

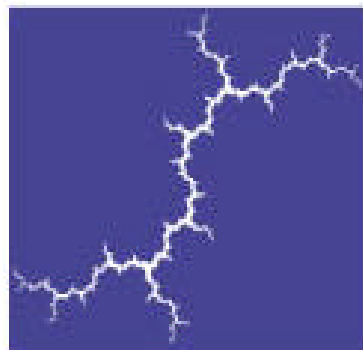
Quality of Service in Performance-Based Regulation: US Experiences

Seminar on Regulation of Electricity Supply Quality

Milan, Italy

June 8, 2001

Bruce Biewald



Synapse
Energy Economics, Inc.

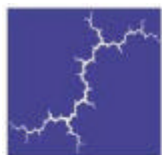
22 Pearl Street

Cambridge, MA 02139

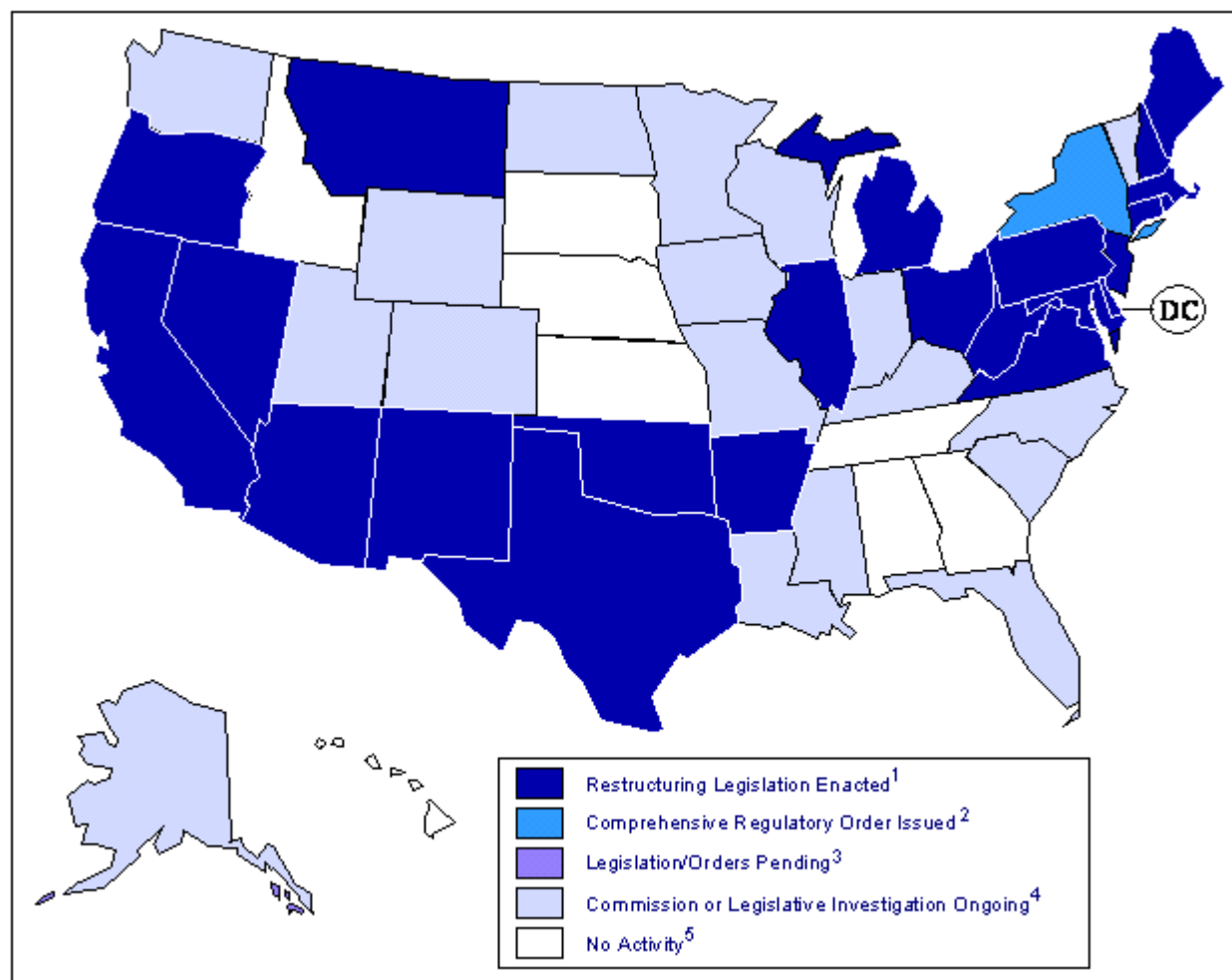
617.661.3248

bbiewald@synapse-energy.com

www.synapse-energy.com



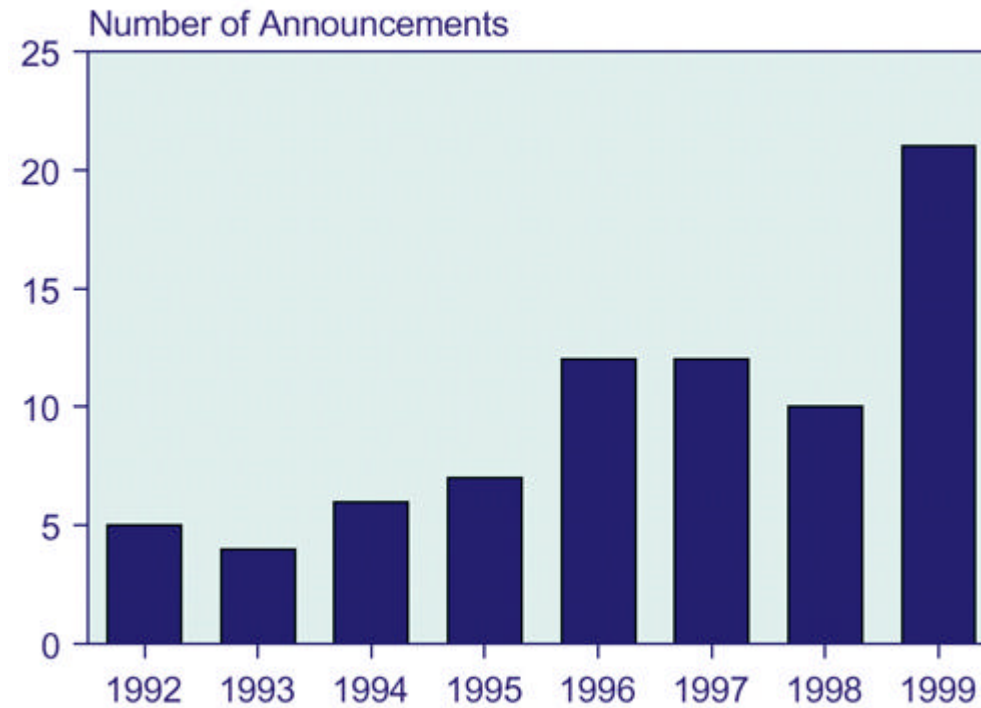
State Restructuring as of May 2001





Mergers

Figure 80. Mergers and Acquisitions in the U.S. Electricity Industry, 1992-1999

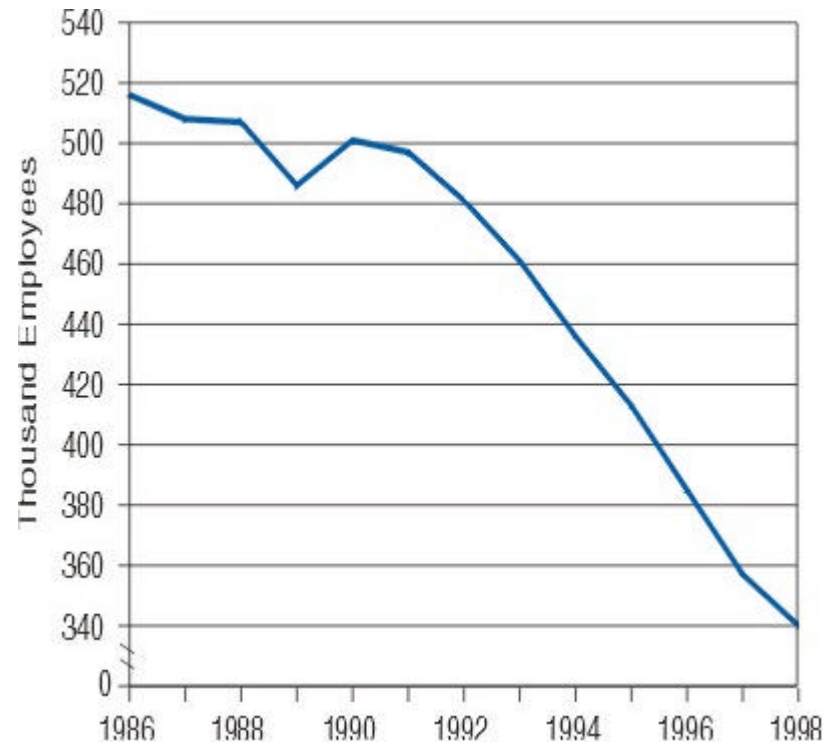


Source: Ausma Tomserics, Edison Electric Institute, personal communication, March 13, 2001.



Employment Down by One Third

Employment at Major U.S. IOUs, 1986-1998





Quality of Service is at Risk

- Reduced staffing
- Less frequent inspections of equipment
- Deferral of non-emergency repairs
- Cutting training programs for new employees
- Reduced capital investment

Result: Concern for customer service, system reliability and safety



Outage Indices

- SAIDI- System Average Interruption Duration Index
- CAIDI- Customer Average Interruption Duration Index
- SAIFI- System Average Interruption Frequency Index
- ASAI- Average Service Availability Index
- MAIFI- Momentary Average Interruption Frequency Index
- Major Events



Trends in Measuring Reliability

	1990	1995
SAIDI	80%	88%
CAIDI	67%	82%
SAIFI	70%	83%
ASAI	63%	67%
MAIFI	NA	24%



Power Quality Characteristics

- Voltage stability
- Spikes
- Transients
- Flickers
- Sags
- Surges
- Harmonic distortion

No commonly accepted measures

Can vary by circuit



Setting Benchmarks

- Industry standard or company history?
- Maintain or improve performance?
- Treatment of outlier data?
- Lack of data!



Choosing Amount of Penalty and/or Reward

- Symmetrical rewards and penalties?
- Enough to matter to the company?
- Reflect value to the customer?
- Direct payment to the customer/victim where possible



Examples of PBR provisions

- San Diego Gas & Electric. SAIDI standard at 52 minutes. SAIFI at 0.9 interruptions.
- Pacificorp - 80% of calls answered within 20 seconds.
- Missed appointments. \$50 paid to customer.



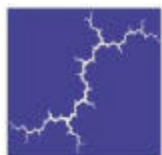
Integrating Distributed Generation

- Planning for distributed resources
- Interconnection rules and procedures
- Ratemaking issues
- Environmental problems (oil diesel generators) and opportunities (renewables, combined heat and power, etc.)

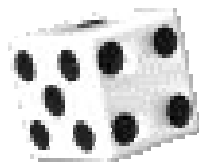


Generating Capacity Adequacy

- Separate market for “capacity”?
- Required reserve margins for “competitive” wholesale electricity markets appear to be much higher than traditional reserve requirements.
- If 20% reserve requirement is raised to 30% then additional capacity investment of \$4 billion is needed for the US.
- Generator outage rates up by 50% in New England with deregulation.



Las Vegas Odds on California's Crisis



Odds

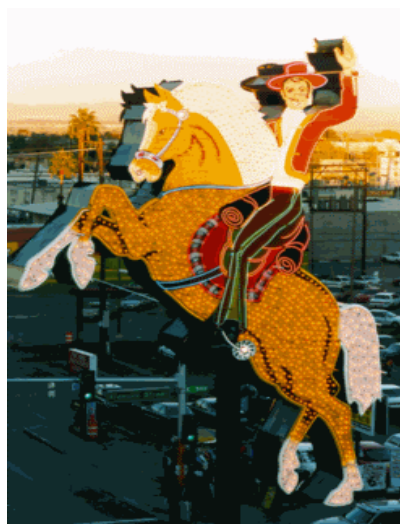
Blackouts to September 1

1-2



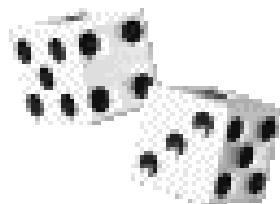
To January

Even Money



To Next April

2-1





Monitoring, Evaluation and Input

Audit the data.

Establish a program of monitoring, evaluation, and public input so indices and procedures are amended based on experience to better meet objectives.



Sources

Reports by Synapse Energy Economics
(www.synapse-energy.com):

- For the National Association of Regulatory Utility Commissioners, “Performance-Based Regulation in a Restructured Electric Industry,” November, 1997.
(www.synapse-energy.com)
- For the Union of Concerned Scientists, “Generator Outage Increases...”, January, 2001.



Sources (continued)

Institute of Electrical and Electronics Engineers
(grouper.ieee.org) IEEE P1366 “Trial Use Guide for
Electric Power Distribution Reliability Indices.” Draft.

JBS Energy. (not currently on the web) “Customer Service
Standards and Guarantees...”, May 1999.

US Department of Energy (www.eia.doe.gov) data on state
restructuring, mergers, and employment.