

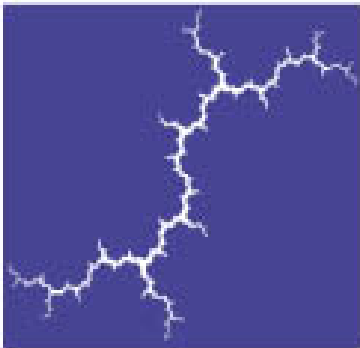
Quality of Service in Performance-Based Regulation: US Experiences

Seminar on Regulation of Electricity Supply Quality

Milan, Italy

June 8, 2001

Bruce Biewald



Synapse
Energy Economics, Inc.

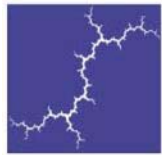
22 Pearl Street

Cambridge, MA 02139

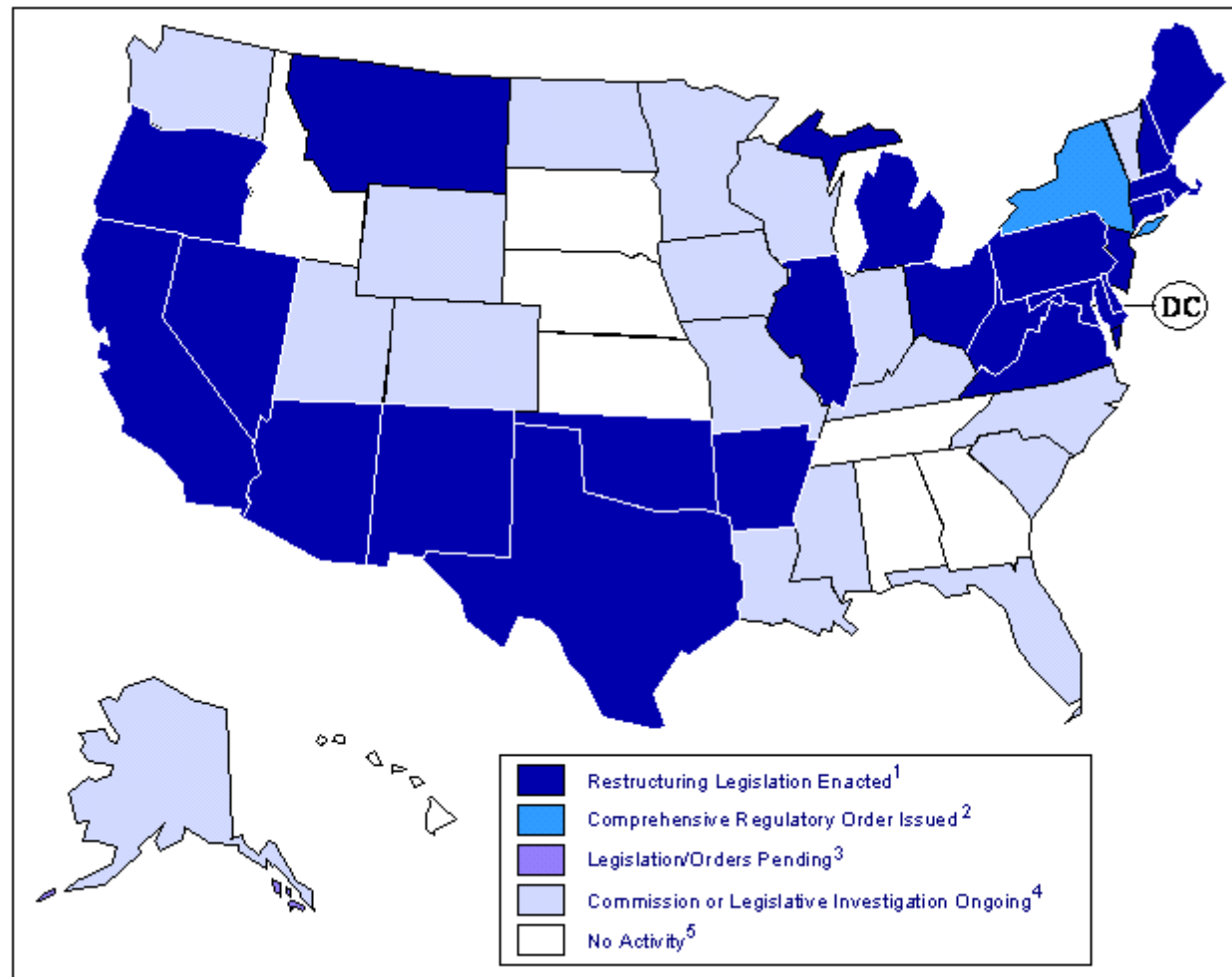
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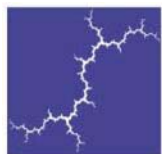
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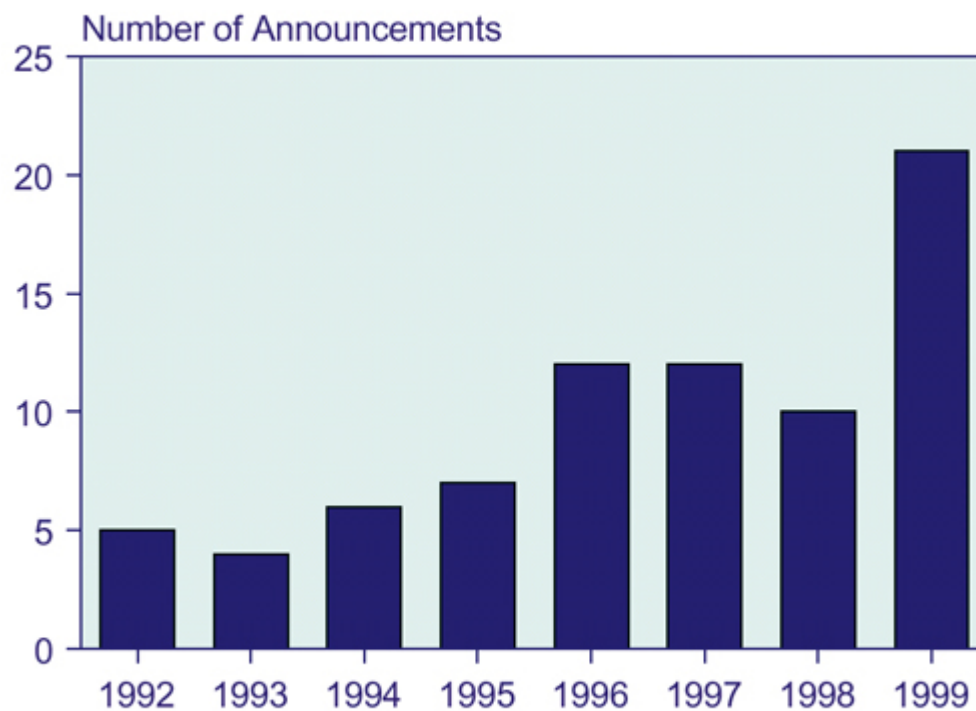
State Restructuring as of May 2001



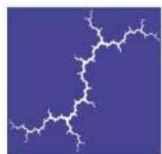


Mergers

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

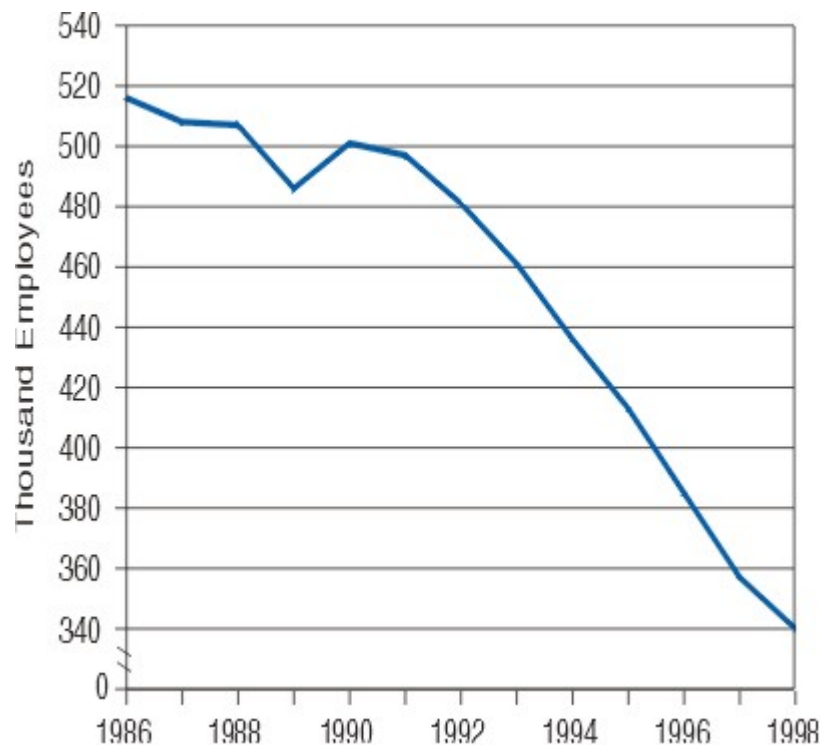


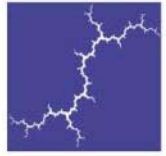
Source: Ausma Tomserics, Edison Electric Institute, personal communication, March 13, 2001.



Employment Down by One Third

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

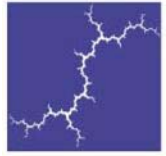




Quality of Service is at Risk

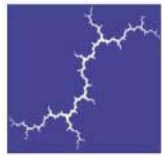
- Reduced staffing
- Less frequent inspections of equipment
- Deferral of non-emergency repairs
- Cutting training programs for new employees
- Reduced capital investment

Result: Concern for customer service, system reliability and safety



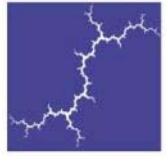
Outage Indices

- 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%

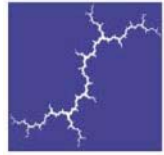


Power Quality Characteristics

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

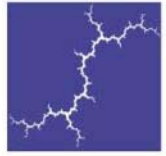
No commonly accepted measures

Can vary by circuit



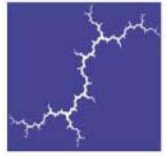
Setting Benchmarks

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



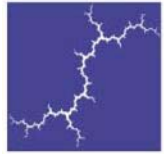
Choosing Amount of Penalty and/or Reward

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



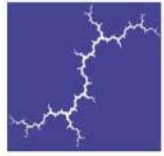
Examples of PBR provisions

- 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.



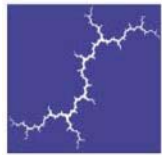
Integrating Distributed Generation

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

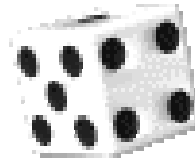


Generating Capacity Adequacy

- 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



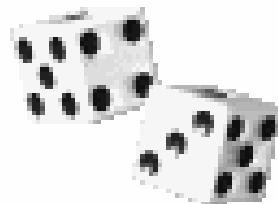
To January

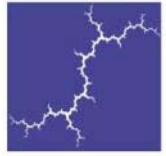
Even Money



To Next April

2-1

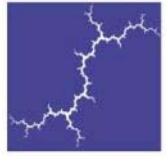




Monitoring, Evaluation and Input

Audit the data.

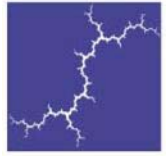
Establish a program of monitoring, evaluation, and public input so indices and procedures are amended based on experience to better meet objectives.



Sources

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