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Industry participants call for open standards to support wholesale electric power markets

For a background on these issues, see *Utility Deregulation Requires Effective E-Business Standards*, a DISA white paper (June 2002), at <http://www.disa.org/whitepaper.cfm>

Participants at an 18 July 2002 meeting called by the Federal Energy Regulatory Commission (FERC) urged FERC to adopt open software and data standards as part of the drive to design a standard structure for wholesale electric power markets in the U.S. Wholesale markets cover the exchanges of power among generators, transmission companies, and utilities, which up to a few years ago were closely regulated, but now are being opened up to encourage competition and reduce costs.

FERC proposes a standard market design for wholesale power

At the meeting, representatives from the electric power industry, solutions vendors, and FERC discussed the role of software and data standards as part of FERC's proposed standard market design (SMD) for wholesale electric power. FERC intends SMD to provide a common framework that promotes efficiency, minimizes costs when transactions involve two or more regional grids, provide fair and well-defined rules that are neutral to different kinds of fuels or technologies, and encourage more choices for customers. FERC also wants the SMD to separate the transmission systems and trading markets from the market participants (generators and transmission facilities), create price signals that reflect the time and location value of the power generated, and reflect the demand response by customers.

SMD would make distribution of bulk electric power among participants function more like a market than an engineering exercise. FERC wants the network of power grids open to all participants, whether under an existing supply contract, spot market player, or for integrated companies (e.g., traditional public utilities) providing power to an internal entity. Market participants could buy and sell available power through a system of tradable transmission property rights. The markets would be based on bids in a form of auction, and operate in two time frames:

- Day-ahead markets that estimate power available for the next day, and
- Real-time markets, to cover last-minute imbalances and contingencies¹

FERC proposes a pricing model called locational margin pricing or LMP that reflects the principle of price signals based on time and location value, to manage congestion across the grid. LMP calculates the costs of generation and transmission, and combines them into one price for moving power from one node in the grid to another. As explained in a white paper by industry software provider Henwood Energy, buyers and sellers of bulk power will not likely know the true price of the transmitted power until after the transaction's settlement, since in times of large supply or demand fluctuations, transmission prices can vary significantly. Therefore, some regional grid operators have developed a companion system of financial transmission rights or FTRs that act as a hedge against price fluctuations, and thus provide more certainty and reduce the risks faced by market participants.²

Extent of standards debated

Participants in the 18 July conference agreed that for FERC's standard market design to work, the industry needs standards to cover many of SMD's features. However, the group divided over the degree to which FERC and the industry should apply standardization.

Petar Ristanovic of Siemens Power Transmission said SMD required a standard data model, and recommended the Common Information Model or CIM developed by Electric Power Research Institute as a starting point. CIM is an IEC standard for representing the objects in an energy management system model that includes a version in XML.³ John Finney of ABB agreed, but noted that CIM is designed for static data and needs to be extended, since the SMD environment will likely be dynamic.

Guillermo Irisarri of OATI recommended standards for the interconnections among market participants. He singled out the E-Tag standard of the National Electricity Reliability Council or NERC for load planing as a good example. Irisarri said E-Tag defines external interfaces and leaves the implementation of the systems behind the interfaces to the developers.

Jay Britton of Alstom cautioned against strict standardization, and suggested instead that participants use open architectures that allow for the publication of the interfaces. Britton said imposing one-size-fits-all standards would be expensive and constraining. Ristanovic agreed with the use of open architectures, but said that without standard interfaces market participants would need to develop different solutions for each trading partner.

The operators of the regional grids, called independent system operators (ISOs) also urged the development of industry standards. Andy Ott of the PJM Interconnection -- covering Pennsylvania, New Jersey, and Maryland -- recommended developing standards for data exchange. Ott noted that companies in the industry use different terms to express the same ideas (a point echoed by David LaPlante of the New England ISO), and a common vocabulary alone would help participants save money. He added that standards can provide more data transparency, to help build confidence among customers.

Roberto Paliza of the Midwest ISO said his operation, its first phase scheduled to begin in late 2003, is building software from scratch from multiple vendors, and as a result, runs the risk of interoperability and integration problems. Paliza recommended exchanging models to help the coordinate the work of regional organizations and supported the use of CIM as the industry model. He added that the industry would need a separate body to maintain and support the standards.

Bob Thompson of the New York ISO, in discussing his organization's software experience, recommended a standard for exchanges between ISOs or the regional transmission organizations (RTOs) proposed by FERC. He identified several problems the New York ISO encountered in dealings with other regional grids: inconsistent data for common transactions, multiple data entered or single transactions, inability of respective ISO software to communicate with each other, and inefficient checkout processes.

This communication standard, Thompson said, would address what FERC calls seams issues -- those involving interactions between the regional grids -- such as bids across control areas and checking of

transmission schedules. He said standards will help reduce seam problems that may arise, but they need to be augmented with appropriate operating procedures communicated among the market participants.

Don Watkins of the Western Interconnection, a group of grid operators from Western states, called for more comprehensive set of industry standards, which he dubbed Electric Grease, because it would grease the wheels of business in electric power markets. Watkins said Electric Grease would provide a virtual single interface, enable greater market monitoring, encourage reliability, offer more access to information, and optimize vendor competition.

Watkins outlined a model for the standards covering a range of functions:

- Energy buying and selling
- Transmission rights
- Transmission markets (day-ahead and same-day)
- Real-time operations, such as schedule management
- Data mart and metadata registry, including archiving for audits
- Metering
- Settlements and billing
- Electronic funds transfers

The standards would define human and electronic interfaces, as well as hooks for and pointers to a common information interface. This common information interface would connect legacy systems, as well as provide for market monitoring and reliability. Watkins encouraged development of a separate business consortium to write the industry specifications that would bring in the power generators, ISOs, and energy traders. The consortium would work with established standards bodies and regulators, such as FERC.

Security standards, now more than ever

Chuck Noble of NERC reported on the development of new security standards for the wholesale electricity network, a joint undertaking with FERC that will be part of the proposed rules released at the end of July. The draft standards, prepared by NERC's Critical Infrastructure Protection Advisory Group, note the need for security standards as part of the planning for information systems:

Wholesale electric grid operations are highly interdependent, and a failure of one part of the generation, transmission or grid management system can compromise the reliable operation of a major portion of the regional grid. Similarly, the wholesale electric market – as a network of economic transactions and interdependencies – relies on the continuing reliable operations of not only grid resources, but also the operational infrastructure of monitoring, dispatch and market software and systems.⁴

The group writing the standards has proposed an effective date of 1 January 2004 to cover all grid operations and supporting organizations (RTOs and ISOs), power producers, transmission owners, marketers, power purchasers, and reliability authorities such as NERC. Other companies engaged in the dispatching of power into the regional grids, such as manufacturers acting as co-generators of power, and are part of the wholesale market, will also be subject to these standards.

The standards cover both physical and cyber security, including governance, asset classification and control, personnel, access control, systems management, planning, incident response, and business continuity. The NERC group proposes a system of self-certification, where the responsible executive signs off on the organization's compliance with a set of criteria. Organizations would need to file that compliance document by 31 January 2004 and each year thereafter.

Noble said the standards draw from several sources, including industry best practices, guidelines from the National Institute of Standards and Technology, and international standards, including ISO 17799.

That ISO standard provides a comprehensive set of best practices for information security, including certification criteria, which appears to have influenced the proposed standards for wholesale electricity markets.

Next steps: NOPR and a standards development process

FERC plans to issue its Notice of Proposed Rulemaking or NOPR on the standard market design by the end of July. The views of participants at the meeting, however, suggested that a consensus has not yet formed on the scope of the software and data standards needed for this task. While a few examples were raised at the meeting, such as CIM and NERC's E-Tags, the industry would need a far more comprehensive set of standards. Participants also noted that they did not have a lot of time – six months at most – which required a standards development process already in place.

Alison Silverstein, the technology advisor to FERC Chairman Pat Wood III who chaired the meeting, suggested that FERC may devote another workshop to the development of standards perhaps in September.

During the audience Q&A, Gary Michor of The SPi Group, an energy industry software developer and electricity clearinghouse, discussed a project in which his company participated for the Ontario Energy Board (the organization responsible for the Ontario energy marketplace), which is also deregulating wholesale power operations. He said the Ontario project addressed many of the issues raised at the meeting and could serve as a model for standards to support SMD.

¹ “Working Paper on Standardized Transmission Service and Wholesale Electric Market Design,” Federal Energy Regulatory Commission, 15 March 2002, <http://www.ferc.gov/Electric/RTO/mrkt-strct-comments/e-1finalSMD.PDF>

² Jason Christian and Gary L. Hunt, “Market Design Matters ... and how!,” Henwood Energy, 17 July 2002

³ See http://www.epri.com/attachments/285344_1007144.pdf

⁴ “Security Standards for Electric Market Participants,” draft v 0.5, 17 July 2002