# STATE OF NEW YORK DEPARTMENT OF PUBLIC SERVICE

**THREE EMPIRE STATE PLAZA, ALBANY, NY 12223-1350**

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April 11, 2003

Honorable Magalie R. Salas,
Secretary
Federal Energy Regulatory Commission
888 First Street, N.E.
Room 1-A209
Washington, D.C. 20426

Re: Docket No. ER03-647-000
New York Independent System Operator, Inc.

Dear Secretary Salas:

For filing, please find the Comments of the New York State Public Service Commission in the above-entitled proceedings. Should you have any questions, please feel free to contact me at (518) 473-8178.

Very truly yours,

Saul A. Rigberg
Assistant Counsel

Attachment

**UNITED STATES OF AMERICA**
**BEFORE THE**
**FEDERAL ENERGY REGULATORY COMMISSION**

| | | |
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| New York Independent System Operator, Inc. | ) ) ) ) | Docket No. ER03-647-000 |

**NOTICE OF INTERVENTION AND COMMENTS IN SUPPORT OF THE NEW YORK PUBLIC SERVICE COMMISSION**

Pursuant to a Notice of Filing, dated March 25, 2003, Rules 211 and 214 of the Commission's Rules of Practice and Procedure, and 18 CFR§2.1a, the New York State Public Service Commission (NYPSC) submits this notice of intervention and comments in support of the request of the New York Independent System Operator, Inc. (NYISO) for Commission approval of a gradually sloped demand curve as a replacement for the existing vertical demand curve in the NYISO's capacity market.

Copies of all correspondence should be sent to:


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The NYPSC agrees with the NYISO in its March 21, 2003 Filing Letter (at 2) that implementation of a gradually sloped demand curve, which would moderate the "boom or bust" feature of the current market design, would enhance reliability over the long term by providing a more effective economic signal for new investment and would have, as an ancillary effect, a moderating effect on energy prices. It would also significantly reduce incentives to exercise market power. Moreover, a gradually sloped demand curve would satisfy the purposes of a capacity market that the Commission identified in its Standard Market Design (SMD) Notice of Proposed Rulemaking (NOPR).[1]

The NOPR observed that inasmuch as adequate and stable capacity prices are absent (1) the energy spot market is not, as currently constituted, able to induce long-term reliability investment; (2) individual load serving entities (LSEs), especially when faced with retail competition, have the incentive to lower their supply costs by depending on the resource development investments of others (the free rider issue); and, (3) demand response is not adequately developed.[2] This proposal will provide more stable and predictable adequate spot capacity prices that would, in turn, satisfy the goals of the NOPR to promote resource adequacy and improve operation of the markets. Moreover, predictable spot prices will provide a

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[1] Remedying Undue Discrimination Through Open Access Transmission Service and Standard Electric Market Design, 100 FERC 61,138 (2002)(SMD NOPR).

[2] SMD NOPR at ¶¶ 457-73.

natural benchmark for the evaluation of forward contracts. In this way, the proposal should encourage robust forward markets and permit more reliance on multi-year forward contracts.

The NYPSC is charged with the responsibility to ensure that retail rates to consumers are just and reasonable and that service is safe and adequate.[3] Consequently, in May of 2002 we proposed changes to the capacity market because the existing market design, with its static, vertical demand curve feature, (1) is leading to results that could affect the long-term reliability of the system, thereby harming consumer welfare; and (2) is dangerously vulnerable to market power. A fundamental aspect of the proposal is the recognition that capacity in excess of the minimum capacity requirement has value to the system in terms of reliability and lower energy prices as well as providing a cushion in the event an existing plant closes. This concept results in a gradually sloped, self-adjusting demand curve that would replace the vertical curve.[4]

The Demand Curve market design will encourage new generation, enhance reliability, and moderate energy prices by providing more stable and predictable capacity prices. By

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[3] New York State Public Service Law (PSL) § 65(1).

[4] Even though both the current and proposed designs feature demand curves, for ease of discussion, the parties have referred to this sloped demand curve proposal simply as the Demand Curve.

eliminating the vertical (i.e., completely inelastic) portion of the existing demand curve, the proposed Demand Curve market design will substantially mitigate the market power concern.

We also recognize the Commission's authority over the NYISO does not extend to requiring an LSE to purchase a specific amount of wholesale capacity for its retail load.[5] Inasmuch as the states have jurisdiction over reliability and over LSEs' retail service, the NYPSC may prescribe capacity portfolios.[6] The Commission, on the other hand, has jurisdiction to shape and enforce the wholesale elements of the Demand Curve, such as setting the Demand Curve's capacity prices and administering a centralized auction, that would be implemented by the NYISO. Accordingly, we view this filing as a good example of how FERC and the NYPSC can work together to establish a program that will

[5] As the Supreme Court noted in New York v. FERC, 122 S.Ct. 1012, 1026 (2002), FERC does not have jurisdiction over retail uses of the local distribution system. The Commission may not use its jurisdiction over wholesale transmission, wholesale commodity, and wholesale distribution, and the physical and economic relationships between activities on the bulk power system and activities on the distribution system to assert jurisdiction over retail matters. See, e.g., AT&T Corp. v. Iowa Utilities Bd., 119 S.Ct. 721, 731 (1999), where the Court found that absent specific Congressional authorization the Federal Communications Commission could not take "intrastate action solely because it furthered an interstate goal."

[6] See, Public Service Co. of New Hampshire v. New Hampshire Public Utilities Comm'n., 167 F.3d 29, 35-36 (1st Cir. 1998); Pike County Light & Power Co. v. Pennsylvania Public Utility Comm'n, 77 Pa. Comm'n. 268, 273-74, 465 A. 2d 735, 737-738 (1983).

benefit both the wholesale market and retail customers while respecting each other's authority.

# I. THE CURRENT NEW YORK CAPACITY MARKET IS FLAWED

## A. The Existing Market Design Produces Perverse Outcomes

The NYISO's existing capacity market rules are seriously flawed.[7] Each LSE is required to acquire the rights to an amount of generation capacity that equals 118% of the LSE's load at the time of the electric system's peak. LSEs that fail to do so are subject to a large financial deficiency penalty (three times the estimated cost of a gas turbine). But, according to these rules, capacity above the minimum has no value. Paynter Affidavit at ¶¶ 30-33.

This design produces extremely high capacity market prices when generating capacity levels are short of the 118 percent minimum and extremely low prices in a year in which the system has only slightly excess generating capacity. While it is normal for prices to move up and down with changes in supply and demand, in the existing capacity market, even changes as small as five percent of available capacity can produce dramatic

[7] See, Attachment I, Affidavit of Dr. Thomas S. Paynter, Principal Economist, NYPSC Office of Regulatory Economics (Paynter Affidavit), at ¶¶ 33-39. Dr. Paynter also explains the reasons that policymakers insisted on retaining administrative rules governing capacity at the outset of the move to competition and the choices of market design considered. Paynter Affidavit at ¶¶ 9-21.

swings--a price spike or a price that crashes to near-zero levels. Paynter Affidavit at ¶¶ 34-35.

## B. Consumers Suffer Harm From The Existing Market Design

This "boom or bust" feature harms consumers in three ways. The first harm is that capacity prices may be so low when supply is above the minimum requirement level that new entry would be unduly discouraged and existing supply might choose to exit. In this scenario, the system would move closer and closer to the minimum requirement and eventually to deficiency. Paynter Affidavit at ¶ 35.

The second harm happens via the capacity price spikes that occur during a deficiency. The capacity price spikes duplicate the impact of energy price spikes, thus hitting consumers twice for the same shortfall. Furthermore, the high degree of sensitivity of the market's price to supply changes makes the capacity market vulnerable to supplier market power. Whenever the electric system has enough capacity, but only barely enough, a large supplier can withhold some of its supply from the capacity market and induce an artificial capacity shortage and its concomitant price spike. The exposure of consumers to such extreme price spikes is a continuing concern with the existing market design. Paynter Affidavit at ¶¶ 37-38.

The third harm is that the monies that flow from the existing capacity market to generators over a multi-year period will be characterized by such a large degree of volatility that they will count for little in the financial calculus of potential new developers.[8] Moreover, while existing generators may benefit from deficiency payments, anyone considering investing in new generation would realize that the addition of the new plant's capacity may well cure the deficiency and eliminate the very capacity payments they had been counting on. If suppliers of investment capital heavily discount these volatile capacity payments, then consumers will end up paying a lot of money over time, but getting little benefit from their payments in terms of additional supply. Paynter Affidavit at ¶ 39.

## II. IMPLEMENTATION OF THE DEMAND CURVE WOULD ENSURE ADEQUATE LONG-TERM RESOURCES AND REDUCE MARKET POWER

The primary objectives of the Demand Curve proposal are to (1) reduce price volatility in the market for capacity by recognizing the value of additional capacity above minimum reserve requirements and (2) reduce the vulnerability of capacity markets to the exercise of market power. A willingness to pay (gradually sloped demand curve) for buying capacity, to be applied to all LSEs via a centralized spot auction conducted

[8] It also may be difficult for existing producers to make efficient investment or maintenance decisions based on extremely volatile and unpredictable capacity prices, especially for generating units with low capacity factors. Paynter Affidavit at ¶ 36.

by the NYISO, satisfies these objectives. Paynter Affidavit at ¶¶ 24-25, 48-53.

### A. **The Demand Curve Spot Market Auction Would Replace the Current Deficiency Auction**

The NYISO explains that the Demand Curve Spot Market Auction would replace the NYISO's current "deficiency" auction.[9] All other forward market activity would take place as it does currently. The NYISO would continue to allow self-supply of capacity via bilateral contracts and would continue to operate voluntary auctions within a six-month time frame to reveal forward prices. Paynter Affidavit at ¶ 40.

The Demand Curve sets a price buyers pay that varies with the amount of capacity available at that price. As more, or less, capacity is offered, the price paid per kW gradually decreases, or gradually increases.[10] Under this proposal, the NYISO may procure an amount of capacity above the minimum resource level.

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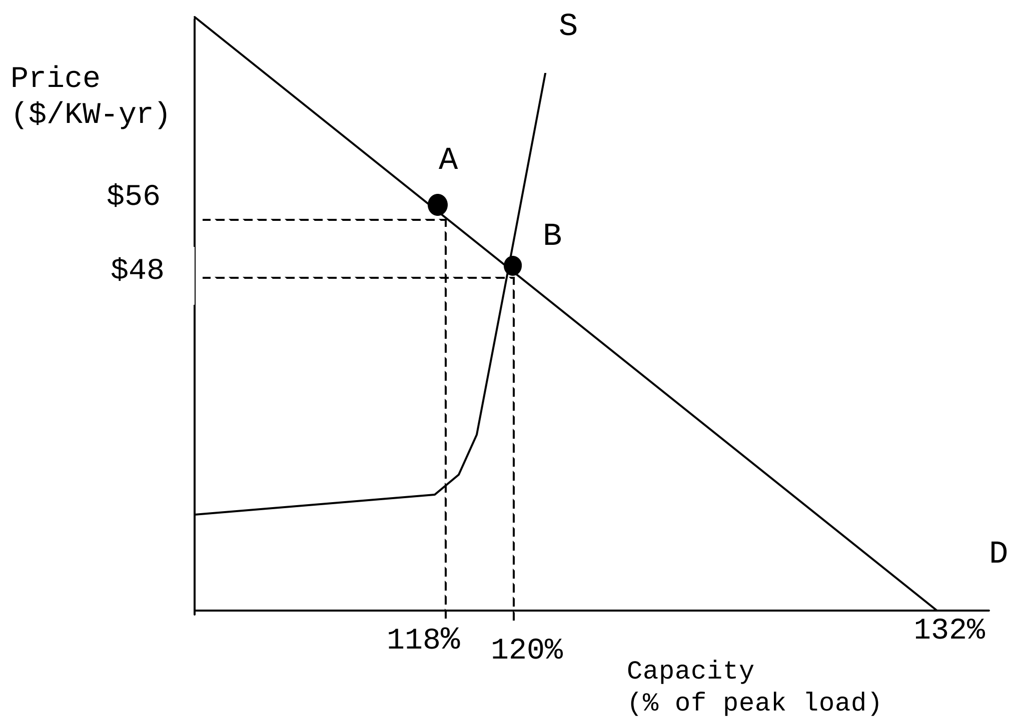
[9] NYISO Filing Letter at 4.

[10] Due to reliability requirements, a minor exception to this gradual change in price occurs whenever the auction clears at less than the minimum requirement. At that point, deficient LSEs would be assessed a penalty one and one-half times the estimated cost of a gas turbine for the amount of their deficiency. This penalty does not set the market-clearing price, however, so the price paid for the purchased quantity is still determined by the demand curve. NYISO Filing Letter at 10.

This figure depicts an illustrative spot market auction; it is taken from Dr. Paynter's Affidavit at ¶¶ 40-44.




The minimum capacity requirement necessary to satisfy the one-day-in-ten-years criterion in New York is 118% of summer peak load. The annual cost of peaking capacity, less energy and ancillary services net revenues, is $56 per KW-yr.[11] The demand curve, therefore, is established at a height such that it equals $56 per KW-yr at a capacity level of 118% of peak load (Point A). The demand curve slopes down in a straight line and reaches $0 at 132% of summer peak load. Beyond this point, additional

[11] The numbers used are illustrative.

capacity is believed to offer no additional benefit to the system.

*D* is the demand curve. It is placed into the auction by the NYISO. *S* is the supply curve. It represents the voluntary offers of all suppliers, including supplies under contract to LSEs. The market-clearing price for capacity in this example occurs at the intersection of the demand and supply curves, at point B. The price is $48 and the quantity is 120% of peak load. Based on these results of the spot market auction, all LSEs are required to possess capacity rights equal to 120% of their contribution to peak load.

For example, if the minimum resource level is 118% of summer peak load, but suppliers offer capacity equal to 120% of summer peak load at a low enough price (established by the Demand Curve), then the NYISO would purchase capacity equal to 120% of summer peak load and allocate this capacity to all LSEs. Thus, each LSE would be charged the capacity market price for an amount of capacity equal to 120% of its summer peak load.[12]

### B. <u>The Demand Curve Better Represents The True Value Of Capacity To The System</u>

As the NYISO explains in its Filing Letter at 5, the Demand

[12] This resolves the "free rider" problem discussed in the SMD NOPR where each individual LSE currently has an incentive to purchase only the minimum capacity because the benefits of capacity levels above the minimum are shared by all LSEs regardless of their purchases. SMD NOPR at ¶¶ 469-72.

Curve better represents the true value to the system, both short and long-term, of a little more or a little less capacity at or near the 118% minimum level. The 118% minimum level is a technical reliability requirement aimed at ensuring that outages occur no more than one day in ten years due to generation capacity shortages. However, a little more capacity has value to the market. In addition to making generation supply, as a whole, more reliable, more supply should moderate energy prices. It moderates energy price spikes, including those caused by an exercise of market power. It would also send more stable price signals that may increase investors' certainty in capacity revenue streams. Paynter Affidavit at ¶ 27.

With these benefits, LSEs and consumers are well served by being willing to acquire more than 118% capacity reserves when it can be obtained at somewhat lower prices than the price that would prevail at the 118% capacity level. Similarly, when reserves fall short of 118%, the system would pay a price that is higher than the annual fixed costs of a peaker to ensure sufficient capacity, but not nearly so high as the current mechanism's extremely large deficiency penalty. Paynter Affidavit at ¶ 28.

Demand curves should be set high enough to ensure that reasonable amounts of resources are supplied in the long run, but not so high that consumers become saddled with a large amount of expensive capacity that is not needed. In the vicinity of the minimum reserve levels, a demand curve should reflect the long-run cost of capacity in order to retain and attract sufficient generation in order to at least maintain that minimum. This is calculated by determining the cost of building a new gas turbine and subtracting anticipated net revenues from the sales of energy and ancillary services.[13] Paynter Affidavit at ¶¶ 54-61.

Balance is the key. On the one hand, a demand curve should be designed to have a sufficiently shallow slope to limit price volatility and mitigate market power. On the other hand, it should be steep enough so that the emergence of substantial excess capacity can be halted by a falling capacity market price. Allowing the price to decline down the curve, moreover, protects the system against the mistake of setting a demand curve that is too high and which, absent the declining price,

[13] The offsets for energy and ancillary services net revenues should be estimated based on the assumption that the electric system is at its minimum required reserve margin. Paynter Affidavit at ¶ 57.

would elicit too much capacity.[14] Paynter Affidavit at ¶¶ 26, 54, 58.

### C. The Demand Curve Would Reduce The Volatility of Capacity Prices

The Demand Curve would stabilize the spot market-clearing price for generation capacity since at times when supply is moderately above minimum requirements, the price for capacity will fall only slightly, rather than crash, as is the current situation. The capacity payments made to generators would be at a given price when capacity levels equal the minimum requirements, at a moderately lower price when capacity levels are somewhat above the minimum, and at a moderately higher price if capacity levels fall somewhat below the minimum.

The key word is “moderately” because, unlike the tendency of the existing approach to produce prices that either crash or skyrocket in response to slight changes in the demand/supply balance, the new approach produces prices that respond much more moderately to such changes. Under the Demand Curve approach, prices rise and fall with changes in supply and demand, as all

[14] In order to encourage new generation, the capacity market must provide a revenue stream to cover the annual fixed costs of a peaker that are not expected to be recovered through the energy and ancillary services markets. For example, assume that the annual (non-fuel) costs of a peaker, including return on and of investment, are $80 per kw-yr, and that the peaker can be expected to achieve energy and ancillary services market net revenues of $25 and $5 respectively. In such a case, the capacity market need not provide the full $80, but only $50.

prices should; they just do so in a relatively gradual way. Paynter Affidavit at ¶¶ 45-47.

This stability would enable new merchant generation entrants and their investment bankers to more easily forecast the likely future stream of capacity market prices. Paynter Affidavit at ¶ 24. It would also make it easier for existing generation owners to make investment and maintenance decisions. Moreover, reduced volatility is likely to decrease costs of capital, since suppliers can demonstrate more predictable revenue streams. Paynter Affidavit at ¶ 36.

### D. The Demand Curve Would Provide Strong Protection Against Market Power

Sellers exercise market power by withholding supply.[15] Withholding can drive the market price up enough to make it profitable for the withholding generator. This strategy is successful if the extra revenues a generator receives from its supply that remains in the market exceeds the lost profits associated with the supply that is withheld from the market.

The Demand Curve approach features a slope that is gradual enough to eviscerate the profitability of an attempt at

[15] Withholding is accomplished either via a reduction in the amount of capacity that participates in the market (physical withholding) or via the pricing of a portion of one’s capacity so high as to price it out of the market (economic withholding).

exercising market power. The slope of the demand curve determines the extent to which an act of withholding will raise the price. A sufficiently graduated slope can keep any such price rise small enough that generating firms, even large ones, will find it unprofitable to withhold. In other words, the extra revenues a generator would receive from its supply that remains in the market would not exceed the lost profits associated with its supply that is withheld from the market. Paynter Affidavit at ¶¶ 48-51.

**E. The Demand Curve Would Provide Several Other Benefits**

There are several other benefits of the Demand Curve. First, less volatility in the capacity spot market would facilitate and stabilize forward markets for capacity since both buyers and sellers would be able to reasonably predict the future spot market for capacity, thereby giving them confidence that the forward price they negotiate is within a reasonable range. We agree with the SMD NOPR that vibrant forward markets are desirable; the Demand Curve would help accomplish that goal. Paynter Affidavit at ¶ 24.

Second, one can safely assume that a generating facility with a small capacity factor receives small energy revenues. Facilities such as the 1,200 MW Bowline plant in the Hudson Valley, which ran only 16% of the time in 2001, or the 1,700 MW Oswego plant in upstate New York, which ran only 3% of the time in 2001, may close because the sum of their net energy market and capacity market revenues may not be adequate to meet their "to go" costs.[16] Under the Demand Curve approach, not only are such closures less likely to occur in the short-run, but in the event they do occur, their effect on price is less severe. Paynter Affidvit at ¶ 35.

Third, to the extent the Demand Curve approach yields larger reserve margins in the near term, consumers will face fewer price spikes in the energy market on the system's hottest summer days. Paynter Affidavit at ¶ 25. Thus, while potentially paying more in the near term for capacity, consumers would likely pay less for energy. Dr. David Patton, the NYISO's Independent Market Advisor, has estimated that when the system is at its 118% capacity requirement an extra one percent added to the reserve margin will save consumers $100 million per year in terms of reduced price spikes.[17]

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[16] The standard economic definition is that an entity will continue to operate as long as it is able to earn revenues sufficient to cover normal operating expenses (e.g., running costs comprising fuel, variable O&M, and emission allowance costs) and "to-go" costs (e.g., fixed O&M, property taxes, insurance, capital additions, and administrative and general expenses). The recovery of capital costs for the original construction or purchase of the generating station is not included.

[17] NYISO Filing, Attachment IV, Patton Affidavit at ¶ 22.

Finally, larger reserve margins provide consumers with greater reliability. Related to this observation is the conclusion in a recent report on the performance of the NYISO's Price Responsive Load (PRL) Program. Neenan Associates, et al. stated that the ICAP/Special Case Resources Program and the Emergency Demand Response Program enhanced reliability, but that, according to the results of a survey of potential participants, low capacity prices upstate discouraged participation.[18] The report strongly suggests that more reasonable capacity prices would attract greater enrollment in both these programs, further improving reliability and lowering energy prices. Id.

## III. THE COSTS OF THE DEMAND CURVE ARE REASONABLE GIVEN THE BENEFITS.

As explained above, the Demand Curve should minimize electric prices over the long term; it should also serve as an insurance policy against unexpected plant closings in the short-term.[19] This proposal is not designed to overcompensate or "bail out" merchant generation, as some may claim. Indeed, the NYPSC insisted on offsetting the estimated cost of a new peaker with

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[18] How and Why Customers Respond to Electricity Price Variability: A Study of NYISO and NYSERDA 2002 PRL Program Performance, January 2003, at E11-E12.

[19] See, Attachment II, Affidavit of Harvey Arnett, Chief, Rates and Retail Choice, NYPSC Office of Electricity and the Environment (Arnett Affidavit), at ¶ 12.

anticipated revenues from the sale of energy and ancillary services. Paynter Affidavit at ¶¶ 54-57. Moreover, the NYPSC's deep concern about customer impacts led us to insist on a phase-in of the height of the curves. A side effect of phasing in the curves is that there is some leeway regarding the estimate of the costs of entry. Paynter Affidavit at ¶¶ 61-65.

### A. First Year Demand Curves Are Based On Historical Data And Estimated Revenues

The NYISO and its market participants developed preliminary estimates of the cost of new gas-fired combustion turbines for New York City, Long Island, and upstate New York based on recent historical data from New York City, Long Island, and New England. The cost estimates are $159 per kW-year in New York City, $139 per kW-year on Long Island, and $85 per kW-year upstate. The NYISO and market participants agreed to a careful process to reevaluate these costs prior to 2005, and every three years thereafter. Paynter Affidavit at ¶ 62.

The market participants were not able to reach consensus on the appropriate offsets for revenues from energy and ancillary services. However, based on data provided by Dr. Patton, the NYPSC proposed a conservative, i.e., understated, offset of $21 per kW-year, implying a slightly overstated annual cost of capacity of $64 per kW-year for a generic upstate New York location.[20] Given the uncertainties in estimating the price needed to induce entry, it is prudent to use a Demand Curve that is slightly overstated to ensure that sufficient entry is attracted into the market. Paynter Affidavit at ¶ 61. The NYPSC made comparable estimates for New York City and Long Island. Some market participants argued for higher estimates of capacity costs, based in part on uncertainty regarding anticipated revenues from sales of energy and ancillary services. Paynter Affidavit at ¶ 64.

The market participants agreed to lower phase-in values for 2003 and 2004 to mitigate rate impacts. The NYISO tariff filing provides for a review of these costs and revenues, to be completed in time to determine the appropriate levels of the demand curves in 2005. The first year's statewide demand curve (beginning May 2003) is set to recover $50 per kW-year at the

[20] Dr. Patton provided estimates of net revenues from energy and ancillary services for gas-fired combustion turbines with various heat rates, for the 12 months ending August 31, 2002. These included $7.50 per kW-year for energy revenues and $12 per kW-year for ancillary services revenues. In addition, Dr. Patton estimated that prospective rules changes to more accurately price shortage periods in the energy markets would add $13 per kW-year. Also, NYPSC staff estimated that a reduction in capacity from 2002's 123% of peak load to the 118% minimum requirement would increase energy revenues by $10 per kW-year. Adding these values yielded an estimate of revenues from energy and ancillary services of $42.50 per kW-year. The NYPSC suggested an offset of only one-half of this value, or $21 per kW-year, so as to understate anticipated revenues; the subsequent review that the NYISO and its market participant will conduct before 2005 will have the benefit of actual revenues.

118% capacity level, increasing to $60 per kW-year in May 2004. In addition, the demand curves were adjusted upward to account for the fact that capacity prices are generally depressed in winter months, so that a gas turbine would have to receive more in the summer months to compensate for the lower prices in the winter months.[21] Paynter Affidavit at ¶ 65.

**B. Cost Impacts of the First-Year Curves Are Reasonable**

A number of parties, including the NYISO and NYPSC Staff, have estimated the added payments that would be made to generators in 2003 and 2004 compared to payments of the recent past.[22] Our estimates of payments to generators, which is similar to that of the NYISO's, equate to a 1-1.5 percent increase in total electric bills, assuming all these costs are flowed through to end-use consumers. Many customers, however, will not see increases due to commodity price protections that may be provided by their energy supplier. For a customer that

[21] In order to recover an annual cost of $X per kW-year, the capacity demand curve must be adjusted for the fact that many generating units, including gas turbines, can generate more output in the winter months than in the summer (due to more efficient cooling in the winter). This results in lower prices in winter. The demand curves are adjusted upward to account for these effects, so that if the supply were just equal to the minimum requirement in the summer, but higher in the winter, the capacity revenues of a new gas turbine would total $X per kW-year.

[22] See, Affidavit of Harvey Arnett, Chief, Rates and Retail Choice, NYPSC Office of Electricity and the Environment (Arnett Affidavit).

has no price protection, we estimate the Demand Curve could increase total electric bills by no more than three percent. Arnett Affidavit at ¶ 9.

We also analyzed the cost impacts associated with a system deficiency under the existing market design. This is a far more difficult exercise; the existing methodology is very sensitive to the balance of supply and demand. If there are adequate supplies, then we could expect prices not to change. Conversely, should supplies get tight because a plant is no longer financially viable or safety or environmental concerns require its shutdown, our analysis shows that the existing methodology, with its reliance on extremely high deficiency charges, is a far more expensive option than a gradually sloping demand curve. For example, the difference in payments under the existing methodology compared to those under the Demand Curve, assuming New York State is deficient, is in the order of several hundreds of millions of dollars. Arnett Affidavit at ¶¶ 10-11.

The short-term increase in capacity prices of 1-3% due to the Demand Curve is a reasonable short-term insurance payment to avoid a much larger increase with shortage conditions under the existing approach. And, over the long-term, reliability of the system will be enhanced and costs will go down.

## **CONCLUSION**

For the reasons expressed above and in the NYISO's filing, the NYPSC urges the Commission to adopt the NYISO's Demand Curve proposal.

Respectfully submitted,

Dawn K. Jablonski
General Counsel

by: Saul Rigberg
Assistant Counsel
Public Service Commission
of the State of New York
3 Empire State Plaza
Albany, New York 12223-1350

Dated: April 11, 2003
Albany, New York

# CERTIFICATE OF SERVICE

I, Karen Houle, do hereby certify that I will serve on April 11, 2003, the foregoing Comments of the Public Service Commission of the State of New York by depositing a copy thereof, first class postage prepaid, in the United States mail, properly addressed to each of the parties of record indicated on the official service list compiled by the Secretary in this proceeding.

_________________________
Karen Houle

Date: April 11, 2003
Albany, New York

**Attachment I**

**UNITED STATES OF AMERICA**
**BEFORE THE**
**FEDERAL ENERGY REGULATORY COMMISSION**

| | | |
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| New York System Independent Operator, Inc. | ) | Docket No. ER03-647-000 |

# Affidavit of Dr. Thomas S. Paynter

New York Public Service Commission
April 11, 2003

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## I. QUALIFICATIONS AND PURPOSE

1. My name is Thomas S. Paynter. My business address is Three Empire State Plaza, Albany, New York 12223-1350. I am employed by the New York State Department of Public Service as a Principal Economist in the Office of Regulatory Economics. My current responsibilities include analyzing competitive issues, efficient pricing, marginal costs, and regulatory policies. I am a member of a staff team responsible for analyzing and commenting upon the pricing rules of the New York Independent System Operator (NYISO), which operates the New York bulk transmission system. I have participated in numerous NYISO committee meetings related to energy and transmission pricing, capacity reserves, operating reserves, and market power issues.

2. I received a Ph.D. in Economics from the University of California at Berkeley (1985), with emphasis in econometrics and labor economics. I have a B.A. in Physical Science and in Economics, also from the University of California at Berkeley (1975). I am a member of the American Economic Association.

3. From 1983 to 1986, I was an Assistant Professor of Economics at Northern Illinois University, where I taught graduate and undergraduate courses in economic theory. From 1986 to 1990, I was employed by the Illinois Commerce Commission as a Senior Economic Analyst in the Policy Analysis and Research Division and served as a member of the Electricity Subcommittee of the National Association of Regulatory Utility Commissioners. I also authored an article concerning coordination and efficient pricing for independent power producers, "Coordinating the Competitors," published by The Electricity Journal in November 1990.

4. I joined the New York Department of Public Service in November of 1990. I have testified in numerous rate cases and other proceedings before the New York Public Service Commission (NYPSC). I also testified before the New York State Board on Electric Generation Siting and the Environment regarding transmission congestion and competitive markets in siting cases regarding the Athens Generating Station, Case 97-F-1563, and the Brookhaven Generating Station, Case 00-F-0566.

5. In this affidavit I discuss the theoretical foundation of the Demand Curve proposal and explain its various elements and long-term benefits. I also discuss the parameters of the demand curves and the procedures for resetting them.

## II. OVERVIEW

6. The primary objective of this proposal is to reduce price volatility in the market for capacity resources by recognizing the value of additional capacity above minimum reserve requirements. Suppliers will benefit from a more stable and predictable revenue stream from the capacity market, complementing the more volatile energy market. Consumers will benefit from increased reliability and reduced exposure to extreme price spikes in the capacity and energy markets. A further objective of this proposal is to reduce the vulnerability of capacity markets to the exercise of market power.

7. The proposal addresses these objectives by establishing a demand curve (willingness to pay) for capacity, to be applied to all load-serving entities (LSEs) in New York via a centralized spot market auction conducted by the NYISO. This auction would replace the NYISO's current "deficiency" auction and its related deficiency charge. The NYISO would continue to allow self-supply of capacity via bilateral contracts and would continue to operate voluntary forward auctions from one to six months in advance to establish visible forward prices.

8. It is expected that under this proposal, the NYISO would often procure amounts of capacity above the minimum requirement levels. For example, if the minimum requirements level is 118% of summer peak load, but suppliers offer capacity equal to 120% of summer peak load at a low enough price, then the NYISO would purchase capacity equal to 120% of summer peak load and allocate this capacity to all LSEs. Thus, each LSE would be charged the market price for capacity equal to 120% of its summer peak load. This resolves the "free rider" problem, where each individual LSE currently has an incentive to purchase only the minimum capacity because the benefits of capacity levels above the minimum are shared among all LSEs regardless whether each LSE purchased additional capacity.

## III. THEORETICAL FOUNDATION

### A. <u>The Role of Entry in Driving the Outcome of a Natural Market</u>

9. Any businessperson knows well the importance of entry and how it drives the results of the market place. Ultimately, it is the cost of entrance that determines overall price levels and it is the amount of new entry, and exit, that determines the reliability of service seen by a buyer in the market place. If

prices are high relative to the cost of new entry, then new entrants will be attracted into the market place and prices will be pulled back down. If prices are low compared to the cost of new entry, then there will be little or no new entry, exit may occur due to the inability to make a reasonable profit, and prices will be pushed up. The process of prices affecting entry, and entry affecting prices, yields an equilibrium price that is tied to the cost of entry. Over time, prices will fluctuate up and down in cycles of several years, even many years, depending on the industry, with the price gravitating toward and fluctuating around the cost of entry.

10. The very same process also yields a natural level of quantity, also known as reliability. It is often the relative scarcity of a product that pushes its price up, and, at the point where the degree of scarcity yields a price that is just right, i.e., equal to the cost of new entry, the natural level of reliability in that market place is established.

11. For example, consider the market for hotels in New Orleans. In equilibrium, hotel rooms are prevalent during off-peak periods, but are in short supply during peak periods, such as during Mardi Gras. During a peak period, prices are pushed up and the ability to obtain a hotel room is difficult, if not virtually impossible. The overall annual revenue stream of a hotel operator is greatly enhanced by high prices during peak periods, and there needs to be at least some of these high-priced peak periods (often accompanied by shortages) in order to boost the overall annual revenue stream to a level that adequately compensates the hotel operator for its annual fixed cost. In its natural equilibrium, the hotel market yields an overall annual price level that matches the cost of new entry and overall reliability level that falls out naturally as part of the market. Virtually all markets for capital-intensive products and services use this process to yield the two outcomes of price and reliability.

### B. Why Intervene in the Electricity Market?

12. At the onset of electric deregulation in the United States, policymakers were concerned about whether the electric market place would naturally yield reliability levels as high as those that policymakers and electric users had grown comfortable with under the status quo. The obvious default approach was to simply let the market operate naturally, without intervention, i.e., no generation adequacy requirement and no capacity market. Under such an approach, as discussed above, entry and exit would

occur and the market would reach its own natural equilibrium. The result would be energy market prices that just cover the cost of entry and a natural reliability level.[1] It is important to remember that in the wholesale electric market, as in any other market, if prices are too low to encourage new entry, the mechanism that raises prices is the lack of entry (and retirements), which tightens the market, drives up energy prices, and lowers reliability. As such, prices and reliability are the opposite sides of the same coin; to increase the former, the market needs to lower the latter.

13. Policymakers, at least in the Northeast, rejected the "natural" approach. Not knowing what level of natural reliability was likely to emerge, it was decided to ensure that a minimum level of reliability was maintained (118% of summer peak load in New York, which is consistent with the one-day-in-ten-years reliability standard).

14. Two factors entered into this decision. First, electricity was thought to require a treatment that differs from many of society's other, less crucial, products. For example, society tolerates the market's natural outcome in which several weeks a year people have to be turned away from hotels because they are sold out. In contrast, it is not acceptable to allow the electric system to turn electric users away with that same frequency due to shortages.

15. Second, the reliability of the electricity market exhibits significant externalities. If an LSE fails to procure sufficient capacity, leading to an actual shortage of energy, the NYISO does not yet have the technical capability of curtailing just the customers served by the deficient LSE. Instead, the NYISO must curtail load throughout the region, following specific criteria to ensure that the most critical services are maintained. Because the benefits of their generation capacity are shared, each LSE has an incentive to procure too little capacity and "lean on" the system.

16. The potential that, in an interconnected system, LSEs might procure too little capacity was a concern even prior to restructuring, among traditional utilities. In New York and

[1] Ancillary services markets would provide an additional revenue stream, but are ignored here to keep the discussion simple.

elsewhere, this concern was addressed by the establishment of minimum capacity requirements, expressed as a percentage of the utilities' peak loads.  New York and other state commissions enforced this requirement and provided for the recovery of the prudent costs associated with it.

17.  With retail competition, it is even more difficult to limit curtailment to customers of deficient LSEs, since their customers will be intermingled with customers of LSEs that have procured more capacity.  Thus the NYPSC supports continued application of capacity requirements to all LSEs serving load in New York.  The NYISO enforces minimum capacity requirements established by the NY Reliability Council, based on the accepted one-day-in-ten-years standard.

18.  Intervention does have its consequences, however.  The extra generation capacity associated with a minimum capacity requirement affects the energy market.  It depresses annual energy market revenues for all generators, which in turn leads to the need for an alternative revenue stream via some kind of generation capacity payment mechanism.[2]  This extra revenue stream enables the market to entice more entry than would otherwise occur, thereby achieving the goal of enhanced reliability.

19.  It is useful to think of a capacity market mechanism as a government-mandated "thumb on the scale" that puts more revenues into the mix for those that are supplying generation capacity. This is a normal policy activity for government.  For example, it is akin to the policy of deductible interest on mortgages held by homeowners, which gives more money to those who choose to own a home rather than to rent one.  The goal is to stimulate increased homeownership, and it works.

20.  Once a decision has been made to intervene in the market, administratively, there are three alternatives on how to do so, as follows:

(a) Administratively establish a minimum quantity level (minimum requirement), enforced with a

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[2] For a discussion of the relationship between capacity reserve requirements, energy market prices, and generation capacity payments, see Eric Hirst and Stan Hadley, "Maintaining Generation Adequacy in a Restructuring U.S. Electric Industry," ORNL/CON-472, Oak Ridge National Laboratory, October 1999, available at www.ehirst.com.

large penalty for deficient LSEs. This fixed quantity is often referred to as a "vertical demand curve", for reasons explained below. With this approach, the intervention takes the form of a quantity target and the market is left to reveal the price adder that it needs (up to the deficiency charge) in order to achieve that quantity target rather than the natural quantity that it would otherwise provide.

(b) Administratively establish a fixed price adder (price floor). This fixed price can be regarded as a horizontal demand curve. According to this approach, an added revenue stream is made available to all providers of capacity, the amount (per MW) of that revenue stream is determined administratively, and the market is then left to reveal the amount of extra quantity it is willing to provide.[3]

(c) Administratively establish a price adder formula (demand curve), in which the price adder declines as the quantity of capacity increases. This is often referred to as a "sloped demand curve." With the demand curve specified, the market determines the point along the demand curve, revealing the combination of price and quantity it is willing to provide.

21. In New York, we initially chose the first of the above three options (vertical demand curve). We established a 118% capacity requirement and let the marketplace reveal the price it needs to achieve this government-imposed target. The actual experience with this approach, discussed below, has led me to conclude that this design is seriously flawed because it yields excessive price volatility and is prone to market power abuse.

22. However, I would not recommend switching to the second approach, a fixed price adder (horizontal demand curve), because of the difficulty of administratively determining the cost of capacity. If the price were set too low, the market might not provide the minimum capacity required. On the other hand, if the price were set too high, investors might rush in and build

[3] This is akin to the tax deduction on home mortgages that is provided to stimulate increased homeownership.

excessive amounts of capacity, imposing excessive costs on consumers.

23. The sloped demand curve provides a middle ground, in which small changes in supply yield only small changes in price, reducing price volatility and market power problems. Yet, significant changes in the supply of capacity yield significant and predictable changes in capacity prices, providing appropriate long-term price signals for new entry. Under the sloped demand curve approach, the market will ultimately determine the price of capacity, since entry will drive the price toward the cost of new generation. If the corresponding quantity of capacity proves too low or too high, over a sustained period, the NYISO and its market participants may consider adjusting the level of the demand curve to compensate. My analysis suggests that this mechanism can mitigate the price volatility and market power concerns of the fixed quantity approach, while avoiding the dangers of encouraging inadequate or excessive capacity under the fixed price approach.

24. The sloped demand curve would stabilize the spot market-clearing price for generation capacity since at times of modest excess supply the price for capacity will fall only slightly, rather than crash, as is the current situation. This stability would enable new merchant generation entrants and their investment bankers to more easily forecast the likely future stream of capacity market prices. Also, it would facilitate forward markets for capacity since both buyers and sellers would be able to reasonably predict the future spot market for capacity, thereby giving them confidence that the forward price they negotiate is within a reasonable range.

25. Extremely high price spikes in the spot market for capacity would also be moderated by the sloped demand curve approach. Capacity price spikes occur under the current NYISO approach as the result of slight capacity shortages, whether they are true shortages or those that result from the exercise of market power. Unreasonable price spikes can create intolerable financial problems for fledgling LSEs and for consumers.

26. A demand curve would be set high enough to ensure reasonable amounts of resources are supplied in the long run, but not so high that consumers become saddled with a large amount of expensive capacity that is not needed.[4] In the vicinity of the minimum reserve levels, the demand curve should reflect the long-run cost of capacity. This is calculated by determining the cost of building a new gas turbine and subtracting anticipated net revenues from the sales of energy and ancillary services. Balance is the key. On the one hand, a demand curve should be designed to have sufficiently shallow slopes to limit price volatility and mitigate market power. On the other hand, it should be steep enough so that the emergence of substantial excess capacity can be dampened by a falling capacity market price. It is the declining price that protects the system against the mistake of setting a demand curve that is too high and which, absent the declining price, would elicit too much capacity. In other words, the declining (sloped) demand curve provides a self-correcting aspect to the overall design.[5]

27. The sloped demand curve would better represent the true value to the system, both short-term and long-term, of a little more or a little less capacity at or near the minimum requirements level. The minimum requirements level is a technical reliability requirement aimed at ensuring that outages occur no more than one day in ten years due to generation capacity shortages. However, a little more capacity has value to the market as a whole. In addition to making generation supply, as a whole, more reliable, additional capacity could

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[4] The NYISO and its market participants should review the demand curves periodically in conjunction with the NYISO's long-term planning functions. Demand curves would not be changed frequently; changes should only be made to address long-term imbalances.

[5] In order to induce capacity to come on-line, the capacity market must provide a revenue stream to cover the annual fixed costs of a peaker that are not expected to be recovered through the energy and ancillary services markets. For example, assume that the annual (non-fuel) costs of a peaker, including return on and of investment, are $80 per kw-yr, and that the peaker can be expected to achieve energy and ancillary services market net revenues of $25 and $5, respectively. In such a case, the capacity market need not provide the full $80, but only $50.

result in lower energy prices with more supply available. Additional capacity also moderates energy price spikes, including those caused by an exercise of market power.

28. With these benefits, the electric system should be willing to acquire more than 118% capacity levels, when it can be obtained at somewhat lower prices than the price that would prevail at the 118% capacity level. Similarly, when reserves fall short of 118%, the system should pay a higher price to encourage additional capacity, but not nearly so high as the current mechanism's extremely large deficiency penalty.

29. Because the benefits of capacity are largely socialized, we cannot rely on the bids of individual LSEs to determine the value of capacity. To the individual LSE, the only value of purchasing capacity is to avoid a deficiency charge. The value to the system as a whole must therefore be estimated by other means. Thus, it is appropriate for the NYISO, working with the NYPSC and other parties, to estimate this value and place the bids for the loads. As the electricity markets mature, and more loads can respond to real-time price signals, non-priced curtailments may become increasingly rare. At that point, the need for a capacity requirement can be reevaluated.

## IV. CURRENT CAPACITY MARKET DESIGN AND ITS PROBLEMS

### A. Current New York Capacity Market Design

30. The New York Reliability Council annually determines the minimum capacity levels needed to meet the standard reliability criteria of one day's loss of load in 10 years. The current NYISO capacity market design requires each LSE to procure contracts for installed capacity (ICAP) equal to 118% of its summer peak load.[6] Deliverability of ICAP is ensured via locational requirements. Up to 2755 MW of ICAP may be procured from regions outside New York. LSEs serving load in New York City must procure ICAP equal to 80% of their in-City summer peak load from capacity in New York City. LSEs serving load on Long Island must procure ICAP equal to 95% of their Long Island summer peak load from capacity on Long Island. Deficient LSEs are charged a large penalty, set at three times the estimated

[6] The ICAP requirement is converted to Unforced Capacity (UCAP) to recognize differences in forced outage rates among suppliers. All capacity measures and prices in this affidavit reflect ICAP measures and prices before translation to UCAP.

cost of new gas-fired turbines. The NYISO has estimated the cost of new gas-fired turbines to be $159 per kW-year in NYC, $139 per kW-year on Long Island, and $85 per kW-year in the rest of New York. These yield deficiency charges of $477 per kW-year ($39.75 per kW-month) in NYC, $417 per kW-year (34.75 per kW-month) on Long Island, and $255 per kW-year ($21.25 per kW-month) in the rest of New York state, to go into effect in May 2003.

31. The NYISO operates forward auctions for each six-month capability period (beginning May and November), and each month also operates monthly auctions for each of the remaining months of the current capability period. These auctions are voluntary and open to all parties. The NYISO accepts supply offers and demand bids (MW and price) and ranks these by price to create supply and demand curves. In each auction, the market-clearing price is paid by all chosen LSEs and to all chosen suppliers. Locational requirements can lead to clearing prices for suppliers in New York City and on Long Island above the statewide prices prevailing in the rest of the state and limits on imports can lead to clearing prices for suppliers outside New York below those statewide prices.

32. Prior to each month, each LSE must provide contracts to demonstrate to the NYISO that it is covering its ICAP requirement for the coming month. If one or more LSE's are deficient, then the NYISO will attempt to procure the deficient quantities in a centralized deficiency auction. The NYISO enters a bid for each deficient MW at a price equal to a predetermined deficiency charge and accepts supply offers from uncommitted capacity. If a sufficient amount of capacity is offered, the needed amount is bought at the deficiency auction's clearing price, and the deficient LSEs are charged that price. If the capacity offered is less than the total deficiency, then the NYISO will charge the LSEs the deficiency charge for the remaining amounts and use the funds to attempt to procure additional capacity.

## B. Problems Stemming From Current Market Design

33. The current New York capacity market design can be expected to produce very high market prices when capacity is short and very low market prices when the market is in even moderate surplus. When the market is short, deficient LSEs must pay the very high deficiency charge. If suppliers expect a shortage, they have no incentive to offer capacity at less than the deficiency charge. As a result, the entire capacity market will

tend to clear at a price equal to the deficiency charge. Conversely, when the amount of existing capacity is even moderately above the minimum level, competition among existing suppliers will drive capacity prices down precipitously. However, even with very low capacity prices, LSEs are unlikely to purchase additional capacity because the benefits are socialized: LSEs who purchased more than the minimum would end up subsidizing their competitors. Because the LSEs place no value on capacity above the minimum requirements, any additional supply will drive market prices down toward zero.

34. Actual market-clearing prices in New York have borne out these expectations of extremely volatile prices. There was one occasion in which the upstate capacity market was short and cleared at the extremely high deficiency charge, while more recently, given a roughly 5% excess (i.e., 123% of summer peak load), the market has crashed to an exceedingly low value below $1.00/kW-month. Market participants often talk about the 118% minimum requirement as a cliff, and use the term “falling off the cliff” to represent what happens to price when supply exceeds the minimum requirement. Although the current 123% supply within New York State does not seem excessive, it has nevertheless driven the market-clearing price down dramatically and undervalues the benefit of the additional capacity.

35. The current New York capacity market design can be characterized most prominently as a vertical demand curve, i.e., the demand is fixed at the minimum requirements. The results are unsatisfactory to both buyers and sellers. Capacity prices are often low, but cannot stay low and still have generators all stay in business. There will inevitably be periods in which the supply shrinks, drops below the minimum requirement, and drives capacity prices to the deficiency charges, yielding short-term bonanzas for generators and nightmares for consumers. These would, in turn, be followed by periods in which new investment occurs, yielding sufficient or excess capacity, accompanied by extremely low capacity prices.

36. Such a pattern of extreme volatility in prices and reliability in the capacity market is not helpful to producers or consumers. From the producer’s perspective, it is difficult to make efficient investment or maintenance decisions based on extremely volatile and unpredictable capacity prices. This is especially problematic for higher-cost peaking units, which only operate during a few peak hours and therefore have limited, and unpredictable, earnings from energy sales. Moreover, this extreme volatility is likely to increase costs of capital, since

suppliers cannot demonstrate predictable revenue streams. These effects will tend to increase the cost of supplying capacity, and ultimately these higher costs will flow through to consumers. Additionally, volatile prices make it difficult for consumers to budget for this essential product.

37. The current market design also raises serious concerns about market power. Sellers exercise market power by withholding supply.[7] Withholding can drive the market price up enough to make it profitable for the withholding generator. This strategy is successful if the extra revenues a generator receives from its supply that remains in the market exceeds the lost profits associated with the supply that is withheld from the market.

38. When existing supplies are only slightly above the minimum requirements, the vertical demand curve provides an enormous temptation for large suppliers to withhold some of their capacity from the market, in order to create a deficiency and drive the market price up toward the deficiency charge.

39. Moreover, the current design (vertical demand curve) may be ineffective in encouraging new generation even if a shortage occurs and prices reach the deficiency charge, which are paid to existing, not prospective generators. If there is only a moderate shortage, or if a deficiency is the result of withholding, then investors may fear that adding new capacity would cause the price to “fall off the cliff.” Further, the addition of new capacity sufficient to place the system above the minimum reserve margin would immediately eliminate the deficiency charge. As a result, investors may discount potential capacity revenues in deciding whether to finance new generation. This poses a bleak prospect for consumers, since they would then be suffering inadequate reliability and paying extremely high deficiency charges to existing suppliers without effectively encouraging the new entry needed to provide relief.

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[7] Withholding is accomplished either via a reduction in the amount of capacity that participates in the market (physical withholding) or via the pricing of a portion of one’s capacity so high as to price it out of the market (economic withholding).

## V. PROPOSED CHANGED TO THE NEW YORK CAPACITY MARKET DESIGN

### A. Centralized Spot Market Auction With Sloped Demand Curve

40. The NYISO would operate a centralized monthly spot market auction for capacity resources, replacing the current deficiency auction. In this auction, the NYISO will submit demand bids for all loads in the region as a predetermined schedule of willingness to pay for capacity. By this schedule, or demand curve, the NYISO will indicate a willingness to procure more than the minimum amount of capacity, but at a price that declines gradually as capacity increases. The NYISO will accept offers from all qualified suppliers.[8] LSEs can self-supply by procuring supply in advance (via forward auctions or bilateral contracts) and selling into the spot auction.[9] The NYISO will rank supply offers by price (from low to high) to create a supply curve. The intersection of the supply curve with the demand curve will determine the market-clearing price and quantity of capacity. All LSEs will be charged the market-clearing price for their share of the capacity. Figure 1 depicts an illustrative spot market auction.

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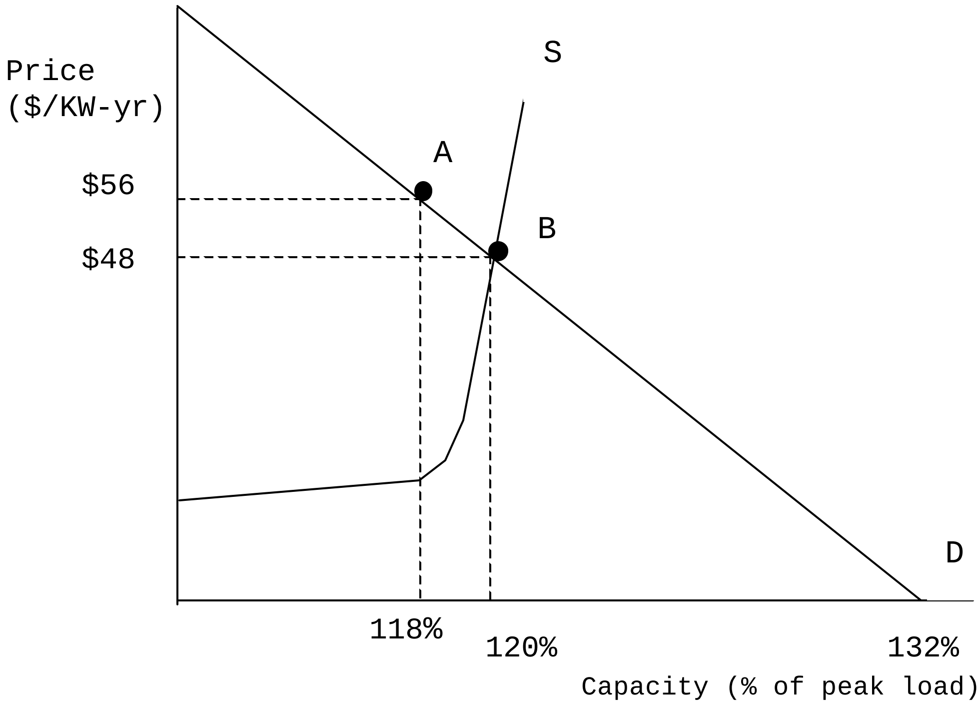
[8] Qualified suppliers should include qualified providers of price responsive demand.

[9] This is the equivalent of to the LSE selling the bilateral contract to itself; the NYISO will pay the LSE the auction's clearing price for the sale, and will then charge the LSE that same clearing price for the capacity needed to satisfy the LSE's resource adequacy obligation.

**FIGURE 1: Illustrative Spot Market Auction**




41. The minimum capacity requirement necessary to satisfy the one-day-in-ten-years criterion in New York is 118% of summer peak load. The annual cost of peaking capacity, less energy and ancillary services net revenues, is $56 per KW-yr.[10] The demand curve, therefore, is established at a height such that it equals $56 per KW-yr at a capacity level of 118% of peak load (Point A). The demand curve slopes down in a straight line and reaches $0 at 132% of summer peak load. Beyond this point, additional capacity is believed to offer no additional benefit to the system.

42. *D* is the demand curve. It is placed into the auction by the NYISO. *S* is the supply curve. It represents the voluntary offers of all suppliers, including supplies under contract to LSEs. The market-clearing price for capacity in this example occurs at the intersection of the demand and supply curves, at point B. The price is $48 and the quantity is 120% of peak load. Based on these results of the spot market auction, all LSEs are required to possess capacity rights equal to 120% of their contribution to peak load.

[10] The numbers used are illustrative.

43. For example, assume an LSE has a peak load of 100 MW and contracts for 70 MW at $40 per kW-year. Suppose also that the NYISO sets the capacity demand curve to $56 per kW-year at a quantity equal to 118% of peak load, gradually declining to $52 at 119%, $48 at 120%, etc. In the spot auction, the LSE would offer its 70 MW contract towards its resource requirement. The NYISO would add this to all other resource (supply) offers to come up with a supply curve and compare this to its capacity demand curve. Suppose the spot auction clears (i.e., supply and demand curves cross) at a price of $48 per kW-year and quantity of 120% of peak load. The LSE is allocated a resource requirement of 120 MW and is charged for an additional 50 MW (120 MW minus 70MW) at the spot price of $48 per kW-year.

44. For another example, assume the LSE had contracted for 122 MW at $40 per kW-year. In that case, it would have been credited with a net sale of 2 MW in the spot auction, at the spot price of $48 per kW-year. The LSE would have been compensated at the market price for providing an extra 2 MW of resources.

### B. An Example of Volatility Reduction From Sloped Demand Curve

45. A simple numerical example can be used to demonstrate the volatility-reducing properties of the demand curve. Through this example, the spot capacity prices produced by the demand curve are compared to the spot capacity prices produced by the current NYISO deficiency charge approach over a hypothesized 15-year period.

46. Consider a 15-year period in which there are years with large surpluses, years with modest surpluses, and years with deficiencies. The deficiency charge approach will yield extremely high capacity prices, equal to the deficiency charge, during years in which the system is deficient, extremely low prices when the system is safely in surplus, and intermediate prices for years of small surpluses. The demand curve approach will yield prices that track the gradual slope of the demand curve; they will be higher in years of tight capacity and lower in years of surplus, but will not vary as dramatically from one period to another.

47. Table 1 and Figure 2 compare the pattern of yearly capacity prices that would arise from the two approaches over a hypothesized 15-year period. One can see the extreme volatility of the deficiency approach, which depends heavily on an

occasional extreme price spike in the capacity market to generate substantial funds. In contrast, the Demand Curve approach is much less volatile and yields a more dependable capacity market revenue stream to potential new generation entrants.

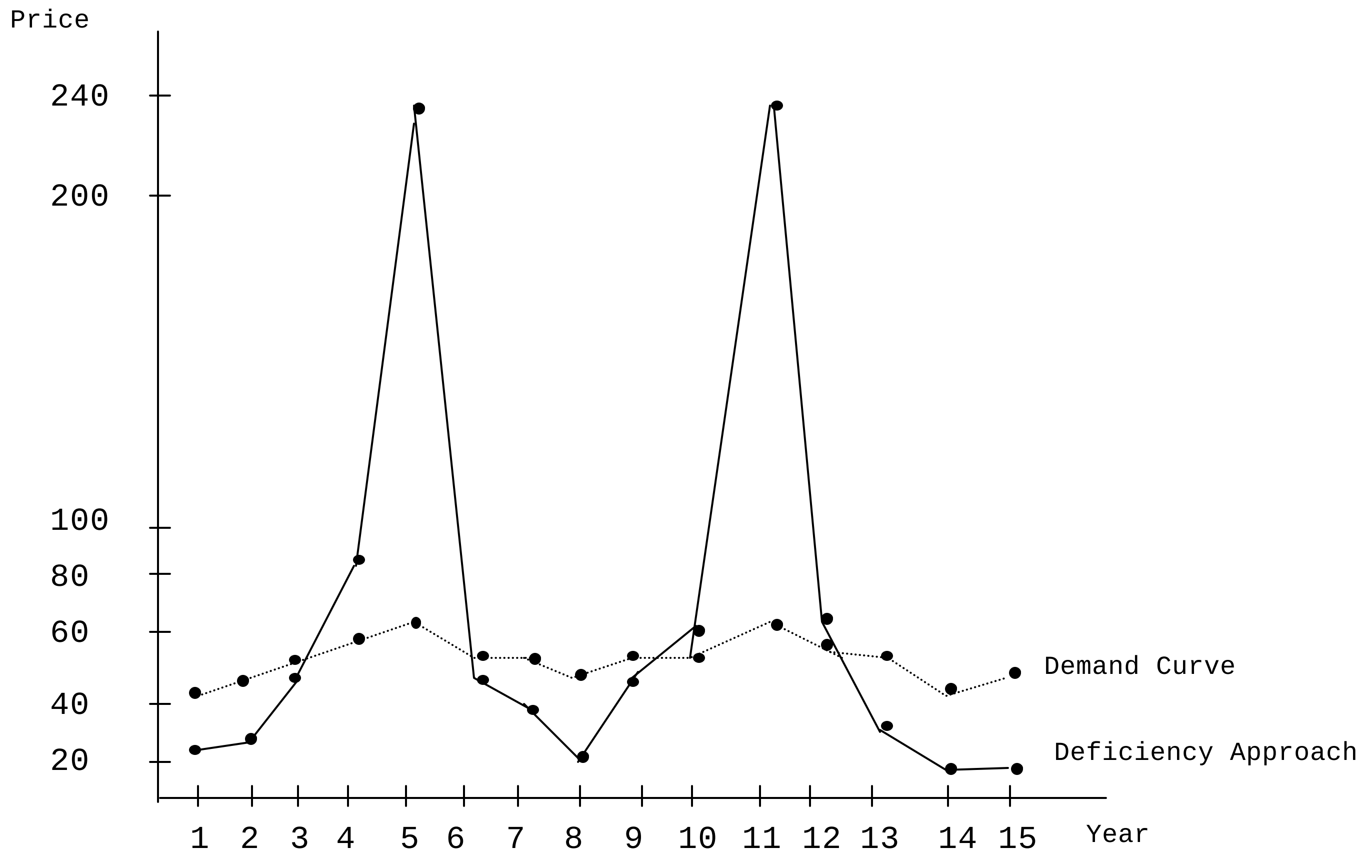
**TABLE 1**

**Capacity Price Volatility: Deficiency Approach vs. Demand Curve**

| Year | Quantity % of Peak Load | Deficiency Approach's Capacity Price | Demand Curve's Capacity Price |
|---|---|---|---|
| 1 | 23% | $12 | $36 |
| 2 | 22% | $13 | $40 |
| 3 | 20% | $40 | $48 |
| 4 | 18% | $80 | $56 |
| 5 | 17% | $240 | $60 |
| 6 | 20% | $40 | $48 |
| 7 | 21% | $24 | $44 |
| 8 | 22% | $13 | $40 |
| 9 | 20% | $40 | $48 |
| 10 | 19% | $60 | $52 |
| 11 | 17% | $240 | $60 |
| 12 | 19% | $60 | $52 |
| 13 | 21% | $24 | $44 |
| 14 | 23% | $12 | $36 |
| 15 | 22% | $13 | $40 |

**FIGURE 2**

**Capacity Price Volatility: Deficiency Approach vs. Demand Curve**



### C. **Example Of Market Power Mitigation By Sloped Demand Curve**

48. One concern that has been continually raised about the current deficiency charge approach for capacity requirements is its vulnerability to the exercise of market power. With a deficiency charge that equals a multiple of the estimated annual carrying charges of a combustion turbine (three times for the NYISO), the financial benefits to a generation owner during times of deficiency are so huge that a large supplier may be tempted to artificially induce a deficiency by withholding capacity from the market.

49. For example, assume a situation in which the system-wide supply is 600 MWs above the minimum requirement, at 120% of peak load. A 2000 MW supplier can act competitively, i.e., as a price taker, and sell all 2000 MW at $40 per kW-year, for an annual payment of $80 million. Alternatively, it could withhold 1000 MW, half its capacity, and drive the price to the deficiency charge of $240 per kW-year, for an annual payment of $240 million. Such an act is profitable since the supplier sells only half as much but at six times the price. This problem is caused by the sudden jump in prices inherent in the existing deficiency charge approach.

50. In contrast, a gradually sloped demand curve yields only modest price increases for an act of withholding. If supply is withheld, the market-clearing price moves up and to the left along the demand curve, raising the price, but not as dramatically.

51. For example, consider the same 2000 MW supplier under a demand curve regime. If it sells all 2000 MW, it receives a competitive price of $48 per kW-year, for an annual payment of $96 million. If it withheld 1000 MW, which for New York State as a whole represents about a 3% reduction in reserves, the price would rise along the demand curve to $60. The supplier would then receive only $60 million, losing $36 million from its attempt to exercise market power. Since the supplier’s quantity sold drops by half, the price would have to double for the withholding strategy to be profitable, yet the price increases only by 25%. The withholding strategy, therefore, is not profitable.[11]

[11] The example assumes that no costs are shed by withholding from the capacity market.

52. Table 2 shows the results of the same withholding strategy at different prices in the market under the Demand Curve approach.

**TABLE 2**

**Profitability of Withholding in Capacity Market Resource Demand Curve Approach**

| Starting Price $per kw-yr | Revenue At 2000 MW Sold | Price If 1000 MW Is Withheld | Revenue at 1000 MW Sold | Revenue Gain From Withholding |
|---|---|---|---|---|
| 52 | $104 mill. | 64 | $64 mill. | -$40 mill. |
| 44 | $ 88 mill. | 56 | $56 mill. | -$32 mill. |
| 36 | $ 72 mill. | 48 | $48 mill. | -$24 mill. |
| 28 | $ 56 mill. | 40 | $40 mill. | -$16 mill. |
| 20 | $ 40 mill. | 32 | $32 mill. | -$ 8 mill. |
| 12 | $ 24 mill. | 24 | $24 mill. | 0 |
| 4 | $ 8 mill. | 16 | $16 mill. | $ 8 mill. |

53. Table 2 reveals that withholding is unprofitable for a 2000 MW supplier at all market prices other than the very lowest price ranges. These low price ranges will occur only at times of large surpluses. At those times of large surpluses and low prices, the overall capacity payments are so low that consumers will be little impacted by any withholding; moreover, those are periods when supply would be expected to exit. For more normal years, the market will clear at more competitive prices, and will be relatively free of market power concerns.

## VI. THE PROPOSED CAPACITY DEMAND CURVES

### A. Setting the Capacity Demand Curves

54. The Demand Curve approach is, in the long run, self-adjusting: If the cost of capacity is over-estimated, it will encourage too much supply, which will then drive the price down the demand curve until it reaches the true market cost of capacity (i.e., excess capacity will automatically reduce wholesale prices.) Nevertheless, the numbers used to establish a demand curve directly impact the price that is paid in the short run, and an excessively high demand curve will lead to excessively high quantities in the long run.

55. There are two key steps in developing an estimate of the price, per KW-yr, that a new generation entrant would need in the capacity market for entry to be economic. First, one must estimate the annual carrying costs of a new gas-fired combustion turbine. Second, one must estimate the expected net revenues that a new combustion turbine would earn, per year, by selling into the energy and ancillary services markets. The extent to which the net revenues from the energy and ancillary services markets fail to cover the combustion turbine's annual carrying costs becomes the basis for determining the capacity revenues that the new generator needs to receive. In other words, the price needed in the capacity market is a combustion turbine's annual carrying cost, offset by its expected net revenues from the energy and ancillary services markets.

56. In practical, numerical terms, it is very important to account for the energy and ancillary services markets' offsets in estimating the annual cost of new entry. Failure to account for the energy and ancillary services markets' net revenues can result in a severe overpayment to generators because the curve would be set too high.

57. The offsets for energy and ancillary services net revenues should be estimated based on the assumption that the electric system is at its minimum capacity requirement (currently, 118% of peak load). This fixed offset is used to determine the height of the demand curve (i.e., the price at the minimum requirement level). Actual supplies may be different, leading to different levels of actual net revenues from energy and ancillary services, but the demand curve will not be moved on that account. Instead, changes in supply will simply cause the clearing price and quantity to move along the (frozen) demand curve. If supplies shrink (or fail to keep up with load growth), revenues from energy and ancillary services will tend to increase, encouraging entry. We do not want this price signal canceled out by reducing the level of the demand curve. Instead, the demand curve remains fixed, and reductions in supply increase capacity prices, reinforcing the price signals from higher energy and ancillary services revenues.[12]

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[12] Changes in scarcity pricing rules and other long-term changes that impact expected revenues from energy and ancillary services would be considered in the periodic three-year reviews of the demand curves.

### B. Conservative Estimates Can Be <u>Used To Assure Resource Adequacy</u>

58. The annual cost of new entry, net of the energy and ancillary service offsets, provides a reasonable value upon which to base the demand curve. It sets the price point on the demand curve at which it crosses the minimum required 118% capacity level. It is prudent, from a resource adequacy standpoint, to err somewhat on the side of an overestimate of the capacity payment needed to ensure that entry of new generation becomes economic as the system's capacity drops down toward its minimum required level. This can be accomplished by building a slight cushion, or adder, into the estimate of the cost of new entry. A slight overstatement causes little harm since, if new entry truly is less costly than the estimate, additional new entry will add to the system's capacity and move down the demand curve to the point at which the demand curve's price equals the cost of new entry. This is the self-correcting aspect of the downward sloping demand curve. The added cost to society is simply the cost of slightly more capacity (a few percent), which is partially offset by the benefits of greater reliability and lower energy prices.

59. The economics of new entry under the Demand Curve approach is worth describing briefly. Consider a situation in which load growth is occurring in the absence of new generation entry. As load growth occurs, the capacity steadily shrinks as a percent of peak load. As the capacity level shrinks, the expected profitability of a potential new entrant grows in two ways. First, revenue from the capacity market grows as the shrinking capacity causes a movement up the demand curve to a steadily higher capacity market price. Second, net revenue from the energy and ancillary service markets grows as increased tightness of these markets causes their prices to rise.[13]

60. As one approaches the minimum capacity level, the growth in energy market revenues becomes pronounced and, when combined with the capacity market's revenues, yields an environment in

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[13] As noted in the previous section, the energy and ancillary services markets' offsets used in establishing the demand curve are based on an assumed level of capacity that equals the minimum capacity requirement. As such, as the actual system gets tighter, the actual energy and ancillary service markets' revenues ramp up, but the offsets assumed for purposes of setting the height of the demand curve stay fixed.

which new entry becomes profitable. One may think of the growth in energy market revenues as the key driver of entry, with the Demand Curve approach supplementing it as it also produces ever growing capacity prices in response to a lessening of capacity levels.

### C. Development of Initial Demand Curves

61. The demand curves are to be set high enough to ensure that reasonable amounts of capacity resources are supplied in the long run. As noted above, in the vicinity of the minimum requirement levels, the demand curves should reflect the long-run cost of capacity. An estimate of the cost of capacity is provided by the annual cost of a new combustion turbine, offset by net revenues from energy and ancillary services.[14]

62. The NYISO, through its market participant committee process, developed preliminary estimates of the cost of new gas-fired combustion turbines for New York City, Long Island, and upstate New York. The cost estimates are $159 per kW-year in New York City, $139 per kW-year on Long Island, and $85 per kW-year upstate. These values do not include offsets for revenues from energy and ancillary services.

63. Although these estimates are based on historic data from New York City, Long Island, and New England, there are some uncertainties regarding these estimates. Accordingly, the parties agreed to reevaluate these costs prior to 2005, and every three years thereafter.

[14] Other resources, including demand-side resources and older, inefficient generation, may be able to provide capacity at lower cost.

64. The parties were not able to reach consensus on the appropriate offsets for revenues from energy and ancillary services. However, based on data provided by Dr. Patton, the NYPSC developed a conservative, i.e., understated, offset of $21 per kW-year, implying an annual cost of capacity of $64 per kW-year for a generic upstate New York location.[15] The NYPSC staff made comparable estimates for New York City and Long Island. Some market participants argued for higher estimates of capacity costs, based in part on uncertainty regarding anticipated revenues from sales of energy and ancillary services.

65. The supporting parties agreed to smaller phase-in values for 2003 and 2004 to mitigate rate impacts. The tariff filing provides for a further review of these costs and revenues, to be completed in time to determine the appropriate levels of the demand curves in 2005. The first year's statewide[16] demand curve (beginning May 2003) is set to recover $50 per kW-year at the 118% capacity level, increasing to $60 per kW-year in May 2004. The demand curves were adjusted upward to account for the fact that capacity prices are generally depressed in winter months,

[15] Dr. Patton provided estimates of annual net revenues from energy and ancillary services for gas-fired combustion turbines with various heat rates, for the 12 months ending August 31, 2002. These included $7.50 per kW-year for energy revenues and $12 per kW-year for ancillary services revenues. In addition, Dr. Patton estimated that prospective rules changes to more accurately price shortage periods in the energy markets would add $13 per kW-year. Also, NYPSC staff estimated that a reduction in capacity from the current 123% of peak load to the 118% minimum requirement would increase energy revenues by $10 per kW-year. Adding these values yielded an estimate of revenues from energy and ancillary services of $42.50 per kW-year. The NYPSC suggested an offset of only one-half of this value, or $21 per kW-year, as a conservative value.

[16] The statewide requirement can be met by generators located anywhere in New York State; the statewide demand curve is set to reflect the lower cost of capacity in upstate locations.

so that a gas turbine would have to receive more in the summer months to compensate for the lower prices in the winter months.[17]

## VII. RESPONSE TO CAPACITY DEFICIENCIES

66. The NYISO currently forecasts load growth and capacity additions to provide an early warning of impending shortages. Under the Demand Curve proposal, tight supply conditions would automatically increase capacity prices, encouraging additional supply. In addition, the NYISO could respond to persistent tight conditions by increasing the level of the demand curve to provide a greater cushion and avoid actual deficiencies. The NYISO will review the level of the demand curves every three years, with input from independent consultants, market participants, and the NYPSC. Forecasts of impending shortages that are thought to be an indication of insufficient generation revenues could lead to increases in the levels of the demand curves.

67. In the event of an unanticipated actual deficiency in the Capacity Spot Auction (i.e., where the market clears at a capacity level below the minimum requirement), the NYISO would take emergency measures to ensure reliability. The NYISO would charge deficient LSEs (those which have not procured their minimum capacity requirements) a deficiency charge set to 1.5 times the estimated annual cost of a new gas-fired combustion turbine. The NYISO would use the funds to attempt to purchase capacity from new or existing suppliers (whose offers may have been rejected in the Spot Auction).

68. Dr. Patton has raised concerns in his affidavit regarding the potential for suppliers to exercise market power in these circumstances. It is important to recognize that these

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[17] In order to recover an annual cost of $X per kW-year, the capacity demand curve must be adjusted for the fact that many generating units, including gas turbines, can generate more output in the winter months than in the summer (due to more efficient cooling in the winter). This results in increased supply of capacity and, therefore, lower capacity prices in winter. The demand curves are adjusted upward to account for these effects, so that if the supply were just equal to the minimum requirement in the summer, but higher in the winter, the annual capacity revenues of a new gas turbine would total $X per kW-year.

circumstances can arise with even greater consequences under the existing tariff procedures, where withholding can drive the entire market price to the deficiency charge. Under the Demand Curve, a deficiency causes only a moderate increase in the Spot Market Auction price, and only a relatively small amount of capacity, equal to the size of the deficiency, is charged the deficiency charge. Moreover, the Demand Curve should encourage additional capacity above the minimum requirements, thus avoiding deficiencies in the first place.

69. Nevertheless, I share Dr. Patton’s concerns. The NYISO, through its committee process, is currently developing additional market mitigation measures to guard against suppliers that may take advantage of these circumstances. It is my understanding that the NYISO intends to file these measures shortly.

70. This concludes my affidavit.

# ATTESTATION

I am the witness identified in the foregoing affidavit. I have read the affidavit and am familiar with its contents. The facts set forth herein are true to the best of my knowledge, information, and belief.

/s/ Thomas S. Paynter________
Thomas S. Paynter

April 11, 2003

Subscribed and sworn to before me
this 11th day of April, 2003

/s/ David VanOrt____
Notary Public

My Commission expires: 3-30-07

**ATTACHMENT II**

**UNITED STATES OF AMERICA**
**BEFORE THE**
**FEDERAL ENERGY REGULATORY COMMISSION**

| | | |
|---|---|---|
| New York System Independent Operator, Inc. | ) ) ) | Docket No. ER03-647-000 |

**Affidavit of Harvey Arnett**

New York Public Service Commission
April 11, 2003

## I. QUALIFICATIONS AND PURPOSE

1. My name is Harvey Arnett. My present position is Chief, Rates and Retail Choice, Office of Electricity and Environment, New York State Department of Public Service. My office is located at 1 Penn Plaza, New York, New York 10119.

2. I have been employed by the Department of Public Service since 1970, working primarily on electric rate matters since 1976. My experience covers utility operations, revenue requirements, fully allocated cost of service studies, revenue allocations, rate designs, regulatory incentive mechanisms, QF contracts under PURPA, standby rates and other issues regarding distributed generation and power industry restructurings. I have testified before the New York Commission more than 30 times. I am a member of a staff team responsible for analyzing and commenting upon the pricing rules of the New York Independent System Operator (NYISO), which operates the New York bulk transmission system.

3. I have a Bachelor of Engineering from The Cooper Union for the Advancement of Science and Art.

4. The purpose of my affidavit is to discuss the short-term costs associated with the Demand Curve and compare my analysis of those costs with that of Dr. David Patton, the NYISO’s Independent Market Monitor.

## II. ANALYSIS OF DR. DAVID PATTON’S COST IMPACTS

5. I have reviewed the cost impacts provided in the affidavit of Dr. Patton (NYISO March 31 filing, Attachment IV) as well as the spreadsheets he used to develop them. Earlier in the process of reviewing the Demand Curve, I prepared impact estimates under a variety of scenarios. These earlier estimates were independent of those done by Dr. Patton for the NYISO and have differed somewhat from Dr. Patton's for a number of reasons, such as differences regarding how suppliers in neighboring states may react to the prices set by a demand curve and in the geographic locations included in the estimates for various areas of the state.

6. In preparing estimates of increased payments to generators, I have adopted Dr. Patton's assumptions that are similar to

mine.  I also note that because Dr. Patton provides a range of outcomes, minor differences in our assumptions do not have a significant effect on the results of our analyses. I have, however, made some adjustments to his analysis, which I will describe below.

7. I reviewed impacts provided on page 16 of Dr. Patton’s affidavit in a table entitled "Summary of Estimated Demand Curve Impacts Non-Shortage Conditions."  My analysis of impacts under non-shortage condition incorporates modifications to four of Dr. Patton’s assumptions.  The results, which are shown below, decrease the New York City (NYC) estimated impact by over 50 percent and narrow the range of outcomes.  These adjustments also increase the Rest-of-State (ROS) impact by about 10 percent and widen the range of outcomes.

**Summary of Estimated Demand Curve Impacts**

**Non-Shortage Conditions**

**NYC**

| **Summary** | **Estimate** | **Min** | **Max** |
|---|---|---|---|
| **Costs ($)** | $ 33,776,894 | $ 30,978,476 | $ 38,085,746 |
| **Rate Cost ($/MWh)** | $ 0.78 | $ 0.72 | $ 0.88 |

**Rest of State**

| **Summary** | **Estimate** | **Min** | **Max** |
|---|---|---|---|
| **Costs ($)** | $ 93,851,626 | $ (8,178,130) | $ 187,997,566 |
| **Rate Cost ($/MWh)** | $ 0.99 | $ (0.09) | $ 1.98 |

8. The first modification to Dr. Patton’s assumptions increases the amount of capacity that would be eligible for payments at the deficiency price (similar to the adjustment made in the deficiency conditions analysis described below in Paragraph 11).  Second, I analyzed the amount of ROS capacity that is used as self supply or sold under bilateral contracts.  My analysis indicated the amount sold at the ROS Demand Curve would likely be significantly higher than the amount Dr. Patton used.  Third, I have reduced the amount of ROS capacity New York City that LSEs would need to purchase under of the Demand Curve spot

auction. This reduction recognizes the amount of ROS capacity that Con Edison and the New York Power Authority control. This revision significantly lowers the New York City impacts. Finally, I have recognized the impact on Demand Curve clearing prices that results from availability of additional capacity due to temperature sensitivity in the winter and from the elevated summer capacity levels under the high excess case.

## III. COST IMPACTS

9. Assuming all of the increased payments to generators are flowed through to end-use consumers, they equate to a 1-1.5 percent increase in total electric bills. Many customers, however, will not see increases due to commodity price protections that may be provided by their energy supplier, or other aspects of the rate plan that governs their utility. For a customer that has no price protection, I estimate the Demand Curve could increase total electric bills by no more than three percent.

10. In addition to the approach of using historic prices as a base to develop these impacts, I analyzed the cost impacts of a deficiency under the current market design. This is a far more difficult exercise; the existing methodology is very sensitive to the balance of supply and demand. If there are adequate supplies, we could expect prices would not change, but should supplies get tight (as they are now in New York City), because a plant is no longer financially viable or safety or environmental concerns require its shutdown, my analysis shows that the existing methodology is a far more expensive option than the Demand Curve.

11. In paragraphs 31-33 of his affidavit, Dr. Patton discusses savings resulting from avoidance of the current deficiency structure. In the table entitled "Cost Savings from Demand Curve Under Deficiency Conditions for New York City," Dr. Patton estimates that the cost savings recognizing IPP bilaterals are $57 million or $1.32 per MWH. Dr. Patton has, however, understated the amount of capacity that will likely be eligible to receive the deficiency price in 2003. As a result, he has underestimated the potential impact that would result if the current market rules (which would result in a deficiency price twice as high as that proposed under the Demand Curve) would be in effect. Using my higher estimate of such capacity, I have projected that under the scenario that there was a Demand Curve in place,

and there were deficiency conditions, cost savings would be approximately $105 million or $2.43 per MWH. I have not, however, addressed the estimates in the table labeled "Without IPP Bilaterals." These bilaterals do exist, and are expected to exist into the future, so this portion of Dr. Patton's table is not useful in developing impact estimates. The result of my analysis is that the difference in payments under the existing methodology compared to those under the Demand Curve, assuming New York State is deficient, is in the order of several hundreds of millions of dollars.

## IV. CONCLUSION

12. To the extent there is any short-term increase in capacity prices due to the Demand Curve, I conclude that this proposed new market design can be viewed as a reasonable insurance payment to avoid a much larger short-term increase that would occur under shortage conditions under the existing approach.

13. This concludes my affidavit.

ATTESTATION

I am the witness identified in the foregoing affidavit. I have read the affidavit and am familiar with its contents. The facts set forth herein are true to the best of my knowledge, information, and belief.

/s/ Harvey Arnett________
Harvey Arnett

April 11, 2003

Subscribed and sworn to before me
this 11th day of April, 2003

/s/ Jan Goorsky____
Notary Public

My Commission expires: 4/30/03