically decreased day-ahead congestion event hours and brought the number of day-ahead congestion event hours much closer to the number of real-time congestion event hours observed.

Figure 3 Day-ahead and real-time total congestion event hours by day: January 1, 2017 through March 8, 2018



[3] *2017 State of the Market Report for PJM*, Vol. 2: Section 11: Congestion and Marginal Losses p. 514

Figure 4 Day-ahead and real-time total congestion event hours by day: January 1, 2018 through March 8, 2018



Day-Ahead and Balancing Congestion

The reduction in UTC bid locations did not result in an increase in day-ahead congestion or UTC contributions to day-ahead congestion. UTCs remain the primary contributor to balancing congestion, both negative and positive.

Figure 5 shows the total daily day-ahead congestion from January 1, 2017, to March 8, 2018, and UTC contribution to day-ahead congestion for the same period. Negative UTC congestion values indicate that UTCs were net paid congestion from the day-ahead market, positive congestion values indicate that UTCs were net charged congestion in the day-ahead market. The increase in total and UTC related congestion values in January were the result of weather related high energy market prices.

Figure 5 Day-ahead congestion costs by day: January 1, 2017 through March 8, 2018

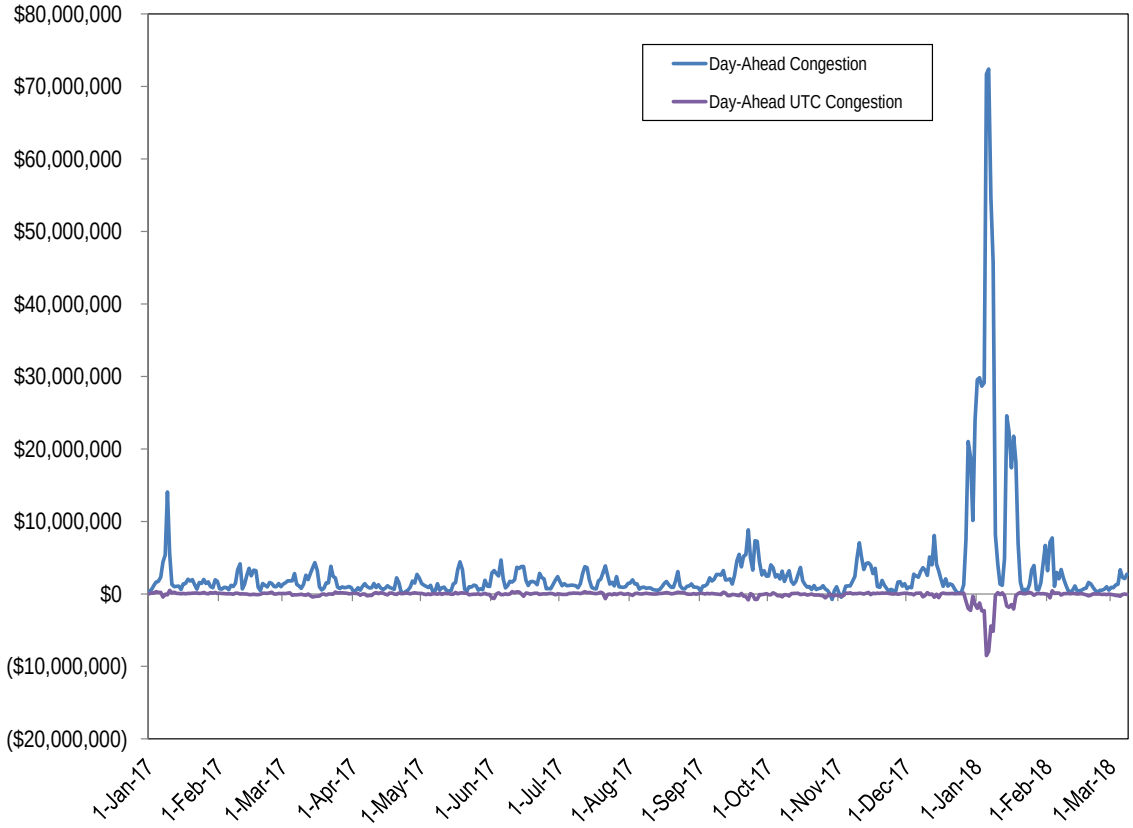
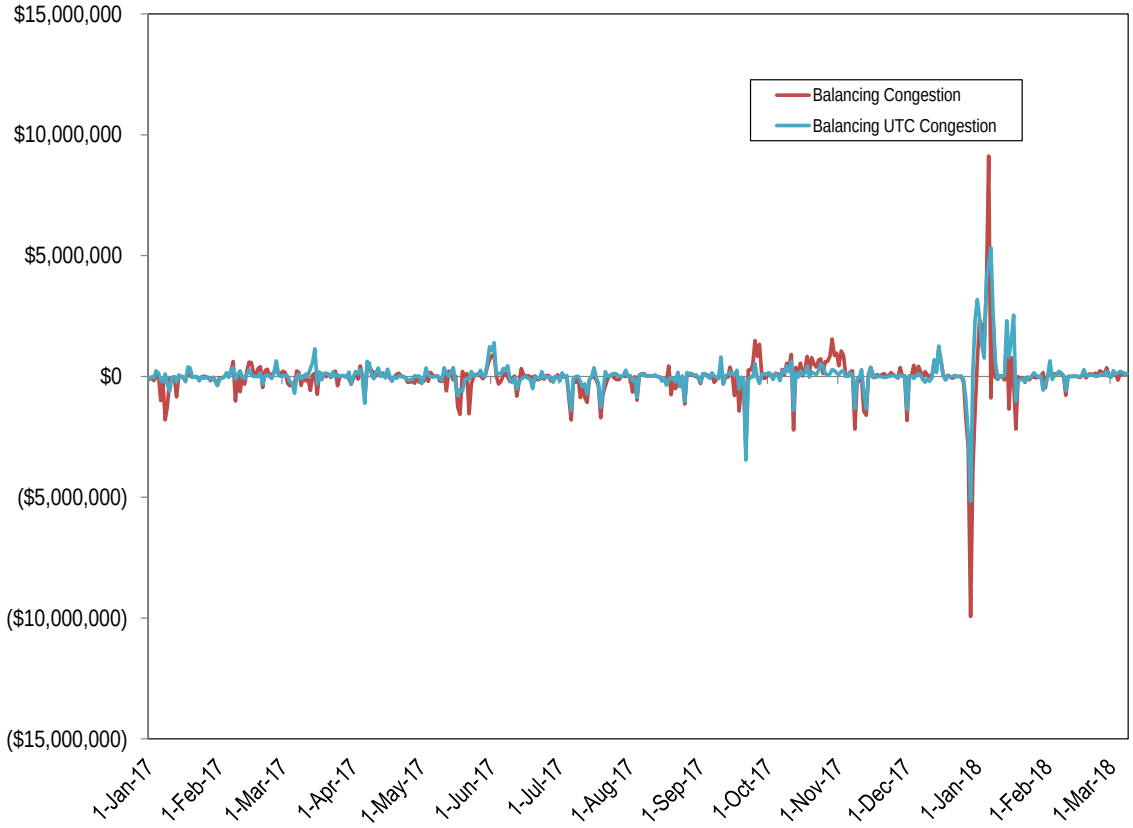


Figure 6 shows the total daily balancing congestion and the UTC contribution to balancing congestion from January 1, 2017, to March 8, 2018. In Figure 6, negative UTC balancing congestion values indicate that UTCs were, in net paid (received) balancing congestion from the PJM market. Positive UTC balancing congestion indicates that UTCs were, in net, charged (paid for) balancing congestion. Figure 6 shows that UTCs are paid most of the balancing congestion charges and pay most of the balancing congestion credits incurred in the PJM market.

Figure 6 Balancing congestion costs by day: January 1, 2017 through March 8, 2018



UTC Profitability and Price Convergence Incentives

Almost all UTCs profit while creating a divergence between day-ahead and real-time prices at either the source or sink location. The profitability of a UTC transaction is the net of the separate profitability of the component injection and withdrawal. UTCs cannot contribute to system wide energy price convergence because UTCs cannot affect overall system power balance.

Table 1 shows the number of cleared UTC transactions, the number of profitable cleared UTCs, the number of cleared UTCs that were profitable at their source point and the number of cleared UTCs that were profitable at their sink point for the periods from January 1 through February 21, 2018, and February 22 through March 8, 2018.

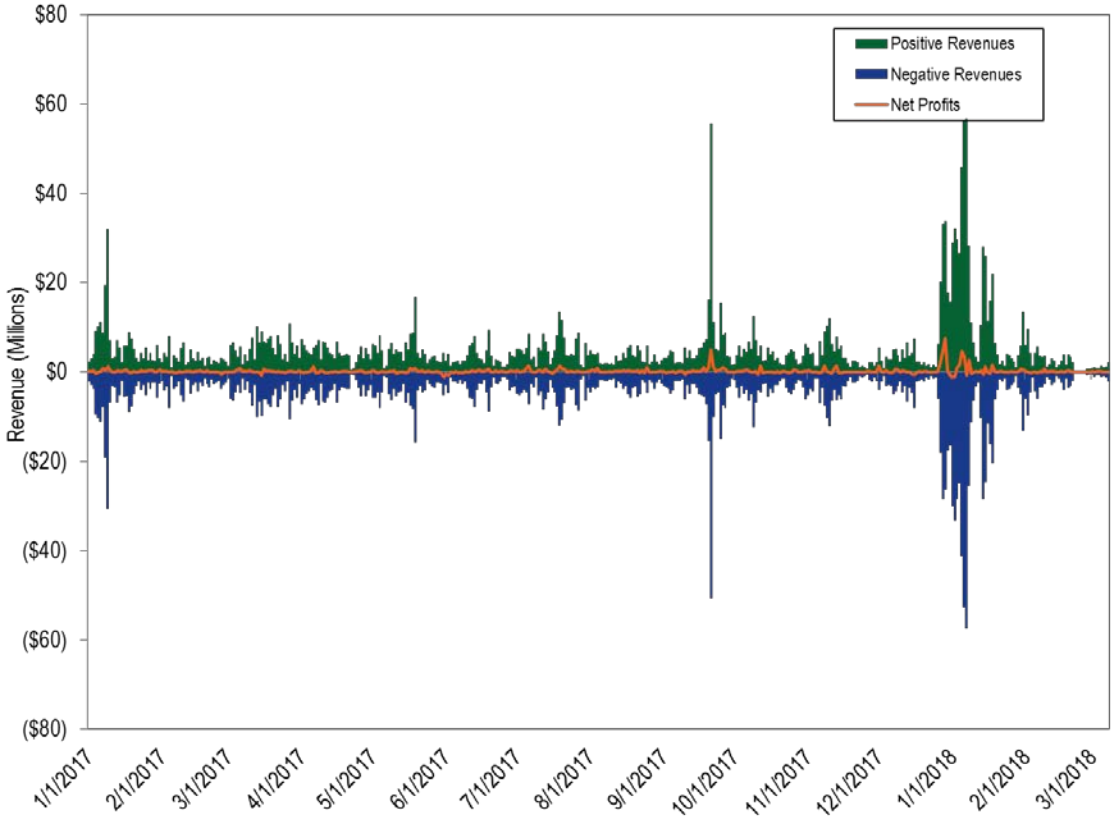
Table 1 UTC profitability by source and sink point: January 1 through March 8, 2017 and January 1 through March 8, 2018

2018	Cleared UTCs	Profitable UTCs	UTC Profitable at Source Bus	UTC Profitable at Sink Bus	UTC Profitable at Source and Sink	Profitable UTC	Profitable Source	Profitable Sink	Profitable at Source and Sink	Net Profit	Net Profit by MW
January 1 - February 22	2,822,117	1,424,470	1,860,980	980,694	131,482	50.5%	65.9%	34.8%	4.7%	$13,841,797	$0.35
February 22 - March 8	144,894	77,790	88,064	56,096	10,028	53.7%	60.8%	38.7%	6.9%	($26,141)	($0.01)

Figure 5 shows total UTC daily total revenues, positive and negative, by UTC bid points and the total net profit of UTCs for the January 1, 2017, through March 8, 2018, period.

Figure 5 and Table 1 show that UTCs earned significant positive and negative revenues, and were net profitable prior to February 22. Figure 5 and Table 1 also show that UTCs received approximately net zero profits during the period from February 22 through March 8.

Figure 7 UTC total positive and negative revenues and net profits: January 1, 2017 through March 8, 2018[4]



4 Calculations exclude PJM administrative charges.