

McCullough Research

New Yorkers Lost \$2.2 Billion Because of NYISO Practices: The Debate Continues

and

A Short Review of Anomalous Bidding at the New York ISO from September 2007 through August 2008

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The responses by NYISO and the PSC are notable for what they do not do say. They do not challenge or rebut our finding that New Yorkers are overpaying by \$2.2 billion a year because of the market-clearing price auctions run by the New York Independent System Operator and apparently supported by the PSC. Below we provide a point-by-point response to the objections by NYISO and the PSC to our facts and figures, while noting that their responses do not explain why New Yorkers are now paying more than if they had purchased the fifteen plants mentioned in our analysis of the open market.

Reasoned debate about important public policy issues is always to be commended, but only when it is grounded in good data. Sadly, the two responses to our testimony before the Assembly Committee on Corporations, Authorities and Commissions and the Assembly Committee on Energy on March 5, 2009 fail to supply the detail required by the policy-makers of New York State to evaluate whether electricity deregulation needs reform.¹

It is significant that neither of these critiques addressed the scale of the problem facing New York, nor accessed the limited data currently available. In the twelve months of bidding data currently available from the New York ISO, 585,043 bids – approximately 12% of the total – had prices above \$900/MWh. Since natural gas units at standard efficiencies would not normally have marginal costs above \$200/MWh, this is a surprisingly high number of anomalous bids. The accompanying document, “A Short Review of Anomalous Bidding at the New York ISO from September 2007 through August 2008,” gives a brief review of the bidding data.

In 1995, the Public Utility Commission of California, envious of the deregulation successes in neighboring states with open wholesale electricity markets, rejected the concept in favor of an administered wholesale market where the bids, bidders, and price calculation were secret, and called for legislation to implement it. In 1996, the New York Public Service Commission decided to deregulate and in large measure adopted the California PUC model, with its emphasis on secret bid-based day-ahead and real time uniform clearing price auction markets.

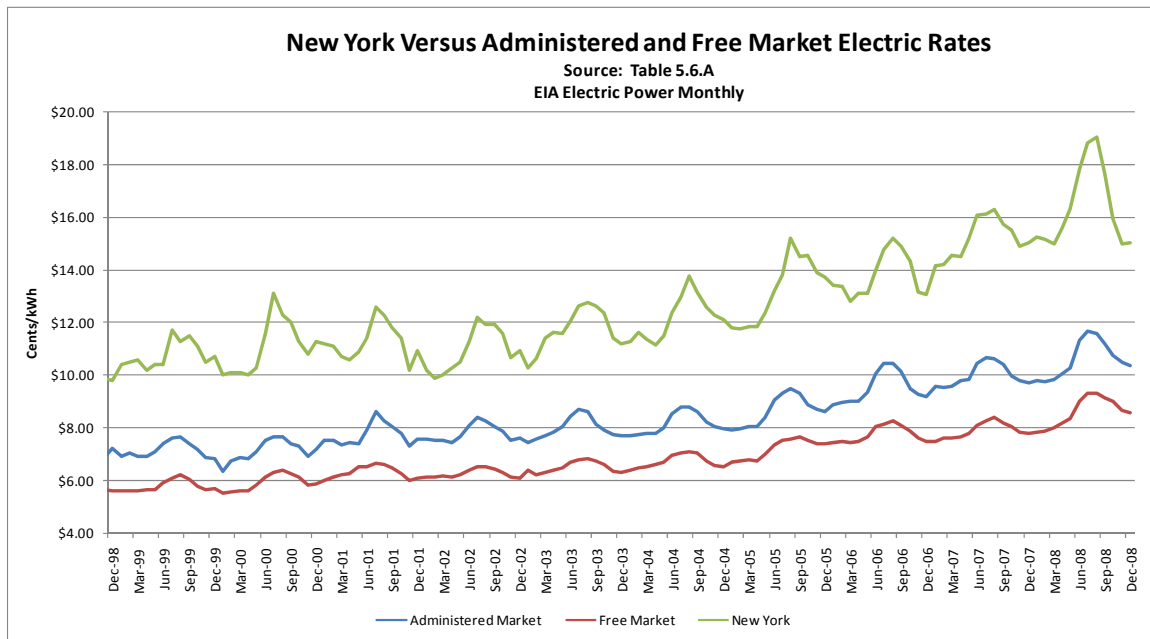
¹ An Evaluation of the McCullough Research Report on New York’s Wholesale Power Market, Susan Tierney, March 25, 2009; Department of Public Service Staff Analysis of McCullough Research Report, Mark Reeder and Rajendra Addepalli, March 27, 2009.

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Today, U.S. states are split about half and half between open wholesale markets and administered markets. In the administered markets like New York's, wholesale prices are set by a secret computer algorithm. In open market states, wholesale prices are set by the free market. At McCullough Research we compare electricity prices using the publicly available data compiled and published by the federal government's Energy Information Administration. The graph below shows the most recent results:



The two conclusions that should be drawn from this graph are straightforward. 1. The administered markets have gradually become more expensive to consumers over time compared with free market states. 2. The price of electricity for New Yorkers is far higher than the average of the states where computer algorithms set the price.

The reasons why administered pricing is losing out in this race are well understood:

1. States that required divestiture – a process still underway in New York – transferred the economic benefit of existing utility plants from ratepayers to generators. The technical term for this benefit is “producers’ surplus”.
2. The lack of transparency in administered markets creates an incentive for producers to make non-economic bids for their generation. Markets where bidders bid above marginal cost are economically inefficient.

3. The arcane nature of the administered markets rewards those who game the system. New York's markets are currently being investigated for "Death Stars" – imaginary circular schedules designed to defraud the NYISO's congestion payments. New York also has a large number of bidders submitting "Hockey Sticks" – bids that start rationally but end up with enormous final bids.

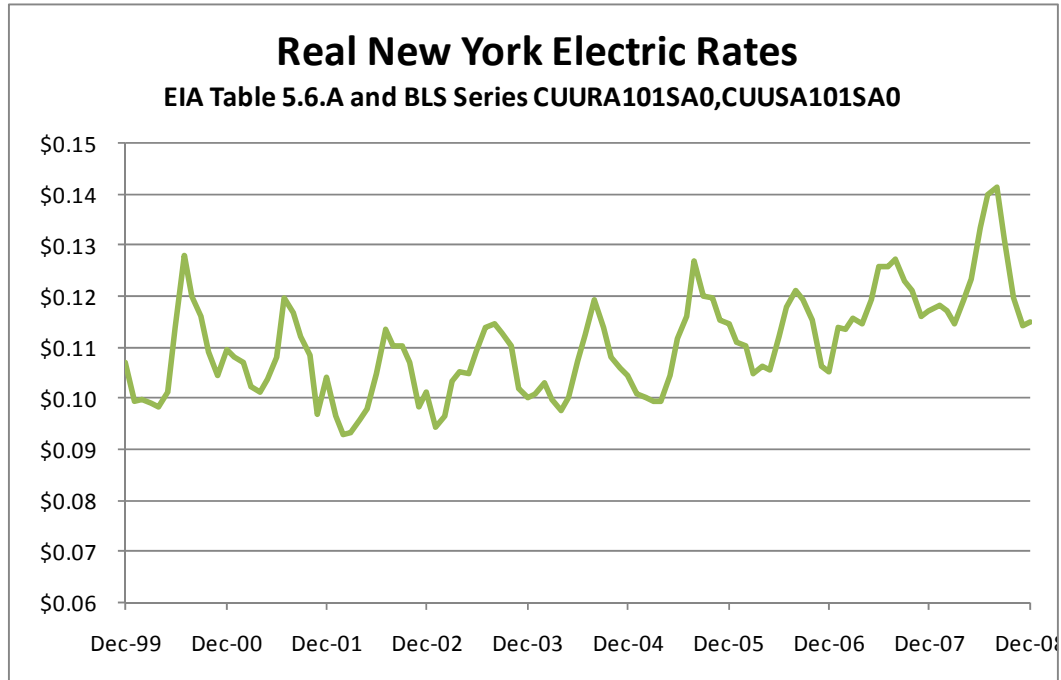
We emphasize that competition is *not* the problem. The Federal Energy Regulatory Commission mandated wholesale electricity competition in its Order 888 on April 24, 1996.² The question is whether a centralized bureaucracy like NYISO should administer markets or whether the traditional, more transparent market mechanisms used to buy and sell commodities throughout the economy should be used. The data suggests that open markets are kinder to consumers (and thus to the state economy) and less profitable for generators and that administered markets are harsher to consumers and kinder to producers.

The Tierney and Reeder/Addepalli responses are energetic in their defense of the New York Independent System Operator. They do not support open competition and the interests of ratepayers. Since their two documents are similar, we address the eleven objections in the Tierney response, and comment on the Reeder/Addepalli response where they expand upon the points in Tierney's outline.

1. "McCullough ignores the fact that New York's electricity prices were high under the traditional regulatory approach that he idealizes in his report"

Tierney appears to say that New York's substantial rate increases were due to inflation. This is misleading, because New York's electric price increases have outpaced inflation, the national average price of electricity, and prices of electricity in other states that adopted the California model. It is more accurate to say that New York's electric rates have grown worse over time, with reference to both inflation and the U.S. national averages.

² <http://www.ferc.gov/legal/maj-ord-reg/land-docs/order888.asp>



2. “New York’s high electricity prices in the mid-1990s were a principal reason why the state decided to restructure its electric industry”

McCullough Research has been both an advocate and active participant in bringing competition to the nation’s electricity industry since the 1980s. If Tierney’s objection is a defense of utility resource divestiture, it is a very poor one. New York’s ratepayers having paid the high upfront costs for resources under traditional regulation then lost their investment when the plants were sold to third parties. Whatever the flaws of the old system, divesting customers of one of the few advantages they enjoyed is unfair public policy.

3. “McCullough ignores one of the primary reasons why New York’s electricity prices are high: the overall mix of fuels in New York relative to other parts of the country”

The use of natural gas as a fuel to produce electricity in administered price states is roughly comparable to that in free market states. McCullough Research regularly

tests the hypothesis in this objection whenever the EIA makes new data available. The hypothesis always fails statistical tests for significance.³

Tierney incorrectly asserts that New York State's fuel mix was not considered in our analysis. To the contrary, this is the central issue. The fifteen-largest non-NYPA-owned plants we analyzed include six fueled by natural gas, five by coal, and five by nuclear.⁴ The administered prices in New York reflect high bids based on natural gas, or in many cases, at a substantial margin above the price of natural gas. The failure of administered pricing in New York to deliver benefits to ratepayers is caused by divestiture and the pricing algorithm. If New Yorkers had purchased the plants on divestiture, their rates would have been significantly lower than they are today – even with the fuel mix of the fifteen-largest plants not owned by NYPA.

4. "McCullough ignores the fact that from 1999 to the present – the same period during which New York's system operator has administered the wholesale electricity markets in the State – natural gas prices nearly quadrupled."

Even when using actual natural gas prices as we did in our report, New Yorkers would have been better off to have purchased the plants when they were divested – at market prices – then under the administered prices.

Part of the problem is that contrary to theories advanced in support of the administered market, electricity prices based on sellers' bids in NYISO's markets are frequently above the marginal costs of the state's gas-fired units. It does policy-makers a disservice to defend a system that prices electricity, no matter how it is produced, at a margin above natural gas generation costs and inflicts the excessive charges upon consumers.

5. "McCullough fails to mention that New York actually depends upon contracts, rather than the spot power markets, for most of its supplies to consumers."

³ For a detailed analysis of this see "Why Are Electricity Prices in RTOs Increasingly Expensive? November 2008 Update", McCullough Research, pages 5-7.

⁴ The state's large hydroelectric plants were excluded from our testimony on March 5, 2009, because they are owned by the New York Power Authority which was not forced to divest.

Our testimony compared cost-of-service pricing for the fifteen plants with prices from NYISO's markets. Longer-term contracts are either higher or lower than NYISO's prices depending on the date of the contract, its terms and conditions, and duration. Given the steep increase in fossil fuel prices over the past decade, older contracts are generally more favorable than newer contracts. Unfortunately, contracts signed in summer 2008 would be at significantly higher prices than those signed in fall of the same year. No one knows the dates the contracts are signed because the data simply is not available. What we do know is that New York's retail prices are sharply above U.S. averages and the average of similarly administered states. This tends to indicate that New Yorkers did not receive the benefit of long-term contracts signed in the early part of this decade. The peak in retail prices last summer indicates how much ratepayers are exposed to spot prices. From March 2008 through August 2008 retail electric prices increased 27%, a dramatic contrast to Tierney's assumption.

6. "McCullough fails to mention that New York's consumers no longer have to pay for power plants in utility rate base."

This assertion makes little sense. Our analysis specifically compared capital costs, O&M, and fuel costs with NYISO's administered prices. The capital costs followed traditional cost-of-service rules with conservative assumptions of twenty-year straight line depreciation and a cost of capital of 12%. We described the calculation on page eight of the report that accompanied our testimony.

7. "McCullough leaves the false impression that electricity prices in New York's electric energy markets are not competitive by pointing to a \$1,000-per-megawatthour bid."

The impression that something is "wrong" when market participants continuously submit continuous hockey stick bids is a natural one. As the FERC Order in the Western Market Crisis states:

In addition, the Commission is conditioning public utility sellers' market-based rates to ensure that they do not engage in certain anti-competitive bidding behavior. Suppliers violating these conditions would have their rates subject to refund as well as the imposition of other conditions on their market-based rate authority.

First, bids that vary with unit output in a way that is unrelated to the known performance characteristics of the unit are prohibited. An example of this bidding practice is the so-called “hockey stick” bid where the last megawatts bid from a unit are bid at an excessively high price relative to the bid(s) on the other capacity from the unit.⁵

Tierney’s example displays a poor grasp of economics. Assume that her hypothetical hospital has a generating station that is highly inefficient by normal standards – a heat rate of 25,000 mmbtu/kWh, for example. When natural gas costs \$10/mmbtu, the hospital would normally choose to generate when the price is \$250/MWh.⁶ Regardless of the fixed cost of the generator unit, the hospital is always better off bidding at \$250/MWh rather than \$1,000/MWh, since the higher bid will eliminate its unit from dispatch in the many cases where prices are higher than \$250/MWh and less than \$1,000/MWh.

On the other hand, Reeder/Addepalli use the example of an environmentally constrained run of river plant. (We believe they mean a hydroelectric unit with storage and flow restrictions.) In isoperimetric problems of this type, the optimal bid is not \$1,000/MWh, but the expected price that just satisfies the isoperimetric constraint over the planning period.⁷ Using a \$1,000 bid would effectively lead to an inefficient use of the reservoir, since the hydro unit would rarely if ever be dispatched.

In reality, the problem is far more extensive. Hockey stick bids are not simply the province of a single bidder in New York State. Bids higher than any plausible level of marginal cost are made continuously by a number of different bidders. Our database of NYISO bids, for example, has non-economic bids (over \$900/MWh) made by 95 different bidders. On average, each bidder submitted non-economic bids for seven different generating units.

Why would bidders make such irrational, non-economic bids? Given the opaque nature of New York’s markets, it is difficult to determine the rationale, but three reasons have been observed in other areas with administered markets:

⁵ April 26, 2001 Order (95 FERC ¶61,115 at 61,360).

⁶ In this simple example, the hospital must use 25 units of gas priced at \$10 each to produce one MWh. The product of the efficiency (25) and the price (\$25) is the fuel cost per MWh.

⁷ Isoperimetric means a resource with a limited volume.

Project Stanley: In Alberta, Enron and Powerex had a collusive agreement to divide the market. Powerex allowed Enron to purchase power from it at a lower rate in exchange for Enron setting the high price in the market. Proceeds were then divided on a share-and-share-alike basis.

Market Allocation: In PJM, EMMT made maximum bids in order to avoid providing capacity in the day ahead market.

Load Shift: Enron frequently made anomalous bids in Northern California and Southern California in order to manipulate the California ISO's computer algorithm to assume heavy traffic on a transmission line. Enron then received the congestion payments.

We believe that non-economic bidding is a problem with broad ramifications – perhaps even criminal ramifications – that should not be casually dismissed as the irrational behavior of an imaginary hospital or hydro generator.

8. “McCullough ignores all of the economic literature that supports New York State’s wholesale power market design.”

Tierney appears to be arguing that bids at marginal cost – the prediction of standard economic theory – would drive generators into bankruptcy. If so, she overlooks the fact that generators would receive prices for energy above the marginal costs for energy in many cases and that they receive capacity payments.

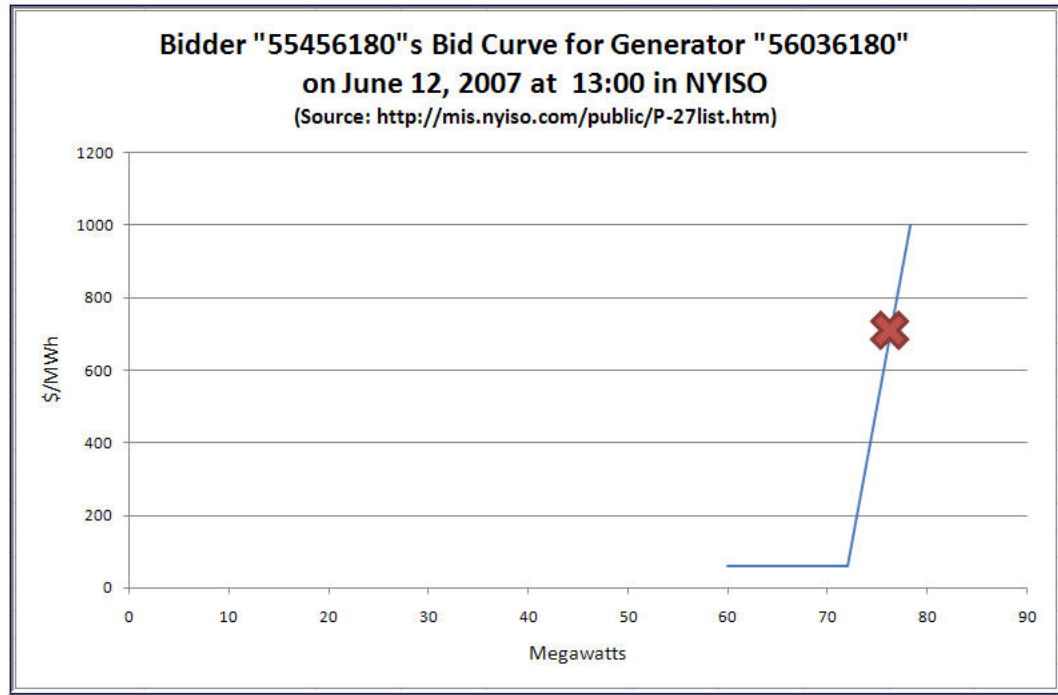
New York has a capacity payment market known as ICAP.⁸ Generators in New York receive both an energy payment and a capacity payment. Adopting the proposal suggested by the American Public Power Association to hold their maximum bids to their actual marginal cost does not restrict generators from receiving a contribution to their capital costs from both energy payments and their ICAP revenues. Assume for example that a specific generation unit like our eponymous hockey stick bidder, Mr. 55456180, is restricted to actual marginal costs:

⁸ A description of ICAP can be found at <http://www.nyiso.com/public/products/icap/index.jsp>

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The APPA's rule would eliminate the unrealistic \$1,000/MWh bids (marked above with a red "x"), but not the revenues when prices were above the bidder's actual marginal costs. Moreover, the generator would still receive its ICAP payments on the 78 megawatts of actual dispatchable capacity.

9. "McCullough fails to mention that if suppliers were only paid at their marginal costs, valuable renewable power resources like wind farms, would have a much-harder time entering New York's power market."

The gist of this argument is that while market flaws (and outright manipulation) might raise prices, it is beneficial to struggling renewable energy producers. Enron made very similar claims in its civil and criminal trials.⁹

The problem with forgiving market failure because it helps some producers is that the higher cost is borne by all consumers, but the benefits are only paid to the few deserving renewable generators. Assume for example that prices average \$10/MWh due to market flaws and market manipulation. If the market is 30,000 MWh in a giv-

⁹ For a potpourri of such arguments, see ENR-01 in EL03-137.

en hour, consumers will pay an extra \$300,000 in that hour. In New York, wind power comprises somewhat less than 1% of the total generation. In this example the consumers pay \$300,000 and the renewables receive a paltry \$3,000. This is a very inefficient method to encourage development of windmills. In the old test for pareto optimality, elimination of market inefficiencies would yield \$300,000 and any payment to renewables above \$3,000 would make them better off as well.

10. “McCullough fails to mention that New York’s wholesale electricity spot markets are heavily regulated.”

This argument, made many times in many locations, can be restated by saying that the levels of secrecy and apparent problems can be forgiven because of the active market surveillance by NYISO, the Public Service Commission, and FERC. We beg to differ. Even if the mysterious 55456280 bidder publicly explained its unusual bidding behavior, federal regulators lack “cease and desist” authority (today, it is likely that after a prolonged hearing – Enron’s lasted over five years – that the bidder could face a fine, and that FERC could discover that the money – Enron is bankrupt – no longer exists).

The existing federal and state regulatory agencies lack the staff, resources, experience, and police powers to successfully regulate the opaque and bizarrely complex wholesale electricity markets in New York State.¹⁰ It is far more efficient to identify market problems through transparency than to wait until consumers are actually harmed and then retroactively seek damages.

11. “McCullough fails to mention that electricity price information is much more transparent today than it was a decade ago”

Traditional state and FERC regulation provided for a searching review of wholesale power costs before they could be charged to ratepayers. Indeed, one of the principal advantages of gaining Market Based Rate Authority (MBRA) is to avoid the pre-filing requirements at FERC.

¹⁰ We recently testified in support of a Congressional bill designed to add “cease and desist” authority to FERC’s powers. See A Forensic Analysis of Pickens’ Peak: Why Were Oil Prices So High in 2008, and What Steps Are Needed to Find an Answer?, Robert McCullough, Subcommittee, United States Senate Committee on Energy and Natural Resources, Washington, DC., March 25, 2009.

At the heart of the debate is whether keeping the bids, bidders, and the all-important algorithm secret benefits or hurts the market. NYISO currently keeps bid data secret for six months and never releases the names of the bidders and the generating units. The logic for these restrictions has been argued vociferously by generators (often the same generators facing civil and criminal investigations).

There is nothing sacred about such rules. The Independent System Operator in Texas has recently reduced its bid data delay to two months and allows the bidders' identities to be known. Our econometric analysis of the change in bidding rules in Texas indicates that the reduction in delay had a very significant impact on both maximum bids and average bids. Other countries, Australia for example, have shown that a two-day delay works quite well.

While the Reeder/Addepalli comments largely mirror Tierney, they may not be in complete accord. On page 10, Mr. Reeder states:

In a recent proceeding FERC reviewed this issue. It concluded that the lag time for the release of bid and other data should be reduced to three months. Further, it continued the practice of masking the identities of bidders. However, FERC did invite Regional Transmission Organizations (RTOs) and Independent System Operators (ISOs) to propose a period when such unmasking might be permitted, if they believe it to be desirable. The NYISO intends to comply with the three-month posting requirement in a compliance filing due at FERC on April 28, 2009. We will continue to review the potential for unmasking of data and further reduction of duration for holding data.

McCullough Research asserts that secrecy is not a good component of market design. Imagine a world in which you receive your groceries using a system administered by NYISO. You submit your order for breakfast cereal and a secret algorithm tells you the price. If you disagree with the grocer, your appeal will be a Kafka-like process during which you hope the judge will have kept an eye on your grocer's behavior (did it ever take advantage of the secret algorithm for cereal prices?). After years of litigation, you may finally receive a small refund.

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Conclusion

We find the Tierney and Reeder/Addepalli responses both short on actual facts, yet free with opinions. The bottom line is that New York's electricity price increases have outpaced inflation, the national average price of electricity, and prices of electricity in other states that adopted the California model.

The problems posed by NYISO's lack of transparency amply demonstrate that the Tierney and Reeder/Addepalli are unable to provide convincing explanations for the hockey stick bid in New York that is continuously posted by bidder 55446280. Even worse from a policy perspective, it appears that the Public Service Commission has not yet been briefed on the full extent of the problem.

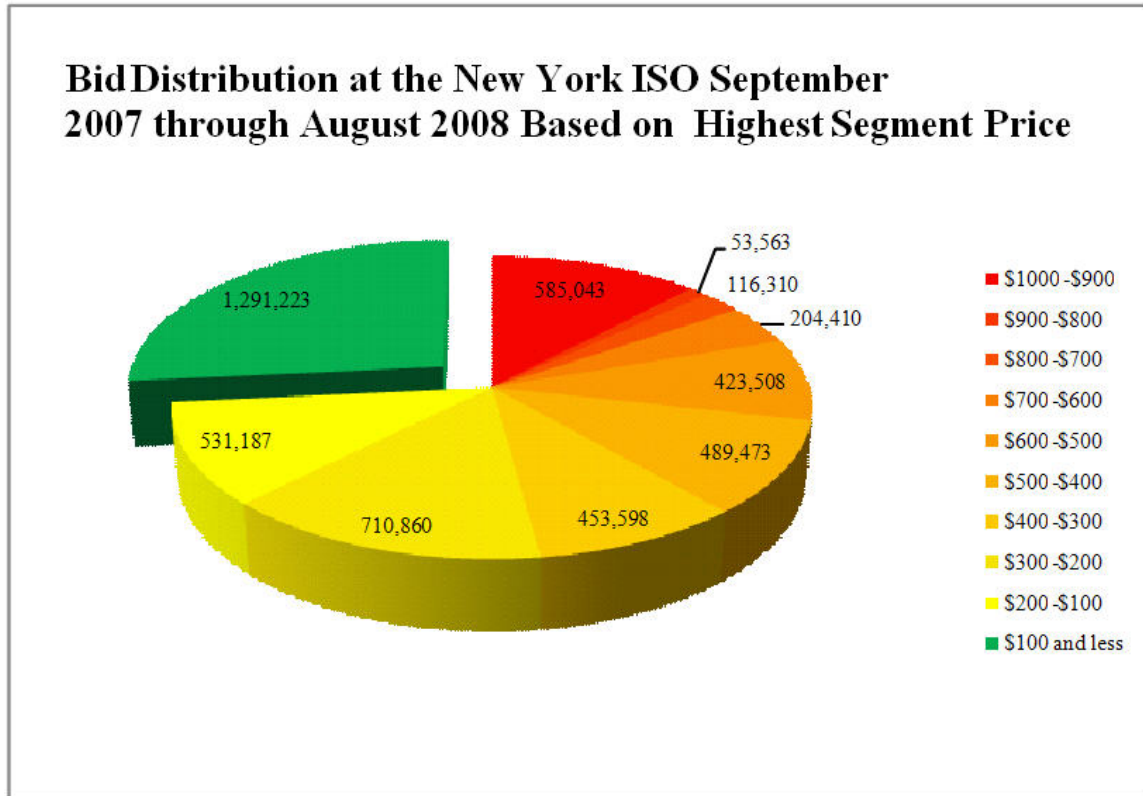
It is moot whether Tierney and Reeder/Addepalli object to our finding that cost-of-service for the fifteen plants analyzed in the report that is the basis of our testimony would have provided savings for New Yorkers, since neither response provides a study to address the issue.

We look forward to a fruitful dialog when all of the facts on the table.

A Short Review of Anomalous Bidding at the New York ISO from September 2007 through August 2008

In the twelve months from September 2007 through August 2008, the New York ISO received 585,043 bids at \$900/MWh or more. This appears to be a very large number of anomalous bids – 12% of the 4,859,186 bids entered into the NYISO markets during this period.

In the recent debate over reform of the New York Independent System Operator's market system, four experts, Dr. Patton and Dr. Tierney for NYISO and Mark Reeder and Rajendra Addepalli from the New York Public Service Commission have ventured three explanations for the hockey stick bid example used in our testimony before the Assembly Committee on Corporations, Authorities and Commissions and the Assembly Committee on Energy on March 5, 2009. The three explanations are: the bidder was inefficient; an example of a theoretical hospital with high fixed costs; an example of a theoretical run of river hydroelectric project. Even if these explanations correctly addressed the behavior of bidder 55456180, they fail to explain the other 94 bidders that made bids over \$900/MWh during this period.



The chart above shows the distribution of bids from September 2007 through August 2008, the most recent month available. The bids have been identified by the highest price contained in the bid. Bids marked in red are the least likely to be explained in the normal course of business. Those in green reflect bids we would have expected in the normal course of business. The varying shades of yellow give an indication of how doubtful the bids are between these two extremes. The price caps imposed by FERC during California’s energy crisis in 2000-2001 would have excluded segments of 88% of the bids received by the New York ISO from September 2007 through August 2008.

The term “Hockey Stick” was coined during the analysis of the California crisis. Hockey stick bids have been used on many occasions in a number of different locations. Like a burglar’s “jimmy” they are part of a tool kit that can be used to manipulate administered electricity markets. The three standard explanations for their use is explicit anti-trust (Alberta, 1999), market allocation (Illinois, 2003 and 2004), and manipulation of computer scheduling (California, 2000 and 2001). Given the complexity and opacity of administered electricity markets, it is helpful to study the use of this tool that departs so markedly from economic

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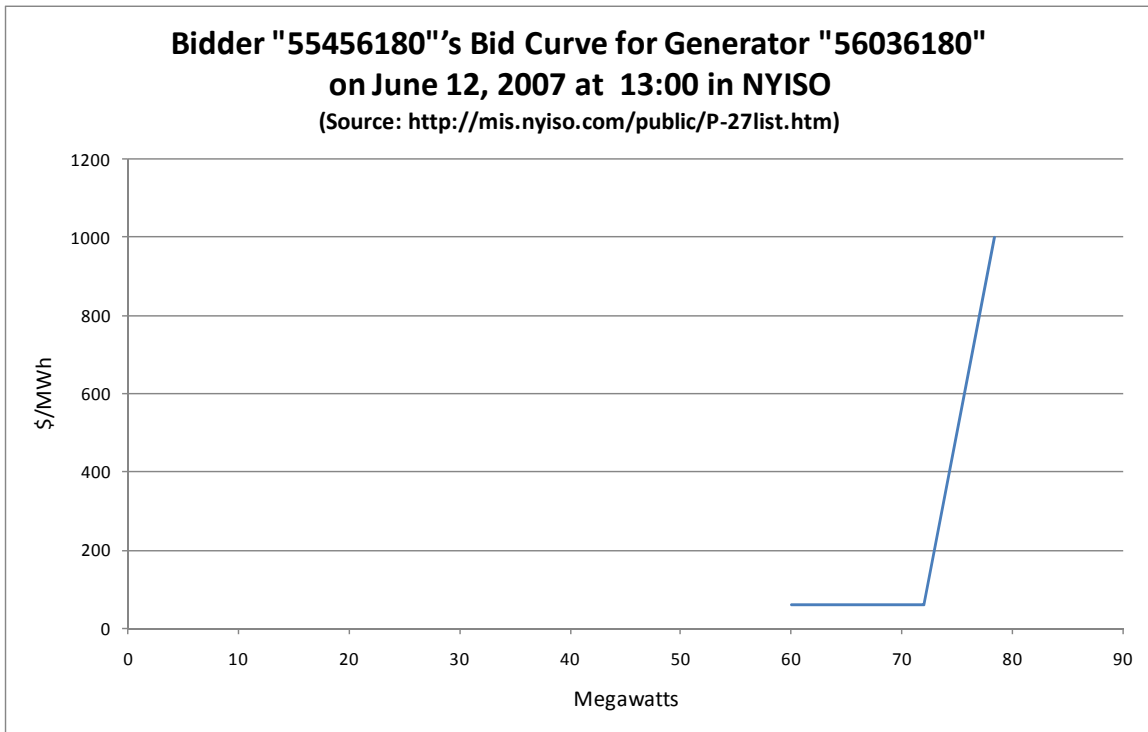
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logic. (FERC actually prohibited the practice, making it subject to refund and other sanctions in its April 16, 2001 Order.)

In New York, bidding data is released by the ISO six months after it has been submitted. The names of the bidders, the locations, and the name of the generators are either masked or removed. The data is not user-friendly and substantial computer resources and expertise are required to access it.

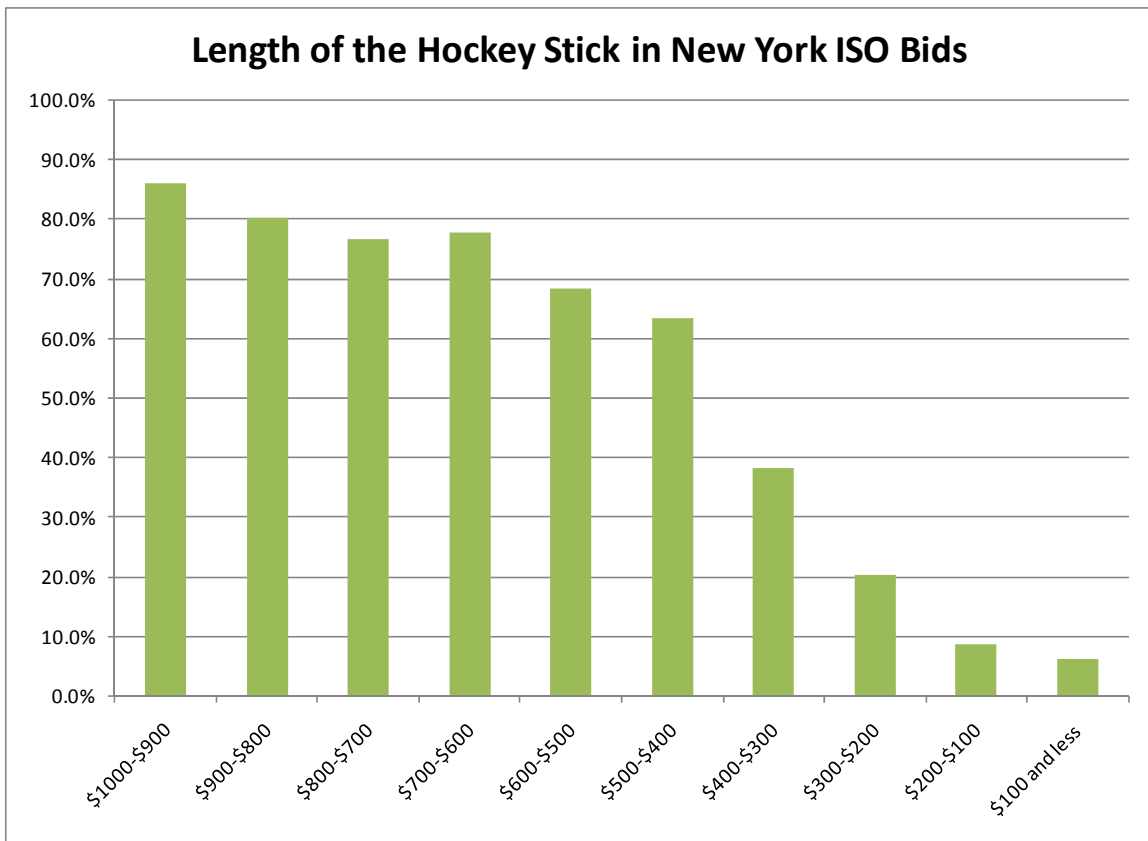
Each bid is composed of up to twelve “segments”. Each segment reflects a price and quantity that the bidder has offered to the ISO. The original chart referenced in our March 5, 2009 testimony and reproduced below shows the bid of bidder 55456180. It is one example of a very common class of hockey stick bids found in New York.



The sheer scale of the data makes reproducing each hockey stick bid impossible. It is possible, however, to characterize the bids by the size of the “stick” – the generation involved in the non-economic prices. When generators bid their marginal costs it is logical that the last segment will be the most expensive, simply because generating units require more fuel as their output increases. Like driving a car, fuel economy is maximized at medium speeds, not at the highest speed the engine is capable of producing. The technology of electric genera-

tion is well understood and it is rare for the highest production levels to double or triple the costs of the next highest levels.

In the example shown above, 95% of the price desired by this bidder is contained in the last few megawatts. This is highly unlikely – even if the plant was inefficient, or a theoretical hospital or hydroelectric unit. We can graph the bids across the range of prices desired to find the percentage of the highest price contained in only the last increment of production. This gives us an idea of the “length” of the hockey stick versus its paddle:



For the bids in the normal operating range (\$100.00 and less), there is no hockey stick. These bids reflect the normal operating curves associated with electric generating units throughout the industry.

For bids in the suspicious range – high bids which cannot be explained by high natural gas prices – the hockey stick quickly represents most of the bid. These bids are suspicious not

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only due to the size of the price requested by the bidder, but also the dramatic increase in price required to make a very small increase in the amount of energy generated.

If a hundred years of electric generating engineering theory is wrong and the small increments of production really do require ten to twenty times as much fuel as the next lower block of generation, this is important information and thus would need to be factored into the design of new generating units throughout the world. It is highly unlikely that this is the case. If (as appears reasonable to assume from the limited data available) the complex and secretive bidding process at NYISO is creating an environment where anomalous bidding is a frequent occurrence, this should be part of the public debate concerning NYISO's reform.