On October 29, 2014, the Electric Power Supply Association (EPSA) released a paper by Dr. Susan L. Pope, a Managing Director at FTI Consulting, which identifies the types of price formation problems prevalent in wholesale electricity markets administered by independent system operators (ISOs) and regional transmission organizations (RTOs) under the jurisdiction of the Federal Energy Regulatory Commission (FERC). Dr. Pope's paper offers substantive recommendations for near-term improvements, as well as practical suggestions to facilitate identifying and implementing improvements across ISOs and RTOs to make sure that accurate price signals are sent to guide investment decisions that increase efficiency, advance innovation and maintain reliability. The paper expands on Dr. Pope's participation on behalf of EPSA at FERC's price formation staff workshop held on September 8, 2014.

The paper, *Price Formation In ISOs And RTOs: Principles And Improvements*, details concerns about price formation deficiencies under current rules and practices centered around price suppression in energy markets and the resulting need for out of market payments known as uplift. The paper shows why prompt action to address the identified underlying problems should be an urgent priority for regulators and ISOs/RTOs to preserve and strengthen competitive wholesale electricity markets. The paper notes that market participants, especially generators, will not independently make investments when and where needed to meet the reliability needs of the system, and system operators will not be able to depend on the market to voluntarily provide resources to maintain reliability in the short- or long-run, without improvements that result in more accurate prices for energy and ancillary services. In the absence of needed reforms, regulators and ISOs/RTOs will be forced to maintain reliability through non-market solutions, which over time may further distort and erode the competitive price signals that should be used.

The two price formation concerns frequently mentioned in the paper - the suppression of real-time prices and increasing levels of uplift - are tightly linked: price suppression artificially decreases energy and ancillary services revenues for generators, leading to higher uplift costs. Thus, the paper urges,

A goal of improvements to price formation should be to reduce the importance of uplift by improving the performance of the basic energy markets in all hours. If energy and ancillary services prices can be improved so as to align more tightly with the system dispatch, this will reduce the need for uplift and at the same time provide price signals leading to improved reliability and operating efficiency. This objective is embraced by the principle of dispatch-based pricing.

**Excerpts from the Paper on Price Formation Issues and Recommendations**

**Types of Price Formation Issues** – A rough taxonomy assists in organizing discussion of possible problems with price formation. While not exclusive, the categories enable identification of pricing problems with similar underlying causes that may have similar solutions. The paper discusses the following:
Problems arising from omissions, approximations in unit commitment and dispatch software models, as well as possibly inefficient operator interventions.

Problems arising in the price formation step of the ISO/RTO software, including: difficulty in calculating dispatch-based prices because of the lumpiness (non-convexity) of bids and offers; averaging of settlement prices; and, omissions of information about the dispatch and unit commitment in estimating prices.

Problems arising from the definition of electricity market products and bidding rules. This includes: absence of valuation of operating reserves in the day ahead energy market and advance unit commitment steps; inefficient bidding rules that do not mesh with the operational constraints and business risks present in electricity and gas markets; and, evolving implementation of shortage pricing.

Substantive Recommendations — Five improvements to price formation stand out as possibilities for near-term change. The methodologies summarized below have been worked through and proved in operation in one or more ISOs/RTOs. Other ISOs/RTOs are in the process of working on similar changes. Further analysis of the details of solutions already in use could provide a way to move forward to progressively improve price formation:

- Include All Active Constraints in Price Formation, Including Those Leading to Operator Actions
- Enable Intra-Day Offer Changes
- Include Block-Loaded Fast-Start Resources in Prices
- Use Quantity-Weighted Hourly Prices
- Continue to Improve Shortage Pricing

Practical Suggestions — The following practical suggestions are directed to the process for identifying and implementing improvements to price formation:

- Observe the Principle of Dispatch-Based Pricing*
- Focus on Real-Time Pricing
- Focus on Improving Prices, Rather than on Reducing Uplift
- Adopt Decision Criteria that Do Not Hinge on Quantification of Costs and Benefits
- Don’t Underestimate the Value of Small Improvements to Price Formation
- Monitor Uplift, But Transparency is not a Substitute for Changes to Pricing Rules

* The principle of dispatch-based pricing calls for the determination of clearing prices in electricity markets that are as consistent as possible with the actual operation of the transmission system by a system operator seeking to minimize the offer cost of meeting load while adhering to all standards of reliability. In the words of a market participant, dispatch-based pricing translates to the goal, “if the system operator did it [e.g., dispatched a unit or cut an export], it should be included in the pricing.”

The full report including an executive summary is available at EPSA’s web site, www.epsa.org.

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EPSA is the national trade association representing competitive power suppliers, including generators and marketers. Competitive suppliers, which collectively account for 40 percent of the installed generating capacity in the United States, provide reliable and competitively priced electricity from environmentally responsible facilities serving power markets. EPSA seeks to bring the benefits of competition to all power customers. For more information, go to www.epsa.org.