

Regional Transmission Organizations (RTOs): Effects on Electricity Markets, Operational Reliability and Transmission Planning (Panel)

Chris Mensah-Bonsu
Member IEEE

Market Operations
California Independent System Operator
151 Blue Ravine Road
Folsom, CA 95630
Tel: (916) 608-1108
Fax: (916) 351-2267
E-mail: cmensah@caiso.com
URL: <http://www.caiso.com>

Lawrence E. Jones
Member IEEE

ALSTOM ESCA Corporation
Global Energy Markets Group
11120 NE 33rd Place
Bellevue, Washington
Tel: (425) 739-3293
Fax: (425) 889-3121
E-mail: lawrence.jones@esca.com

Extended Summary

Keywords: *RTO Characteristics and Functions, Regulatory Policies, Electricity Markets, Transmission Planning and Expansion, System Reliability, System Operation, Congestion Management, Forward Markets, Transmission Rights and Reservation, Market Performance*

The restructuring of the electric power industry in response to the Federal Regulatory Commission (FERC) Orders 888, 889 and 2000 has evolved with many major milestones that have resulted in the creation of different kinds of market structures and business practices in various regions of the United States. In its series of July 12, 2001 orders, the FERC directed several mediated processes for the consolidation of RTOs to encompass "natural markets".

These orders, and a technical conference on June 19, 2001 addressing RTO seams coordination, may have signaled the commission's inclination towards more uniform practices and a systematic process for the coordination of practices among the various RTOs. The recent orders of July 12, 2001 acknowledge that wholesale power markets will benefit from having fewer seams, and more consistent business models and practices. Seams issues may be characterised by the problems of conducting power transactions between different geographic areas under well-defined rules and tariffs. These involve the coordination of the scheduling practices that govern the flow of energy and energy payments between various control areas and transmission regions, coordination of ancillary service requirements and characterizations that are used for grid management. The resolution of inter-regional seams issues even with fewer RTOs can be a challenging process that may take many years to accomplish.

Presently in the USA, the ISO landscape can be described as five (5) Independent System Operators (ISOs) that are in operation. Four (4) of them: -the Pennsylvania Jersey Maryland (PJM) interconnection, California ISO (CA ISO), ISO New England (ISO NE), and New York ISO (NY ISO) are under FERC's jurisdiction. The other is the Electric Reliability

Council of Texas (ERCOT) which is not under FERC's jurisdiction. Two newly created ISOs: the Midwest ISO (MISO) and Southern Power Pool (SPP) will soon begin market trials. Also, in the development process are the Alliance RTO and Grid South. There have even been proposals for several ISOs/RTOs in the horizon, including the RTO West and Desert STAR. Of all these, only the PJM has received a provisional RTO approval per "FERC Order . 2000 Compliant Status". This was based on the Commission's ruling on July 12, 2001.

The recent FERC's call for only four (4) RTOs in the US namely: North East, South West, Mid-West and West has transmission planning and expansion, fewer seams issues and consistent market protocols that aim at achieving competitive market results as some of its core functions. These large RTOs according to FERC are intended to foster uniform and systematic market development processes, and also provide increased reliability with affordable wholesale electricity market prices. The characterisation of the existing candidate RTO markets can be categorised as follows:

- Non-market-based operations involving bilateral transactions and a transmission reservations
- Market-based operations with integrated spot energy and transmission access
- Hybrid real-time spot market with forward bilateral contracts

In the establishment of RTOs through various stages of implementation, their deployed processes and systems will become part of a legacy infrastructure that may be increasingly challenging and expensive to change over time. For this reason, the RTO coordination should be considered as a continuous process for integrating regional systems that provide for a reliable power transmission network, facilitate non-discriminatory open-transmission access, and efficient competitive electricity markets. The RTOs must be active participants in industry fora, working together with all essential players, including state regulators and stakeholders to ensure a consistent and efficient market design and implementation, sufficient generating resource capacity, and a reliable operating transmission system and expansion.

The recent FERC orders pertaining to the creation of these RTOs covering huge geographic regions have placed new challenges on the electric power industry. Some of the key issues that must be addressed through the implementation and operation of RTOs include:

- a.) How to merge the existing large markets and systems into a fewer number of super-sized systems
- b.) RTO-to-RTO processes, intra-RTO and inter-RTO seams management
- c.) Will fewer RTOs facilitate the creation of market-based implementation of regional transactions across control area boundaries? Issues to be resolved include the coordination of energy and reserve markets, congestion management for intra and inter-regional transactions, and incentives for investment into transmission facilities?
- d.) To what extent will larger RTOs minimize the lack of standardized market design and protocols that have been considered as some of the key barriers to inter-regional coordination and competitive electricity markets?
- e.) How the proposed larger RTO paradigm will impact system reliability, transmission access, expansion and maintenance, and market efficiency?
- f.) How will the creation of large RTOs affect the functional scope, business practices and the daily operation of existing markets?

- g.) Will large RTOs lead to a reduction in the number of control areas?
- h.) What regulatory policies and economic signals exist today to incentivize essential new investment in transmission facilities under electric power industry restructuring and the transition to larger, but fewer RTOs?
- i.) How do we educate regulators to deal with reliability command and control?
- j.) How do we create fair and equitable fora to allow various Public Utility Commissions and state government agencies to have constructive inputs on the day to day RTO operation?
- k.) What are the impacts of for-profit, or not for-profit based RTOs on operations and markets?

In order to understand some of the above listed issues, and to fully achieve the intended goals of the proposed RTO paradigm, there is the need to examine closely the elements that have come together to precipitate the restructuring of the US power industry. This panel brings together individuals who have first-hand experience with the various aspects of the present power industry restructuring in the United States to discuss the goals of the recent FERC's RTO Orders, and how those RTO principles can be pursued to provide for a more efficient electricity markets, affordable wholesale electricity prices, and a reliable transmission infrastructure. The panelists bring with them diverse mixture of expertise to address a variety of issues relating to the RTO paradigm, but not limited to, the consistency of electricity markets across "regional" boundaries, efficient market design protocols, reliability of transmission infrastructure operation and expansion, sufficient generation resource capacity, regulatory policies, and seams management.

Biography:

Dr. Chris Mensah-Bonsu (aka "*Dr. CMB*") holds the Ph.D. (2000) and Masters (1997) degrees in Electrical Engineering from Arizona State University (ASU), Arizona and Cleveland State University (CSU), Ohio respectively. He also received his "Ing.-Dipl." (1994) degree in Electrical Engineering from the Higher Institute of Mechanical and Electrical Engineering in Varna, Bulgaria. Chris served as an Electrical Engineering Graduate Research Assistant and Part-Time Lecturer at CSU, and Graduate Research and Teaching Associate at ASU.

Dr. Mensah-Bonsu is presently a Market Design Engineer with the Market Operations group of the California Independent System Operator (CA ISO). At the CA ISO, Chris is actively involved in the technical design, implementation, integration, testing, documentation, support and coordination of CA ISO market applications and protocols to ensure efficient markets, system reliability, and FERC compliance. His research interests are in the areas of network modeling, power grid congestion management and system reliability issues pertaining to competitive electricity markets, Global Positioning Satellite (GPS) system applications in power systems, and dynamic line ratings. Dr. Mensah-Bonsu holds membership to several professional institutions, including the National Society of Black Engineers (NSBE), Institute of Electrical and Electronics Engineers (IEEE), Power Engineering Society (PES) and IEEE PES System Economics Technical Subcommittee. He is also a Fellow of the Preparing Future Faculty (PFF) Program. Dr. Mensah-Bonsu has published, organized and chaired a number of IEEE technical paper and panel sessions.

Dr. Lawrence E. Jones joined ALSTOM as a Senior Product Manager with the Global Energy Markets Group in 2000. His responsibilities include management of products involving Information Technology for real-time operations and control of power systems and electricity markets. Dr. Jones' research interests include: dynamics, control and economics of network systems and infrastructures; HVDC Transmission, FACTS and smart devices; renewable energy and distributed power technologies. Dr. Jones previously worked as a consultant for ABB Power Systems AB in Ludvika, Sweden, and on short term projects for ABB Network Control in Vasteras, Sweden; he was a lecturer at ABB T&D University in Ludvika, Sweden and the STF Postgraduate Education Institute (A subsidiary of Swedish Association of Graduate Engineers). He was also a visiting researcher at Electricite de France (EDF) in Clamart, France.

Dr. Jones received his M.Sc., Licentiate of Engineering, and Ph.D. degrees in electrical engineering from the Royal Institute of Technology, Stockholm Sweden, in 1994, 1996 and 1999, respectively. He is one of the co-founders of the International Workshop on Transmission Networks for Off Shore Wind Farms, and he co-founded the International Symposium on Distributed Generation: Power Systems and Markets Aspects. Dr. Jones is a member of the IEEE Power Engineering and Control System Societies, a contributing member to CIGRE committees, and a member of two IEEE committees - Power System Dynamics Performance and the PSACE Technical committees.