

Presentation to Representatives of the Public Utilities Regulatory Commission of Ghana

Regional Transmission Organizations Part 2

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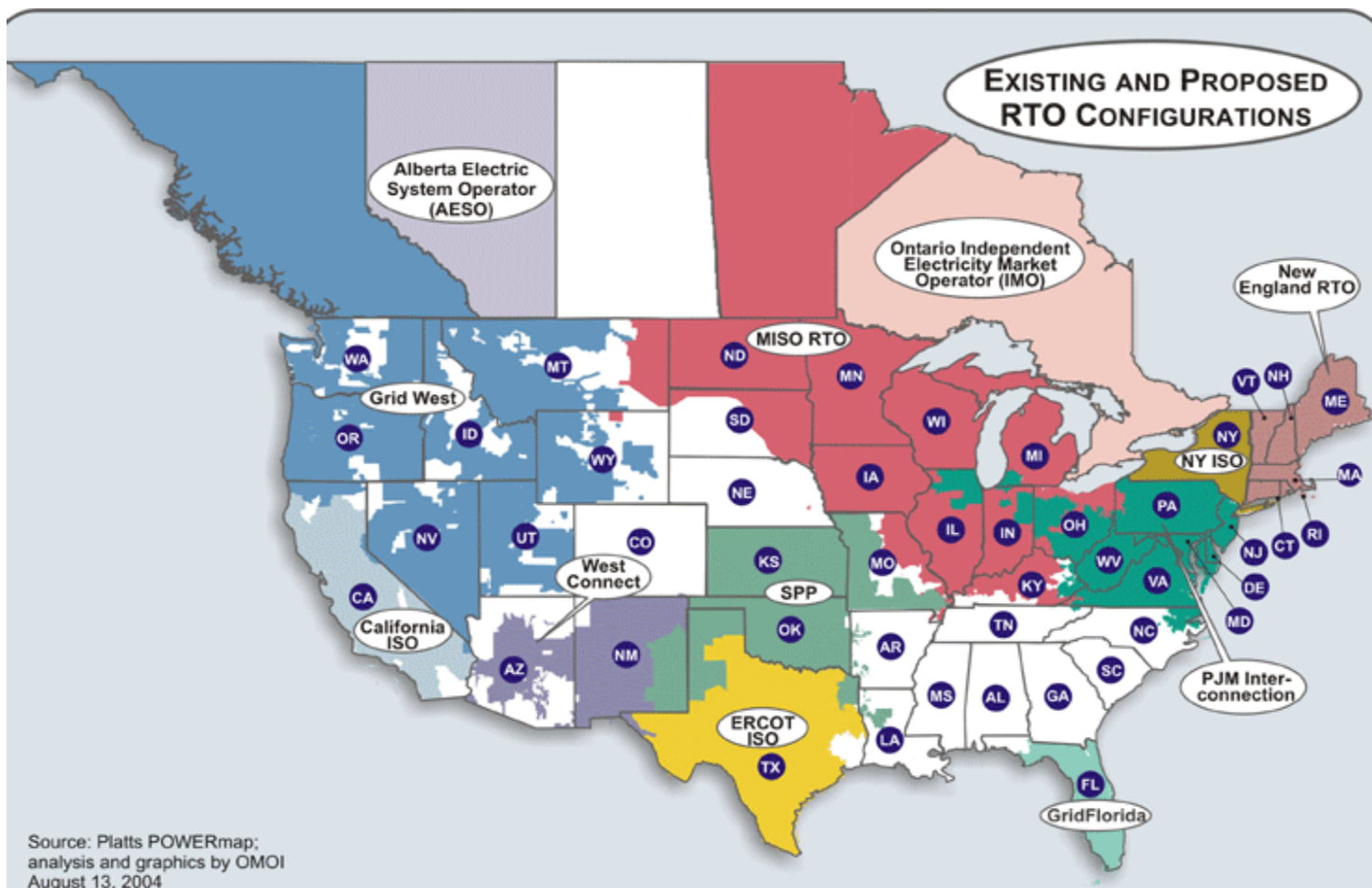
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**Indiana Utility Regulatory Commission
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Why Do We Want Transmission Companies Like RTOs?

- Prevent Unreasonable Discrimination in the Use of the Transmission System
- Enhance Reliability
- Improve Economic Efficiency
 - Transmission use
 - Generation use
 - Demand Response
- Provide “Transparent” Real-Time Prices
- Better Long-Term Regional Planning

What's New With RTOs In The United States?



Preventing Undue Discrimination

- The electric grid in the United States evolved from individual utilities being “islands.”
- The U.S. has a history of undue discrimination in the use of the transmission system.
- The Federal Energy Regulatory Commission requires “Open Access Transmission Tariffs” – Similar to the Golden Rule: “*Do Unto Others As You Would Have Them Do To You.*”

IMPROVE RELIABILITY

- The August 14, 2003 Blackout Served As A “Wake-Up” Call – we hope. Congress still hasn’t acted on enforceable reliability requirements.
- RTOs, should reduce the communications and control problems that allowed the blackout to cascade.
- RTOs should reduce constraints on the transmission system that, historically, have caused curtailments of transactions.
- RTOs dispatch should coordinate maintenance outages of generating and transmission facilities to better assure a reliable system at all times.

Improve Economic Efficiency

MATHEMATICALLY EVERY UTILITY WILL BENEFIT AND NO UTILITY WILL BE WORSE OFF

Our economic analysis projects that the introduction of centralized security-constrained economic dispatch using Locational Marginal Cost Pricing (LMP) will result in annual gross production cost savings of approximately \$255 million throughout the Midwest ISO region.

Furthermore, the implementation of regional dispatch will allow for more efficient use of the existing transmission and generation assets, which should not only lower spot energy prices, but also put downward pressure on prices in bilateral contracts, resulting in a potential annual gross savings of approximately \$713 million to energy consumers.

Dr. Ron McNamara of the Midwest ISO

This does not include the expected substantial cost savings resulting from better regional planning of new generating units (including meeting new stringent environmental requirements), transmission facilities and the utilization of demand-response programs.

Price Transparency

- For markets to function well, accurate prices need to be observable to all.
- Investors in energy infrastructure need this information to make informed decisions about generation, transmission, and demand response.
- Customers need this to allow them to make informed choices about their energy use.
- Effective monitoring of the markets requires transparent prices to reduce the potential for abuse and anticompetitive behavior



Better Planning

RULES FOR CUTTING YOUR OWN FIREWOOD...

- 1. Park twice as far from the tree as the tree is tall.**
- 2. It helps to notch the tree away from the truck.**
- 3. Just because you live near a forest does not make you a lumberjack.**

and

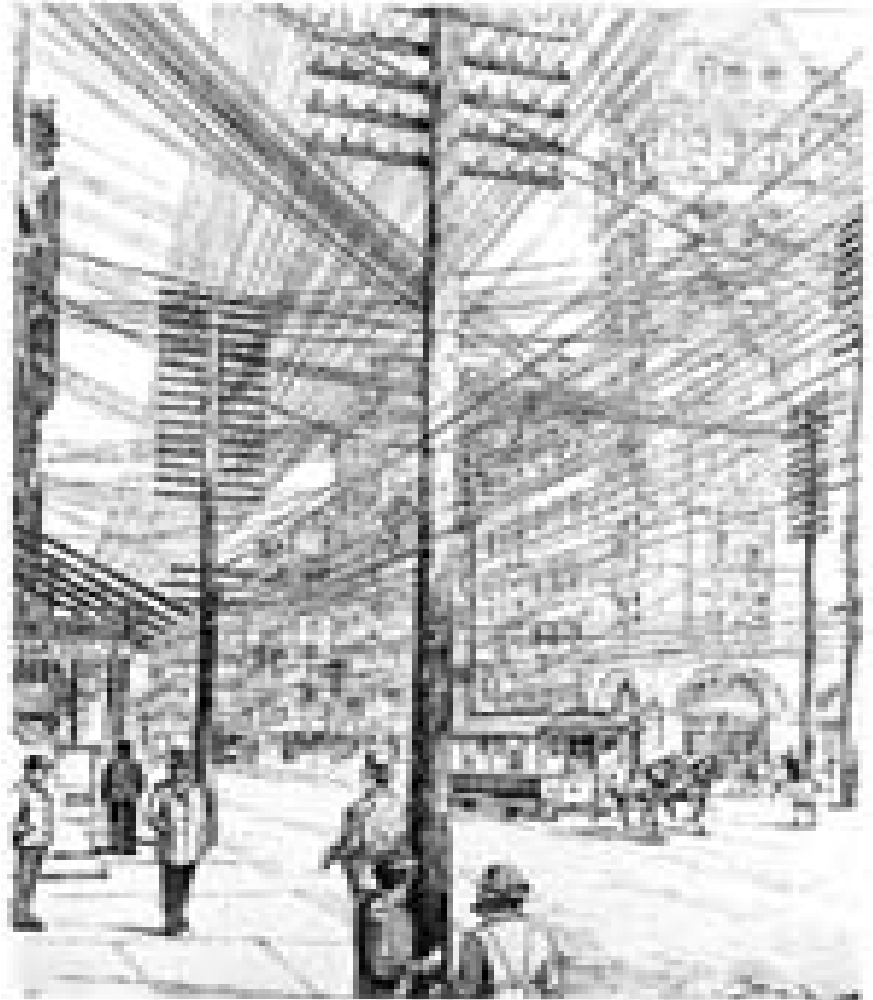
- 4. Always borrow your Friend's truck.**

***For RTOs – Better
planning can prevent
mistakes***



Comprehensive Regional Planning

- Transmission planning necessitates an open process.
- Transmission must be evaluated in context of all cost-effective alternatives such as generation and demand response.
- Investment decisions driven by reliability and economic efficiency are interrelated and both should be considered.



How Do We Assure That Supply Will Be Equal To Or Greater Than Demand?

- Incentives Have Been Proposed As A Means Of Encouraging New Cost-Effective Investment.
- What Do We Need To Do Assurance That Generation, Transmission, Distribution, And Demand Response Programs Will Be Built And Available?

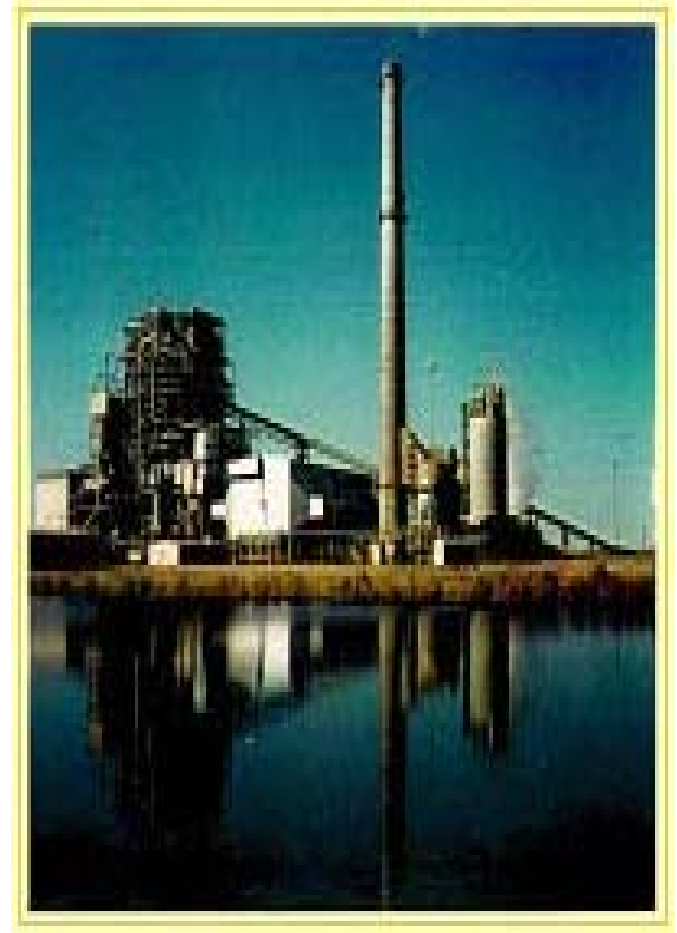


How Do We Make Sure That The Right Types Of Generating Capacity Will Be Built And On Time?

- **How Will New Baseload Generating Units Be Built?**

- In 1998 and 1999 the Midwest experienced significant price spikes – the price of electricity on the wholesale markets went to \$1.00 / kWh! Merchant power plant developers flooded the market in anticipation that these price spikes would be the norm – they proved to be the exception.
- The “irrational exuberance” of the price spike era is over and few want to build any generating unit.
- Many of the baseload units are at the end of their useful life. In part, this is due to Clean-Air standards. What will fill the void for these units?
- How will the United States respond to concerns about coal? Will we give serious consideration to “Clean Coal” technologies? If Congress and the President finally address the nuclear storage issue, will nuclear power be more acceptable? With the high price and extreme volatility in natural gas prices, how much reliance does the United States want to place on natural gas?

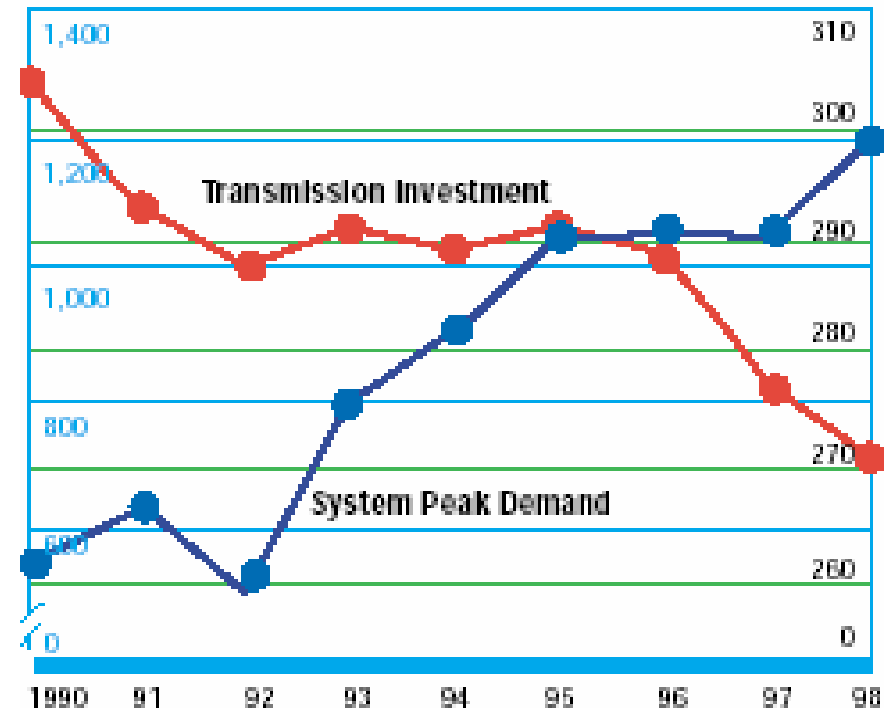
Ironically, the market signals haven't worked well. PJM is considering incentives to get firms to build power plants. It may be that firms will only want to build in states that have traditional regulation because of the greater assurance of cost recovery.



How Much Transmission Is Needed?

- **Do We Really Need More Transmission?**
 - Following the blackout, there seemed to be a consensus that the United States was woefully underinvested in transmission. As the chart illustrates, there was a drop in transmission related investment from the 1990s. If this graph were to go back to the 1970s and 1980s, it would show a substantial increase due to the construction of large baseload generators during this period. Why the decrease?
 - During the 1970s and 1980s the utilities had substantial excess capacity at a time when the economy had extraordinary interest rates, double digit inflation and very high fuel prices. Despite higher rates, utilities experienced a profit squeeze. Too many, reduced their investment in transmission construction and maintenance.
 - Very few baseload units have been built or even contemplated since 1980.
 - To varying extents, generation (and demand response) is a substitute for transmission.
 - Transmission is very difficult to build – harder than building a generating unit.
 - It may also be that there are greater financial incentives for building generating units than transmission facilities. That is, if a utility can recover the cost and the return is based on the investment, generating facilities can be more lucrative.
 - To some extent, we may be able to get more out of our existing wires. Historically, overloads on the “wires” were handled by physically terminating power transactions (“Transmission Loading Relief” – TLRs). We are hopeful that when “congestion” occurs in the future that pricing (“Locational Marginal Cost Pricing”) that Regional Transmission Organizations - RTOs will provide better price signals to:
 - Clear congestion by making sure that those that value the transaction the most – native load – will get the power while those that can make other arrangements, will reduce their use of the grid at critical times.
 - Spur development of new transmission, generation, and demand response.
- We should not over-react or under-react. It is essential that the Investment in new transmission is the most cost-effective alternative so as to prevent under-investment in generation or demand-management.

U.S. Investment in New Electric Power Transmission
(Millions of 1990 Dollars)



Growth in peak demand for electricity has far outstripped investment in transmission capacity. As a result, transmission constraints could aggravate already limited supplies of power and could result in high prices in some areas of the country.

Source: PA Consulting Group, based on data from the EIA data base.

Midwest ISO's Day 2 Markets

- **Operations of the “Day-Ahead” Market**

Market participants bid their capacity and load requirements 24 hours in advance so that the Midwest ISO can run simultaneous feasibility studies to make sure that the system can handle all of the transactions. These transactions are financially binding. If, for example, a company tells the Midwest ISO that they are going to have generating units operating in the next day and they don't, the company has to pay the costs in the real-time market.

- **Real-Time Energy Market Operations**

This is a bid-based security constrained economic dispatch that uses the lowest cost combination of power plants at any moment in time. Differences between the real-time and day-ahead markets are reconciled. Some pay more and others pay less depending on the supply and demand.

- **Locational Marginal Cost (LMP)**

- Pricing Differences in prices resulting from transmission constraints are reflected in the LMP prices. Those transactions that have a higher value are more likely to flow while market participants that have lower value transactions may conclude that they don't want to pay the LMP costs and will reconfigure their transaction. Historically, congestion was handled by Transmission Line Loading Relief (TLRs) that physically curtailed transactions.

- **Providing Ancillary Services**

Voltage support, load following, balancing... are arranged by the Midwest ISO. These are currently provided by utilities (control areas).

A Clear Regulatory Framework Is Essential

- The regulatory objectives must be clearly articulated
 - What needs to be done?
 - How will performance be measured?
 - What instruments will the transmission system operator be empowered with to achieve these objectives?
- The integration of reliability and economic goals and objectives is especially important.
- Effective regulatory mechanisms must align the incentives faced by the regulated firm with the performance goals of the regulator.

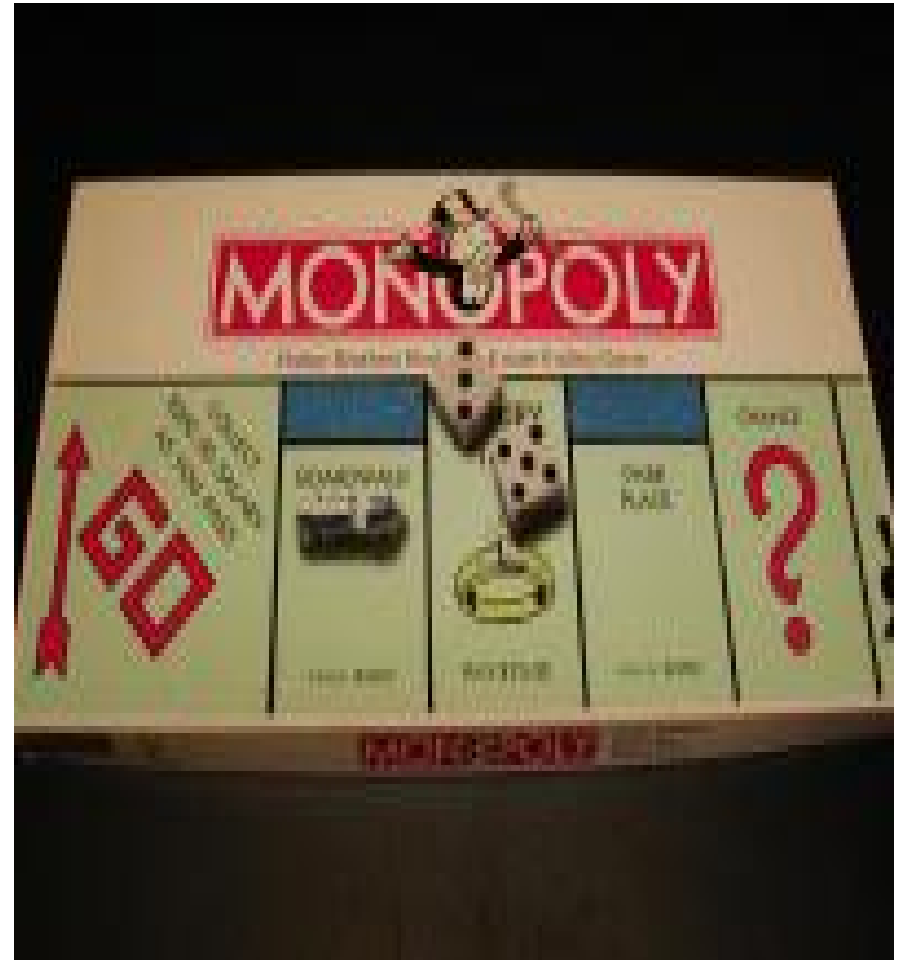
Market Monitoring And Governance Of The RTO Is Essential

- After ENRON (and others) What Lessons Have We Learned?
 - There is a demonstrable need for truly Independent monitoring of the electric and natural gas markets
 - There is a need to mitigate abusive behavior in the real-time markets
- Corporate Governance
 - There is a need to make corporations and their directors more accountable to investors / Stakeholders, and the public interest.



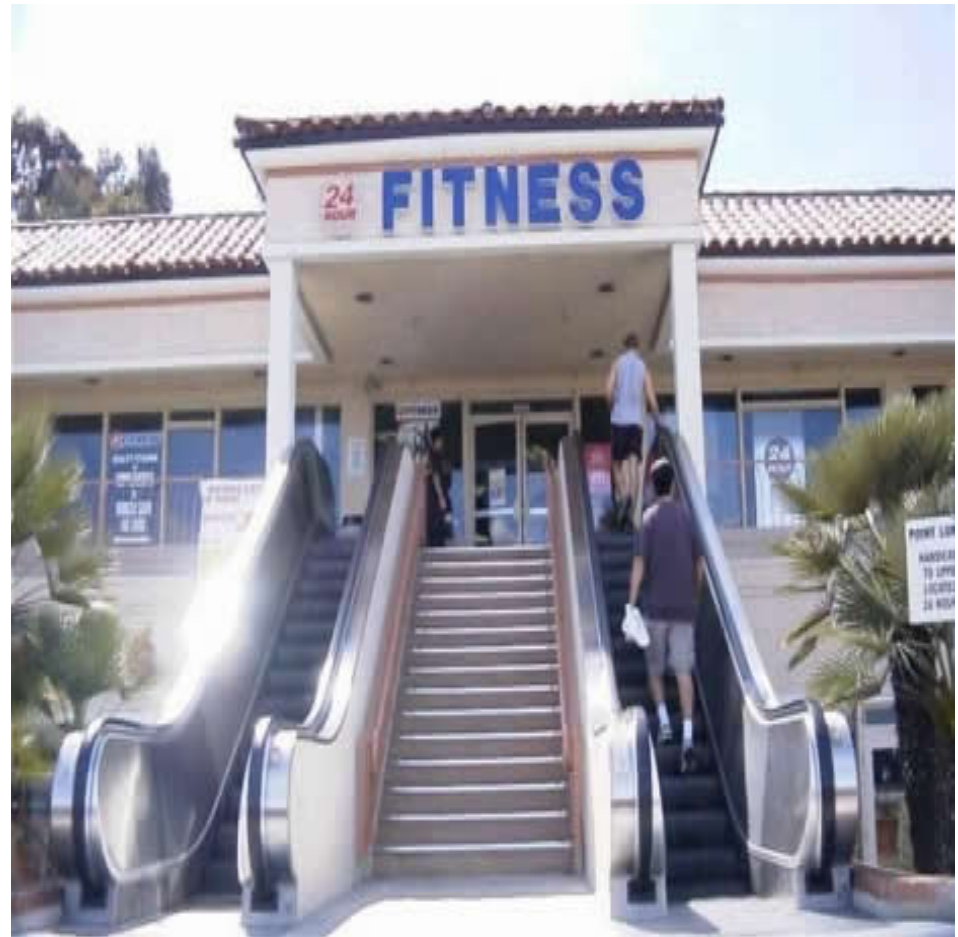
Making Sure Markets Are Competitive

- **How can you tell if there is too much control in the hands of a single company?**
 - Can a firm raise its prices above the competitive level?
 - Does a single provider have an unfair advantage in providing service to a specific area?
 - Are there few enough firms that would make it possible for them to collude to fix prices or limit production?
- **Are there effective “policing” and monitoring to prevent market power abuse?**
- **If abuse is detected, is there authority to effectively penalize the guilty parties?**
- **Is it possible to develop benchmarks to determine if specific mergers or acquisitions will create unfair advantages?**
- **Is it possible to develop benchmarks to determine if affiliates of energy companies have an unfair advantage?**



In The End, How Do We Best Serve The Public Interest

- In the end, what matters is the end.



The Need for Coordinated State efforts in Regard to the MISO

- The Organization of MISO States
- OMS

Calls for Multi-State Cooperation:

- April 2002 – The National Governor Association’s report on Electric Transmission recommended that states form “multi-state entities” to consider new transmission facilities on a regional basis.
- July 2002 – FERC proposed a rule on “Standard Market Design.” One section recommended states to form “Regional State Advisory Committees.” The rule itself has not been adopted.

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Why did the Governors and the FERC make these recommendations?

- Federal policy is looking for a way to align state opinion.
- The utility industry is restructuring into larger companies.
- New investments often serve regional needs. These projects should not be studied only on the basis of local interests.

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Response of Midwest Commissions

- State commissions were straining to follow the FERC case load.
 - Cases involving membership in MISO or other RTOs.
 - Reorganization of utilities.
 - Tariff filings by MISO and new transmission companies.
- Commissions felt need to coordinate participation in stakeholder meetings.

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Response of Midwest Commissions

(2)

- Commissioners considered cooperative models from electricity, telephone and natural gas industries and other regions.
- The best legal tool was coordination of state agency work. This approach does not shift any decisional authority or legal jurisdiction.
- We work for consistent information and good analysis.

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OMS Formation

- November 2002 – planning began
- May 2003 - incorporation as Indiana non-profit corporation
- June 2003 - bylaws adopted, officers elected, funding agreement with MISO
- January 2004 - staff and office

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OMS Membership

- Membership is open to state regulatory authorities:
 - That regulate retail electricity or distribution rates of transmission-owning MISO members or transmission-dependent MISO members
 - That have primary siting authority
- Associate membership is open to other state agencies

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OMS Organization

- Matches MISO footprint:
 - 14 state members and Manitoba
- Board of Directors has 15 members
 - One from each member agency
- Executive Committee is composed of 5 members
 - Includes the 3 members of the MISO Stakeholder Advisory Committee who represent the state regulatory sector

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Funding of OMS

- A funding agreement was signed with MISO.
- The agreement includes a statement of independence between MISO and OMS.
- The OMS budget is included in the MISO budget.
- Remittances are automatic electronic transfers.
- The agreement provides for dispute resolution by FERC.

OMS Functions:

- The overall purpose of OMS is to coordinate the way states do their work.
- OMS coordinates participation in MISO stakeholder meetings. OMS can pay travel expenses for state commissioners and staff.
- OMS work groups analyze issues and present draft positions to the OMS Board (commissioners).
- The Board tries to reach consensus.
- OMS submits a single position statement to MISO or FERC on behalf of member states when possible.

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Communications and Positions

- OMS uses a process like NARUC:
 - Board assigns issues to working groups
 - Working groups formulate positions
 - Board adopts positions
- Seven Working Groups
- Board discusses monthly MISO Advisory Committee agenda – the state representatives are guided by membership views
- Board meetings are open conference calls

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Work Groups

- Pricing (Randy Rismiller, Illinois)
 - Developing policy for interconnection pricing
 - Regional Through and Out Replacement Rate
 - Regional Expansion Criteria and Benefits
- Congestion Management and FTR Allocation (Mike Proctor, Missouri)
 - FTR allocations
 - Grandfathered agreements

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Work Groups (cont'd)

- Market Monitoring and Market Power Mitigation (Dave Hadley, Indiana)
 - Tariff provisions
 - State access to market monitoring data
- Resource Adequacy and Capacity Markets (Jan Karlak, Ohio)
 - Reliability issues
 - Reactive power

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Work Groups (cont'd)

- Seams Issues (Bob Nelson, Michigan)
 - Integration of PJM, Commonwealth Edison, Grid America, AEP
 - MAPP area seams
 - Joint Operating Agreement
 - Readiness Metrics
 - Regional Through and Out Replacement Rate

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Work Groups (cont'd)

- Market Rules and Implementation Timelines (Nancy Campbell, Minnesota)
 - Advice to MISO on Energy Market Tariff
 - Comments to FERC on Energy Market Tariff
 - Readiness Metrics
- Transmission Planning and Siting (Klaus Lambeck, Ohio)
 - Updating planning and siting reports
 - Midwest Transmission Expansion Plan
 - Regional Expansion Criteria and Benefits

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First Year Snapshot

- OMS model builds technical analysis in state commission staff
 - Participation enriches state staff expertise
 - Travel reimbursement is key to participation
- Policy decisions need commissioner input
 - Respect for policy differences
 - Include minority viewpoints – judicial v. legislative model

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OMS Creates Value

- Efficiency of dealing with the states collectively
 - FERC
 - RTO
 - RTO members
- The states get better attention from FERC and the RTO
- States get better expertise and better analysis of issues by sharing

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Relation to State Commissions

- Commissions must select and assign staff to OMS Work Groups.
- Staff must balance OMS work with commission work.
- Commissioners need to participate.
- OMS supports state commissions.
- OMS must accommodate differing positions among commissions.

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