
State of Reliability Related Regulation in the United States

-- Overview & Trends --

Study sponsored by EEI
Presented by Davies Consulting, Inc.
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Purpose of the Study and Hypothesis

Purpose:

- To gain an understanding of the state of reliability related regulations in the United States including :
 - Performance Based Rate application
 - Quality of Service standards
 - Reporting requirements (data type, frequency of reports)
 - Penalties/Rewards for utility performance

Hypothesis:

- Regulators enacted Performance Based Ratemaking to protect consumers from reliability service deterioration post mergers and rate freezes

Methodology

- Agreed to purpose, scope and definitions with EEI
- Conducted secondary research
- Conducted phone survey and interviews of State Commissions
- Visited or interviewed 18 IOUs operating in 39 states and DC
- Consolidated reliability related data into one database of 50 states and the District of Columbia
- Analyzed trends & regulation patterns based on collected data
 - Level of regulation within a state is represented by the utility with the most stringent requirement (e.g., if at least one utility within a state has QOS standard with penalties that state is represented as having QOS with penalties)
- Began to correlate reliability information to enacted regulation
- Supplemented findings with DCI experience working with a number of clients



Company Interviews

Interviewed 18 Utilities
Operating in 39 States

AEP
Ameren
Aquila
Central Vermont Public Service
Duke Energy
Empire District Electric
Entergy
Georgia Power
KCP&L
LG&E Energy
MidAmerican Energy
Minnesota Power
Northeast Utilities
PacifiCorp
PEPCO Holdings
PG&E
SCE
Xcel

Arizona	Missouri
Arkansas	New Hampshire
California	New Jersey
Colorado	New Mexico
Connecticut	North Carolina
District of Columbia	North Dakota
Delaware	Ohio
Georgia	Oklahoma
Idaho	Oregon
Illinois	North Dakota
Indiana	South Dakota
Iowa	Tennessee
Kansas	Texas
Kentucky	Utah
Louisiana	Vermont
Maryland	Virginia
Massachusetts	West Virginia
Michigan	Wisconsin
Minnesota	Wyoming
Mississippi	



Commission Interviews/Surveys

Interviewed or surveyed 29 Utility Commissions to supplement information gathered from utilities

Alabama
Alaska
Arkansas
California
Connecticut
District of Columbia
Delaware
Florida

Hawaii
Idaho
Iowa
Kansas
Maine
Maryland
Massachusetts

Montana
Nevada
New Jersey
New York
North Carolina
Ohio
Oregon

Pennsylvania
Rhode Island
Texas
Utah
Washington
West Virginia
Wisconsin



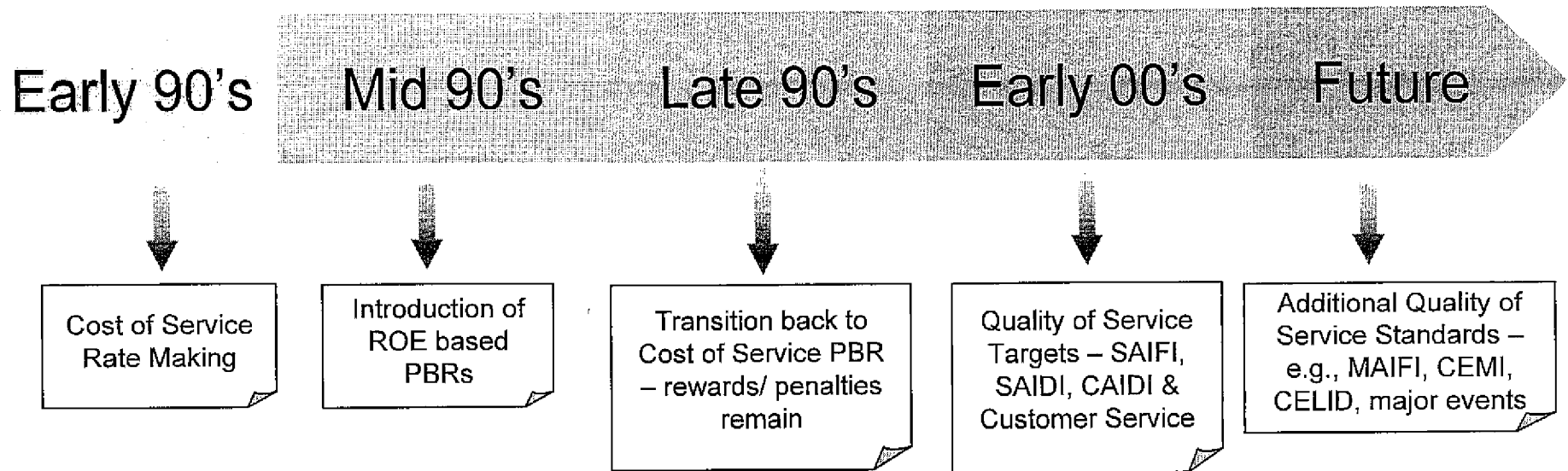
Definitions of Key Terms

- **ROE Based PBR (PBR)** occurs if the Rate of Return is set with a Dead Band (range the utility and shareholders assume all benefits and cost) and a live band (range above and below the Dead Band that would have a sharing mechanism assigned)
- **Quality of Service PBR (QSP)** exists if the Rate of Return is set by using the conventional cost of service methodology and the utility has reliability and/or quality of service targets set by the commission with penalty
- **Quality of Service Targets (QST)** exists if the Rate of Return is set by using the conventional cost of service methodology and the utility has reliability and/or quality of service targets set by the commission with penalty
- **Reporting Only** exists if the utility has to file reports but does not have specific targets set by the commissions

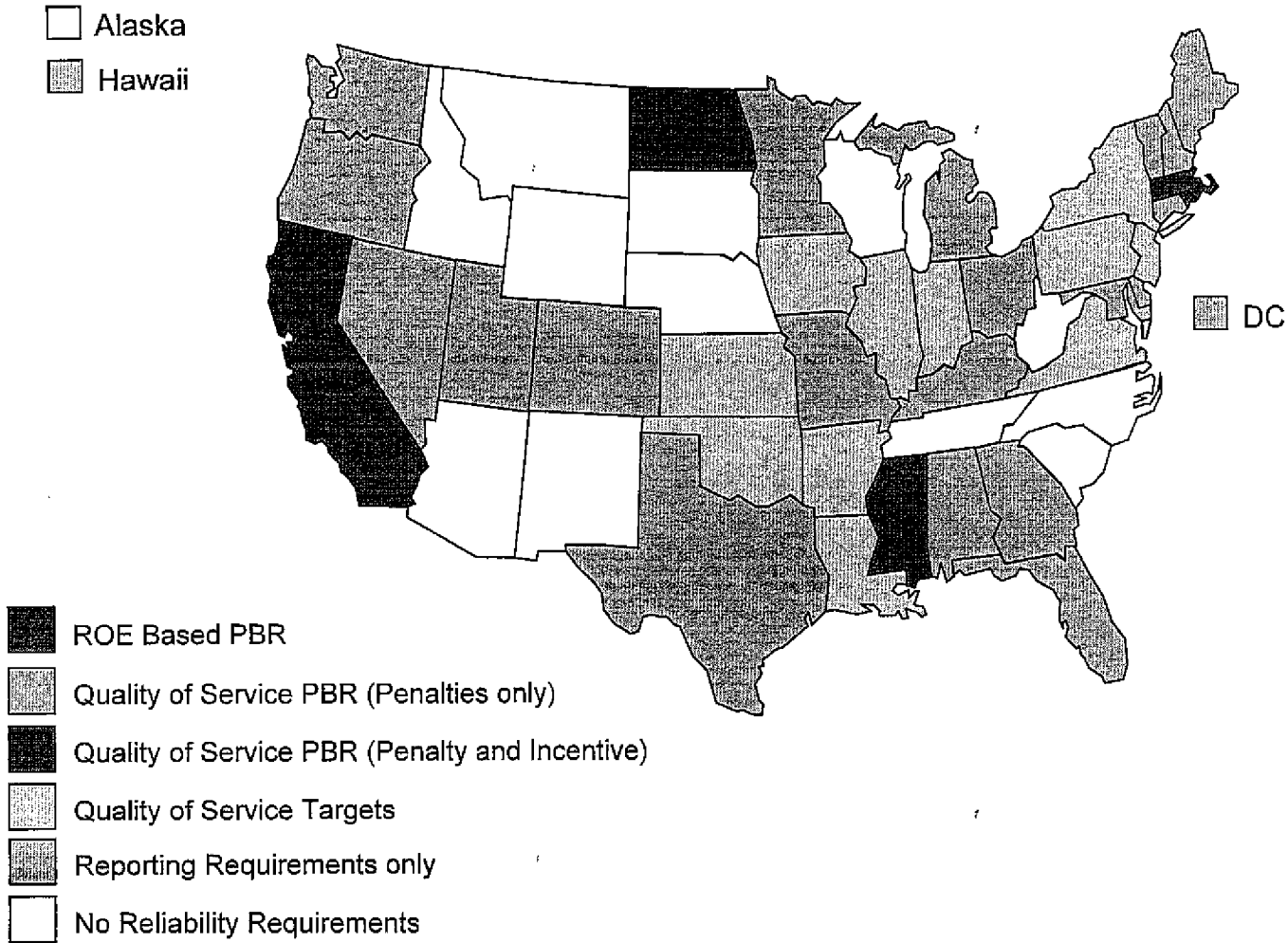


PBR History

- Deregulation and PBR have transformed traditional cost of service rate making into Quality of Service regulation tied to penalties



State of Reliability Regulation in the US

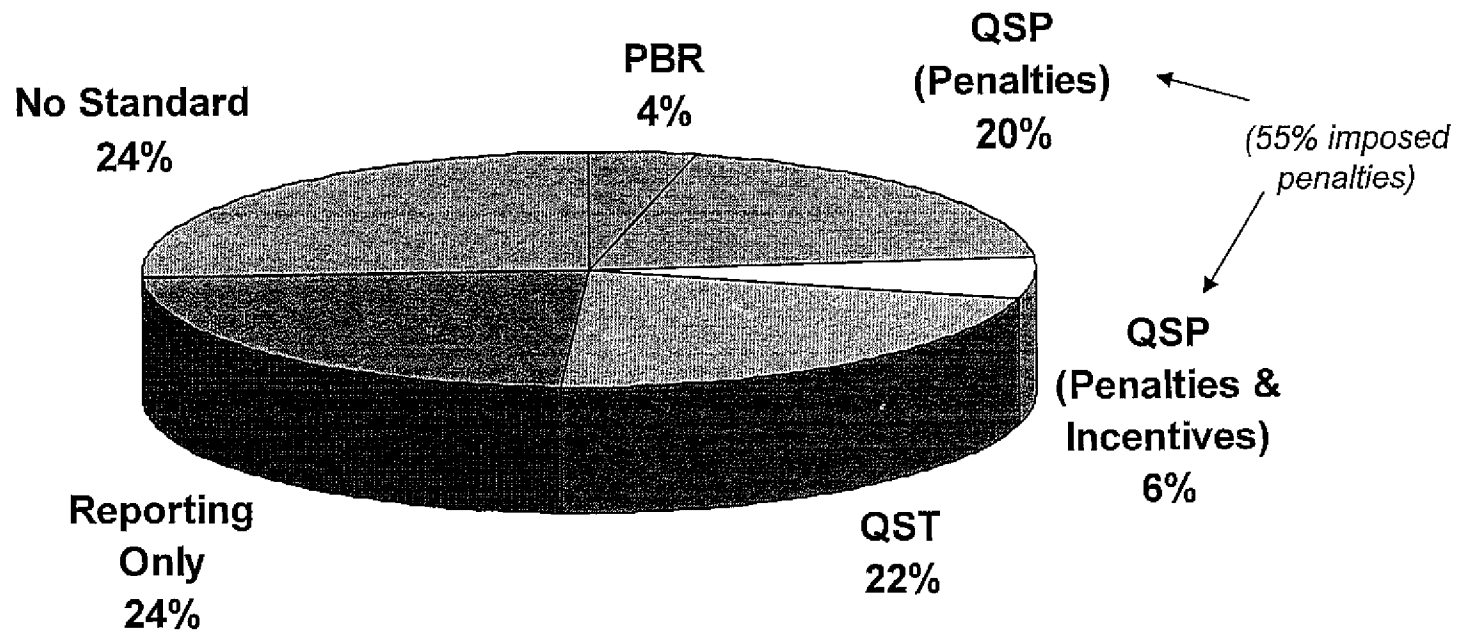


Source: DCI Interviews/survey with 29 state commissions and 18 utilities



State of Reliability Regulation in the US

- 30% of states have some form of Performance Based Ratemaking (PBR or QSP)
- 27% of PBR and QSP states have rewards also (8% of total)



Source: DCI Interviews/survey with 29 state commissions and 18 utilities



Summary of Key Findings

- Many of the PBR related regulations were triggered by merger agreements or significant events
- While more than 75% of the states have some form of reliability requirement, only 2 states (ND and MS) have the ROE based PBR in place
- About half of states with Quality of Service standards have penalties associated with them, but only two have incentives
- The primary reliability service standards reported by utilities are SAIFI, SAIDI, and CAIDI
- A few states are beginning to look at specific major event-related restoration standards



Summary of Key Trends

- There seems to be a shift away from ROE based PBR to Quality of Service PBR where the focus is on the establishment of Reliability and/or Customer Service targets
- Several states, which are currently without Quality of Service targets are considering implementation of Quality of Service PBR (e.g., MT, DE, NV)
- In general, Regulators are moving towards Quality of Service PBR approach with penalties only

True PBR' in North Dakota and Mississippi

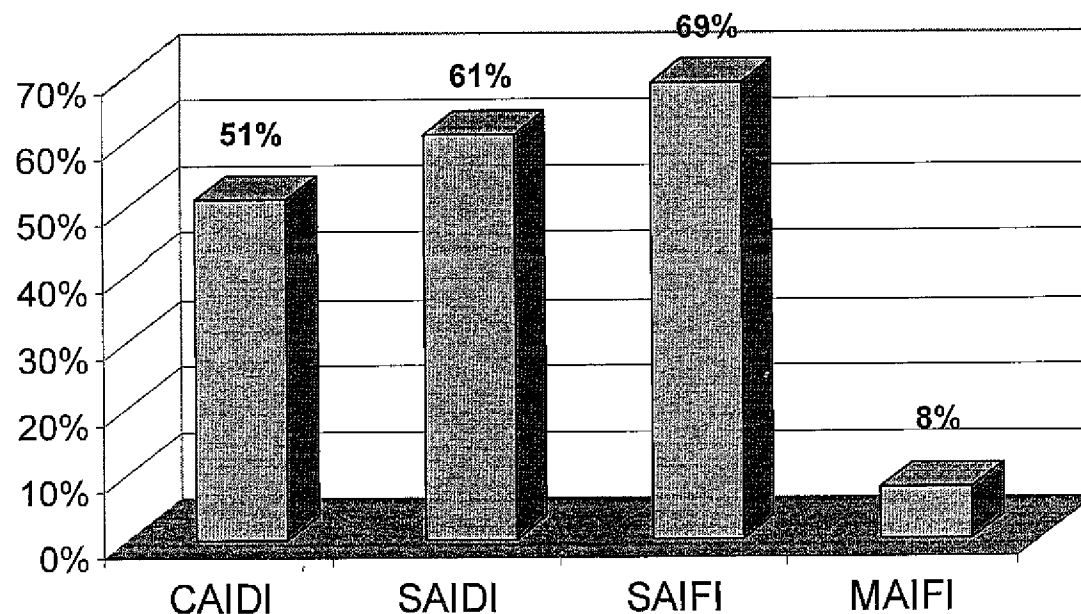
North Dakota	Mississippi	
Xcel and Otter Tail	Entergy	Mississippi Power
<ul style="list-style-type: none"> ▪ Base RoR & seven performance standards ▪ The risk - reward max 25 basis points ▪ Collected as a surcharge or paid as a credit on the bill. ▪ The seven performance standards are: CAIDI, SAIFI, Relationship Survey, Transaction Survey, Average Residential Rate, Change in Residential rate & work force safety ▪ The PBR tariff will end in 2005 and the results will be evaluated 	<ul style="list-style-type: none"> ▪ Called Formula Rate Plan (FRP) with a reliability component. ▪ Only use SAIDI ▪ The target is the four year average (98 -01) ▪ Risk - reward structure based on performance ▪ The band width is +/- 33.3% of the target. ▪ Penalties/rewards are calculated using a RELADJ (reliability adjustment) factor which can impact ROE up to +/- \$3.3 million. ▪ One utility has paid penalties and received bonuses for their performance. 	<ul style="list-style-type: none"> ▪ Called PROI – performance based return on investment – with a 100 basis point dead-band ▪ Maximum adjustment is 4% of retail revenue (increase or decrease) ▪ Reliability = 40% based on minutes of outages vs. minutes available (5 points 131 mins) – use 36 months rolling average ▪ Price = 40% ▪ Customer Sat. = 20% based on bi-annual customer satisfaction survey

Source: DCI Interviews and Secondary Research



Reliability Standards

- SAIDI, SAIFI and CAIDI are the primary performance standards used for calculating reliability penalties.



- More than 80% of states with reliability requirements adjust data for storm events (vast majority do not use the new IEEE 1366 definition)

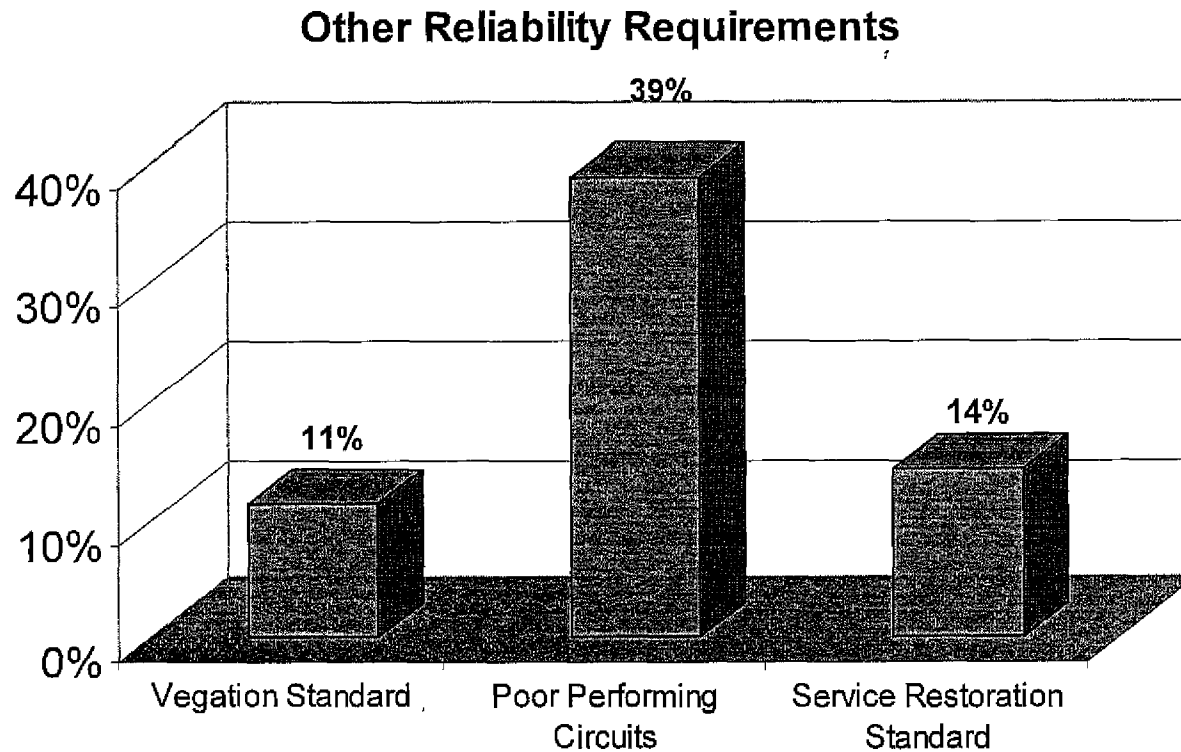
Source: DCI Interviews/survey with 29 state commissions & 18 utilities

Note: In most cases forced transmission outages were included in reliability indices.



Reliability Standards

- In addition to SAIFI, SAIDI and CAIDI, regulators are interested in WPF programs and Vegetation Management standards



Source: DCI Analysis of 35 States.

Reliability Standards – Key Findings

- Key elements of SAIFI, SAIDI and CAIDI calculations include:
 - Storm adjustments (or lack thereof)
 - Validity of historical outage performance to set targets
 - System level or by operating area
- Tree trimming cycle requirements
 - Average 4 year cycle is the most common benchmark
- Worst performing feeders (WPF)
 - Formulas for identifying WPF vary from state to state
 - Focus is on repeat offenders
- Service restoration target examples:
 - % customers restored within specific timeframe
 - By number of outages over a specified time frame

Implications of Quality of Service PBR

- Are regulators focused on penalties only?
- Do utilities with both penalties and rewards have the same upside and downside?
- What are the key drivers that utilities have to be aware of when negotiating penalties and rewards?

Calculating Penalties and Rewards

- To understand the probabilities of penalties and rewards, DCI ran Monte Carlo Simulation associated with 1.00 and 1.75 Std. Dev.
- By increasing the dead band, this utility was giving up the potential for rewards, but also decreasing probability of penalty
- Utility's position on proposed dead band will depend on its risk tolerance

Example A → +/-1.0 Std. Dev.

End of Year Status	Likelihood of Annual Status		
	SAIFI	CAIDI	SAIDI
Penalty (Parameter is > Average + 1 Std Dev)	15.89%	14.65%	14.63%
No Penalty (Parameter is Between Average + or - 1 Std Dev)	70.56%	73.26%	78.11%
Reward (Parameter is < Average + 1 Std Dev)	13.55%	12.08%	7.26%
	100.00%	100.00%	100.00%

Example B → +/-1.75 Std. Dev.

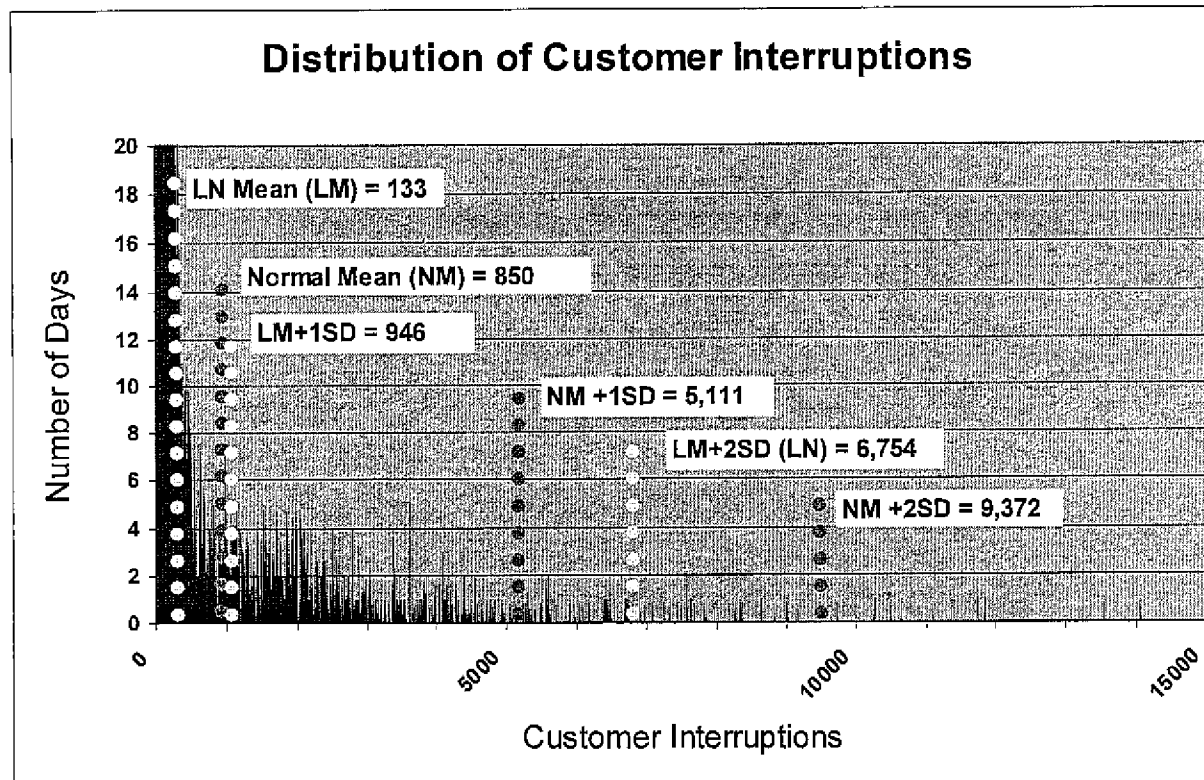
End of Year Status	Likelihood of Annual Status (1.75*Standard Deviation)		
	SAIFI	CAIDI	SAIDI
Penalty (Parameter is > Average + 1.75 Std Dev)	5.22%	6.82%	7.07%
No Penalty (Parameter is Between Average + or - 1.75 Std Dev)	91.12%	92.76%	92.93%
Reward (Parameter is < Average + 1.75 Std Dev)	3.66%	0.42%	0.00%
	100.00%	100.00%	100.00%

Source: DCI Proprietary Analysis



Calculating Penalties and Rewards

- Regulator proposed normal distribution statistics to determine targets for reliability performance
- DCI conducted statistical analysis to five years of data
- Reliability data fits log normal distribution, so applying normal distribution eliminates the upside to utility



Source: DCI Proprietary Analysis

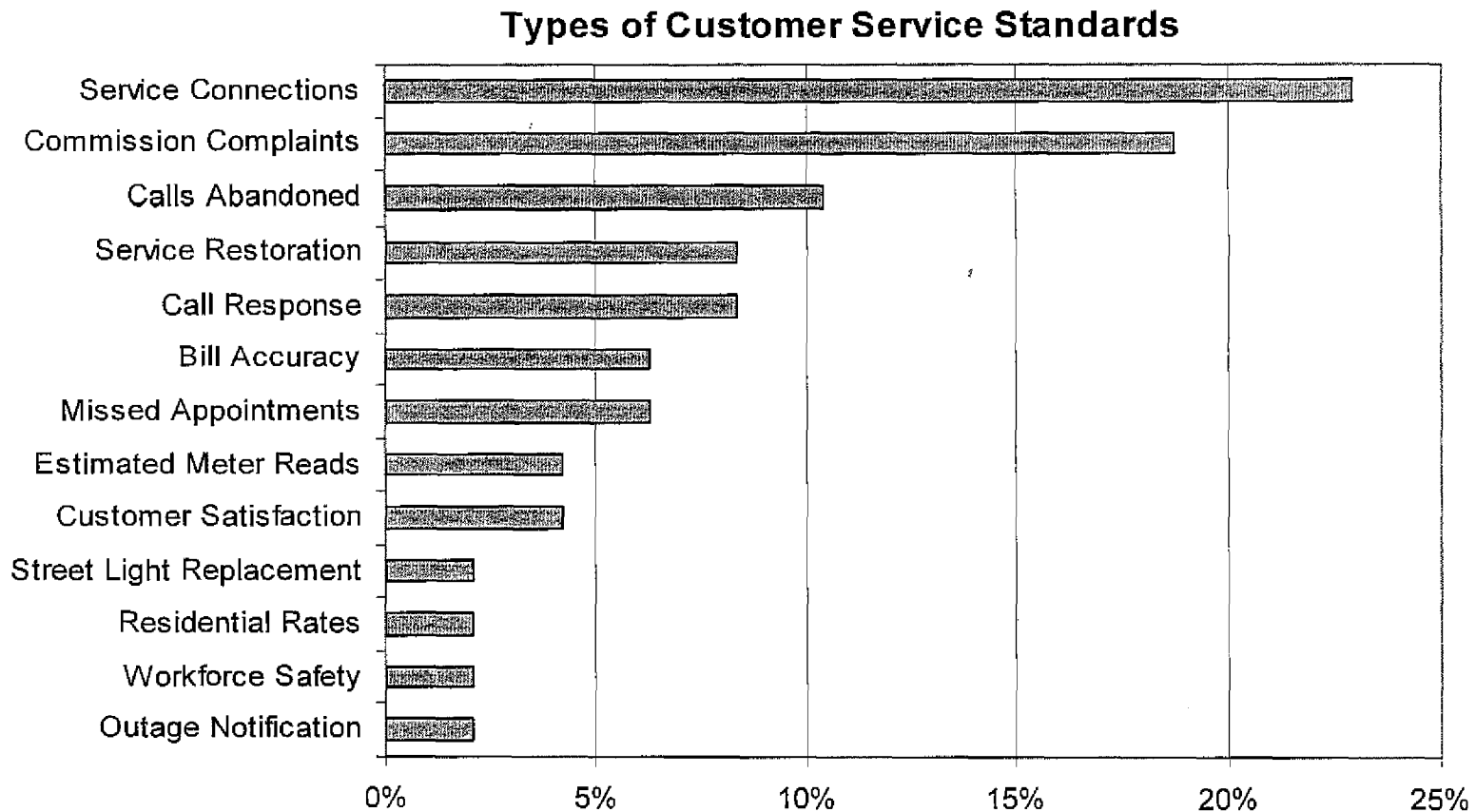


Quality of Service PBR – Key Findings

- Commissions are more focused on penalties for not meeting standards versus incentives for exceeding standards
- Utilities must exercise care when agreeing to method for calculating penalties
- Utilities implementing new OMS systems are often granted a grace period to attain accurate data (quality and consistency of data is critical)
- Most of the penalties are administered in the form of bill credits (either to individual customers or across entire customer class)
- None of the states have a single reliability target for all utilities within their jurisdiction (exception states with single IOU)

Customer Service Standards

- Many of the standards deal with commitments to communicate with customers (e.g., customer complaints, call abandonment, average speed of answer and outage notifications)



Source: DCI Analysis of 34 States.



Conclusion

- Vast majority of ROE based PBR and Quality of Service PBR legislation was passed as a result of a merger agreement or following a significant event
 - Significant events range from extensive outages and call center performance to billing errors
- Prudent investment in delivery infrastructure minimize the scrutiny after significant events and potential legislation
- Mergers usually result in rate freeze agreement so regulators are using PBR mechanisms to protect consumers



Summary

- Many of the PBR related regulations were triggered by merger agreements or significant events
- Regulators favor penalties for not meeting standards versus incentives for meeting or exceeding standards
- In addition to SAIFI, SAIDI and CAIDI, regulators are interested on WPF programs and pruning cycles
- Additional reliability indices including MAIFI, CEMI and CELID are being used to evaluate individual customer experience
- Tracking and reporting these indicators may force utilities to undertake significant investments in information systems
- Utilities must assess the impact of proposed methods for setting targets & calculating penalties to understand associated risks
- Results of this study will be published in collaboration with EEI

¹ CEMI (Customers Experiencing Multiple Interruptions)

² CELID (Customers Experiencing Longest Interruption Duration)



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