Evaluation of the Impact of Virtual Bidding on the New York Electricity Markets

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Market Monitoring and Performance Department

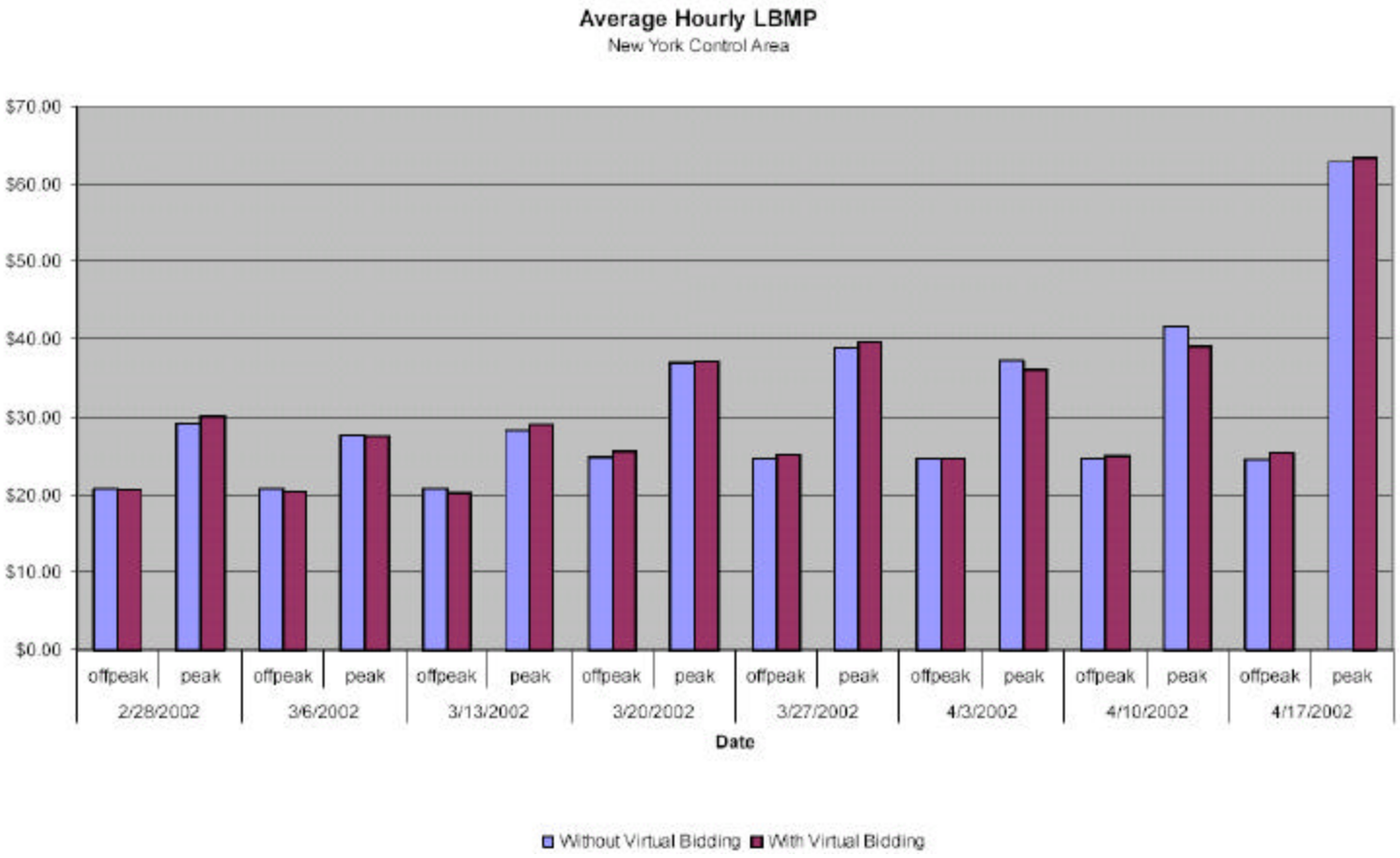
Introduction. The Market Monitoring and Performance Department ("MMP") undertook a study of the initial impact of virtual bidding on the New York energy markets. This study covered the period from the introduction of virtual bidding in November 2001 through the end of the winter 2001- 02 capability period. The study focused on two issues: the impact of virtual bidding on market-clearing prices in the Day Ahead Market, and the possible role of virtual bidding in the divergence or convergence of prices between the Day Ahead and Real Time Markets.

It is important to note at the outset the preliminary and limited nature of this analysis. The NYISO introduced virtual bidding during the winter capability period in part because energy markets in the winter tend to be less volatile and less constrained than in the summer. The NYISO was able to administer virtual transactions over this period without the need for any market interventions, suspensions, or mitigation, and saw no evidence of gaming or other serious concerns.

In addition, as is discussed in section 3 below, only a fraction of the megawatts authorized for virtual trading has been bid over this period. This suggests that the results reported here may not be firm indicators of the likely outcomes in a different environment with increased volumes of virtual bidding. The summer period will provide a more rigorous test of the impacts of virtual bidding on these markets. The NYISO will submit a further report on virtual transactions at the end of the summer capability period.

1. Impact on Day Ahead LBMPs. The first issue examined was the effect of the presence of virtual bidding on location based marginal prices ("LBMPs"). To address this question, the MMP recomputed *pro forma* results for eight market days with and without the virtual bid inputs, using the NYISO's Day Ahead Market optimization software, the Security Constrained Unit Commitment ("SCUC"). The study selected eight consecutive Wednesdays and divided the hours in those days into peak and off-peak categories. The study determined and compared the average of the hourly LBMPs over the entire New York Control Area during those peak and off-peak periods. The results are depicted in Figure A-1.

Figure A-1



These data suggest that the introduction of virtual transactions has not had any adverse effect on market clearing prices. There do not appear to be any significant differences between the average prices determined with virtual bids included in the SCUC run and those determined on the basis of physical bids only. However, given the limitations of the data set, the MMP recognizes that this study may not provide conclusive evidence about how virtual bidding may affect the Day Ahead Market. Further experience with virtual bidding, under a range of additional market conditions, would be warranted before definitive conclusions can be drawn about the impacts of virtual bidding. Experience with virtual bidding to date in Winter Capability Period with respect to DAM LBMPs, however, provides no basis to conclude that virtual bidding should not be continued into the coming Summer Capability Period.

2. Day-Ahead and Real-Time Price Convergence. In introducing virtual transactions, the NYISO anticipated that market participants would use this tool for arbitrage as they deemed appropriate. The degree of convergence in the prices between the Day-Ahead and Real-Time markets would tend to indicate that market participants have in fact utilized this mechanism for this purpose. To measure the convergence between the markets, the MMP analyzed and compared Day Ahead and Real Time average weekly prices across the entire New York Control Area before and after the introduction of virtual bidding. The results of these analyses are shown in Figures A-2, 3, and 4.

Figure A-2

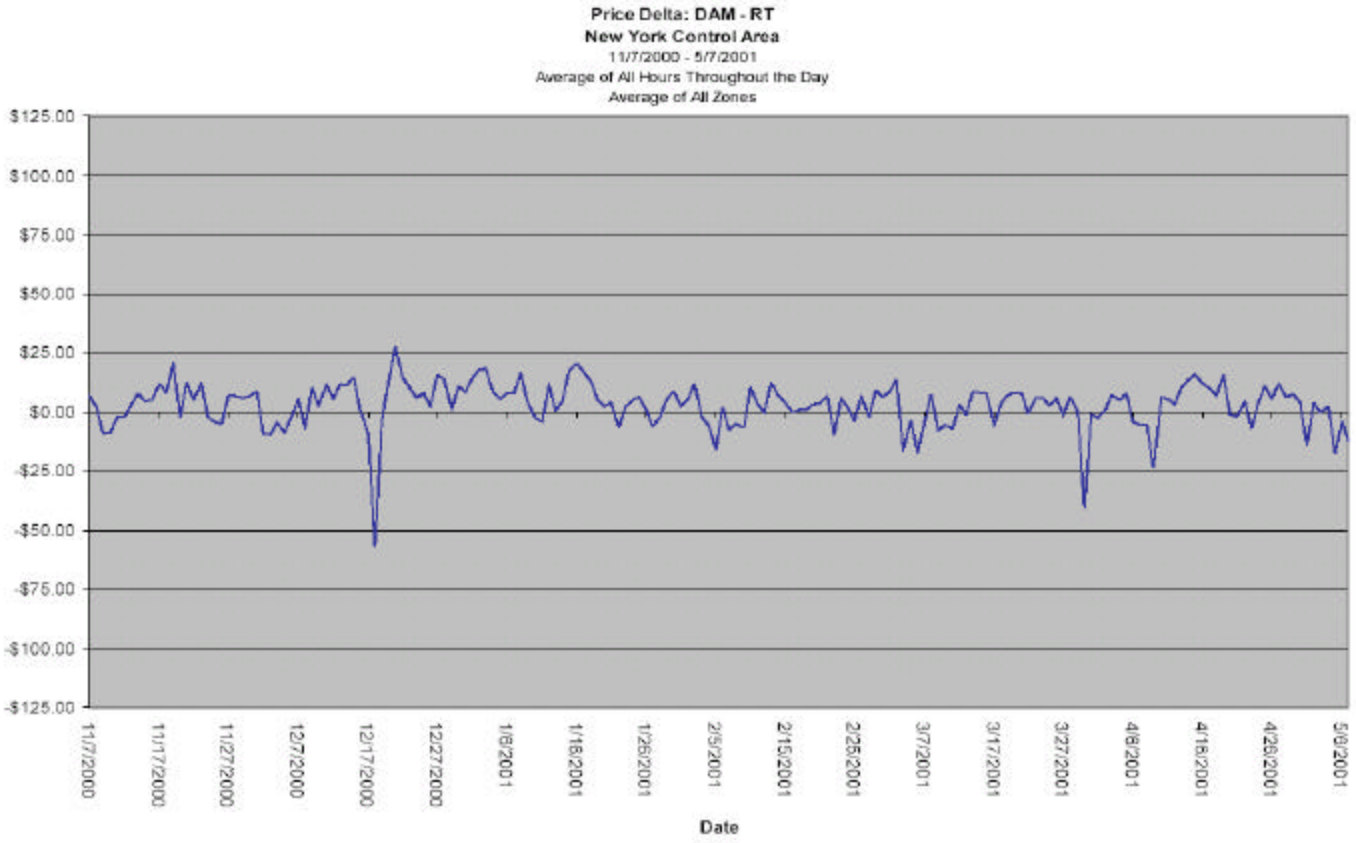


Figure A-3

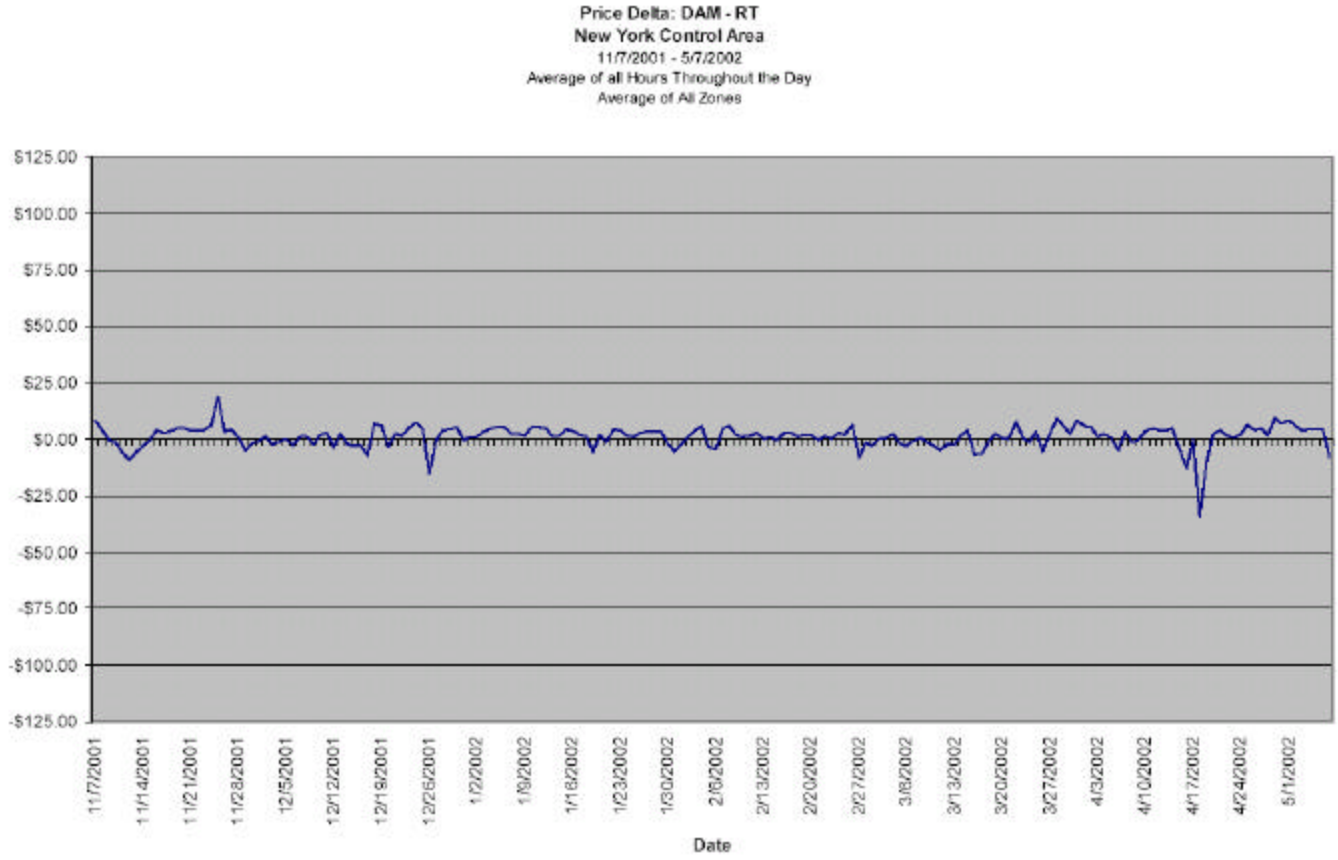


Figure A-2 depicts the difference between the average prices in the two markets over the 2000-01 Winter Capability Period. The graph shows that the delta ranged from negative $50.00 to $25.00, with considerable fluctuation. Figure A-3 shows average prices since the introduction of virtual bidding, and suggests that virtual bidding has fostered price convergence, because the more recent prices have varied only slightly between the markets. Indeed, the price delta over most of this period has hovered close to zero. However, it is important to note that fuel prices during the recent winter period were significantly lower than they were in 2000-01. This factor would also tend to explain the lower price volatility observed in 2001-02.

Figure A-4

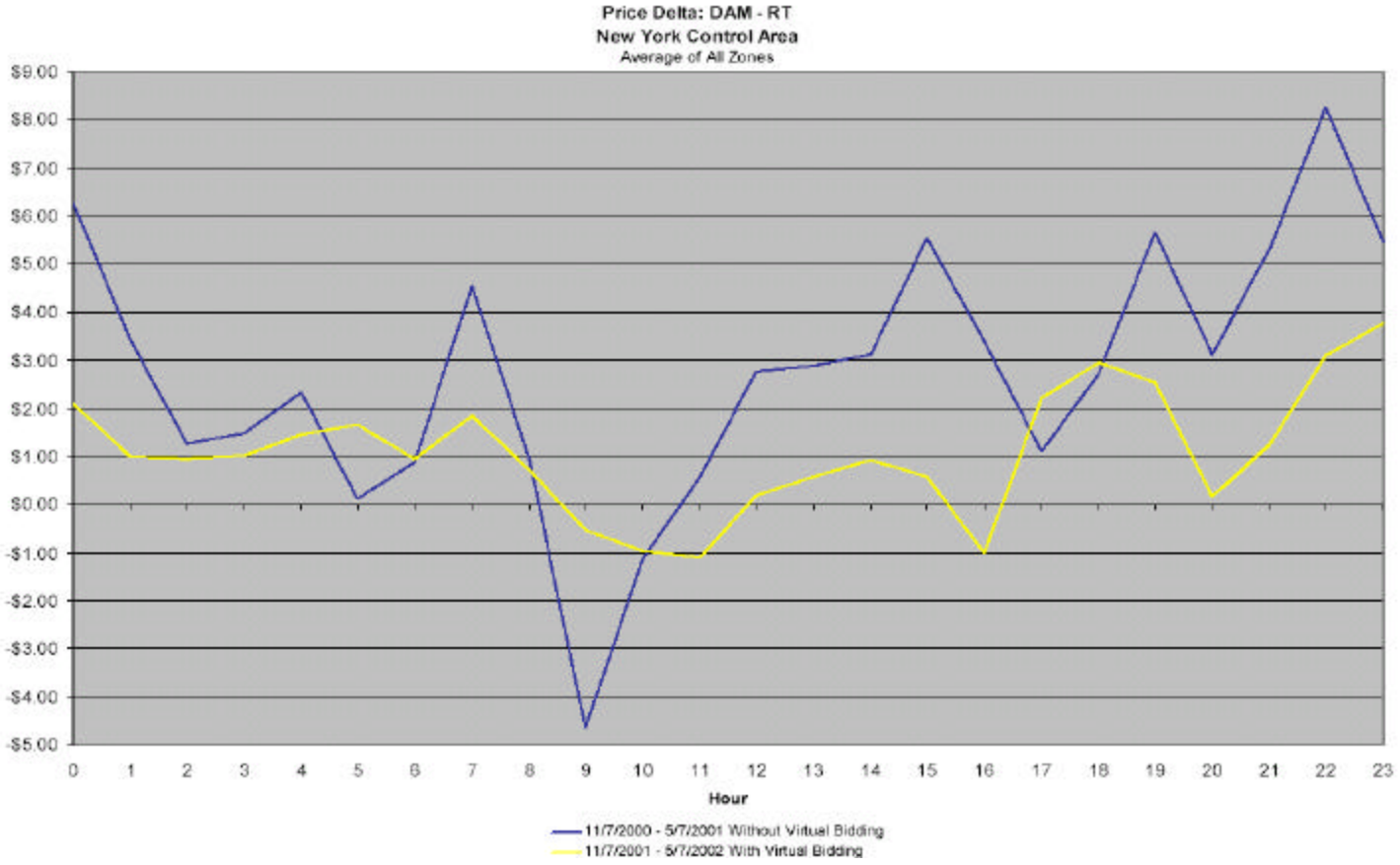


Figure A-4 presents an alternative approach to measuring the convergence in prices. It compares the average LBMPs for each hour in the day over the study period with the average prices during the comparable period in the prior year. Again, while there continue to be differences in the prices between the two markets, this figure shows that those differences were much greater in the earlier period, prior to virtual bidding. The availability of virtual bidding would be expected to further price convergence in the

markets, and certainly does not appear to have led to any degree of price divergence. Additional studies on a more developed database will permit a more robust conclusion.

3. Summary of Virtual Trading Activity. The MMP also reviewed the extent of virtual trading activity that took place during the study period. In general, the MMP observed that the volume of virtual transactions increased from November 2001 through the spring of 2002. However, it also appears that market participants have not been utilizing the full volume of virtual trading that has been authorized because only a portion of the authorized megawatts has been bid. Thus, the activity observed to date is not necessarily an indicator of the full impact virtual trading could have on the markets during summer periods, when more active virtual trading may occur.

During the early months of virtual trading, from November through January, most of the increase in activity was due to increased bidding of virtual loads. In January and February, virtual supply activity increased. The gap between the volume of virtual load and supply bids continued to narrow over the remainder of the capability period. Figures A-5 and A-6 summarize these trends and show some evidence that the virtual supply and virtual load markets are coming in balance with one another. As noted above, these data may not anticipate the affects virtual trading may have in more active trading periods, since only a fraction of the authorized volume has participated in the markets to date.

Figure A-5

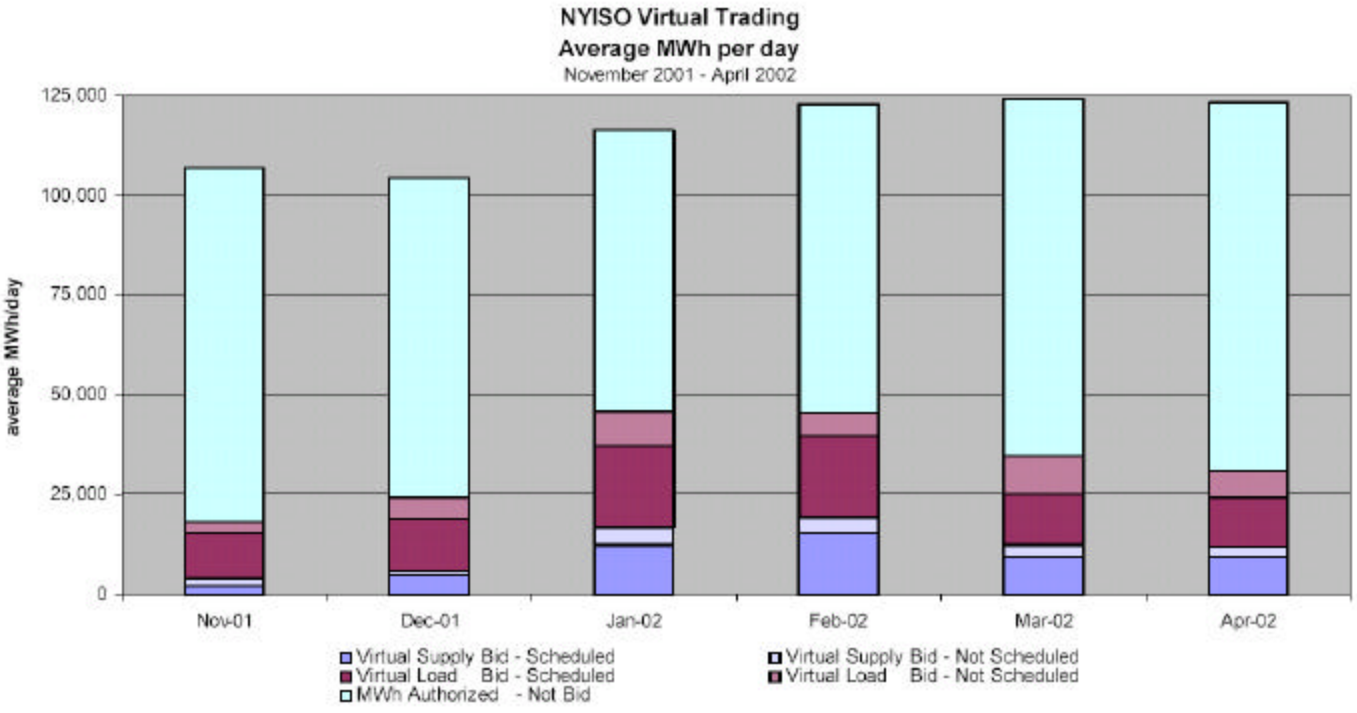
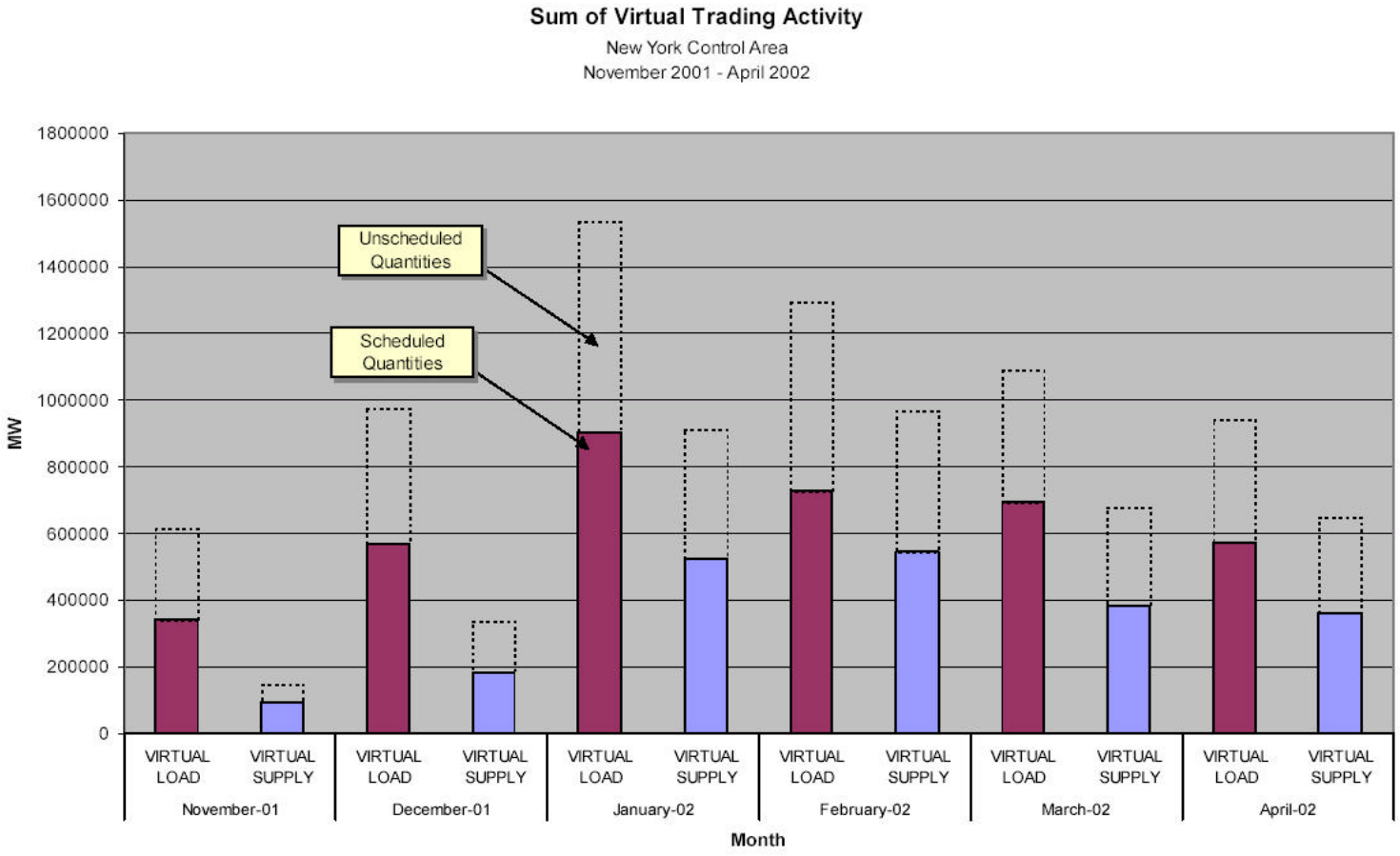


Figure A-6



This study reports on the early months of virtual bidding in the New York electricity markets. The initial data indicate that virtual bidding has been fulfilling its intended objectives. The low volume of activity so far in this new market, however, would not present a firm basis for definitive conclusions about this program's impacts. While the data support a preliminary determination that the availability of virtual bidding has not adversely affected prices, and may have resulted in an increased convergence between DayAhead and Real- Time prices, further assessment of the program under summer conditions .