ELECTRICITY MARKET RESTRUCTURING: REFORMS OF REFORMS

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The evolution of electricity restructuring contains a thread of issues related to counterintuitive market design requirements.

- **PURPA, 1978.** The rise of the new generators.

- **Markets for Power, 1983.** Joskow and Schmalensee.

"The practice of ignoring the critical functions played by the transmission system in many discussions of deregulation almost certainly leads to incorrect conclusions about the optimal structure of an electric power system."[1]

- **EPAct, 1992.** The 'camel's nose' of wholesale competition.

- **Order 888, 1996.** Open Access to Transmission.

- **Capacity Reservation Tariff (CRT), 1996.** A new model.

"The proposed capacity reservation open access transmission tariff, if adopted, would replace the open access transmission tariff required by the Commission ..."[2]

- **Order 2000, 1999.** Regional Transmission Organizations, the 'Millennium Order.'

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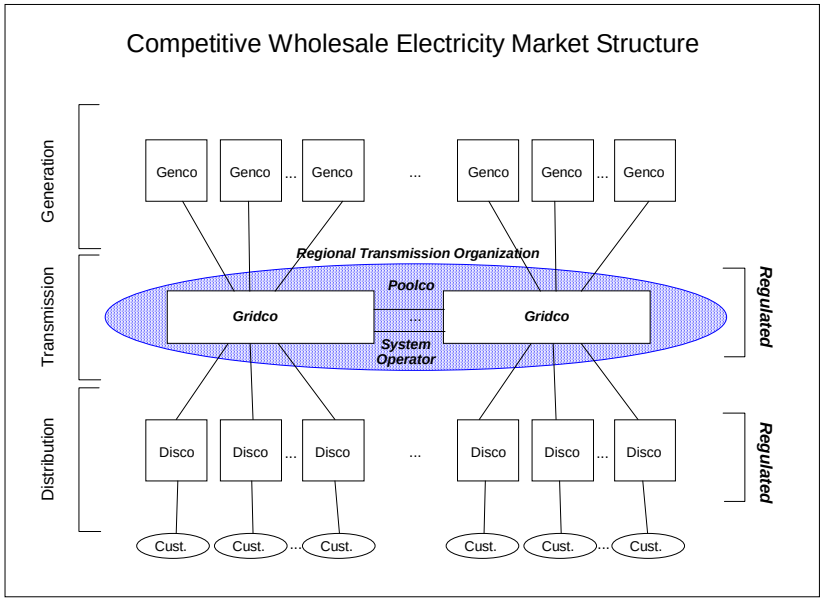
1 Paul L. Joskow and Richard Schmalensee, Markets for Power: An Analysis of Electric Utility Deregulation, MIT Press, 1983, p. 63.

2 Federal Energy Regulatory Commission, "Capacity Reservation Open Access Transmission Tariffs," Notice of Proposed Rulemaking, RM96-11-000, Washington DC, April 24, 1996, p. 1.

ELECTRICITY MARKET — Competitive Structure

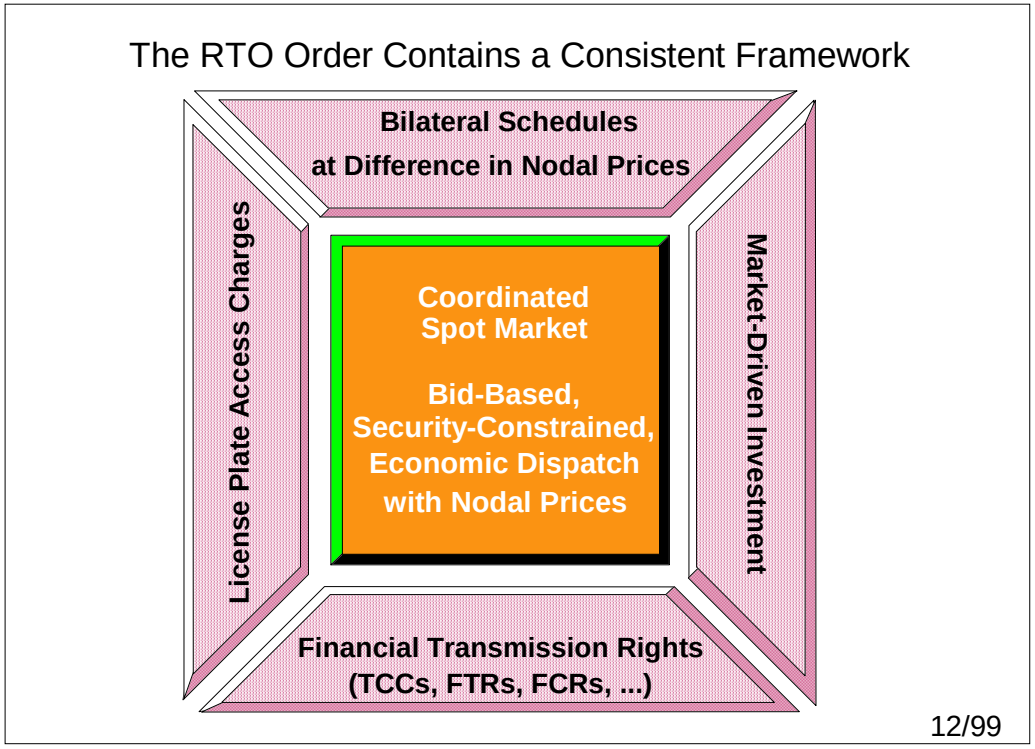
The usual separation into generation, transmission, and distribution is insufficient. In an electricity market, the transmission wires and the pool dispatch are distinct essential facilities.



The special conditions in the electricity system stand as barriers to an efficient, large-scale bilateral market in electricity. A pool-based market model for regional coordination helps overcome these barriers.

ELECTRICITY MARKET — A Market Framework

The Regional Transmission Organization (RTO) Millennium Order (Order 2000) contains a workable market framework that is working in places like the Pennsylvania-New Jersey-Maryland Interconnection (PJM).



Poolco…ISO…IMO…GO/SO…Transco…RTO…: "A rose by any other name …"

The core feature of a bid-based, security constrained economic dispatch with locational prices can be found in many existing or announced market designs.

- Argentina.
- Bolivia.
- Chile.
- Mexico (proposed).
- New England (proposed).
- New York.
- New Zealand.
- Norway (dynamic zones).
- PJM.
- Peru.
- and more .... .

The breadth of application and success of the framework dispel the notion that the model is too complex to be implemented. We now have both the theory and substantial operating experience.

ELECTRICITY MARKET Reforms of Reforms

Market design problems have resulted in reforms of reforms in electricity restructuring:

- The first region in the United States to abandon a too simplified market model after it failed in practice was PJM, from its experience in 1997 when its zonal pricing system prompted actions which caused severe reliability problems. Given this experience, PJM adopted a nodal pricing system that has worked well since March 1998.[3]

- Subsequently, the original one-zone congestion pricing system adopted for the New England independent system operator (ISONE) created inefficient incentives for locating new generation. To counter these price incentives, New England proposed a number of limitations and conditions on new generation construction. Following the FERC's rejection of the resulting barriers to entry for new generation in New England, there developed a debate over the preferred model for managing and pricing transmission congestion.[4] In the end, New England proposed go all the way to a nodal pricing system.[5]

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[3] William W. Hogan, "Restructuring the Electricity Market: Institutions for Network Systems," Harvard-Japan Project on Energy and the Environment, Center for Business and Government, Harvard University, April 1999, pp. 37-44.

[4] Federal Energy Regulatory Commission, New England Power Pool Ruling, Docket No. ER98-3853-000, October 29, 1998.

[5] ISO New England, "Congestion Management System and a Multi-Settlement System for the New England Power Pool," FERC Docket EL00-62-000, ER00-2052-000, Washington DC, March 31, 2000. The proposal includes full nodal pricing for generation and, for a transition period, zonal aggregation for loads.

(cont.):

- New Zealand has reconsidered its reforms and revisited the issues of electricity market design.[6] The Government of New Zealand set down principles for reform of the electricity market.[7] The foremost missing ingredient in the New Zealand wholesale market design is a system of long-term transmission rights. At the end of 2000, there was common agreement that extending the model to include FTRs would provide an added tool that would provide mechanisms for hedging transmission congestion costs and incentives for long-term investment.[8]
- The case of England and Wales presents an exception and a challenge to the argument developed here. The New Electricity Trading Arrangements (NETA) for the market in England and Wales commenced in March 2001.[9] In the NETA design the old day-ahead pool based on a coordinated spot market with a market-clearing price was replaced by a three-and-a-half-hour ahead balancing system with a complex pricing scheme that features a pay-as-bid mechanism with rules intended to penalize imbalances. Will use of inefficient pricing in the spot market result in greater costs and substantial unanticipated market behavior?

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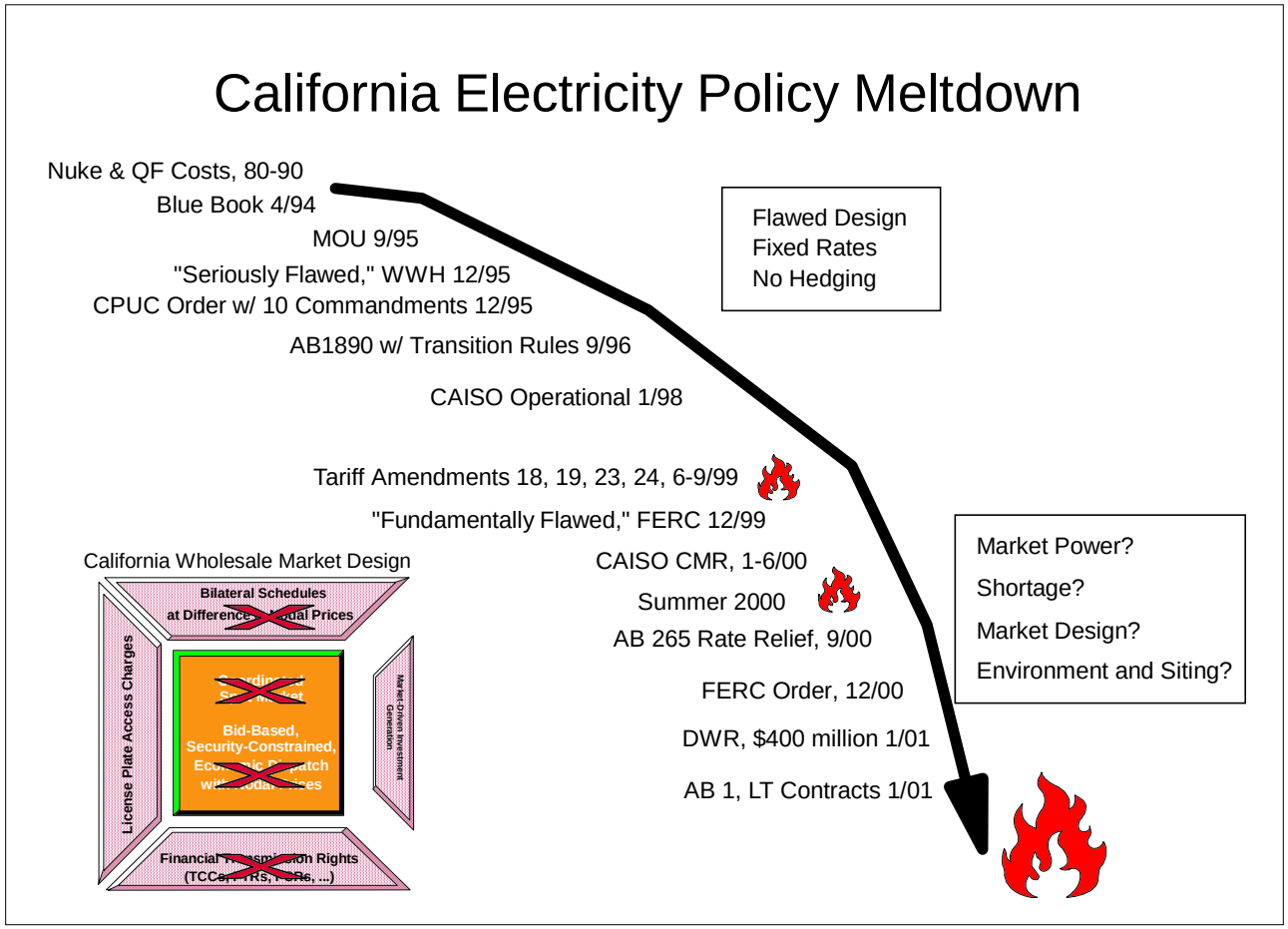
[6] Ministry of Economic Development of New Zealand, "Inquiry into the Electricity Industry," Report to the Minister of New Zealand, Wellington, New Zealand, June 2000.

[7] Pete Hodgson, Minister of Energy, "Government Policy Statement: Further Development of New Zealand's Electricity Industry," Wellington, New Zealand, December 2000.

[8] Ministry of Economic Development of New Zealand, "Inquiry into the Electricity Industry," Report to the Minister of New Zealand, Wellington, New Zealand, June 2000, p. 61.

[9] For details on NETA see the UK regulator: Office of Gas and Electricity Markets, "Balancing and Settlement Code," March 1, 2001.

The California meltdown had been expected, but not expected to be as bad as it has been.

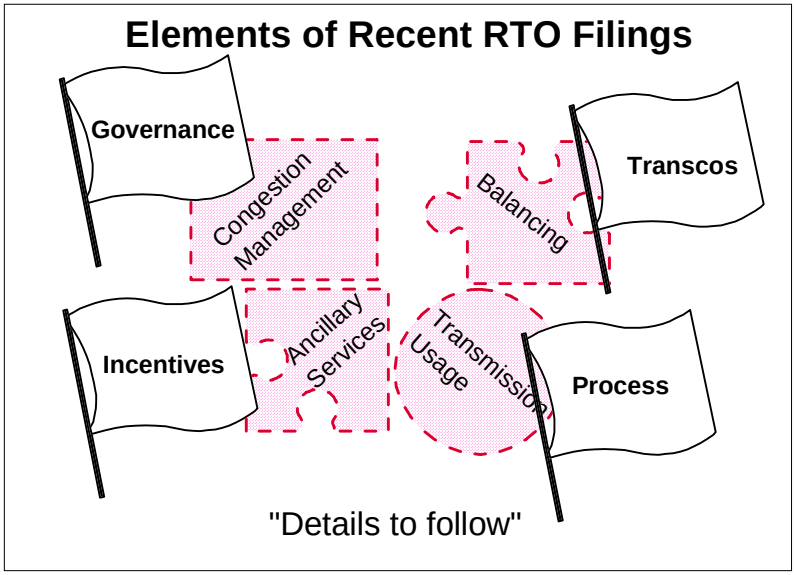


ELECTRICITY MARKET RTO Developments

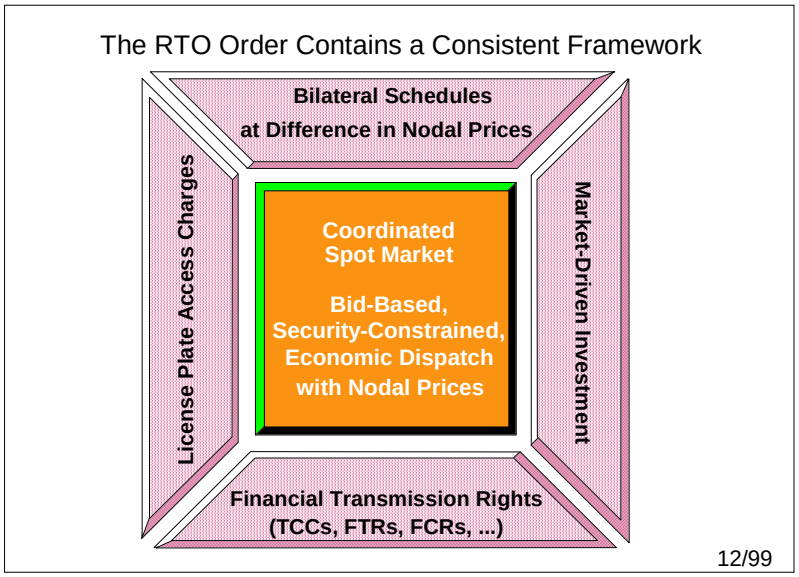
The same chronic disease is found in California and in the RTO proposals. In California the case has become acute. Time is running out. The same medicine would work for the acute case and the chronic sufferers. The FERC is on target. However, the success of the RTO Millenium Order depends on two big "ifs." Market reform can work …

- **If FERC means what it says. …**
- **If FERC follow through. …**

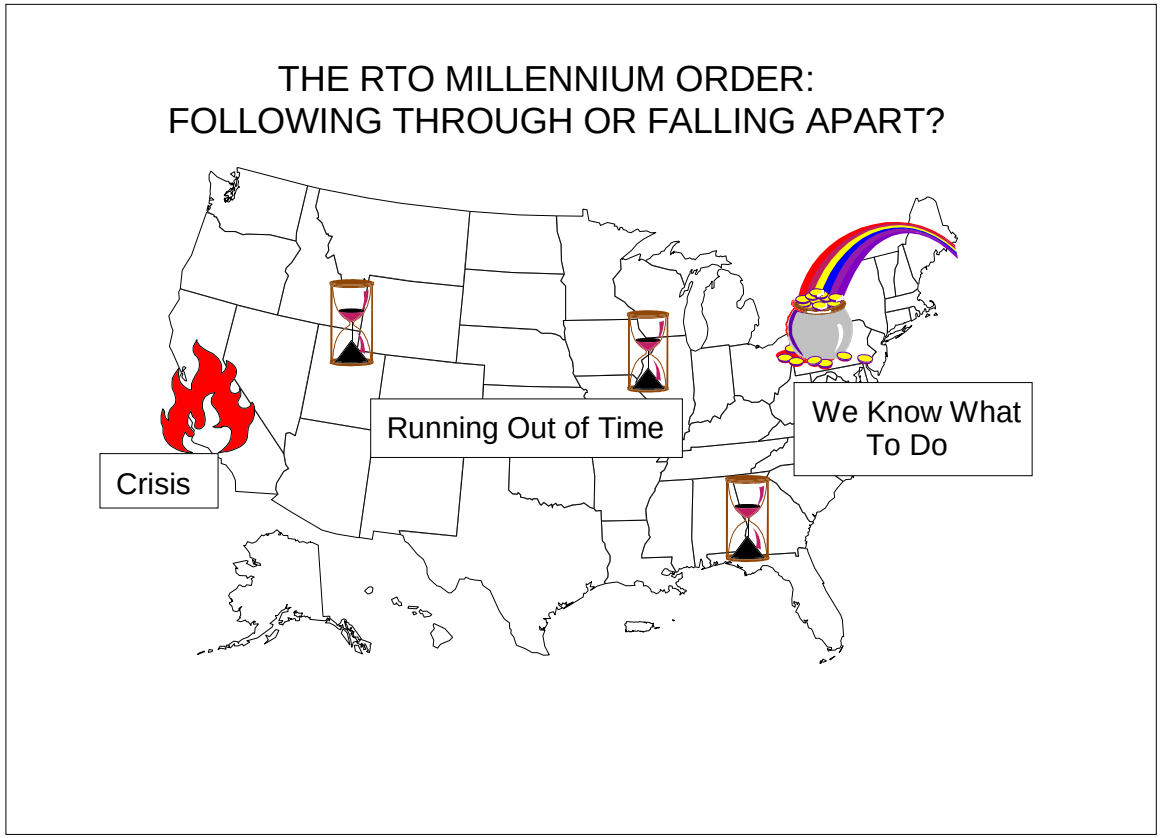
PLACEBOS



MAXIMUM STRENGTH, CLINICALLY TESTED



National progress in implementing the advance of regional transmission organizations under the Millennium Order (Order 2000) hangs in the balance. Time is running out.



Supporting papers and additional detail can be obtained from the author. William W. Hogan is the Lucius N. Littauer Professor of Public Policy and Administration, John F. Kennedy School of Government, Harvard University and a Director of LECG, LLC. This paper draws on work for the Harvard Electricity Policy Group and the Harvard-Japan Project on Energy and the Environment. The author is or has been a consultant on electric market reform and transmission issues for American National Power, Brazil Power Exchange Administrator (ASMAE), British National Grid Company, Calpine Corporation, Comision Reguladora De Energia (CRE, Mexico), Commonwealth Edison Company, Detroit Edison Company, Duquesne Light Company, Electricity Corporation of New Zealand, GPU Inc. (and the Supporting Companies of PJM), GPU PowerNet Pty Ltd., Mirant Corporation, National Independent Energy Producers, New England Independent System Operator, New England Power Company, New York Independent System Operator, New York Power Pool, New York Utilities Collaborative, Niagara Mohawk Corporation, PJM Office of Interconnection, San Diego Gas & Electric Corporation, Sempra Energy, TransÉnergie, Transpower of New Zealand, Westbrook Power, Williams Energy Group, and Wisconsin Electric Power Company. The views presented here are not necessarily attributable to any of those mentioned, and any remaining errors are solely the responsibility of the author. (Related papers can be found on the web at http://www.ksg.harvard.edu/whogan).