

## **Attachment I**

Affidavit of Dr. David Patton

President, Potomac Economics

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

**AFFIDAVIT OF DAVID B. PATTON, PH.D.**

**I. Qualifications and Purpose**

1. My name is David B. Patton. I am an economist and President of Potomac Economics, Ltd. Our offices are located at 9990 Fairfax Boulevard, Fairfax, Virginia 22030.  
  
Potomac Economics is a firm specializing in expert economic analysis and monitoring of wholesale electricity markets.
2. Potomac Economics is the external Market Monitoring Unit for the New York Independent System Operator, Inc. (“NYISO”), ISO New England, Inc., and the Midwest ISO (“MISO”). In these roles, I am responsible for assessing the competitive performance of the markets administered by these Independent System Operators and Regional Transmission Organizations (“ISOs/RTOs”), including developing and implementing monitoring plans to identify and remedy market design flaws and abuses of market power. I also review and provide recommendations regarding market design and market rules.
3. On numerous occasions over the past twelve years in my work with NYISO I have worked on analyses that required a detailed understanding of the PJM Interconnection, LLC’s (“PJM’s”) market rules, pricing, and operating procedures. This included the

Potomac Economics study of the loop flow issues around Lake Erie. Additionally, I have monitored and analyzed pricing, scheduling and congestion management in PJM in connection with Potomac Economics responsibilities as the Independent Market Monitor for MISO. An understanding of PJM's pricing, scheduling and congestion is necessary because PJM and the MISO jointly manage congestion on a large number of transmission constraints that affect PJM's and MISO's interconnected transmission systems.

4. I have worked as an energy economist for twenty one years, focusing primarily on the electric utility and natural gas industries. I have provided strategic advice, analysis, and expert testimony in the areas of electric power industry restructuring, pricing, mergers, and market power. I have also advised other existing and prospective RTOs on transmission pricing, market design, and congestion management issues. With regard to competitive analysis, I have provided expert testimony and analysis regarding market power issues in a number of mergers and market-based pricing cases before the Federal Energy Regulatory Commission ("FERC"), state regulatory commissions, and the U.S. Department of Justice.
5. Prior to my experience as a consultant, I served as a Senior Economist in the Office of Economic Policy at the Federal Energy Regulatory Commission, advising the Commission on a variety of policy issues including transmission pricing, open-access and electric utility mergers.
6. Before joining the Commission, I worked on energy policy as an economist for the U.S. Department of Energy. I hold a Ph.D. and M.A. in Economics from George Mason

University and a B.A. in Economics with a minor in Mathematics from New Mexico State University.

7. I have been asked to submit this affidavit in support of the NYISO's interface pricing proposal, including the pricing rules that the NYISO proposes to add to Section 17 of (Attachment B to) its Market Administration and Control Area Services Tariff.

## **II. NYISO Proposed Interface Pricing Rules**

### **A. Power Flow Assumptions in the Interface Prices**

8. The NYISO's proposed interface pricing rules specify that the NYISO will determine interface prices based on expected power flows. This is consistent with the method that PJM uses to determine prices.
9. Setting interface prices consistent with how the power will actually flow is conceptually sound. However, since actual flows associated with an external transaction cannot be known at the time the external transaction is scheduled and priced, ISOs and RTOs all make assumptions about how power is expected to flow, and set prices consistent with those assumptions.
10. Transactions in the eastern interconnection are generally scheduled on a control area to control area basis. It is virtually impossible for any ISO or RTO to know precisely where power will be injected and withdrawn for a control area to control area transaction. For example, when power is scheduled from PJM to New York, certain generators in PJM will produce more (*i.e.*, the marginal generators) and certain generators in New York will produce less. The locations of these marginal generators and the current topology of the

networks in the two areas determine how the power will actually flow. However, the locations of the marginal generators are not known at the time external transactions are scheduled and priced. Furthermore, they can only really be accurately known in retrospect by re-running each ISO's/RTO's market model to measure how the dispatch level of each generator would have changed, and how those changes affected transmission constraints on each system.

11. In order to incorporate expected power flows into its interface pricing, ISOs and RTOs necessarily makes assumptions about where the power will be injected and withdrawn. For example, I understand that PJM calculates the expected power flows associated with transactions to and from New York based on two electrical nodes in New York (Roseton in eastern New York, and Dunkirk in western New York). This simplified assumption is reasonable, given that PJM cannot know the actual source/sink locations associated with imports from or exports to New York. In fact, the true source and sink locations can change on a five-minute basis, which could cause erratic changes in the interface prices were PJM to actually know the location of the marginal resources in New York and use them to calculate the interface prices. Therefore, while PJM's pricing uses the actual output of internal PJM generators to determine LMPs at those generators' locations, it does not incorporate comparable information on actual flows associated with external schedules.
12. The NYISO's proposed rules for pricing its Keystone Proxy Generator Bus employ a different mechanism to achieve a similar result to PJM's interface pricing method. Section 17.1.1.1.2 of the NYISO's proposed tariff revisions requires the NYISO to develop prices that reflect:

- the impact of Consolidated Edison Company of New York's ("ConEd's") hourly elections under the wheel agreement (whereby power is wheeled from New York, across northern New Jersey into New York City using the EFO and ABC PARs), and
  - an assignment of a portion of PJM/New York scheduled interchange to the PAR-controlled Branchburg-Ramapo, JK and/or ABC interconnections based on the NYISO's expectation of what power flows associated with scheduled interchange will be.
  - assignment of the remaining portion of the scheduled PJM/New York interchange to the uncontrolled A/C transmission interconnections between Pennsylvania and western New York, or (secondarily) as loop flow across the NYISO's interconnections with Ontario.
13. The NYISO's proposed method of determining expected power flows will produce results similar to PJM's weighting method, and is a reasonable method of calculating interface prices and schedules.

#### **B. Assumptions in the Day-Ahead Market**

14. In the Day-Ahead Market, the NYISO proposes to separately determine expected unscheduled power flows based on a rolling 30-day average for each hour. The NYISO has successfully employed this method of anticipating unscheduled power flows for several years. Because unscheduled power flows occur in real time due to the interconnected nature of the transmission grid, failure to include a mechanism to anticipate unscheduled power flows in the Day-Ahead Market would tend to

unnecessarily and inappropriately cause the Day-Ahead and real-time market outcomes to diverge.

### **C. Path Validation**

15. The NYISO's proposal to continue to employ its path validation process (whereby NYISO rejects proposed circuitous transaction schedules when a more direct scheduling path is available) is reasonable.
16. The NYISO's path validation process is designed to ensure that the actual power flows associated with the transactions are as consistent with the scheduled flows as possible. Precluding circuitous paths substantial reduces unscheduled loop flows and reduces market participants' ability engage in patterns of transactions that may constitute manipulation of the RTO's interface pricing.
17. The NYISO's proposed scheduling process and pricing is not inconsistent with PJM's source-sink scheduling. In fact, it is superior because it goes further than PJM's scheduling rules to require designation of the path. The scheduled path cannot reasonably be ignored for two reasons.
18. First, ISOs and RTOs must still manage external interface and ramp capability, which is affected by the path over which the transaction is scheduled. By requiring that transactions be scheduled on the paths over which most of the power will flow, both the dispatch and pricing outcomes will be as efficient as possible.
19. Second, Phase Angle Regulators ("PARs") can cause the expected power flows associated with two transactions with identical sources and sinks, but that are scheduled

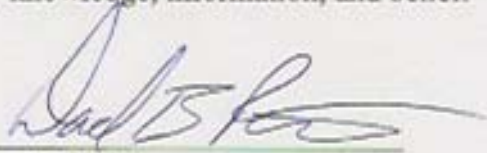
over different paths, to be very different. Ultimately, therefore, I believe it may be necessary for all RTOs' interface pricing to distinguish between transactions that may have the same source and sink, but different transmission paths, when one or both paths include PARs whose operation is affected by the transaction schedule. For example, if PARs on a particular path are operated to conform actual flows over an interface to the net schedules (i.e., to reduce loop flows), then the expected power flows for transactions over that path may be materially different than the expected power flows for transaction from the same source that is scheduled over other paths. However, this improvement in the interface pricing should be addressed in the future once the performance of relevant PARs has been fully evaluated.

20. In sum, the NYISO's path validation process is well adapted to the NYISO's market design and essential for ensuring efficient market outcomes and transaction scheduling incentives. Therefore, the Commission should accept its continued use as a reasonable method of conforming interface schedules and determining prices that are consistent with the confirmed schedules.
21. This concludes my affidavit.



ATTESTATION

I am the witness identified in the foregoing Affidavit of David B. Patton, Ph.D. dated January 17, 2013 (the "Affidavit"). I have read the Affidavit and am familiar with its contents. The facts set forth therein are true to the best of my knowledge, information, and belief.



David B. Patton  
January 17, 2013

Subscribed and sworn to before me  
this 17<sup>th</sup> day of January, 2013



Notary Public

MATTHEW JAMES CARRIER  
Notary Public  
City/County of Fairfax  
Commonwealth of Virginia  
Notary registration number - 7233763  
My commission expires - Nov. 30, 2013

My commission expires: Nov. 30, 2013