PUBLIC VERSION—PROTECTED MATERIALS REDACTED

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

The People of the State of Illinois,	)	**Docket No. EL07-47-000**
***ex rel.* Lisa Madigan, Attorney General**	)	
of the State of Illinois,	)	
Complainant,	)	
	)	
v.	)	
	)	
Exelon Generation Co., LLC, et al.,	)	
Respondents	)	

Affidavit of

Professor Peter Cramton

on behalf of J. Aron & Company and

Morgan Stanley Capital Group Inc.

I. Summary

I have been asked by J. Aron & Company and Morgan Stanley Capital Group Inc. to evaluate the level of competition in the fixed-price Section of the Illinois auction for electricity. Furthermore, I have been asked to review and assess the complaint filed before the Federal Energy Regulatory Commission (FERC) by the Illinois Attorney General and the Affidavit of Robert F. McCullough.[1] After reviewing the auction rules and the post-auction reports produced by the Auction Manager, NERA, and the staff of the Illinois Commerce Commission (ICC), I find that the auction design was sound and the auction itself was competitive. Furthermore, I find that the allegations in the Illinois Attorney General's complaint and Mr. McCullough's affidavit are without merit.

FERC should reject—without delay—the complaint by the Illinois Attorney General, as it misrepresents the competition that took place in the Illinois auction and the fairness of the prices determined in that auction. To do otherwise would ultimately cause consumers in Illinois and elsewhere to pay more for energy services.

II. Qualifications

My name is Peter Cramton. I am Professor of Economics at the University of Maryland and Chairman of Market Design Inc. Over the last 20 years, I have published research on auction

1. Amended Complaint by the People of the State of Illinois, *ex rel.* Illinois Attorney General Lisa Madigan, Requesting that FERC Investigate Evidence of Price Manipulation in the Illinois Auction, Require Refunds for Sales at Rates that are Not Just and Reasonable, and Direct Certain Wholesale Electricity Suppliers to Show Cause Why Their Market-Based Rate Authority Should Not be Revoked, Docket No. EL07-47-000 (Mar. 16, 2007) (Complaint); Affidavit of Robert F. McCullough (Exh. 1 of Complaint) (McCullough Affidavit).

theory and practice in the leading peer-reviewed economics journals. During the last 12 years, I have applied this research in the design and implementation of auction markets worldwide, especially in North America and Europe. I have led the design and implementation of dozens of high-stake electricity auctions in the United States, France, and Belgium, as well as gas auctions in France and Germany. I have advised several energy companies on auction strategy in major energy and capacity auctions in the United States and Canada. I have advised telecommunications firms on bidding strategy in more than 25 spectrum auctions.

In 1997, I led the design and implementation of the COM/Electric auction for standard offer service in Massachusetts. Since 1998, I have advised ISO New England on electricity market design. I was a lead expert retained by the ISO to design the forward capacity market in New England. I also led the design of the firm energy market adopted in Colombia in 2006. I am currently designing Colombia's energy contract market, both for regulated customers and nonregulated customers. In the New Jersey Basic Generation Service (BGS) auction, I served as an advisor to PSEG Power in each of the first four years that the BGS auction took place. Since 2001, I have been involved in the design and implementation of the virtual power plant auctions used by Electricité de France to sell 6,000 MW of electricity—approximately 10 percent of France's capacity. I was also involved in the design and implementation of the virtual power plant auction used by Electrabel in Belgium. I designed and implemented the Alberta auction for power purchase arrangements, which first occurred in August 2000.

I have advised the U.S. Federal Communications Commission, Industry Canada, and the Telecommunications Authority of Trinidad & Tobago on spectrum auction design. I am currently advising Ofcom in the United Kingdom on the design and implementation of its next-generation spectrum auctions.

I have published dozens of scholarly articles in peer-review economics journals, including *Econometrica, Journal of Law & Economics, Journal of Economics and Management Strategy, European Economic Review, Journal of Regulatory Economics, Journal of Economic Literature, Review of Economic Studies, American Economic Review,* and *Electricity Journal*. With Yoav Shoham and Richard Steinberg I was editor of *Combinatorial Auctions*, a comprehensive research book on combinatorial auctions published by the MIT Press in 2006.

I received my B.S. in Engineering from Cornell University and my Ph.D. in Business from Stanford University. My curriculum vitae, which includes a list of my publications and other experience, is attached.

III. Introduction

I have been asked to comment on aspects of the Illinois auction to procure wholesale electricity for retail customers.

After providing a detailed description of the Illinois auction format, I explain that there are several instruments in the Illinois auction design that promote competition. First, the auctioneer has the ability to reduce the volume demanded after bids have been submitted in the first round. Second, bidders only see aggregate bidding data, and therefore can only respond to aggregate supply signals. Third, near the end of the auction, information that is provided to bidders is further restricted, frustrating a bidder's ability to unilaterally impact the clearing price. When properly managed, these instruments minimize the potential for collusion and promote a competitive and efficient auction outcome. Indeed, the Illinois auction format has been tested

several times, most notably in the New Jersey BGS auctions, where it has determined efficient suppliers and competitive market-based prices for wholesale electricity since 2002.

I also explain that the Illinois auction is a dynamic clock auction and that this format has been successfully used worldwide in dozens of high-stake auctions. I also review decisions of FERC and reports by the Auction Manager (NERA), and ICC staff. FERC determined that the Illinois auction mechanism was reasonable and should result in fair rates, and also decided that affiliated entities would be unable to exploit their relationships with one another through the auction. Both the Auction Manager and ICC staff reviewed the auction outcome. NERA found bidding during the auction to be competitive. Furthermore, ICC staff calculated that retail rates for the two utilities' customers were, as a result of the auction, often lower than those customers' inflation adjusted rates in 1997. The ICC also noted that customers' rates moved closer together, since the auction reduces the dependence of an individual customer's rates on the investment decisions made by that particular customer's utility.

I then explain why it is inappropriate to base a test for prices resulting from the Illinois auction or any other market-based prices on a vague definition of marginal costs, such as the one expressed in a recent decision by the United States Court of Appeals for the Ninth Circuit (Ninth Circuit) concerning long-term market-based rate contracts. For example, one might interpret the Ninth Circuit's opinion to mean that individual generation units should be compensated based on their individual marginal costs. Such a compensation scheme would erode the incentives to invest in more efficient nuclear and coal plants, which would substantially distort the mix of resources, and ultimately lead to higher energy costs for consumers. For this same reason, it makes little sense to benchmark market-based prices when one has already constructed and conducted a competitive auction process to determine such prices.

I next discuss why there would be harmful effects to electricity markets were the results of the Illinois auction rejected or even set for hearing. Were the Illinois auction outcome overturned, investment incentives would be harmed. Bidders in the auction made substantial commitments to serve load at fixed prices determined by the auction. Similarly, the utilities, acting on behalf of the regulated customers, made a commitment to pay for the energy demanded at the auction clearing prices. If regulators were to reject the outcome without clear evidence of a flawed auction, collusion, or other wrong-doing, it would be a severe blow to market-based prices. One cannot have a market and should not attempt to have a market if the regulator cannot honor its end of the commitment: to review and then enforce the outcome of a competitive auction. Finally, modification of the Illinois auction contracts would harm competition as it would deter continued participation in the energy markets by power marketers that have become an important part of the industry, providing liquidity as well as risk hedging.

In the final sections of my expert report, I respond to Mr. McCullough's affidavit, which alleges that the Illinois auction produced an anti-competitive result and that there was evidence of market allocation in the auction. I first point out the numerous flaws in Mr. McCullough's analysis. His test for anti-competitive bidding has no basis in the economic literature. Furthermore, his test, which was derived from the U.S. Department of Justice's Horizontal Merger Guidelines, fails to take into account the critical fact that the individual fixed-price products for sale in the Illinois auction are not distinct products; rather, they are close substitutes. Had Mr. McCullough applied his test across the fixed-price products as a whole, his test would have deemed the auction competitive. I also provide several illustrative examples, including an

application to the New Jersey BGS auction, which show that Mr. McCullough's test is likely to conclude that an auction was non-competitive when in fact it was competitive.

Not only is Mr. McCullough's test for competition in the Illinois auction fatally flawed, but his analysis of market allocation is also defective. Mr. McCullough alleges that the mere fact that [redacted] proves market allocation. Such an allegation is absurd, since the [redacted] is entirely consistent with a competitive market in which suppliers have similar expectations about the cost and profitability of serving load. Indeed with perfect competition, all suppliers would drop out at the same price level. Is perfect competition, then, proof of collusion? Of course not.

In addition, Mr. McCullough's story of market allocation does not make sense because bidders only had aggregate information available to them during the auction. Therefore, a bidding ring or cartel would have been nearly impossible unless bidders involved in the cartel physically submitted bids from the same room during the auction. Using the data in Mr. McCullough's affidavit and in the Auction Manager's post-auction report, I also construct the sequence of bidding [redacted] and show that it is consistent with competition rather than collusion. In particular, [redacted]. Furthermore, some bidders switched supply from one product to another as the prices for individual products changed—a strategy consistent with unilateral profit maximization.

Mr. McCullough's test for competition and his market allocation story violate sound economic analysis and are fraught with error and inconsistency. FERC should reject his affidavit's poor attempt to cast doubt on the results of a competitive auction. Rather, FERC should review the auction design and execution, and examine the Auction Manager and ICC post-auction reports, both of which are well-done, and conclude, as I do here, that the auction was competitive and resulted in competitive market-based prices. FERC should take this action without delay. Each day of delay sustains a cloud of regulatory uncertainty that undermines the market and ultimately costs consumers money. Baseless complaints like this one, apparently motivated by politics rather than evidence, impose large costs on market participants and, ultimately, consumers.

IV. The salient characteristics of the Illinois electricity auction

Below, I describe the important features of Illinois' electricity auction. The design of this auction format is now standard and has been used to procure energy and capacity valued at tens of billions of dollars for tens of millions of people. Indeed, the Illinois auction format is nearly identical to New Jersey's BGS auction, which has been held annually since 2002. I have also designed and implemented several dozen dynamic clock auctions in many countries and have recently designed capacity and energy auctions in New England and Colombia that use a similar format.

A. The Illinois auction procures electricity for regulated customers

The Illinois auction involves the procurement of wholesale electricity by Commonwealth Edison Company (ComEd) and the three Ameren utilities (together, Ameren) for their regulated

customers. Bidders in the auction compete for the right to supply electricity to the utilities at prices that are determined through the auction process.[2]

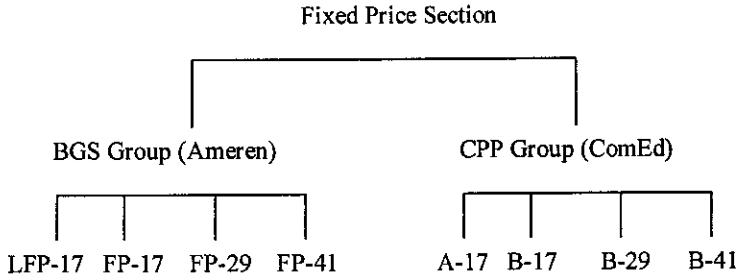
1. Buyers purchase electricity from winning bidders

In the Illinois auction, ComEd and Ameren procure "full service requirements" for customers that are classified into different load categories (customer classes).[3] Full service requirements refers to the combination of "energy, specified ancillary and transmission services, and other services necessary to serve the load of ComEd's and Ameren's customers."[4] Winning bidders in the auction agree to supply those full service requirements at the clearing prices for the product or products they win. Therefore, bidders in the Illinois auction compete with one another for the right and obligation to provide, at rates specified through the auction, wholesale electricity for ComEd and Ameren customers.

2. Several different "products" are demanded at auction

The products sold in the Illinois electricity auction specify the utility, customer class, contract length, and pricing scheme. There are eight fixed-price products. Under contracts associated with these products, suppliers are paid a fixed price per MWh throughout the contract period. These eight products comprise the fixed-price Section, which is broken by utility into two load Groups, as shown in Figure 1.

Figure 1. Groups and products in the fixed-price Section of the auction



The fixed-price Competitive Procurement Process (CPP) Group contains the four fixed-price products for ComEd's customers; the fixed-price Basic Generation Service (BGS) Group contains the four fixed-price products for Ameren's customers.[5] Both the CPP and BGS Groups contain fixed-price products with durations of 17, 29, and 41 months for small customers. In addition, both the CPP and BGS fixed-price groups contain 17 month products for large customers. These products and their characteristics are listed in Table 1.

2. NERA, Illinois Auction Rules (May 15, 2006) (*Illinois Auction Rules*), at 3, available at: http://www.illinois-auction.com/index.cfm?fa=bid.rul. *See also* NERA, Update to Illinois Auction Rules (June 6, 2006) (*Update to Illinois Auction Rules*), available at: http://www.illinois-auction.com/index.cfm?fa=bid.rul.

3. *Illinois Auction Rules* at 3.

4. *Id.*

5. For a complete listing of all Sections, Groups, and products in the auction, *see id.* at 7. In addition to the fixed-price products, there are also two products with hourly prices, but I focus here on the fixed-priced products.

Table 1. Fixed-price load categories in the Illinois auction

Load Category	Product	Utility	Customer Size	Customer Load
CPP-B	CPP-B 17 month	ComEd	Small	400 kW or less
CPP-B	CPP-B 29 month	ComEd	Small	400 kW or less
CPP-B	CPP-B 41 month	ComEd	Small	400 kW or less
CPP-A	CPP-A 17 month	ComEd	Large	more than 400 kW
BGS-LFP	BGS-LFP 17 month	Ameren	Large	1 MW or more
BGS-FP	BGS-FP 17 month	Ameren	Small	less than 1 MW
BGS-FP	BGS-FP 29 month	Ameren	Small	less than 1 MW
BGS-FP	BGS-FP 41 month	Ameren	Small	less than 1 MW

Source: NERA, *Illinois Auction Rules* at 13-16.

3. Tranche targets and load caps

The Illinois auction is expected to procure 100% of ComEd's and Ameren's actual load. The products in the Illinois auction are sold in the form of "tranches," which are calculated as a percentage of the peak load for each load category. For each load category, Table 2 lists the estimated peak load, the tranche sizes for that category as a percentage of the category's estimated peak load, and the targeted number of tranches.[6]

Table 2. Tranche sizes for fixed-price load categories

Load Category	Estimated Peak Load (MW)	Tranche Size (% Peak Load)	Targeted Number of Tranches
CPP-A	4,403	1.14	88
CPP-B	13,990	0.36	278
BGS-FP	5,897	0.93	107
BGS-LFP	2,500	2.7	37

Source: NERA, *Update to Illinois Auction Rules*, table 1 at 4.

The load for CPP-A (ComEd's large customer product) is estimated at 4,403 MW. Setting a tranche size of 1.14 percent of load equates to a division of CPP-A's load into 88 tranches, each of which represents an *estimated* 49.73 MW of load. Peak load is estimated at 13,990 MW for small ComEd customers. A tranche size of 0.36 percent of peak load equates to 278 tranches of approximately 49.92 MW, which are spread over the three different products for small ComEd customers. One must bear in mind, however, that by committing to supply a tranche at auction, the bidder is committing to supply a *share* of the expected load. Because actual load is subject to change, so too is the size of the tranche (in MW) that bidders are committing to supply. Thus, each product requested in the Illinois auction is a load-following energy product.

6. As discussed below, the auctioneer was given the authority to reduce the number of tranches demanded in the auction.

The Illinois auction rules also call for a "load cap" for each load Group. A load cap refers to the maximum number of tranches that any single bidder can win in that particular Group. Table 3 lists the number of tranches demanded, and the load cap for each load Group.

Table 3. Tranche targets for fixed-price products and load caps for fixed-price Groups

Product		Group	
	Tranche Target	Total Tranche Target	Load Cap
CPP-A 17 month	88	366	128
CPP-B 17 month	92		
CPP-B 29 month	93		
CPP-B 41 month	93		
BGS-LFP 17 month	37	144	50
BGS-FP 17 month	35		
BGS-FP 29 month	36		
BGS-FP 41 month	36		

Source: NERA, *Update to Illinois Auction Rules*, table 2 at 3.

In total, there are 366 tranches in the ComEd or CPP fixed-price Group. The load cap for this Group is 128 tranches. This means that no single bidder is permitted to win more than 128 tranches, in sum, for ComEd fixed-price products, which represents no more than 35 percent[7] of ComEd's fixed-price load. Similarly, there are a total of 144 tranches in the Ameren or BGS fixed-price Group, with a load cap of 50 tranches.

One characteristic of the load caps in the Illinois auction bears particular note. The auction mechanism correctly realizes that the fixed-price products within a load Group are close substitutes for one another. For that reason, the load cap is not imposed on a product-by-product basis but is instead applied across the entire Group. A bidder can therefore win, for example, the right to provide supply to all 93 tranches of the CPP-B 29 month product because 93 tranches is less than the 128 tranche load cap for the ComEd fixed-price Group. Exelon Generation winning 89 of the 93 tranches for ComEd's CPP-B 41 month product is a perfect example of this. As the auction format recognizes, since the products within a load Group are close substitutes, it would make little sense to apply a load cap on a product-by-product basis.

B. The Illinois auction is a uniform-price descending clock auction for multiple products

1. In a clock auction for procurement, price starts high and then falls

Because the Illinois auction is a procurement auction—an auction in which bidders compete to supply a good or service—a descending price is used. This is analogous to the use of an ascending-clock process in an auction to sell. In a descending clock auction, prices start high and bidders find it most profitable to offer a larger quantity. As price declines, however, those suppliers with higher expected costs offer less or no quantity. This process continues until the supply offered is equal to the quantity demanded. In this manner, the auction allocates contracts to those suppliers with the lowest expected costs. As a result, customers pay and suppliers

7. (128 / 366) x 100 = 34.9 percent.

receive the market-clearing price for the energy supplied. Absent market power or some form of anti-competitive conduct, this process results in efficient (least-cost) supply, which minimizes long-run procurement cost.

In the Illinois auction, there is a price clock for each fixed-price product. Each clock specifies a price for a particular product, and each clock starts at a pre-determined price.[8] All products are offered simultaneously, and the auction proceeds in a series of rounds. In any given round, each competitor places its bid by specifying the number of tranches it is willing to supply for each product. By making a bid, a supplier commits to supply the specified tranches of a particular product at the current round price for that product. So long as there is excess supply for a product—namely, the number of tranches bid exceeds the tranche target—the price for that product descends in the next round. If the amount of oversupply for a particular product is large, the Auction Manager sets a larger price decrement for that product in the next auction round. When there is no excess supply for a particular product, that product's price will cease to descend in the next round. However, bidders may switch to that product in subsequent rounds. If additional bidding in future rounds for that product is sufficient to induce excess supply, then the price would again continue to tick down. Bidding on a particular Section (for example, the fixed-price Section) will cease when there is zero excess supply for all products in that Section.[9] The fact that prices for separate products are determined simultaneously in the auction allows bidders to take advantage of substitution possibilities among similar products.

2. Initial eligibility, substitution, and supply reduction

To participate in the Illinois auction, bidders are required to make a financial commitment to become eligible to bid on the number of tranches they wish to supply at the start-of-auction price.[10] This initial eligibility constrains the maximum number of tranches that a bidder can offer to supply a particular Section of the auction. As an additional constraint, a bidder cannot submit a bid that would exceed the load cap for a particular load Group. Furthermore, the bidder is not allowed to submit a bid that would exceed the tranche target for a particular product.[11] For example, a bid of 40 tranches on the 17 month BGS-FP product would not be allowed because the tranche target for that product is only 36 tranches.

A bidder may adjust its offered supply for a particular product only in a round in which the price for that product has fallen. A supply adjustment is done by either (1) switching tranches from one product to another, or (2) withdrawing a certain number of tranches from the auction.[12] Put differently, if at the end of round r there exists no excess supply for a product, then no bidder is allowed to switch or withdraw its supply from that product in round $r + 1$, because that product's price will not have fallen in round $r+1$.

Assuming that there is excess supply for a particular product at the end of round r, then the price for that product will fall in round $r+1$ and a bidder is free to switch or withdraw its supply in round $r + 1$. Switching involves a bidder moving its bids from one product to another product within the same Section. A bidder cannot switch a tranche across Sections. A withdrawal

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8. *Illinois Auction Rules* at 28.
9. *Id.* at 28-29. For a description of the price decrement formulae used in the Illinois auction, *see Update to Illinois Auction Rules* at 12-28.
10. *Illinois Auction Rules* at 24. Initial eligibility requires a commitment of $250,000 per tranche. *Id.*
11. *Id.* at 38-39.
12. *Id.* at 33-34.

involves a bidder's reduction of the number of tranches it wishes to supply in a given Section. A withdrawal of tranches is permanent. That is, once a bidder has withdrawn tranches, it cannot offer those tranches again over the course of the auction. A bidder may switch and withdraw supply simultaneously.[13] For example, a bidder could reduce its supply for a particular product by 10 tranches and move only 8 of those tranches to one or more products in the same Section. That bidder would be withdrawing 2 tranches of supply from that particular Section of the auction.

To improve efficiency, a bidder is allowed to submit an exit price at the same time it submits a withdrawal. An exit price is a price between the start of round price and end of round price. It is the lowest price at which the bidder still wants the tranches it is withdrawing. Suppose the start of round price is $65 and the end price is $64. A withdrawal of 4 tranches with an exit price of $64.5 means that the bidder is willing to supply those 4 tranches should the auction terminate at a price between $65 and $64.5. Should excess supply still exist at a price of $64.49, that bidder's withdrawal would be honored. Because it is unlikely that a bidder's preferred drop-out points—that is, the "steps" on a bidder's supply curve—will perfectly match the end of round prices, allowing bidders to submit exit prices improves the efficiency of the auction and is therefore pro-competitive.

The fact that prices for separate products are determined simultaneously in the auction and bidders are allowed to switch from one product to another within the same Section is an important component of the auction design. It allows bidders to take advantage of substitution possibilities among similar products and improves price discovery. Over the course of the auction, it allows each bidder to view the aggregate supply of offers, and thereby to improve its understanding of the likely cost to serve, and the expected profitability of serving, load. Both auction theory and practice have demonstrated the benefits of price discovery in these environments.[14] As I explain in more detail below, actual bidding behavior in the Illinois auction illustrated that the products in the fixed-price Section are close substitutes. Were bidders unable to move tranches from one fixed-price product to another, then auction efficiency would be compromised. For example, bidders might, by random luck, bid disproportionately on a single fixed-price product early in the auction. Were those bidders' supplies locked into those initial products, then some products would quickly decline in price while others would slowly decline in price if they declined at all. In addition, locking in bids to particular products would prevent bidders from viewing how the market as a whole valued these products in relation to one another; uncertainty and, ultimately, inefficiency would result. In its post-auction report, NERA makes this very point:

> It would appear that bidders largely discounted the possibility of future tightening of the capacity market, market changes, or regulatory uncertainty. This may in fact be attributable to the open auction format, whereby suppliers could see how their competitors were in the aggregate valuing risk and were able to see that in order to win, they needed to find better ways to deal with the risks that they perceived.[15]

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13. *Id.* at 44-45.
14. Lawrence M. Ausubel and Peter Cramton, "Auctioning Many Divisible Goods," 2 *Journal of the European Economic Association* (2004) (*Auctioning Many Divisible Goods*), at 480-493.
15. NERA, Public Report Presented to the Illinois Commerce Commission (December 6, 2006) (*NERA Post-Auction Report*), at 123.

Therefore, an important characteristic of the dynamic clock auction is that it allows bidders to reduce their uncertainty by viewing how the market, as a whole, has evaluated the future cost of supply. Clock auctions tend to result in more competitive auctions, and thus in lower prices for consumers.

3. The marginal bidder determines the price for all winning bidders

In a descending-clock auction, bidders reduce their supply as prices decrease. The final price for each fixed-price product is decided when there is no excess supply for any fixed-price product. This occurs when a bidder or bidders have withdrawn sufficient tranches from the fixed-price Section to eliminate any excess supply from the prior round. The last bidder to drop out, and therefore the bidder that effectively sets the price for similar products in the auction, is known as the marginal bidder.

The marginal bidder, like all bidders in the auction, will withdraw its supply when, at the current price, the bidder no longer expects that it will be profitable to provide that supply. Because all other bidders in the auction are still "in" at the marginal bidder's drop-out price, those bidders can expect to earn profits. Therefore, the marginal bidder is the price-setter in the auction.

Although the marginal bidder is the price-setter in the auction, this does not mean that other bidders do not impact the price. Rather, the final price reflects all the bidding choices made by the bidders throughout the auction. The importance of the marginal bidder in setting the clearing price is apparent. The marginal bidder's drop-out price represents the expected marginal cost of supplying the product in question. The expected marginal cost of supplying electricity is, in turn, the expected opportunity cost for winning bidders in the auction. Suppliers have opportunities to provide service outside of the auction itself. Were the auction designed to compensate bidders at prices below their opportunity costs, they would forgo participation in the auction altogether because they could achieve superior prices outside of the auction.

4. All winning bidders receive an identical price per MWh

Winning bidders are those bidders still holding tranches at the end of the auction. All winning bidders receive the same price—the clearing price—for tranches in any given product. This pricing rule is called uniform-pricing. It is the standard pricing rule used when auctioning many identical items—in this case tranches of a particular product. The clearing price is a *single fixed price* that bidders will be compensated for providing supply, and that fixed price does not vary with load. Thus, when load rises or falls, the size, in MW, of each tranche of load rises and falls too. In times of high demand, suppliers receive the same price per MWh as in times of low demand. Therefore, for a bidder to profit from supply, the clearing price must compensate the supplier for its expected average cost of supply over the entire length of the contract.

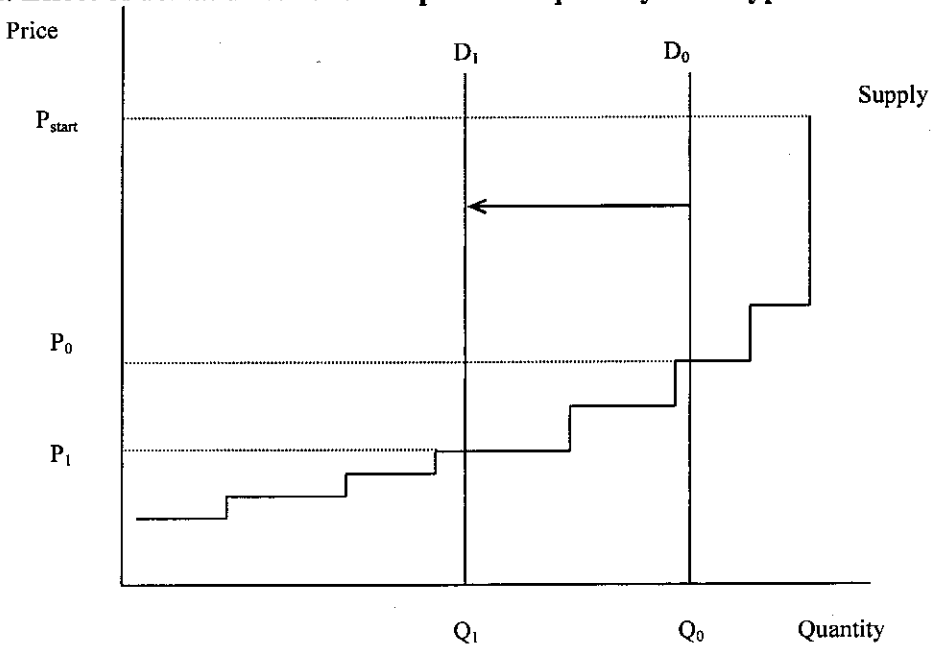
C. The auction design included mechanisms to promote competition and protect against undesirable outcomes

1. The auctioneer can adjust demand early in the auction if it believes that competition is insufficient

The Illinois auction includes several instruments to protect against undesirable outcomes. First, the Auction Manager has the ability to reduce demand if it believes that there is insufficient

supply in a particular Section to ensure a competitive auction for that Section. This demand reduction would *only* occur during the "calculating phase" of round 1, which follows the bidding phase for round 1.[16] At this point, the Auction Manager has the opportunity to assess the level of competition in a Section and the Auction Manager would ". . . use a confidential set of guidelines to decide whether to cut back the volume for a Section and to determine the magnitude of any necessary cutback."[17] If the Auction Manager finds that the level of competition in the auction does not meet its confidential criterion, and is therefore insufficient to achieve a competitive outcome, the Auction Manager can reduce the number of tranches to be purchased. By reducing demand, the Auction Manager would achieve a lower price for supply in a particular Section. Figure 2 displays a hypothetical demand reduction for a particular load Section (for example, the fixed-price load Section) and the effect of that demand reduction on price.

Figure 2. Effect of demand reduction on price and quantity for a hypothetical load Section



After receiving bids in the first round, the Auction Manager may anticipate that to fulfill a quantity demanded Q_0, a price of P_0 is necessary. If the Auction Manager believes that a price of P_0 is too high, the Auction Manager can reduce demand before round 1 closes. In Figure 2, this is presented as an inward shift of the Auction Manager's demand curve from D_0 to D_1. As a result of this demand reduction, the Section's market-clearing price for the load is P_1, which is less than P_0. Therefore, the Auction Manager has the opportunity, according to the auction rules, to reduce demand for electricity if interest in the auction is insufficient to generate competitive prices.[18]

16. *Illinois Auction Rules* at 39.
17. *Id.* at 41.
18. In an August 2006 update to the auction rules, the Auction Manager specified the manner in which it would decrease demand during the first round of the auction. NERA, Update to the Illinois Auction Rules (August 10, 2006) at 2, available at: http://www.illinois-auction.com/index.cfm?fa=bid.rul. The Auction Manager stated that if, according to its private guidelines, it felt it necessary to cut back volume in round 1, it would do so to achieve a target eligibility ratio of between 1.25 and 1.6. *Id.* That is, it would reduce the volume demanded in the relevant

Of course, at the time of this decision, the Auction Manager only knows a single point on the supply curve—the quantity bid at the starting price. Thus, the Auction Manager is unable to know the exact impact of the quantity adjustment. If supply is highly competitive, the aggregate supply curve will be quite flat around the clearing price and therefore the demand reduction would have little impact on price. On the other hand, if the auction is not competitive, then the aggregate supply curve around the clearing price may be steep and a demand reduction can have a large impact on price.

Despite the limited information available to the Auction Manager at the beginning of the auction, the quantity bid at the starting price tends to be an excellent measure of the competitiveness of the auction. For this reason, demand adjustment is an effective and appropriate instrument to address the possibility of insufficient competition. Demand adjustment, though rarely employed, is often included in well-designed auctions. Finally, it bears note that the Auction Manager did not exercise its demand reduction authority in the fixed-price Section but reduced volume in the *hourly* price Section of the auction from 90 tranches to 71 tranches.[19]

2. Bidders only receive aggregate information during the auction

A second important instrument to encourage competition is the auction's information policy. In the Illinois auction, as is typical of well-designed clock auctions, bidders only receive information on the price of each product for the next round and excess supply for the entire fixed-price *Section* (*i.e.,* for both the ComEd and Ameren Groups). Bidders can glean additional information by reviewing the price decrements for participating products, but overall bidders have limited information about what would be required to stop the decline in prices. Furthermore, bidders are unable to view the bids of any other bidder at the auction. The result of this limited information is that bidders are unable to strategically reduce supply in response to a supply reduction by another bidder. Without the ability to view another bidder's actions in a given round, bidders' ability to signal one another with their bids is effectively negated.[20]

In addition to the information limits discussed above, the Auction Manager also limits specific excess supply information as the auction progresses. In particular, the Auction Manager never reveals to bidders the exact amount of excess supply for a particular product. Instead, the Auction Manager specifies a range of excess supply within which the true excess supply lies. As the auction progresses, and as excess supply decreases, the range of excess supply reported by the Auction Manager *increases*. For example, when excess supply is large, the Auction Manager may report a range of excess supply of 10. However, when the auction advances, the Auction Manager may report a range of excess supply of, say, 20. In this manner, the Auction Manager

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Section by dividing the volume demanded at the start of round 1 by a number between 1.25 and 1.6. The specific number chosen would be at the discretion of the Auction Manager. *Illinois Auction Rules* at 41.

19. *NERA Post -Auction Report* at 128.

20. This does not mean that an auction that *does* provide bidder-specific information during the auction necessarily will result in a non-competitive outcome. For example, many FCC spectrum auctions have been highly competitive despite revealing bidder-specific information. *See* Peter Cramton, "The FCC Spectrum Auctions: An Early Assessment,"6 *J. Econ. and Management Strategy*, 431-495 (1997). Nonetheless, in other FCC auctions—the D, E, and F-block auction, for example—bidders were provided with full information on all bids submitted during all rounds of the auction and the identities of the bidders that submitted each bid and certain types of bid-signaling were observed. *See* Peter Cramton and Jesse Schwartz, "Collusive Bidding in FCC Spectrum Auctions," 1 *J. Econ. Anal. and Pol.* (2002) (*Collusive Bidding*); Peter Cramton and Jesse Schwartz, "Collusive Bidding: Lessons Learned from the FCC Spectrum Auctions," 17 *J. Reg. Econ.*, 229, 231-35 (2000) (*Lessons Learned*).

limits the ability of a bidder to prematurely terminate the auction. The bidder is unsure of the precise number of tranches it would need to withdraw from the auction in order to conclude bidding, and, therefore, is also unsure about the profit consequences of such a supply reduction.

Tables 4a and 4b, which I have drawn from actual bid data in the Illinois auction, illustrates the information available to bidders after specific rounds of the Illinois auction.

Table 4a. Excess supply and end of round prices

		Prices							
Round	Excess Supply	B-17	B-29	B-41	A-17	FP-17	FP-29	FP-41	LFP-17
1	501 – 510	100	100	100	104	100	100	100	104
2	451 – 460	95	99.39	98.3	104	95	97.9	97.04	104
3	441 – 450	90.25	98.79	96.55	104	90.4	95.57	94.73	103.48
4	411 – 420	85.93	97.11	93.91	104	86.58	92.92	92.64	102.37
5	411 - 420	82.14	95.13	91.17	104	86.15	88.27	89.7	101.86
6	381 - 390	79.03	92.02	88.51	104	85.29	85.47	86.7	101.35
7	381 - 390	78.07	88.05	85.64	103.5	81.94	82.76	83.14	100.84
8	341 - 350	77.2	84.12	82.84	103.5	79.11	80.13	79.8	100.27
9	331 - 340	76.04	80.28	79.99	103.5	77.84	77.67	77.02	98.87
10	281 - 300	73.38	78.5	77	103.5	75.45	75.62	74.74	97.42
11	256 - 280	70.78	76.54	74.55	103.5	72.6	73.86	72.82	95.65
12	226 - 255	68.61	74.16	71.83	103	70.96	72.57	71.55	93.71
13	176 - 225	67.3	70.76	69.69	102.5	69.57	71.25	70.97	92.13
14	0 - 175	66.22	69.36	68.1	100.4	68.09	68.58	69.81	89.09
15	0 - 175	66.05	67.8	66.57	99.89	67.92	68.41	69.64	88.87
...									
38	0 - 175	63.8	63.84	63.33	90.11	64.77	64.74	66.22	84.74
39	0 - 175	63.8	63.84	63.17	90.11	64.77	64.74	66.05	84.74

Source: *NERA Post-Auction Report*, table IV-25 at 119-20.

Table 4b. Price decrements

Round	B-17	B-29	B-41	A-17	FP-17	FP-29	FP-41	LFP-17
2	5.00%	0.61%	1.70%	0.00%	5.00%	2.10%	2.96%	0.00%
3	5.00%	0.60%	1.78%	0.00%	4.84%	2.38%	2.38%	0.50%
4	4.79%	1.70%	2.73%	0.00%	4.23%	2.77%	2.21%	1.07%
5	4.41%	2.04%	2.92%	0.00%	0.50%	5.00%	3.17%	0.50%
6	3.79%	3.27%	2.92%	0.00%	1.00%	3.17%	3.34%	0.50%
7	1.21%	4.31%	3.24%	0.50%	3.93%	3.17%	4.11%	0.50%
8	1.11%	4.46%	3.27%	0.00%	3.45%	3.18%	4.02%	0.57%
9	1.50%	4.56%	3.44%	0.00%	1.61%	3.07%	3.48%	1.40%
10	3.50%	2.22%	3.74%	0.00%	3.07%	2.64%	2.96%	1.47%
11	3.54%	2.50%	3.18%	0.00%	3.78%	2.33%	2.57%	1.82%
12	3.07%	3.11%	3.65%	0.50%	2.26%	1.75%	1.74%	2.03%
13	1.91%	4.58%	2.98%	0.50%	1.96%	1.82%	0.81%	1.69%
14	1.60%	1.98%	2.28%	2.01%	2.13%	3.75%	1.63%	3.30%
15	0.26%	2.25%	2.25%	0.50%	0.25%	0.25%	0.24%	0.25%
...								
38	0.00%	0.00%	0.00%	0.25%	0.00%	0.00%	0.00%	0.00%
39	0.00%	0.00%	0.25%	0.00%	0.00%	0.00%	0.26%	0.00%

Source: *NERA Post-Auction Report*, table IV-26 at 121-22.

The data in Tables 4a and 4b indicate that little information was revealed to bidders after each round of the auction. Of course, bidders were allowed to see information about their own specific bids, but not about those of their competitors. Furthermore, bidders were unable to see the excess supply on a product-by-product basis, nor were they allowed to see the specific amount of excess supply in the entire fixed-price section.

For example, after round 1 of the auction, bidders would have been allowed to see that excess supply in round 1 was between 501 and 510 tranches for the entire fixed-price Section. Furthermore, bidders would have been able to see that there was zero excess supply for the A-17 and LFP-17 products, because those products' prices remained constant. All products for small business and residential customers had excess supply, but the amount of excess supply for 17 month contracts exceeded excess supply for 29 or 41 month contracts. This is evident from the 5 percent price decrement for 17 month contracts, which exceeds the price decrements for the other contracts.

In sum, bidders were allowed to see an array of bid information, but that information reflected *aggregate market signals only*. Bidders were unable to view specific data on specific competitors, nor were they able to view the specific amount of excess supply remaining in the auction. Once excess supply dropped below 175 (in round 14), bidders were only allowed to know that excess supply was between 0 and 175 for the remainder of the auction. As discussed, this limited information greatly frustrates the ability of bidders in the auction to collude or to exercise market power. The information policy in this auction is consistent with industry best-practice for high-stake clock auctions.

D. The dynamic clock auction is a well-tested mechanism that is consistent with industry-best practice

As discussed, the Illinois auction is a descending clock auction to buy electricity. The analog auction format for an auction to sell is the ascending clock auction. Clock auction formats have

been used in many high-stakes auctions to efficiently allocate products and achieve competitive prices. Below, I give examples where either a descending or ascending clock auction was or will be used to competitively allocate goods or services. Indeed, the dynamic clock auction is a commonly used mechanism to transfer efficiently a divisible good or service from one party to another.

1. Descending clock auctions

The UK Auction for Greenhouse Gas Emission Reductions: In 2002, the United Kingdom used a descending clock auction to procure greenhouse gas emissions reductions. Participation in the auction exceeded government and industry expectations, resulting in more emission reductions at a lower price than was anticipated.[21]

The New Jersey Auction BGS: Since 2002, New Jersey has procured basic generation service through a descending clock auction that is essentially identical to the Illinois auction.[22]

Spain's auction of bilateral contracts for regulated supply: In the summer of 2007, Spain will hold its first auction for contracts for regulated supply of electricity. The auction format will be a descending clock auction, similar to the one used both in New Jersey and in Illinois.[23]

Colombia's forward energy market and firm energy market: Auctions to supply electricity in Colombia's electricity market are scheduled to begin in 2008. Although the auction is still in the design process, the auction format is a descending clock auction.[24]

2. Ascending clock auctions

A descending clock auction is a mechanism used to buy goods from interested suppliers. In contrast to the descending clock auction, the ascending clock auction is used to *sell* goods to interested buyers. These two auction mechanisms are mirror images of one another, distinguished only by whether the bid taker is buying (descending clock) or selling (ascending clock).

Virtual Power Plant (VPP) Auctions: Since 2001, Electricité de France (EDF) has used an ascending clock auction to make available to bidders 6,000 MW of generation capacity, which amounts to approximately 10 percent of France's capacity.

Gas Release Auctions: Since July 2003, Germany's Ruhrgas Gas Release Program has conducted annual auctions of natural gas long-term supply contracts. These dynamic clock auctions are viewed as highly successful and imitated in several other countries: France, Hungary, and most recently Denmark.[25]

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21. *See also* Ausubel and Cramton, *Auctioning Many Divisible Goods*, at 5, 10 (discussing price discovery, efficiency, and intra-round bidding in a descending clock auction).
22. *See, e.g.*, Jeanne Fox, "New Jersey's BGS Auction: A Model for the Nation," *Public Utilities Fortnightly* (September 2005), at 18, available at: http://www.state.nj.us/bpu/tmp/Perspective.pdf.
23. Information on this auction is available at: http://www.subasta-cesur.eu/Auction.asp?selectedTab=links.
24. Peter Cramton, "Product Design for Colombia's Regulated Market" (June 13, 2007), and "Auction Design for Colombia's Forward Energy Market" (June 13, 2007), available at: http://www.cramton.umd.edu/papers2005-2009/.
25. A press release on the most recent auction is available at: http://www.dongenergy.com/en/pr/pressemeddelelser/Press_releases_2007/Data/All+sold+out+again+at+DONG+Energys+Gas+Release+Auction.htm.

Spectrum Auctions: The U.S. Federal Communications Commission pioneered the use of simultaneous ascending auctions to assign radio spectrum. It has conducted 66 of them since 1994. With few exceptions, these auctions have been extremely successful. Recently, several countries have improved upon the FCC's basic auction format by using an ascending clock format, which is faster and better avoids problems of bid signaling that were a problem in some of the FCC auctions. Trinidad & Tobago conducted an ascending clock spectrum auction in 2005, and Ofcom, the telecommunications regulator in the United Kingdom, is in the process of developing a series of ascending clock spectrum auctions which will ultimately be similar to (although much larger than) the auction that took place in Trinidad & Tobago.

The Illinois auction design is similar to those used in the auctions mentioned above, and is consistent with the best practices that occur today in high-stakes auctions for divisible goods. The basic design of a descending-clock auction allows bidders to gradually discover prices, thereby reducing common-value uncertainty. As a result, the Illinois auction design was and is well-suited to determine competitive prices and an efficient allocation of supply contracts for full service requirements.

E. Given the auction design, collusion in the Illinois auction is highly improbable

Based on my review of the Illinois auction design, I find it highly unlikely that bidders would be able to collude in the auction. As described above, the design of the Illinois auction has numerous safeguards that mitigate a bidder's incentive and ability to exercise market power. To collude effectively in a market, firms need to be able to monitor one another's actions. As academic research has shown, cartels are often unstable because it is difficult for cartel members to devise and agree upon a market outcome.[26] Without the ability to quickly and effectively punish a bidder that deviates from the already agreed upon cartel outcome, the incentives to deviate from the cartel or bidding ring are strong.

In the context of the Illinois auction, one immediately recognizes the difficulty of colluding with other bidders. Because of the limited information bidders received, a hypothetical cartel would be unable to monitor bids of other cartel members. As a result, each individual cartel member would have incentive to deviate from the cartel and bid aggressively in the auction. Indeed, the only way that cartel members could credibly monitor and punish the actions of other cartel members during the auction would be to share official bid information after each round of the auction or to physically bid from the same room during the live auction. Without evidence of such blatant violations of the auction rules, any allegations of collusion must be considered extremely unlikely, especially when there is evidence that the market outside of the auction is competitive.[27]

In addition, the United States has strong antitrust laws that explicitly forbid the type of collusive conduct alleged here. Violations are subject to triple damages in addition to jail time. It has been my experience in advising dozens of bidders in high-stake auctions that the antitrust laws encourage competition because bidders are well aware of the anti-collusion laws. The companies I have advised take extreme care to assure that they do not run afoul of these laws.

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26. *See, e.g.,* R. Preston McAfee and John McMillan, "Bidding Rings," 82 *American Economic Review* 579, 579-80 (1992).
27. *See* Affidavit of Robert B. Stoddard on behalf of J. Aron & Company and Morgan Stanley Capital Group Inc., (Stoddard Affidavit) (to be filed contemporaneously).

There is good reason for this. Companies would lose an enormous amount if they were caught engaging in collusion. Equally important, the parties involved in the bidding would benefit little from engaging in collusion. The bidding team typically consists of many people, including legal counsel. Most of these people are salaried employees who would gain little through collusive action, and any collusive action would be observed by many, including counsel. For these reasons, when collusion does occur in auctions it typically occurs in repeated auctions where the bidders have a large (often 100 percent) stake in the outcome. Therefore, the long-standing antitrust rules provide a significant deterrent to collusion.

Finally, it bears note that FERC had determined before the actual auction that the design of the Illinois auction would result in just and reasonable wholesale rates and would not allow affiliated sellers and buyers to abuse their relationships with one another. In responding to an argument by the Missouri Public Counsel that Ameren Energy Marketing's participation in the Illinois auction would increase the probability of affiliate abuse within Ameren Corporation, FERC found that "the competitive solicitation process described by Union Electric and Ameren Energy Marketing satisfies the Commission's concerns regarding affiliate abuse and will, if conducted consistent with the process described here, result in just and reasonable rates."[28] FERC reached a similar conclusion in evaluating a protest by the Illinois Attorney General that the Illinois auction would violate FERC's affiliate abuse standards.[29]

V. The Illinois auction was a competitive process and produced a fair outcome

In this section, I discuss reports by NERA, which served as the Auction Manager, and ICC staff evaluating the conduct and results of the Illinois auction. Both reports state that the auction process was competitive. I also compare bidding in the auction to bidding in the New Jersey BGS auction, which has a nearly identical design, and show that bidding in these auctions was reasonably similar, and also viewed as competitive.

A. Post-auction reports confirm the auction was competitive

Given the auction design and the existence of a competitive generation market outside of the auction, as Mr. Robert Stoddard discusses in his Affidavit,[30] it is highly probable that the Illinois auction would result in a competitive outcome. Still, even the best design may have problems in special circumstances, so it is important to assess the auction at its conclusion. After the auction, NERA and the ICC reviewed bidding during the auction and the final auction result. Both NERA and the ICC found that bidding in the auction was competitive and that the auction resulted in competitive prices. Furthermore, neither NERA nor the ICC found any evidence that bidders had colluded during the auctions.

1. The NERA post-auction report explains that the Illinois auction was competitive

In its report reviewing the outcome of the Illinois auction and bidding during the course of that auction, NERA explained that the auction was competitive and that rates reflected economic

28. Order Granting Authorization to Make Affiliate Sales, Docket No. ER06-831-000, 115 FERC ¶ 61,286 (2006).
29. Order Granting Authorization to Make Affiliate Sales, Docket No. ER06-43-000, 113 FERC ¶ 61,278 (2005).
30. *See* Stoddard Affidavit.

forces and were therefore consistent with market prices. Specifically, in its overall review of competition in the fixed-price section of the auction, NERA explained that "[s]trong competition and the dynamic of the open auction could be seen repeatedly over the course of the Auction."[31] To support this statement, NERA noted that bidders substituted between products in the fixed-price section as the relative prices of those products changed.[32] For example, NERA explained that in the early rounds of the auction, bidders were more interested in the 17 month products for residential and small business than in the 29 month and 41 month products. As a result, the price of the 17 month products declined more rapidly than the prices of the longer-term products. Seeing this price gap, bidders began to switch to the longer-term products, which increased excess supply for those products and caused the prices of those products to decline at a quicker pace.[33] Finally, NERA stated that the gradual decline in bidder supply as prices decreased resulted in a "soft landing" for the final auction prices, and that this was consistent with competitive bidding.[34]

In addition to its descriptions of competition in the auction, the NERA report also considers the auction's final prices and determined that those prices were consistent with the overall market. For example, NERA explained that immediately after the auction, the price on the New York Mercantile Exchange for a 17 month period of non-load-following energy at the Northern Illinois Hub was about $15 per MWh less than the price of 17 month full service requirements for small business and residential customers in the Illinois auction. Put differently, the price of non-load-following energy alone comprised approximately 64 percent of the price of 17 month full service requirements in the Illinois auction. NERA explained that when one considered all the additional costs of providing full service requirements and the inherent risks taken by bidders that won those contracts, the "[p]rices for the B products and FP products appear not only to be priced consistently with the market, but very favorable from the customer's perspective with respect to the market."[35]

Finally, NERA also found no evidence of collusion in the auction. Specifically, NERA provided the ICC staff with a confidential report that analyzed bidding in the auction, the manner in which the auction was carried out, and the information that was disseminated to bidders. In its report to the ICC:

> the Auction Manager certified that the Auction was appropriately promoted, that information was properly disseminated, that ICC Staff was kept informed of activities during the pre-Auction phase and during the Auction, that no evidence was found of collusion, and that Auction results were consistent with competitive bidding.[36]

31. *NERA Post -Auction Report* at 123.
32. *Id.*
33. *Id.* at 108-109.
34. *Id.* at 123.
35. *Id.* at 123-24.
36. *Id.* at 148-49.

2. The staff of the Illinois Commerce Commission also found the auction to be competitive

In its post-auction report, the ICC staff stated that bidding in the auction was closely scrutinized by both the ICC staff and the Auction Monitor, Boston Pacific Company.[37] Both ICC staff and the Auction Monitor had full access to relevant data from the auction and performed on-site and on-line electronic monitoring of the bidding process from the secure auction site. The ICC staff "found that the auction was conducted in a transparent, equitable, and highly professional manner, consistent with both the [ICC] orders in the Procurement Dockets and the auction rules."[38] Both the ICC staff and the Auction Monitor found the auction to be competitive. Finally, it bears note that the ICC report states that "[n]either staff nor the Auction Monitor found evidence of collusive behavior or otherwise anti-competitive actions by bidders."[39] Therefore, the ICC staff found that the Illinois auction was a fair and competitive process, that it was conducted in accordance with proper procedure, and that there was no evidence of collusive bidding in the auction.

3. Competition in the Illinois auction was similar to competition in the New Jersey BGS auction

Another indicator of the competitiveness of the Illinois auction was the fact that competition in that auction was similar to competition in the New Jersey BGS auction, which has been heralded as a competitive process that resulted in fair market-based prices. The 2006 New Jersey BGS auction (an auction that is nearly identical to the Illinois auction) began on 6 February 2006 and ended on 7 February 2006 after 17 rounds of bidding.[40] The fixed-price section of the BGS auction procured 54 tranches of basic generation service for four different electric distribution companies (EDCs).[41] There were ten separate winning bidders in the auction, and the median number of fixed-price tranches won by a single bidder was four, which was 7.4 percent of the total number of the fixed-price tranches sold at auction.

In the Illinois auction, there were a total of sixteen bidders that won a combined 510 fixed-price tranches. The median number of tranches won by a single bidder was 21.5, which equates to 4.2 percent of the fixed-price tranches at auction. Therefore, there were more winning bidders in the Illinois auction than in the New Jersey BGS auction, and the median bidder won a smaller percentage of the fixed-price supply in the Illinois auction than in the New Jersey auction. Although these simple statistics do not amount to a formal analysis of competition in the auction, they show that on a high-level basis the degree of competition in the Illinois auction compares favorably to the competition in the 2006 New Jersey auction.

Given the similarities between the Illinois auction and the New Jersey BGS auction, it bears further emphasis that the New Jersey Board of Public Utilities (NJBPU) explained after the 2006 auction that "despite this expensive market, the state's unique auction process results in the best possible rates for New Jersey in light of current market conditions and compare favorably to

37. Illinois Commerce Commission, Post-Auction Public Report of the Staff (December 6, 2006) (*ICC Staff Post-Auction Report*), at iii.
38. *Id.*
39. *Id.*
40. *The 2006 BGS Auctions* at 1, available at: http://www.bgs-auction.com/bgs.auction.prev.asp.
41. *Id.*

some states such as New York, Massachusetts, Connecticut and Delaware."[42] Despite the fact that prices had increased over those in the 2005 auction, the NJBPU stated that those price increases were justified:

> The NJBPU said that the results of this year's auction reflect increasing costs in world energy markets, especially in natural gas. The cost increases are driven by growing international energy demand and supply constraints that were exacerbated by the impacts of Hurricanes Katrina and Rita, the board said.[43]

In assessing the results of the 2006 New Jersey BGS auction, CRA International (the firm that monitors the BGS auction for the NJBPU) concluded (as did the NJBPU) that auction price increases were justified. Although "[w]inning prices were substantially higher in this year's auction as compared to previous years,"[44] CRA International stated that "[t]he price increases in the New Jersey auction were not isolated phenomena as significant price increases also were seen in wholesale electricity markets, natural gas markets, and energy procurement processes in other jurisdictions."[45]

The CRA International auction report correctly points out that a properly functioning auction market is still the best way to achieve low prices for customers.[46] Given the similarities between the auction designs in Illinois and New Jersey and the similarities in the level of competition in those auctions and the absence of collusion, it is logical to conclude that the prices in the Illinois auction reflect competitive market prices. Had the Illinois auction been conducted in 2004 and 2005 as well, it would almost certainly be the case that the prices in those earlier auctions would have been lower than 2006 prices, which reflect substantially higher marginal fuel costs. As the CRA International report states, the New Jersey BGS auction remains the best way to procure low-cost service for ratepayers.

B. Effect on retail rates

ICC staff also provided an analysis of the effect of the auction on retail rates. ICC staff calculated the retail rates for combined delivery service and electricity rates that would result from the auction and compared this to rates in 1997.[47] After controlling for inflation, ICC staff found that rates set by through the auction for ComEd residential customers actually *fell by 22 percent relative to rates in 1997*. ICC staff also found that real retail rates *decreased by 11 percent relative to 1997* rates for Ameren's Illinois Power customers.

ICC staff found that Ameren's CIPS and CILCO residential customers would face real rate increases relative to 1997.[48] However, it must be noted that the 1997 retail rates for CIPS and

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42. *New Jersey BPU OKs Results of $7B Basic Generation Service Auction* (February 10, 2006), available at: http://www.bgs-auction.com/bgs.press.asp#item4.
43. *Id.*
44. CRA International, "Post Auction Report on the New Jersey Public Utilities' Basic Generation Service Auction Process: February 2006" (March 2006), at 4.
45. *Id.*
46. *Id.* ("We continue to believe that an auction mechanism is the best means to ensure the lowest possible prices for New Jersey ratepayers, but as this year demonstrates, when broader market fundamentals push energy prices higher, auction prices and consumer rates will rise as well. Any bidding mechanism that is designed to achieve the lowest possible prices for consumers in the marketplace will not insulate consumers from changes in market prices.")
47. *ICC Staff Post-Auction Report* at 18-20.
48. *Id.* at 20-21.

CILCO residential customers were significantly less than the rates for Ameren's Illinois Power and ComEd's residential customers. By comparison, the rate gap between these customer groups shrunk significantly in 2007. ICC staff notes that the decrease in rate gaps between these customers is due to the Illinois auction, which resulted in only a 2 percent difference between the average price of ComEd fixed-price products for small business and residential customers and the average price of Ameren products for small business and residential customers.[49]

This leveling of relative prices between ComEd customers and the different Ameren customers is a normal and efficient result of market-based pricing. Under cost-based rate regulation, the portion of rates attributable to electric energy costs was determined by the investment patterns of specific utilities. When utilities made investments that differed from one another, different customers paid different retail rates.[50] By contrast, restructuring gives the utilities incentive to separate themselves from specific plants and instead to rely on purchases from a more extensive and integrated portfolio of assets. As a result, geographic differences in retail rates will tend to disappear.[51] This convergence is efficient and consistent with least-cost procurement of energy.

VI. Notions of marginal cost and potentially inaccurate benchmarks should not be used to assess market-based prices

It is my understanding that under the Federal Power Act (FPA), FERC can investigate the fairness of a rate or a contract to determine if it is lawful.[52] The FPA states that rates that are not just and reasonable are unlawful.[53] To then determine which rates are lawful and which rates are unlawful, one must have either a standard or a mechanism to determine what is just and reasonable. Below, I explain that a main purpose of market-based pricing mechanisms for electricity, such as a uniform-price electricity auction, is to determine just and reasonable rates from workably competitive market forces.

A. Vague and incomplete notions of marginal cost should not be used to determine a zone of reasonableness for market-based prices

Market-based procurement has two essential purposes: (1) to determine the suppliers who can most efficiently provide the service, and (2) to determine the prices that fairly compensate suppliers for the service. As I explained in a recent paper with Steven Stoft, economic changes, such as the recent increase in the cost of fuel, can cause consumer prices to increase in the short-run.[54] The mere fact that prices have increased and consumers must pay more for electricity does not mean that the market-based mechanism that determined those prices is broken. Rather, that mechanism—market-based pricing—is essential to procuring electricity at minimum cost and to assigning commitments efficiently. Furthermore, market-based prices, such as those determined in a uniform price auction, serve as a signal to the market about whether new plants are needed

49. *Id.*
50. *Id.*
51. *Id.* at 21-22.
52. Federal Power Act, §§205 and 206.
53. *Id* at §205(a).
54. Peter Cramton and Steven Stoft, "Why We Need to Stick with Uniform-Price Auctions in Electricity Markets," 20 *Electricity J.*, 26, 27 (2006) (*Uniform-Price Electricity Auctions*).

and, if so, of what type. Market-based prices play an important role in moving from a point of short-run disequilibrium back to a point of long-run equilibrium.[55]

It is my understanding that a recent opinion by the Ninth Circuit concerning long-term market-based rate contracts, upon which the Illinois Attorney General relies in her complaint,[56] suggests that market-based rates must fall within a "zone of reasonableness" and attempts to link the zone of reasonableness to an undefined notion of marginal cost. One could interpret this to mean that rates should reflect the marginal cost of each generation asset in question. This would be *disastrous* to consumers in the long-run. Specifically, were each asset compensated at its marginal cost of generating, there would be no incentive to invest in more cost-efficient baseload plants.[57] As a result, only low fixed cost, high marginal cost plants would be built and rates—based on marginal cost—would be much higher than rates determined through market-based pricing, such as a uniform-price auction, which does not track marginal cost on a resource-by-resource basis. It makes far more sense to determine just and reasonable rates through a well-designed and well-implemented mechanism that determines prices competitively.

Additionally, in the short-run, marginal costs can either exceed or be less than long-run marginal cost (i.e., long-run average cost). When short-run marginal cost is less than long-run marginal cost, consumers pay less for electricity than they will in the long-term. By contrast, when short-run marginal cost exceeds long-run marginal cost consumers pay more. Because electricity markets can be cyclical in nature, market prices will, at times, deviate from long-run marginal cost. This, however, does not mean that there is market failure.

B. It is impractical to benchmark market-based prices after one has already adopted a competitive process to determine these prices

Illinois has adopted and conducted a competitive process to determine competitive wholesale prices for full service requirements in Illinois. Due to the longstanding rate freeze in Illinois, consumers had been insulated from the economic effects of rising fuel costs. Now that the rate freeze has ended, consumers who had experienced the benefits of below-market rates under the latter years of the former rate regime will now experience some rate increases. In an attempt to undermine the auction results, the Illinois Attorney General has offered several benchmarks that purport to show that the auction prices were too high. In the absence of *convincing* evidence that the Illinois auction was not competitive (and as I show below, there is no such evidence in Mr. McCullough's affidavit), one must then ask why one should trust a benchmark over a tested market-based mechanism to fairly determine the appropriate rates for full service requirements. The answer is that a rational person should not.

Benchmarking can be fraught with error. For this reason, benchmarks must be interpreted with caution. Indeed, the ICC Staff's post-auction report explains this in detail:

> At the outset, two points need to be strongly emphasized. First, creating benchmarks of this kind relies upon many assumptions. Thus, any such

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55. *Id.*
56. *See* Complaint at 16.
57. Cramton and Stoft, *Uniform-Price Electricity Auctions*, at 26-27. I also note that Dr. Craig Roach of Boston Pacific Company, Inc. who served as the Auction Monitor in the Illinois Auction has come to a similar conclusion in his affidavit. *See* Affidavit of Craig R. Roach, Ph.D. on behalf of Boston Pacific Company, Inc. as the Auction Monitor for the 2006 Illinois Auction, Docket No. EL07-47-000 (filed June 6, 2007) (Roach Affidavit) at ¶¶ 56-57.

> benchmarks should be interpreted cautiously. Second, Staff did not utilize such benchmarks in forming its recommendations to the Commission concerning approval or rejection of the September auction results. In general, Staff's recommendations for approval or rejection of auction results are based not on second-guessing resulting auction prices, but rather on an assessment of whether the auction is conducted in accordance with the Commission's orders and the auction rules and whether the auction was adversely affected by contemporaneous external events.[58]

This basic point has also been made by economists. For example, when discussing benchmarking the appropriate zone of reasonableness in light of the Ninth Circuit's recent decision concerning long-term market-based rate contracts, Peter Fox-Penner and Joe Wharton note that,

> [f]irst, many large, long term power contracts are not standard homogenous products like the power traded in organized spot markets – there are many vintages, durations, and variations in terms in power purchase agreements. Second, the economic mechanics of competition in long term bilateral contract markets are not as transparent or well-modeled as spot market auctions. Third, the data on these market processes are not as readily available as data for continuously monitored spot markets.[59]

It is foolish and impractical to overturn the results of a well-tested and competitive auction on the basis of a benchmark that is only loosely related to the product auctioned. Put simply, if one has designed, implemented, and conducted a competitive process to correctly determine market-based rates, the presumption should be that those rates better reflect the correct market rates than a biased benchmark with error of unknown size.

VII. Consumers would be harmed were the Illinois auction results thrown out

Absent compelling evidence of auction failure, because of a flawed design or collusion, it would be a huge mistake to reverse auction results or even to set them for hearing.

A. Investment incentives would be harmed

Were the results of the Illinois auction rejected, investment incentives would be harmed. The clearing-price auction provides an essential price signal for short-run performance and long-run investment incentives. Given the uniform-price auction used in the Illinois market, the marginal bidder determines the price for all bidders. Each remaining bidder will enjoy an expected profit determined by the spread between the price and the bidder's expected marginal cost. Bidders with the lowest-cost units will have the highest expected profits. This is economically efficient, since these low-marginal cost units have high fixed costs, and without expected profits in the long-run, these units would be unable to recover those fixed costs.

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58. *ICC Staff Post-Auction Report* at 11.

59. Peter Fox-Penner and Joe Wharton, *The Zone of Reasonableness and Long Term Power Contracts,* Working Paper (March 2007), at 3, available at: http://www.brattle.com/_documents/Publications/ArticleReport2437.pdf.

Under the former cost-based rate-of-return regulatory regime, all plants were guaranteed the same rate of return. Regulating all plants in this way provided poor investment incentives. Investors knew that no matter how many plants of a given fuel type were built, they would still earn the same rate of return on a new asset of the same type—even one that burns a high-cost fuel. Companies had weak incentives to invest in lower-cost assets, and intermediate and long-term marginal cost would not decrease to the most efficient level. When marginal costs are kept high, prices are necessarily kept high to guarantee a rate of return. Rate-of-return regulation forces the regulator to take over the investment decision, and thereby eliminates the principal benefit of moving to a competitive electricity market.[60]

B. Regulatory uncertainty would increase prices

The results from the Illinois auction amount to a contract between the seller and the buyer. In the Illinois auction, the seller agrees to provide the product in question and the buyer agrees to compensate the seller at the price determined through the auction process. Enforceable contracts are perhaps the most basic building block to a successful market economy.[61]

Contracts are essential to promoting efficient investment in production and consumption. FERC has recognized that regulatory uncertainty is a factor that clouds investment decisions made by generators.[62] In the context of the electricity auctions, if participants believe that the contract determined through the auction process is not enforceable—that is, if the buyer will attempt to cancel a competitive auction if at a later date it does not like the results—then bidders will condition their bids on this regulatory risk. The result would be much higher prices for consumers.

Because regulatory uncertainty can affect market prices, the Illinois Attorney General may be doing more harm than good by challenging the results of the auction. Illinois' second electricity auction should occur in September 2007. Were the results of its first auction still in doubt shortly before or when the second auction occurs, competition in the second auction would be harmed. Bidding at auction is not a costless endeavor. It takes time to formulate a bid strategy, to attend training sessions and review auction rules and procedures, and to bid in the auction. If bidders believe that the results of the auction will be unfairly challenged or thrown out, their incentives to participate in the auction will be reduced. Furthermore, if bidders believe that allegations of collusion will be launched every time there is an outcome that the state finds politically uncomfortable, bidders would have further incentive to avoid the auction process or raise their bids in response to higher transaction costs. Both of these factors harm competition in the auction and result in higher prices.

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60. Cramton and Stoft, *Uniform-Price Electricity Auctions*, at 29-30.
61. Steven Shavell, "Contracts," in 1 *The New Palgrave Dictionary of Economics and the Law* 437 (Peter Newman, ed., Stockton Press, 1998).
62 FERC, Office of Market Oversight and Investigations, *2004 State of the Markets Report* (June 2005) (*FERC 2004 State of Markets Report*), at 27.

C. A reduction in the number of marketers would reduce competition in electricity auctions

The role of the financial industry in the energy market has increased over time. As evidence of this, FERC certified the first power marketing company in 1989.[63] In 1994, the wholesale marketing business consisted of just nine firms reselling 7.2 million MWh of electricity.[64] In 1995, the number of marketers increased to 40, and these marketers resold 26.6 million MWh in 1995.[65] In 1998, power-marketer sales were 24 million MWh, and increased to 49 million MWh in 1999.[66] These numbers attest to the increasing importance of the power marketers in energy markets, which has helped to enhance competition in those markets.

The financial industry's increased role in the energy market can also be seen in the substantial increase in commodity investments and in financial trading volume in energy markets. This trading occurs both in active, well-publicized exchanges for futures and options contracts such as the New York Mercantile Exchange, and through less-publicized bilateral agreements among market participants. According to FERC:

> Available indicators show that participants in the futures and financial markets traded greater volumes, showed more willingness to hold on to sales or purchase commitments, and developed new ways to trade. Such markets also appeared to influence some cash physical markets. Increased activity was particularly apparent in visible natural gas markets, but affected electric power markets as well.[67]

Financial trading of electric power in the United States on the IntercontinentalExchange increased by a factor of 10 during 2004, from less than 10,000 GWh in January 2004 to more than 80,000 GWh in December 2004.[68] Volumes continued to increase in 2005 and 2006, reaching more than 250,000 GWh in August 2006.[69]

The financial industry's participation in the energy market is also important in maintaining liquidity. Market liquidity is a function of capital availability and credit requirements. After the PG&E and Enron bankruptcies, and the California "meltdown" in 2000 and 2001, credit requirements tightened as market participants became more diligent in assessing credit quality.[70] These more restrictive requirements lowered liquidity: energy merchants had less capital for conducting transactions. In 2004, liquidity improved when other financial institutions joined traditional investment banks such as Goldman Sachs and Morgan Stanley in building energy trading capabilities. New market-clearing platforms developed, which helped to reduce required credit capital.[71]

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63. Smithsonian Institution, *Understanding Deregulation*, available at: http://americanhistory.si.edu/powering/dereg/dereg5a.htm.
64. *Id.*
65. *Id.*
66. U.S. Department of Energy, Energy Information Administration, *Electric Power Industry – 1999* (http://www.eia.doe.gov/cneaf/electricity/epav1/intro.html).
67. FERC, *2006 State of the Markets Report*, at 46.
68. *FERC 2004 State of the Markets Report*, at 63.
69. FERC, *2006 State of the Markets Report*,at 49.
70. *FERC 2004 State of the Markets Report*, at 64.
71. *Id.*

In sum, activity by the financial industry has three major benefits: 1) enhanced competition in electricity markets, 2) better risk management through the development and trading of derivatives and other hedging instruments, and 3) greater liquidity. These benefits would be reduced if a regulator were somehow able to reverse auction results absent clear evidence of auction failure. At the very least, marketers would hesitate to participate in the market, and even if they did, they would be forced to charge a higher risk premium.

VIII. A critique of the McCullough affidavit

In this section I show that the allegations in Mr. McCullough's affidavit are based on tests of competition that are devoid of economic reason and are likely to indicate insufficient competition in auctions that were, instead, competitive. Furthermore, I show that had Mr. McCullough applied his misguided Herfindahl-Hirschman Index (HHI) test to the data with an understanding that the fixed-price products in the Illinois auction were close substitutes for one another, his own test would have forced him to conclude that the auction outcome was competitive. Finally, I show that Mr. McCullough's allegations of coordinated market allocation are without merit. For these reasons, FERC should reject Mr. McCullough's allegations, as they completely misrepresent the competition that occurred in the Illinois auction.

A. Mr. McCullough neglects to consider the vast economic literature on anti-competitive bidding in developing his test

In his affidavit, Mr. McCullough advocates the use of the HHI test to determine whether competition existed in the Illinois auction.[72] As I explain below, Mr. McCullough's use of HHI as a test for competition in an auction is inappropriate—it is likely to indicate weak competition in a large number of competitive auctions. In the present section, however, I note that had Mr. McCullough truly been interested in rigorously testing for insufficient competition he most likely would have followed the academic process, which first involves consulting the existing literature on the topic of interest. In the present case, he is attempting to determine whether bidders were colluding or exercising market power in a simultaneous clock auction. Therefore, the academic literature that I and others have published in respected, peer-reviewed economics journals, is directly relevant to the subject.[73] Mr. McCullough, however, chose to *completely ignore* these articles and the tests they have developed in favor of his own poorly-conceived test, which, to the best of my knowledge, has never been used in auction literature to test for anti-competitive bidding.

1. The proper methodology for constructing a test for competition

A researcher interested in properly constructing a test for insufficient competition would follow this process:

1. Identify, based on the auction and the industry in question, a characteristic or a set of characteristics that distinguish competitive bids from anti-competitive bids. In rigorous analyses, this is performed by constructing an economic model of collusion or market power.

72. McCullough Affidavit at ¶¶ 23-26.
73. *See, e.g.*, Cramton and Schwartz, *Collusive Bidding*; Cramton and Schwartz, *Lessons Learned.*

2. Devise a test that uses the characteristics identified above to accurately determine whether a given bid, bidder, or auction was anti-competitive. This test can be a statistical model or, in certain instances, can result in a search algorithm that detects the characteristics inherent in collusive bidding.
3. Make sure that an alternate economic phenomenon could not result in similar data patterns.

Every respected paper of which I am aware that tests for collusion or market power in an auction market follows the basic process outlined above.[74] Following this process is important because researchers wish to avoid what are known as type I or type II errors. In the context of testing for anti-competitive behavior, a type I error would occur when a test does not indicate anti-competitive behavior when it actually exists. By contrast, a type II error would occur when a test indicates anti-competitive bidding when, in fact, there is none. If one constructs a test that often results in type II error, that test is referred to as a *low-power test.*

As I explain and demonstrate below, Mr. McCullough failed to follow the steps above. As a result, he constructed a test with extremely low power—*i.e.*, his test is likely to indicate that bidders exercised market power when the auction was actually competitive. For this reason, Mr. McCullough's test and its resulting conclusions should be rejected as inaccurate.

2. Mr. McCullough's test for anti-competitive bidding does not take into account the rules governing the auction

In a simultaneous clock auction for multiple products, the possibility of a collusive outcome can increase if bidders have the ability to transmit significant amounts of information to one another through their individual bids. As I showed in academic research on the D, E, and F-Block spectrum auction conducted by the U.S. Federal Communications Commission in 1996, bidders were able to effectively communicate with one another at auction because they were allowed to submit specific price points at auction and observe the bids of all others.[75] Because bidders were allowed to submit bids down to single dollar amounts, bidders were able to indicate license identification numbers with the trailing digits of their bids. This enabled some bidders to engage in retaliatory bidding strategies that potentially supported collusive outcomes.[76]

Bidders in the Illinois auction were unable to collude with other bidders in this way. As I explained earlier, prices are set by the Auction Manager according to a formula. Furthermore, bidders only see aggregate bid information after each auction round. As a result, it is not practical to enforce a cartel in the Illinois auction unless bidders are either bidding from the same location or are sending bid confirmation notices to one another between auction rounds. In the absence of such evidence, I find it highly unlikely that bidders were coordinating their actions during the auction.

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74. *See, e.g.,* Robert H. Porter and Douglas J. Zona, "Detection of Bid Rigging in Procurement Auctions," 101 *J. Pol. Econ.*, 518, 518-538 (1993); Patrick Bajari and Garret Summers, "Detecting Collusion in Procurement Auctions," 70 *Antitrust L. J.* 143, 143-170 (2002); Laura H. Baldwin, Robert C. Marshall, and Jean-Francois Richard, "Bidder Collusion at Forest Service Timer Sales," 105 *J. Pol. Econ.*, 657, 657-99 (1997); Martin Pesendorfer, "A Study of Collusion in First-Price Auctions," 67 *Rev. Econ. Stud.*, 381, 381-411 (2000); Cramton and Schwartz, *Collusive Bidding*; and Cramton and Schwartz, *Lessons Learned.*
75. Cramton and Schwartz, *Collusive Bidding*, at 1, 4-8.
76. *Id.*

B. Mr. McCullough's test would cause one to conclude with alarming regularity that competitive auctions have insufficient competition

Mr. McCullough saw fit to simply apply his improperly formulated test for anti-competitive behavior without motivating that test or attempting to explain why that test is valid. As an expert in auction design and bidding, I reject Mr. McCullough's HHI methodology as an appropriate test for anti-competitive bidding in the Illinois auction. I am not dismissing the use of HHI as a tool that one could employ to measure concentration in a relevant product market. Rather, I show below that Mr. McCullough's HHI test is, in general, an extremely low-power test. Indeed, Mr. McCullough's test is likely to indicate that an auction had insufficient competition when, in fact, it was competitive. I also show that a critical flaw in Mr. McCullough's HHI test is the fact that he failed to apply it to a relevant economic market.

1. Mr. McCullough improperly used a merger analysis tool to test for competition in an auction

In his affidavit, Mr. McCullough states that a "lack of competition contributed to above-market clearing prices in the auction."[77] In support of this statement, Mr. McCullough [redacted].[78] Furthermore, he cites to the U.S. Department of Justice's (DOJ's) standard for the measurement of a concentrated market, which, according to the DOJ, is a market in which HHI exceeds 1,800.[79]

Mr. McCullough asserts that the Illinois auction was not competitive [redacted]

In no way does Mr. McCullough follow the general testing methodology that I outlined above. Instead, he simply expects FERC *to assume* that the use of HHI is a test that conclusively assesses competition in an auction. However, HHI is a tool that the DOJ and the U.S. Federal Trade Commission (FTC), as well as FERC, use to assess whether *a horizontal merger* will result in price increases for consumers.[84] Although I recognize that FERC accepts an HHI over 2,500 as evidence of the potential for firms to exercise market power, Mr. McCullough fails to explain why an HHI test can be used to *conclusively* assess competition in the Illinois auction.

77. McCullough Affidavit at ¶ 23.
78. *Id.* at ¶¶ 24, 25, 32.
79. *Id.* at ¶ 23.
80. *Id.* at ¶ 24.
81. *Id.* at ¶¶ 25, 26, 28.
82. *Id.* at ¶¶ 25-27.
83. *Id.* at ¶ 32.
84. US Department of Justice and the Federal Trade Commission, Horizontal Merger Guidelines, 8 April 1997, at §1.5, available at: http://www.usdoj.gov/atr/public/guidelines/hmg.htm#1 (discussing the use of HHI as a tool for measuring market concentration); *id* at §1.51 (stating the post-merger market concentration and the increase in concentration resulting from the merger are tools used by DOJ to assess the effects of a merger).

Not only is Mr. McCullough's test poorly designed, it is also poorly implemented. The Merger Guidelines discuss the use of HHI as a method for determining concentration *in a relevant economic market.* For example, the Merger Guidelines state that *"[o]nce defined,* a relevant market must be measured in terms of its participants and concentration."[85] Mr. McCullough, however, skips the step of defining the relevant economic market and [redacted]—an assumption that ignores the realities of how products were defined and treated in the auction.

As an initial matter, there is substantial evidence that the relevant economic market is defined by large portions of the markets in the geographic footprint of PJM and MISO.[86] Moreover, even if one were to assume that the relevant market should be limited to the Illinois auction itself, the fixed-price products are contracts to supply electricity and related services to different utilities in Illinois. For this reason, the fixed-price products are close substitutes, which is evidenced by the fact that bidders routinely substituted across all products in the fixed-price Section. This reflects rational bidding because suppliers in the auction care only about the maximization of expected profit from the supply of full service requirements. In its review of bidding during the auction, NERA noted the following:

> At the start of round 4, the going prices for the B-17 and FP-17 products were $85.93/MWh and $86.58/MWh respectively, approximately $11/MWh below the going price for the B-29 product, and approximately $7.50/MWh below the going price for the B-41 product, the two most expensive products for residential and small business customers to that point. Bidders responded by switching their bids out of the shorter term products and into longer term products.[87]

Furthermore, the NERA report stated that substitution occurred between the fixed-price products for small customers and the products for large customers. It states:

> Day 2 saw a change in bidders' strategy that would tend to prevent the gap between the products for the residential and small business customers on the one hand, and the products for the commercial and industrial customers on the other hand, to widen further, and that would eventually tend to reduce that gap. In the first three rounds of the day, from round 11 to round 13, the price of LFP-17 decreased an average of 2.34% per round, while the price of A-17 an average of 1%. Bidders were switching their bids into the products for the larger commercial and industrial customers.[88]

Mr. McCullough's use of HHI to measure competition in the Illinois auction was doubly flawed. Not only did he have no economic model or economic reasoning to support the application of an HHI test in this setting, but he also improperly applied that test by simply bypassing the market definition phase that is stipulated in the Merger Guidelines and using HHI [redacted]

This criticism of McCullough's HHI test was also recognized by Dr. Roach who served as the Auction Monitor in the Illinois Auction. Dr. Roach correctly concluded that any HHI analysis of the Illinois auction must include all of the fixed-price products as a whole. To do otherwise

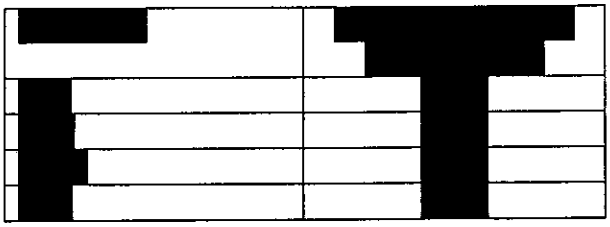
85. *Id.* at §1.0 (emphasis added).
86. *See* Stoddard Affidavit.
87. *NERA Post -Auction Report* at 108.
88. *Id.* at 110.

would render the results meaningless. Furthermore, Dr. Roach stated that Boston Pacific found that over the course of the entire auction there was substantial switching between the fixed price products, which is evidence that those products are substitutes.[89]

2. Mr. McCullough's test has low power

As I stated above, Mr. McCullough provided no economic model or basic reasoning to justify the use of HHI calculations to assess the level of competition in an auction. His test has low power—it is likely to indicate that many competitive auctions were subject to anti-competitive behavior.

[redacted]



[redacted] Therefore, under Mr. McCullough's test for the competitiveness of the auction, a wide array of auctions will *always* be deemed anti-competitive.

Example 3: The New Jersey BGS auctions

Next consider the very relevant example of the New Jersey BGS auctions. I apply Mr. McCullough's test to the [redacted] New Jersey's BGS auction, which has been heralded as competitive and is essentially identical to the Illinois auction. [redacted]

89. Roach Affidavit at ¶¶ 60-63.

[redacted]

[redacted]					

Note: Numbers that are underlined indicate purchases that would fail Mr. McCullough's test for competition.

Products in the BGS auction are delineated by EDC and by contract length, so according to Mr. McCullough, [redacted] An application of Mr. McCullough's test to the New Jersey BGS auctions shows that his test is likely to conclude incorrectly that competitive auctions were uncompetitive.

3. If Mr. McCullough applied his flawed HHI test across the fixed-price products as a whole, he would have found that the auction was competitive

As a final illustration of the flawed analysis in Mr. McCullough affidavit, I apply his poorly conceived test for competition in the Illinois auction to the fixed-price Section. Before displaying these results, however, I must note that this calculation does not amount to an acceptance of the merits of Mr. McCullough's test which, as discussed above, is fatally flawed. Rather, my analysis here is meant to illustrate that had Mr. McCullough applied his test in accordance with the Merger Guidelines themselves by applying it to the relevant product market, he would have concluded that the auction was competitive. Furthermore, I note that Mr. McCullough's story of market allocation requires him to [redacted][90] Therefore, Mr. McCullough's own affidavit supports assessing all the fixed-price products together, as done in Table 7 below.

90. *See* McCullough Affidavit at ¶ 41.

Table 7. End of auction HHI for all fixed-price products

Bidder	Tranches Won	Share (%)	Share^2
Ameren Energy Marketing Company	46	9.02	81.35
American Electric Power Service Corp.	10	1.96	3.84
Conectiv Energy Supply, Inc	10	1.96	3.84
Constellation Energy Commodities Group	65	12.75	162.44
DTE Energy Trading, Inc	13	2.55	6.50
Dynegy Power Marketing, Inc	28	5.49	30.14
Edison Mission Marketing and Trading	41	8.04	64.63
Energy America, LLC	4	0.78	0.62
Exelon Generation Co, LLC	138	27.06	732.18
FPL Energy Power Marketing, Inc	15	2.94	8.65
J. Aron and Company	30	5.88	34.60
J. P. Morgan Ventures Energy Corp.	39	7.65	58.48
Morgan Stanley Capital Group, Inc	46	9.02	81.35
PPL EnergyPlus, LLC	14	2.75	7.54
Sempra Energy Trading Corp	8	1.57	2.46
WPS Energy Services, Inc	3	0.59	0.35
		HHI	***1,279***

As the data in Table 7 indicates, when one properly recognizes that the fixed-prices products in the Illinois auction were all close substitutes and should therefore be considered together in any sensible market definition as understood by Mr. McCullough, one finds that the HHI is less than 1,800, Mr. McCullough's cut-off point for determining whether competition existed in an auction. Therefore, Mr. McCullough's own test, had he performed it in accordance with a reasonable understanding of substitution among fixed-price products at auction, would have led him to conclude that the auction was competitive.[91] I note, however, that my analysis in Table 7 is meant only to refute Mr. McCullough's analysis. By performing this analysis, I am not suggesting that the fixed-price Section of the Illinois auction was itself a relevant economic market. In fact, as mentioned above, substantial evidence indicates that the relevant economic market includes substantial portions of the markets in the geographic footprint of PJM and MISO.

C. There is no evidence that supports Mr. McCullough's coordinated interaction allegation

In a final attempt to tarnish the Illinois auction, Mr. McCullough alleges [redacted][92] In essence, Mr. McCullough argues the mere fact that [redacted] This claim again demonstrates Mr. McCullough's complete lack of understanding of how a clock auction works.

91. I also note that Dr. Roach also performed this calculation in his affidavit and reached the same conclusion that I did. *See* Roach Affidavit at ¶ 63.
92. McCullough Affidavit at ¶ 36.

I again note that the information presented to bidders makes coordinated market allocation nearly impossible. I then show that other much more plausible explanations than collusion explain bidding [redacted] auction.

1. It would be virtually impossible to coordinate a market allocation scheme unless bidders shared information during the auction

As I stated above, the Illinois auction greatly limits the amount of information provided to bidders at the end of every auction round. Specifically, between rounds 14 and 39 of the auction, bidders only knew that overall excess supply in the fixed-price Section was less than 175 tranches. Also, bidders did not know the identities of other bidders at auction from round to round, nor did they know the number of tranches their competitors were bidding on during any given auction round. This lack of information would have made coordinated allocation in the auction extremely difficult.

As I also explained above, for a market allocation scheme to be successful, bidders must be able to view the actions of other bidding-ring members, and to punish deviations from the cartel scheme. Unless there is evidence that bidders systematically exchanged detailed bid information during the action, claims of collusion in the Illinois auction are not credible.

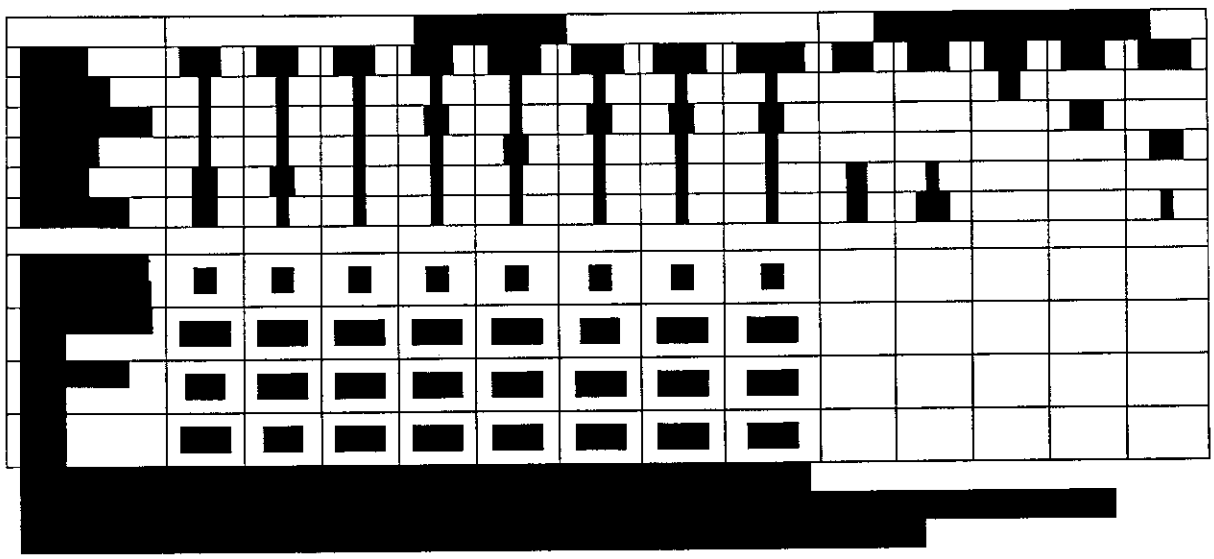
Given the unlikely success of and harsh penalties for coordinated action, I find the allegation of coordinated action to be fanciful. A finding of collusion would be analogous to convicting a suspect of bank robbery without any evidence that the suspect had ever been to the bank or even that the bank had been robbed. I would hope that a higher standard of proof is required.

2. An examination of Mr. McCullough's bid data refutes the notion of coordinated bidding

Based on data provided in his affidavit, Mr. McCullough alleges that market allocation—a coordinated splitting up of the market among suppliers—[redacted][93] Mr. McCullough bases his allegation, [redacted][95] Actual examination of the demand reductions asserted by Mr. McCullough, however, demonstrate that a market allocation scheme among those bidders is nonsensical. To illustrate this, I present in Table 8 the tranches won, the tranches reduced, and the tranches switched by those bidders Mr. McCullough alleges [redacted]

93. *Id.* at ¶ 36-37.
94. *Id.* at ¶ 49.
95. *Id.* at ¶ 36-37, 39.

[redacted]



[redacted] Several aspects of this bidding behavior refute the notion of coordinated action among these firms. For example, the withdrawals that Mr. McCullough says were coordinated generally occurred in different rounds of the auction, not in the same round. Although this characteristic in and of itself is not proof of competitive bidding, when one considers that bidders only view aggregate supply information, it makes sense that bidders were reacting to general information rather than information received from opponents in a coordinated manner.

To assess whether bidding [redacted] was collusive (as Mr. McCullough alleges) I constructed a detailed account of those bids, given only my knowledge of the auction rules, the information in Table 8 above, which was compiled from data on page 13 of Mr. McCullough's affidavit, and the winning bidder and price information in pages 118 through 123 of the *NERA Post-Auction Report*.[96] I must emphasize that any person with a comprehensive understanding of bidding in this auction and with this limited bid information could have performed this research. The fact that Mr. McCullough did not serves to highlight his lack of understanding of the competition that took place in the auction.

A thorough explanation of behavior [redacted] using *the data reported by Mr. McCullough* is as follows.

[redacted]

96. [redacted] The purpose of my analysis below is to show that even if one assumes [redacted], *given Mr. McCullough's interpretation of his data,* his allegations of collusion are implausible. For me to perfectly construct the bidding [redacted], I would need access to all bid data submitted [redacted].

[redacted]

97. I note that Dr. Roach's analysis of bidding [redacted] disagrees with Mr. McCullough's interpretation of the data. [redacted]

[redacted]

The details above drawn from Mr. McCullough's own interpretation of the data [redacted], and (2) was rational and consistent with competitive behavior, not collusion. Absent any hard evidence of collusion or sound economic theory of collusion that is properly supported by rigorous statistical methods—and Mr. McCullough offers neither—it is much more reasonable to conclude that [redacted] were consistent with unilateral profit maximization, which resulted in the "soft landing" discussed in the NERA post auction report.[98] Finally, the fact that bidders were [redacted] is consistent with price revelation and the reduction of common value uncertainty, which is the entire purpose of the dynamic clock auction.

IX. Conclusion

The Illinois auction was a process that resulted in competitive market-based prices. Illinois, however, was transitioning to an auction-based system after a time when rates had been frozen at below-market prices. As a result, prices needed to increase to reflect competitive market prices. Such an increase, despite being justified on the basis of market fundamentals, would cause certain customers to pay more for electricity. Given the absence of evidence of collusion or other factors that might lead to auction failure, I am left to conclude that the complaint is simply political venting: prices went up and someone must be blamed.

The Illinois auction design is consistent with best industry practice, and it appears to have been conducted without flaw. FERC should applaud the Illinois Commerce Commission and ComEd and Ameren for developing and implementing an excellent auction mechanism for determining just and reasonable rates based on market fundamentals. The uniform-price descending clock auction is an effective way for Illinois and other states to procure electricity at minimum cost for its regulated customers.

Were the results of the Illinois auction to be overturned, adjusted, or set for adjustment, a terrible signal would be sent to the market. First, the incentives to invest in an efficient mix of plants would be damaged. Second, regulatory uncertainty would increase prices in electricity markets. And third, the role of energy marketers, which have become an important part of the industry, would be compromised. As a result, the ability of the industry to achieve a least-cost energy solution would be frustrated.

FERC should reject without delay the complaint by the Illinois Attorney General, as it misrepresents the competition that took place in the Illinois auction and the fairness of the prices determined in that auction. To do otherwise, ultimately would cause consumers in Illinois and elsewhere to pay more for the energy services.

98. *NERA Post Auction Report* at 123.

AFFIDAVIT

Peter Cramton, being duly sworn, deposes and says: that he is the witness in the foregoing Affidavit and is familiar with its contents. He states further that the facts contained in said Affidavit are true to the best of his knowledge and belief.

Peter Cramton

Subscribed and sworn to before me,
This 18th day of June 2007

Denise C. McHale
NOTARY PUBLIC
Baltimore County, Maryland
My Commission Expires 3/1/2011

Notary Public

My Commission Expires 3/1/2011