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THE POSITION OF THE EDISON ELECTRIC INSTITUTE

INCENTIVE REGULATION PROGRAMS
IN THE
ELECTRIC UTILITY INDUSTRY

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1.0 INTRODUCTION AND OVERVIEW

Incentive regulation programs, or incentive rate provisions, are mechanisms designed to provide electric utilities with incentives to enhance productivity or increase efficiency. Since the early 1970's when the price of oil skyrocketed, environmental regulations proliferated and inflation eroded earnings, utility executives and regulatory commission members have searched for ways to reduce the cost of producing electricity. Incentive provisions are increasingly being used as the method to accomplish this objective.

Several formal programs are in place today that reward superior performance and penalize inefficiency. The program objectives range from controlling the cost of construction to reducing fuel and purchased power costs. Additionally, some programs are aimed at improving overall power plant or company-wide performance. In addition to these broad program objectives, there are a wide variety of methods available to measure efficiency and to provide incentives; it appears there is no single program that works in all situations. In fact, most programs have been tailored to fit the company's inherently unique operating situation. As new incentive regulation programs emerge, interest in the issue is growing across the nation.

In the spring of 1983, the Rate Regulation Department at the Edison Electric Institute embarked on a project to examine incentive regulation programs that are currently proposed or in use by state regulatory agencies and the federal government. This document represents the culmination of phase one of the project. The project utilized information drawn from research documents addressing incentive regulation or describing state and federal programs. In addition, staff members from each state regulatory commission were interviewed about incentive regulation programs. Section 2.0 describes the data collection effort in more detail.

This report is designed to provide basic information about incentive regulation and to identify pertinent data resources on the topic. Information about existing or pending programs is contained in the report according to the following sections:

- o Section 3.0--Status of Incentive Regulation Programs - Consists of a series of three tables that highlight the status and components of incentive regulation programs.
- o Section 4.0--Pending Programs and Issues - Addresses activities in states where programs are being developed or are under consideration.
- o Section 5.0--Incentive Regulation Program Descriptions - Provides summaries of existing or recently discontinued incentive regulation programs.
- o Section 6.0--Annotated Bibliography - Describes the most important literature on the issue.

1.1 Section 3.0 Highlights

The tables in section 3.0 provide basic information about current incentive regulation programs. Table 3-1 identifies states with programs in place, states that are considering programs, states that have discontinued programs, and states that do not have a program.

Table 3-2 examines key components of existing or recently discontinued programs. The table provides a capsule view of the incentive regulation program by identifying the program title, objectives, measures of performance, basis for the program standards, form of incentive, and the results of applying rewards and/or penalties.

Table 3-3 summarizes much of the data contained in the preceeding tables. From this table it is apparent that 18 states (including the FERC) currently have programs, 12 states are now considering programs, and 6 programs have recently been discontinued. The pattern

shows a correlation between programs in place and programs under consideration or recently discontinued; it appears that the more experience a commission has with incentive regulation, the more likely they are to continue.

Of those states that have discontinued programs, the overwhelming reason given was consumer resistance. There is strong opposition to mechanisms that result in automatic rate increases or fuel cost rewards. It was reported in an interview that Michigan's programs were voted out, in part, because the resulting reward payments and rate increases throughout the year created news. Press reports about the programs tended to focus consumer anger on automatic increases and rewards instead of gains in productivity or efficiency. The resulting voter approved referenda prohibit any form of automatic rate increase.

Table 3-3 highlights the program objectives. The most popular objectives are to reduce fuel and/or purchased power costs, and to improve power plant productivity or efficiency. These objectives may be similar, because most of the programs are linked to fuel and purchased power costs. The most frequently used criteria to measure performance are capacity factors, availability levels, and heat rates. Most of the programs, however, rely on multiple criteria to measure performance rather than a singular measure in order to avoid distortions or unintended outcomes. In some cases, narrowly defined operating measures have led to increases in the cost of service rather than greater efficiency.

Finally, table 3-3 tabulates the form and application of incentives. Most programs provide both rewards and penalties rather than a singular reward or penalty avoidance. Rewards and penalties for almost all of the programs are made through adjustments in allowable fuel and purchased power costs. Adjustments to the company's ROE are made in a few of the programs, and cost savings or overrun absorption factors are built into the construction cost control programs.

1.2 Section 4.0 Highlights

This section describes current efforts to develop incentive regulation or rate incentive programs. The information is listed by state and was gathered predominantly during interviews with commission staff members.

The information in the summaries is current as of July 1983. However, many of the programs described are in the idea or proposal stage and the situation can change rapidly. Also, as interest in incentive regulation grows, there may be additional states that exhibit interest in this important issue.

1.3 Section 5.0 Highlights

Current incentive regulation programs and recently discontinued programs are described in this section. For each program there is a two-page summary providing information on the program status and describing how the program operates. Additionally, the summaries identify criteria used to measure performance and methods used to provide rewards and penalties.

During the interviews, the commission staff members were asked whether or not the commission had worked with the company to design the program or establish measurement criteria. Most of the programs were established through a formal commission proceeding, but many staff members reported that for the program to be successful, the effort had to be collaborative. Programs that work the best and produce positive results tend to be the result of a cooperative relationship or joint effort rather than an adversarial exercise. All of the parties desire beneficial results and the company may be in the most strategic position to provide the program focus and key elements.

1.4 Section 6.0 Highlights

The annotated bibliography contains summaries of major research documents and other important literature on the topic. The reports provide descriptions of several incentive programs, as well as suggestions for designing programs. The bibliography is not intended to be exhaustive, but provides a guide to key documents.

2.0 DATA COLLECTION

Data and information for this report were collected from several sources. First, a literature search was made to gather basic information about incentive regulation and productivity measurement. Second, research reports were identified that provide descriptions of existing state programs or evaluations of prior efforts. These reports represent an invaluable resource on this issue, and all have been transferred to the Utility Regulatory Analysis Program (URAP) at EEI.

The next step was to survey all of the states to inquire about efforts to develop new programs or to verify existing program operations. Commission staff members knowledgeable about incentive regulation activities were asked a series of questions designed to reveal current activities or pending programs. After introducing the project and describing what is meant by incentive regulation, the staff member was asked:

- o Is the commission using any regulatory programs that provide incentives to increase electric utility performance? If yes, please describe the program.
- o Is the commission or the staff studying incentive regulation, or is a program currently being developed? If yes, please describe.
- o Is the commission actively interested in incentive regulation?

For states with existing programs, the following questions were asked:

- o How well is the program working?
- o Is the program successful in achieving desired results?
- o Did you work with the utility to design the program or develop program measures? If yes, please describe how.

At the conclusion of the interview the staff member was asked if written material about the current or proposed program was available. Many

commissions had procedures manuals or could provide sections of rate cases that describe how a program operates, but few commissions had performed evaluations to measure program results or outcomes.

3.0 STATUS OF INCENTIVE REGULATION PROGRAMS

The following three tables highlight current or proposed federal and state incentive regulation programs. Table 3-1 shows which states have programs in place, which are considering programs, and which states have no programs in place or under consideration. Footnotes have been provided to identify states that have more than one program, or have discontinued an existing program.

Table 3-2 provides an overview of key components of each state or federal incentive regulation program currently in use or recently discontinued. The table is organized alphabetically by state (concluding with the FERC) and identifies the following program attributes:

- o Program title
 - What is the program called?
- o Program objective
 - What is the program attempting to accomplish?
- o Criteria
 - What are the measures of performance?
 - What is the basis for the measurement standard?
- o Incentives
 - What is the form of incentive?
 - How is the incentive applied?

Footnotes for this table are provided to identify programs that have been discontinued. Additional information about pending programs may be found in section 4.0, and more complete write-ups of each program listed in the tables may be found in section 6.0 of this document.

Table 3-3 provides a summary of the information from tables 3-1 and 3-2. The table summarizes program status data, as well as key program attribute information.

TABLE 3-1. State Incentive Regulation Program Status

	<u>Program In Place</u>	<u>Program Discontinued</u>	<u>Program Under Consideration</u>	<u>No Program</u>
Alabama	X			
Alaska				X
Arizona				X
Arkansas	X			
California	X ¹		X	
Colorado				X
Connecticut	X			
Delaware				X
District of Columbia	X			
Florida	X			
Georgia				X
Hawaii				X
Idaho				X
Illinois			X	X
Indiana			X	X
Iowa			X	X
Kansas	X			
Kentucky				X
Louisiana				X
Maine				X
Maryland				X
Massachusetts	X			
Michigan		X ²	X	
Minnesota				X
Mississippi			X	X
Missouri				X
Montana				X
Nebraska				X
Nevada				X
New Hampshire	X ³			
New Jersey	X		X	
New Mexico		X ⁴		
New York	X ⁵		X	
North Carolina		X ⁶	X	
North Dakota				X
Ohio	X ⁷			
Oklahoma				X
Oregon	X			
Pennsylvania	X		X	
Rhode Island				X
South Carolina				X
South Dakota				X
Tennessee				X
Texas	X			
Utah	X			
Vermont				X
Virginia	X			
Washington				X
West Virginia			X	X
Wisconsin			X	X
Wyoming				X
FERC	X			

- California has two programs, the Coal Plant Incentive Program and the Energy Cost Adjustment Clause.
- Michigan's three incentive regulation programs were eliminated as of May 1983, when two public referenda and a state law passed, banning automatic adjustment mechanism (see section 5.0 for program details).
- New Hampshire has two programs in place, the Energy Cost Recovery Mechanism and the Shiller Coal Conversion Incentive Program.
- New Mexico's cost of service indexing program was eliminated by the New Mexico Legislature in January 1982 (see section 5.0 for program details).
- New York has two programs: the Productivity and Thermal Efficiency Guidelines and the Construction Cost Control Incentive Program.
- North Carolina's Power Plant Productivity Performance Review was eliminated by a State Appeals Court in May 1981 (see section 5.0 for program details), and a new fuel clause program is under consideration.
- Ohio's current program, Semi-Annual Electric Fuel Component Rate (EFC) replaced the Target Thermal Efficiency Mechanism (TEM) in February 1981 (see section 5.0 for details on both programs).

TABLE 3-2. Key Program Components

STATE COMMISSION	PROGRAM	OBJECTIVE	CRITERIA		INCENTIVE	
			MEASURE OF PERFORMANCE	BA: IS FOR STANDARD	FORM	APPLICATION
Alabama PSC	Rate Stabilization Program	Reduce regulatory lag, frequency of rate cases, and length of hearings	Return on equity (ROE)	Commission sets target ROE and formula computation adjusts retail charges	Automatic adjustment	Charges are adjusted monthly (within limits) to maintain approved ROE.
Arkansas PSC	Monthly Fuel Adjustment Factor	Improve <u>nuclear</u> power plant capacity	Capacity factor target	Set by commission using historical plant data adjusted for planned outages	Reward/Penalty	Company absorbs some of related fuel cost savings/overruns
California PUC	Energy Cost Adjustment Clause	Reduce fuel and purchased power costs	Annual energy rate: annual estimates for fuel and purchased power	Set through formal commission hearing using historical and projected data.	Reward/Penalty	Company absorbs some of related fuel cost savings/overruns
	Coal Plant Incentive Program	Improve coal plant efficiency	Capacity factor, heat rate targets	Set through formal commission hearing using historical and projected data	Reward/Penalty	Company absorbs some of related fuel and purchased power cost savings/overruns
Connecticut DPUC	Generation Utilization Adjustment Clause	Increase <u>nuclear</u> power plant capacity	Capacity factor target	Set by commission using historic data and comparison with other utilities	Penalty Avoidance	Company absorbs some replacement fuel costs
District of Columbia PSC	Fuel Clause Audit and Review Program	Improve system-wide power plant productivity	Productivity improvement goals plus actual statistics for operating and equivalent availability, scheduled, forced and equivalent forced outage rate, heat rate, and capacity factors.	Set by utility	Penalty Avoidance	Commission may disallow some fuel expenses
Florida PSC	Generating Performance Incentive Factor	Reduce fuel and purchased power costs	Average heat rates, equivalent availability and fuel cost targets.	Set through formal hearing using formulas based on historic data and computer simulation of economic dispatch	Reward/Penalty	Return on equity adjusted (within limits) for fuel cost savings/overruns.

TABLE 3-2. Continued

STATE COMMISSION	PROGRAM	OBJECTIVE	CRITERIA		INCENTIVE	
			MEASURE OF PERFORMANCE	BASIS FOR STANDARD	FORM	APPLICATION
Kansas PSC	Energy Efficiency and Conservation Incentive Program	Promote renewable resource, conservation and energy efficiency projects	Investments in conservation or energy efficiency systems	Review by the Commission	Reward	Company receives enhanced return on project equity
Massachusetts DPU	Fuel Clause Bureau annual efficiency hearing	Improve system-wide power plant productivity	Availability, equivalent availability, heat rate, capacity factor and forced outage rate targets	Set by formula in annual efficiency hearings and measured in quarterly fuel adjustment clause hearings	Penalty Avoidance	Commission may disallow some fuel expenses
Michigan PSC ¹	Availability Incentive Provision	Improve average system availability	Average system availability goal	Set by formula using East Central Area Reliability Council method	Reward/Penalty	Return of equity adjusted (within limits) for availability levels
	Fuel and Purchased Power Adjustment Clause	Reduce fuel and purchased power costs	Annual estimates for fuel and purchased power	Set by Commission during general rate case hearings	Reward/Penalty	Company absorbs some of related fuel cost savings/overruns
	Other O&M Indexing system	Reduce select O&M expenses	Certain O&M cost increases are indexed to the CPI	Base costs set by the Commission using historical data	Reward/Penalty	Company receives accelerated capital cost recovery penalized for delays
New Hampshire PUC	Energy Cost Recovery Mechanism	Reduce fuel costs and improve availability	Availability level and fuel cost targets	Set by the Commission using historical data	Reward/Penalty	Company absorbs some of related fuel cost savings/overruns
	Shiller Coal Conversion Incentive	Encourage coal conversions	Construction cost estimate and schedule	Mediated agreement set construction and cost levels	Reward/Penalty	Company receives accelerated capital cost recovery/penalized for delays
New Jersey BPU	Hope Creek Incentive/ Penalty Revenue Requirement Agreement	Control nuclear plant construction cost	Construction cost estimate	Negotiated with public advocate and approved by the commission	Reward/Penalty	Company absorbs part of construction cost savings/overruns

¹Michigan's three incentive regulation programs were eliminated as of May 1983 when two public referenda and a state law were passed that ban automatic mechanisms

TABLE 3-2. Continued

STATE COMMISSION	PROGRAM	OBJECTIVE	CRITERIA		INCENTIVE	
			MEASURE OF PERFORMANCE	BASIS FOR STANDARD	FORM	APPLICATION
New Mexico PSC ²	Cost of service indexing	Reduce regulatory lag and administrative costs of rate cases	Return on equity (ROE)	Commission sets target ROE	Automatic Adjustment	Rates adjusted automatically (within limits) to maintain ROE
New York PSC	Productivity and thermal efficiency guidelines	Improve power plant productivity	Capacity factor, scheduled and forced outage rates, operating and equivalent availability, and heat rate targets	Set by Commission using historical data	Penalty Avoidance	Commission may disallow some related fuel and other expenses
	Construction Cost Control Incentive Program	Control nuclear <u>plant construction costs</u>	Construction cost estimate	Set by commission in negotiation with the company	Reward/Penalty	Company absorbs part of construction cost savings or overruns
North Carolina UC ³	Power Plant Productivity Performance Review	Improve power plant productivity	Capacity factor, fuel cost, outage rates and generation mix targets	Set by the Commission during fuel clause hearings	Penalty Avoidance	Commission may disallow some of related fuel expenses
Ohio PUC ⁴	Semi-Annual Electric fuel Component Rate	Improve power plant productivity (energy output per fuel dollar)	Fuel utilization, pricing policies, sales for resale, power purchasing, net generation, generation, efficiency of economic dispatch, power plant efficiency goals	Set by Commission designed formula based on operating data submitted by the utility	Reward	Company retains some of related fuel cost savings
	Target thermal efficiency mechanism	Improve power plant efficiency	Twelve month rolling average heat rate target	Set by the Commission using historic data	Penalty Avoidance	Commission may disallow some of related fuel expenses
Oregon PUC	Power Cost Adjustment Program	Reduce fuel and purchased power costs	Projected fuel and purchased power costs	Set by the Commission during regular rate case	Reward/Penalty	Company absorbs some of related fuel and purchased power cost savings/overruns

²New Mexico's cost of service indexing program was eliminated by the N.M. legislature in January, 1982.

³North Carolina's Power Plant Productivity Performance Review was eliminated by a State Appeals Court in May, 1981.

⁴Ohio's semi-annual Electric Fuel Component Rate replaced the Target Thermal Efficiency Mechanism in February 1981.

TABLE 3-2. Continued

STATE COMMISSION	PROGRAM	OBJECTIVE	CRITERIA		INCENTIVE	
			MEASURE OF PERFORMANCE	BASIS FOR STANDARD	FORM	APPLICATION
Pennsylvania PUC	Coal Conversion Incentive Program	Encourage coal conversions	Investments in coal conversion	Review by the Commission	Reward	Company receives CWIP allowances accelerated cost recovery, no PUC tax
Texas PUC	Fuel cost adjustment Clause	Reduce fuel costs	Heat rate targets	Set by commission using historic data	Reward/Penalty	Company absorbs all related fuel cost savings/overruns
Utah PSC	Utility Efficiency Incentive Program	Reduce overall operating costs	Power production and service O&M expenses, capital investment costs for generation and T&D facilities	Set by regression model to establish targets for cost categories	Reward	Company and customers share cost savings
Virginia SCC	Performance Based Fuel Cost Recovery	Improve power plant productivity and reduce fuel costs	Fuel costs, equivalent availability and heat rate targets	Computer simulation of economic dispatch and average fuel cost data	Reward/Penalty	Commission may reduce regulatory lag or disallow some of related fuel expenses
FERC	Performance Incentive Provision	Improve system-wide productivity	Fossil units: equivalent availability and heat rate targets Nuclear units: capacity factor targets	Computer simulation of economic dispatch	Reward/Penalty	Return on equity adjusted (within limits) for some of related fuel cost savings/overruns

TABLE 3-3. Summary: Incentive Regulation Program Status and Components

<u>State Status Summary¹</u>		<u>Number</u>
o States with programs in place		18
o States with programs discontinued		3
o States without programs		31
<u>Program Status Summary²</u>		
o Number of programs in operation		21
o Number of programs discontinued		6
o Number of programs under consideration		12
<u>Program Objectives³</u>		
o Limited automatic rate adjustment		2
o Nuclear power plant capacity		2
o Construction cost control		2
o Reduce fuel and/or purchased power costs		7
o Improve power plant productivity or efficiency		8
o Promote conservation		1
o Improve system availability		1
o Reduce O&M expenses or overall operating costs		2
o Encourage coal conversions		2
<u>Criteria to Measure Performance⁴</u>		
o Capacity factor		8
o Outage rates (scheduled and/or forced)		4
o Availability (operating and/or equivalent)		7
o Heat rate (actual and/or average)		9
o Generation mix		2
o Fuel pricing policies		1
o Fuel costs		6
o Purchased power costs		4
o O&M expenses		2
o Aggregate service costs		1
o Return on equity		2
o Capital investments in conservation or coal conversion		2
o Construction costs		3
<u>Form of Incentive</u>		
o Reward and penalty		10
o Penalty avoidance		6
o Reward only		4
o Automatic rate adjustment		2
<u>Application of Incentive</u>		
o Rate adjustment to maintain ROE		2
o Return on equity adjustment		4
o Fuel and/or purchased power expense adjustment		15
o O&M and/or operational expense adjustment		2
o Construction cost adjustment		4

Notes:

1. Includes the FERC program.
2. Some states (California, New Hampshire, and New York) have more than one program in operation.
3. Includes discontinued programs.
4. Most programs use several criteria in combination to set productivity targets or measure efficiency, see table 3.2 and section 5.0 for criteria systems description.

4.0 PENDING PROGRAMS AND ISSUES

This section of the report provides highlights of incentive regulation programs that are under consideration pending commission action or further staff study. The capsule summaries are presented on a state-by-state basis to briefly describe the program content and current status.

The information in the summaries, gathered through a telephone survey and substantiated in written material when available, is believed to be current as of July 1983. However, changes in the thrust, content, and status of the programs may occur and other programs may be under consideration in additional states as interest in incentive regulation grows.

The state-by-state review of pending programs and issues follow.

4.1 California

The California PUC released a request for proposal (RFP) in the spring of 1982 for a consultant to design a Performance Incentive Program for Southern California Edison's (SCE's) San Onofre nuclear unit. The program was to be patterned after the Coal Plant Incentive Program aimed at two baseload coal units owned by SCE.

According to staff in the fuel division, results of consultant report have not been encouraging and a recommendation may be made to the commission to discontinue the project. Reasons given for not going forward include the complexity of implementing such a program, the existing incentive program is simple and understandable, and incentives should be looked at as a whole, rather than in pieces.

4.2 Illinois

In 1981 the Illinois Corporation Commission staff started work on an incentive regulation program that would permit a variable rate of return for CWIP on nuclear plants under construction. The program, as proposed, relied on three stages: first, a construction cost comparison statistical analysis (comparing Illinois plants to similar U.S. nuclear plants), second, an onsite monitoring program, and third, an incentive program allowing CWIP in the rate base at a rate lower than other plant and equipment.

Although pieces of this program have been used in individual rate cases (e.g., the statistical comparison and audit reports), the program has never been officially implemented by the commission. However, the commission has allowed partial CWIP in the rate base on a case-by-case basis.

4.3 Indiana

The Indiana PSC has not yet implemented a formal incentive regulation program, but is considering initiatives in several areas. To date, the commission has attempted to measure relative efficiency of utility operations on a case-by-case basis by ordering audits of management practices.

Currently, the PSC staff is considering structuring an incentive program aimed at controlling the cost of constructing the Marble Hill nuclear plant. On another front, the commission has held preliminary hearings on incentives to diminish operating costs of Northern Indiana Public Services' power plants. The staff cautioned that both programs are in the preliminary proposal stage and may change if implemented.

4.4 Iowa

In the 1983 legislative session, the Iowa legislature passed a regulatory reform bill making significant changes in the regulatory structure. The State Commerce Commission (SCC) was given permission to penalize a utility by a downward adjustment to its return for inefficient or imprudent management, or for "performing in a less beneficial manner than other utilities" in Iowa. Likewise, the SCC may increase the return for a utility which "is operating in such an extraordinarily efficient manner that tangible financial benefits result to the ratepayer." The SCC is directed to adopt rules to determine the appropriate level of adjustment, and rules establishing a methodology for analyzing management efficiency.

The commission also established an Operations Review Division in the fall of 1982 with several mandates including the objective of "examining utility statistics and performance for the purpose of formulating incentives for improved performance." The division organized a regional conference on incentive regulation and is currently drafting preliminary program proposals for review by affected parties.

4.5 Michigan

Although all three incentive regulation programs were eliminated late last year and early this year when two public referenda were approved by voters and the legislature passed Public Act 304, a restraining order has been issued while Michigan courts determine which among the three laws will prevail.

All of the three laws prohibit automatic adjustments for purchased power and fuel costs; all three remove incentive provisions from the prior law. Public Act 304, however, does provide for an annual review of fuel costs with over- and under-revenue reconciliation including interest

payments. The PSC staff maintains that the interest payments (computed at prime rate or the ROE rate, whichever is higher), will provide an incentive to project accurate expenses and institute efficient operations.

4.6 Mississippi

During its regular session, the Mississippi legislature passed the Utility Reform Act of 1983 instituting regular management reviews of electric utilities. The law states that "the commission may...initiate a management review of any public utility company...once every five (5) years, and at such other times deemed necessary by the commission as determined by it during a hearing...such review to examine thoroughly the efficiency and effectiveness of management decisions among other factors as directed by the commission."

Independent of the management review program, the commission staff has been examining the incentives in the fuel adjustment clause including providing incentives for fuel purchasing and power plant productivity.

4.7 New Jersey

The New Jersey Public Service Commission staff is currently considering methods to link incentives to the state's Levelized Energy Adjustment Clause. The project is in its formative stages with work progressing on two fronts. First, the staff is studying various methods to encourage efficiency and is examining criteria to measure productivity. Second, the staff is attempting to design an appropriate system of rewards and penalties to apply to program measures.

4.8 New York

Although the New York Public Service Commission has productivity and thermal efficiency guidelines in place (see section 5.0 for details), there

has been a generic proceeding on instituting a formal incentive regulation program.

The program, as currently conceived, will rely on making projections of economic dispatch using a computer model. Fuel cost targets will be set for the year and a year-end reconciliation will identify savings or cost overruns. Under the program, the company may be allowed to keep 10 percent of any fuel expense savings and may be required to absorb 10 percent of any fuel cost overrun.

The program proposal is scheduled to go before the commission and a decision is expected by fall. The primary issue at present is deciding which computer model to use to simulate economic dispatch and project fuel costs.

4.9 North Carolina

North Carolina's power plant productivity performance review procedure was struck down by a state appeals court in 1981, when the court determined that quarterly fuel adjustment proceedings were not an appropriate forum in which to judge power plant efficiency. In response, the commission has held a generic hearing on establishing an incentive provision related to fuel costs as part of annual rate cases. There has been no implementing order to date.

The program, as currently designed, will provide for prospective estimates of annual fuel expenses, and will set capacity factor targets. The company will be permitted to retain fuel expense savings, and will be required to pay excess fuel costs.

4.10 Pennsylvania

The Lieutenant Governor of Pennsylvania chartered the Electric Utility Efficiency Task Force in response to the 1981 Pennsylvania Energy

Policy. The task force, comprised of representatives of the utility industry, banking, government, academia, business, and professional consulting, had two broad mandates: "First, to examine possible changes in the organization, market, and pricing structures that could increase the competitive nature of the utility industry, and second, to identify possible reforms to the current method of regulating electric utilities." In March 1983, the task force released its two volume report concluding that "current methods of regulation fail to protect the consumer when they lead to inefficiencies and higher costs; regulatory strategies need to be reworked." Seven principles were outlined to enhance profitability, competition, efficiency, and productivity in electric utilities.

The task force is continuing to examine options for implementing incentive regulation programs. One such program would affect the existing energy cost recovery clause by linking power plant efficiency to fuel cost recovery. The new "Energy Price Adjustment Clause" would set targets and prices for the energy generation mix (including purchased power), establish efficiency criteria (e.g., heat rate, availability, capacity factors, etc.), and allow fuel cost recovery on an incentive basis. The task force is also considering requiring management audits to measure management effectiveness. The proposals are currently in the idea stage while the task force and commission staff study mechanisms for implementation.

4.11 West Virginia

The West Virginia PSC staff is working on an incentive regulation proposal aimed at improving power plant productivity and efficiency. The program keys on fuel costs and relative measures of power plant efficiency to create a system of rewards and penalties. The proposal is being reviewed by affected and concerned parties, while it is in draft form.

4.12 Wisconsin

The staff of the Wisconsin PSC is interested in developing an incentive regulation program free of inadvertent or unexpected outcomes. To accomplish this goal, the staff is collecting power plant statistics on productivity measurement (e.g., heat rate, availability, cost of service, etc.). The staff is also studying other state programs and have been working with the electric utilities on the issue. The project has not progressed to designing a program or outlining incentives, but there is interest by the commission in the areas of power plant productivity, construction cost control, and internal cost control systems.

Wisconsin Electric Power Company commissioned a major study by the National Economic Research Associates on measuring electric utility productivity. The report described several methods that may be used to measure productivity and provided discussion of the strengths and weaknesses of each approach. Please see section 6.0 for a more thorough description of the study.

5.0 INCENTIVE REGULATION PROGRAM DESCRIPTIONS

This section of the report provides summaries of state incentive regulation programs together with a description of the recent program instituted by the FERC. Programs that have been discontinued in several states are also included as examples of prototypical program design.

The information is organized alphabetically and presented on a state-by-state basis. The program summaries provide information on the program status, operating characteristics, and incentive systems. In addition to descriptions of how the programs operate, the summaries identify criteria that are used to establish measures and standards to judge relative performance. Finally, the incentives used to reward and/or penalize the company are outlined in the summaries.

Information for the program summaries was gathered from several documents on incentive regulation and substantiated through telephone interviews with commission staff members. Documents used for the following summaries include:

1. William P. Pollard, "Rate Incentive Provisions: A Framework for Analysis and a Survey of Activities," NRRI, November 1981.
2. National Economic Research Associates, "Measuring Productivity of Electric Utilities," May 1982.
3. Resource Consulting Group, "Incentive Regulation in the Electric Utility Industry," October 1982.
4. Edgar M. Roach, Jr., "Review by Regulatory Agencies of Reasonableness of Management Decisions," EEI, Legal Committee, fall 1982.

5. Edgar M. Roach, et al., "The Application of Generating Plant Performance Standards in Ratemaking Proceedings--An Update," EEI, Legal Committee, spring 1982.
6. George L. Smith, Jr., Ed., "State Regulation and Power Plant Productivity: Background and Recommendations," NRRI, September 1980.

Reference notes indicate the use of additional written information, or where the data was supplemented from an interview. The state-by-state program summary descriptions follow.

ALABAMA

Title: Rate Stabilization and Equalization Program (RSE).

Status: Initiated February 1983; continuing.

Coverage: Alabama Power Company.

Description: The purpose of the RSE is to lessen the impact, frequency and size of retail rate increase requests by permitting limited automatic rate adjustment to maintain the approved return on equity. The Commission and company staff members worked in a unified effort to design the program and establish appropriate criteria.

Monthly retail bills can be increased or decreased by the application of the ROE factor so that the company's rate of return on equity is maintained. The ROE factor, based on accounting information is adjusted quarterly and applied prospectively.

The program is designed to accommodate attrition more than to provide incentives to enhance performance, however, there is an incentive to keep operating costs within the automatic adjustment program limitations. The monthly bills may not raise greater than 1% or 2% depending on the calendar quarter and the annual net increase in the ROE may not exceed 2½ percentage points in any one calendar year.

Criteria: The Return on Equity target is 14%; monthly bills are adjusted upward if the computed ROE is less than 13.5% and downward if the ROE is greater than 15.0%.

The RSE factor is calculated for each affected rate schedule using a formula that relies on the following financial data: the target ROE, retail ROE, end of period retail equity, combined federal and state taxes, total retail revenues, monthly percentage increase limitation, base rate revenues, revenues (total and individual retail schedule), and kilowatt hour sales by retail rate schedule. Forms are provided to segregate retail electric from total electric data, certain cost categories are excluded, and the RSE factor is computed from an accounting of the twelve months prior to the adjustment.

Incentive: The company enjoys automatic rate relief so long as it remains within the monthly and annual limits. Under these conditions returns will be more constant and predictable.

Reference

The Alabama Public Service Commission Dockets #18117 and 18416; Alabama Power Company Rate Stabilization and Equalization Factor implementation rules.

ARKANSAS

Title: Monthly Fuel Adjustment Factor.

Status: Initiated July 1981; continuing.

Coverage: Arkansas Power and Light nuclear units.

Description: The goal of this program is to improve the capacity of the utility company's nuclear generating units. Two separate formulas are used to compute monthly fuel adjustment factors; one for normal service levels and one for service levels when the unit is out for periods exceeding 30 days for reasons other than refueling.

When a nonrefueling outage of a nuclear unit exceeds 30 days, the utility must file monthly reports detailing the reasons for the outage and projecting the anticipated duration. Also, the commission may institute an investigation and hearing, and may disallow unjustified fuel costs.

Criteria: Allowable fuel expenses are determined as a function of capacity factors. Replacement costs of fossil fuel and purchased power are included to account for costs when the nuclear units are out of service. Criteria in the fuel adjustment formulas include generation from company owned hydro, customer kwh sales ratios, price of nuclear fuel, price of fossil fuel and purchased power, and total monthly energy input. The Commission determines various formula factors on the basis of historical plant data adjusted for planned outages.

Incentives: When targeted capacity factors are exceeded, the company receives a fuel expense savings; when the targets are not reached, the company undercollects. The clause is computed monthly and there is a 60-day lag before the adjustment takes place.

Issues: In the case of an extended outage, the paper work for reports and hearings can be extensive. Computing the fuel adjustment costs on a monthly basis is time consuming and requires mathematical expertise from the company and the commission. There are no studies available that evaluate the program benefits and costs.

CALIFORNIA

Title: Energy Cost Adjustment Clause.

Status: Initiated 1981; continuing.

Coverage: All electric utilities.

Description: This program was implemented in response to rapidly rising fuel costs as a percentage of total electric revenue requirements; the goal is to contain or reduce fuel and purchased power costs. These energy costs are estimated annually, part of which are recovered on an incentive basis.

The estimates are established through a traditional rate making procedure and the utility is rewarded or penalized by retaining some fuel and purchased power cost savings or absorbing a portion of cost overruns below the line. The program was designed as a cooperative effort between the commission staff and the utility companies. Several informal review meetings were held prior to the commission hearing.

Criteria: For Southern California Edison, 10% of the energy costs are based solely on the Annual Energy Rate (AER), and 90% may vary. Hearings are being held to establish the variable rate for the other electric utilities. Of the variable amount, the companies are allowed to recover 90% of actual expenses plus the AER.

Incentives: If the company succeeds in establishing a cost savings under the projected amount, it will receive some of the

savings. If actual energy expenses are greater than anticipated the company will have to absorb a portion of the cost overview. The total reward or penalty may not exceed 160 basis points of the ROE.

Reference

Interview, Public Utilities Commission of California, Utilities Division, Fuel Program Supervisor, July 1983.

CALIFORNIA

Title: Coal Plant Incentive Program.

Status: Initiated July 1981; continuing.

Coverage: Southern California Edison Company, two baseload coal units.

Description: The program goal is to increase the unit capacity factor and heat rate efficiency. Targets are set for the units based on four year averages for capacity factors and annual average heat rates in the Energy Cost Adjustment Clause hearings. There is no reward or penalty if actual performance falls within the 50% confidence interval (or null zone) set for the targets. The utility is rewarded or penalized through allowable energy cost adjustments when performance is outside the null zone. The commission staff consulted with the utility to design the program targets and measures.

Criteria: Targets are set by formula for both the capacity factor and heat rate. The capacity factor target is set using a four year rolling average historical data and the heat rate target is based on annual average. The null zone is established by calculating the standard deviation for each target.

Incentives: When the actual heat rate or capacity factor, or both, fall above the target null zone, the utility is rewarded; when either one or both of the factors fall below the zone the utility is penalized. The utility is permitted to

retain part of the energy cost savings as a reward, and when performance is substandard, additional energy costs are not charged to customers.

Issues: Improved capacity factors and heat rates may be achieved with maintenance and improvements that do not incur fuel savings; the overall cost of service (and benefits to customers) may not fall as a result of the improvements. Also, this program involves the use of complex formula not easily understood.

Reference

Public Utilities Commission of the State of California, decision 93363. July 22, 1981, appendix C, Derivation and Application of Reward/Penalty and Performance Limit Equations.

CONNECTICUT

Title: The Generation Utilization Adjustment Clause (GUAC).

Status: Initiated June 1979; continuing.

Coverage: Connecticut Light and Power, Hartford Electric.

Description: The regulatory agency has stated that this program provides a mechanism to equitably share the risk of nuclear outages. In this program, fuel expenses are set in base rates by applying the annual anticipated nuclear plant capacity factor (NCF). This capacity factor is used in the computation of the GUAC formula which considers the fuel cost differential between fossil and nuclear generation.

If the actual weighted average nuclear capacity exceeds the NCF target, customers are credited with a part of the avoided replacement fossil fuel costs. If the capacity factor falls below 55 percent, replacement fuel costs will be borne by the utility. If the nuclear capacity is between the target and 55 percent, customers share in the cost of replacement fuel according to the formula.

The GUAC was proposed by Connecticut Light and Power and Hartford Electric Light, and was amended by the commission.

Criteria: Staff of the regulatory commission have established the NCF at 70% by comparing the historical performance of nuclear units under its control with the historical performance of all nuclear units, practices of other regulatory

bodies and utilities, abstract productivity models, and statistical analyses.

The GUAC formula depends on computing actual capacity factors, fossil fuel costs, nuclear fuel costs, total retail KWH sales, and total KWH sales for the previous 12 month period.

Incentives: The major incentive for the utility is to avoid absorbing replacement fuel costs when capacity is below 55%.

Issues: Since performance between 55 percent and the NCF target results in sharing costs between the utility and customers and superior performance results in customers being credited with avoided replacement fuel costs, the underlying incentive may be to achieve average performance. Also, computation of the GUAC formula and establishing the NCF target requires extensive staff analysis.

Reference

State of Connecticut, Division of Public Utility Control, Docket 781206, and Docket 781027, Decision on Approval of Amended Rate Schedules and a Generation Utilization Adjustment Clause for Connecticut Light and Power Company and Hartford Electric Light Company.

DISTRICT OF COLUMBIA

Title: Fuel Adjustment Clause Audit and Review Program

Status: Initiated October 1982, continuing.

Application: Potomac Electric Power Company (PEPCO).

Program Description: The program does not include objective targets or formula efficiency measures but seeks to improve system-wide power plant productivity. The program requires PEPCO to submit a Productivity Improvement Plan (PIP) each year together with actual plant performance statistics. The PIP sets prospective productivity goals that are to be achieved during the course of the year.

The company submits operating characteristics achieved during the year which are measured against the goals. At the year's end, the commission staff prepares a report analyzing overall progress made. The program was proposed by the commission staff and the company submitted comments during the rule making process.

Criteria: In addition to setting annual goals for productivity improvement, generating system statistics required from PEPCO include: scheduled outage rates, capacity factors, heat rates, forced outage rates, equivalent availability factors, operating availability factors, and equivalent forced outage rates. These statistics are required for each generating unit, as well as the utility's entire generating system.

Incentives: There is no system of rewards and penalties associated with the program, however, the staff report submitted to the commission may affect decisions in the fuel adjustment clause; fuel costs due to inefficiencies may not be allowed.

Reference

Public Service Commission of the District of Columbia, case no. 766, order no. 7668, The Commission's Fuel Adjustment Clause Audit and Review Program.

FLORIDA

Title: Generating Performance Incentive Factor (GPIF).

Status: Initiated September 1980; continuing.

Coverage: Florida Power and Light, Florida Power Corporation, Tampa Electric, and Gulf Power Company.

Description: The program goal is to minimize fuel and purchased power costs. The GPIF is an incentive regulation program that uses complex formulas to link the rate of return allowed on common equity to average heat rates and equivalent availability of power generating units.

Targets are set for average heat rates and equivalent availability, and fuel expenses are estimated by running several computer simulations of the utility system economic dispatch. Additional computer runs provide estimates of fuel cost savings associated with operations at maximum, minimum, and target levels.

Rewards of penalties are determined by comparing actual operating values with targets set for equivalent availability and average heat rate. The commission staff worked with the utility companies to design the program criteria and measures.

Criteria: Targets are set by formula for equivalent availability and average heat rates. Equivalent availability targets are set using the historical performance record for each unit adjusted to reflect maintenance improvements. Average heat rate targets are set by using monthly data

weighted according to economic dispatch with adjustments made for unit modifications, fuel changes, and environmental regulations.

Incentives: Above average performance for both equivalent availability and average heat rate results is a reward, and below average performance results in a penalty. Rewards and penalties may be as much as 0.25 percent of return on common equity.

Issues: The singular objective of lowering fuel costs as a function of performance targets may result in the company neglecting other areas of utility operations. At issue is whether the program minimizes the overall cost of operation. Finally, the reporting, administrative and technical analysis activities for the annual hearings involve substantial costs and commitment of manpower.

References

Florida Public Service Commission, GPIF Implementation Manual, July 1981, docket no. 81001-CI, order no. 10168.

Florida Public Service Commission Staff Report, Comparison of Generating Unit Performance Prior to and Since Inception of GPIF.

KANSAS

Title: Energy Efficiency, Conservation and Renewable Resource Incentive Program.

Status: Initiated 1980; continuing.

Coverage: All Electric Utilities.

Description: Kansas State law describes a program aimed at encouraging utility investment in conservation, renewable resource generation and efficiency measures. The program permits the PSC to allow a greater return on such investment than the rate set for the utility's other investment.

Criteria: The commission must determine that the investments can be reasonably expected 1) to produce energy from a renewable resource other than nuclear, 2) to cause the conservation of energy, or 3) to bring about the more efficient use of energy by its customers.

Incentives: Upon determination, the commission may allow additional project based return from 1/2% to 2% greater than the utility's general rate of return.

Reference

Kansas State law, Public Utilities, 66-117, ch. 201, section (d).

MASSACHUSETTS

Title: Fuel Clause Bureau in Massachusetts Department of Public Utilities (DPU).

Status: Initiated August 1981; continuing.

Coverage: All electric utilities.

Description: This program seeks to improve system-wide plant productivity by holding efficiency hearings once a year when targets are set for operating plant performance characteristics. The targets are compared with actual performance statistics submitted monthly by the utility.

The targets, as well as variances, are the foundation for testing the reasonableness of the utility's fuel costs. The Fuel Clause Bureau was created as a result of proposals from the Governor's Task Force on the Fuel Adjustment Clause. The electric utilities were represented on the task force and testified during legislative hearings on instituting the bureau.

Criteria: The targets include heat rate, availability factor, equivalent availability, capacity factor, and forced outage rate. The targets are each determined by an individual formula and are linked through a series of computations.

Incentives: Any variances from the target is explained during Quarterly Fuel Adjustment Clause Hearings. If a variance is deemed to result from unreasonable or imprudent performance, the department can deduct the questioned

expenses from the next quarter's fuel charges. There is no reward for performance above the target.

Issues: It is unknown whether the costs of the program will exceed benefits to consumers from lower costs and higher operating performance.

Additional administrative staff is required for the DPU and for the utilities, and technical talent is required to compute the targets and measure results.

References

Massachusetts Department of Public Utilities, Guidelines for Operation of the Performance Program, December 1981.

Massachusetts Governor's Task Force Report, The Fuel Adjustment Clause Question: A report and Recommendation on Reform of the Fuel Adjustment Clause in Massachusetts, January 1981.

MICHIGAN

Title: Availability Incentive Provision (AIP).

Status: Initiated during 1977/1978 Rate Case Hearings; discontinued May 1983.

Coverage: Detroit Edison Company and Consumers Power Company.

Description: The AIP program goal is to increase the level of average system availability. The program provides incentives by using a sliding scale that measures system availability against adjustments in the rate of return on common equity to reward or penalize the company. The program was discontinued as a result of consumer sponsored popular referendums and legislative actions banning automatic rate adjustments.

Criteria: The average system availability is calculated according to the East Central Area Reliability Council (ECAR) method. Adjustments are made for the respective companies periodic maintenance factors and planned outages.

Incentives: The companies may be rewarded in increments up to .50% of return on common equity, or may be penalized through a decrease in increments from -.05% to -.25% return.

Issues: Because the AIP keys on the singular function of availability, the utility could put excessive amounts of money into maintenance or could select plants to build mainly on availability rather than life cycle costs. Also, the utility could reduce off-system sales that benefit its customers in order to reduce wear and tear on operating equipment.

The program required substantial technical and administrative time from both the Commission and the company to prepare, submit, and evaluate material for the AIP hearing.

References

State of Michigan, 81st legislature, 1982 session, Enrolled House Bill no. 552F.

State of Michigan, Proposals for the general election November 1982, proposals "D" and "H", To Protect Certain Adjustment Clauses,...etc.

State of Michigan, Public Service Commission, case no. U-6949, Opinion and Order, March 31, 1982, and case no. U-6923, Opinion and Order, May 18, 1983.

Five Year Review of the Availability Incentive Provision, Jim Padgett, Lockie MacGregor, November 1982.

MICHIGAN

Title: Fuel and Purchased Power Adjustment Clause (FPPC).

Status: Initiated 1976; discontinued May 1983.

Application: All utilities in the system.

Description: The FPPC goal is to reduce fuel and purchased power costs. Annual fuel and purchased power costs are estimated in advance and disaggregated to monthly increments; fuel costs are automatically reconciled monthly, while purchased power costs are justified after monthly public hearings. Companies retain a portion of savings under the estimated amount and absorb part of the costs exceeding the estimate.

Criteria: The criteria used are estimates of future fuel and purchased power costs measured against costs actually incurred.

Incentives: If the company exceeds the base amount that has been estimated it can only collect 90% of the excess. If, however, the costs are actually lower than the estimate, the company must pass 90% of the savings through to customers, and may keep the remaining 10%.

Issues: The FPPC provides incentives for companies to bargain for better fuel prices and to purchase (even to the exclusion of generating) the lowest cost power, however, the program is based on forecasts that are subject to wide variations beyond the control of management.

First, if demand is higher than anticipated, fuel costs may be much higher also, penalizing the company. Conversely, the company may be rewarded if its sales are less than anticipated. Second, the fuel prices themselves, may deviate from the projected future test year, and these deviations may be beyond the control of management.

The program was discontinued in March of 1983 when two separate public referenda were approved by the voters and the Michigan legislature passed a bill that prohibits automatic adjustment clauses.

References

See references listed for the preceeding Michigan Availability Incentive Provision program description.

MICHIGAN

Title: 'Other' O&M Indexing System.

Status: Initiated 1979; discontinued May 1983.

Coverage: Consumers Power Company and Detroit Edison Company.

Description: This program, with the objective to reduce select O&M expenses, covers all O&M expenses other than fuel, purchased power, and production maintenance expenses. The commission sets a base level for the other each year the company is allowed to automatically collect the amount adjusted for price changes as measured by the National Consumer's Price Index (CPI).

Criteria: Criteria used in this program center on historical cost data for other O&M expenses for each company in the program. After establishing base amounts, allowable increases in expenses are indexed to annual changes in the CPI.

Incentives: The companies are competing against the CPI. If expenses exceed the company's CPI-adjusted base, the PSC may not allow these to be passed through to rate payers. If a company's other O&M expenses are below increases in the CPI, it is allowed to keep the cost savings.

Issues: The CPI is not necessarily a good measure of the cost of utility business, many of the elements have little to do with utility company management. Also, local cost trends may differ widely from national aggregate costs.

The program does not account for structural changes in the company, such as new construction in T&D, conservation mandates, or load management programs. The CPI indexing system may encourage the company to put excessive capital into reducing O&M expenses, and may prohibit the regulatory commission from examining the reasonableness of the other O&M expenses.

The program was eliminated in May 1983, when two public referenda and a state law were passed that prohibit automatic adjustments.

References

See references listed for the preceeding Michigan Availability Incentive Provision program description.

NEW HAMPSHIRE

Title: Energy Cost Recovery Mechanism (ECRM).

Status: Initiated July 1982; continuing.

Coverage: Public Service Company of New Hampshire.

Description: The Program goal is to improve power plant availability and reduce fuel costs. During a rate case the commission instructed its staff and the company to file recommendations for incentive features to be incorporated into the fuel adjustment clause. By working together to negotiate criteria levels, a program was proposed which sets targets for unit availability to establish fuel costs. The company is allowed to keep a portion of fuel cost savings and must absorb part of cost overruns.

Criteria: The program keys on setting targets for energy costs based on overall plant availability factors (planned and unplanned outages). The targets are set using historic plant data and are included in basic rates for a six-month prospective period with reconciled actual costs to establish a reward or penalty for the company.

Incentive: The incentive provides a reward or penalty to the company for 10% of the difference between actual and targeted fuel costs determined by the availability targets.

References

Interview with the Public Utility Commission, Rate Department, staff member, July 1983.

Public Service Company of New Hampshire, Understanding of the Parties Regarding ECRM Outage Incentive Feature, December 1982.

NEW HAMPSHIRE

Title: Shiller Coal Conversion Incentive.

Status: Initiated September 1982; continuing.

Description: The incentive program goal is to speed conversion of three Public Service Company of New Hampshire generating units to coal. A mediated agreement stated the following objectives: a) to improve the prospects for financing the project at the lowest possible cost; b) to complete the conversion to coal as rapidly as possible; c) to improve the design and operation of the facility; and d) to protect rate payers from the risk of higher rates and the company from the risk of unforeseen circumstances.

To accomplish these objectives, the company is allowed to collect the total costs of conversion over an accelerated period after the units begin burning coal. Second, each of the units has a target date for completion and calculation of rewards and penalties. Rewards and penalties are based on fuel cost savings resulting from coal conversion.

Finally, there is a performance incentive built in to ensure that plant modifications result in extending the useful life and improve availability. This incentive like the regular ECRM rate, is based as scheduled and unscheduled outages with a target set for availability, however, in the Shiller program the company will defer reimbursement of an additional 15% of increased costs due to unscheduled outages.

Criteria: The total cost of conversion is calculated to provide the basis for accelerated cost recovery through a fixed adder to the ECRM component of the rate base. The schedule for placing the units in service is established in the agreement and the company's rewards and penalties are computed over a six month time span that includes a grace period of two months. Adjustments to the schedule may be made if the cause is outside management's control. Availability targets are recommended by an independent engineering firm that is selected and compensated by the company.

Incentives: The company will be rewarded if a unit is placed in service prior to the grace period. The early conversion reward is one-half of the fuel savings credit attributable to the conversion. If the unit is placed in service after the grace period, the company is penalized by an amount equal to one-half of the fuel savings foregone attributable to the late conversion. Once the units are in service the incentives for accelerated cost recovery and unit target availability apply.

Reference

The State of New Hampshire, Public Utilities Commission, docket DE79-141, Shiller Mediation, Recommendations of the Parties Concerning the Shiller Coal Conversion, September 1982.

NEW JERSEY

Title: Hope Creek I Incentive/Penalty Revenue Requirement Agreement.

Status: Agreement initiated July 1983; continuing.

Coverage: Hope Creek Nuclear Plant, Unit I.

Description: The objective of this program is to control construction costs. The program was the result of a negotiated agreement that set a target for the cost of constructing the plant at \$3.7 billion. The agreement states that the company may only recover 80% of costs that exceed the target by 10%. Should the cost exceed the target by more than 10%, the company may only recover 70% of the costs above the 10% threshold.

If the plant cost is between \$3.5 and \$3.7 billion, all actual costs will be recovered, and if the cost is below \$3.5 billion the company may recover actual costs plus 20% of the difference between \$3.5 billion and the actual costs.

Criteria: Criteria used in this program include the negotiated cost estimate and an accounting of actual construction costs.

Incentives: The incentive is to complete construction at a cost below \$3.5 billion to recoup the 20% reward, and to avoid penalties resulting from cost overruns.

Reference

State of New Jersey, Board of Public utilities, docket no. 8012-914, joint statements, and signed agreements dated August 10, 1982, September 1982, and July 1983.

NEW MEXICO

Title: Cost of Service Indexing (COSI).

Status: Initiated 1975; discontinued January 1982.

Coverage: Public Service Company of New Mexico.

Description: Although originally designed to automatically adjust rates according to the cost of services on a quarterly basis, the final program granted limited annual automatic rate adjustments, based on showing 10-month actual and 2-month projected information. As implemented, the COSI program was not representative of most incentive regulation programs. The program operated so that preliminary COSI surcharge equal to 90% of the charges necessary to bring a 15.5% return on equity would go into effect automatically without an audit. However, if the surcharge raised rates greater than 5%, there would be a full review. There was a built-in incentive to keep operating costs within the 5% limitation.

Revised COSI surcharges were added to bills to reflect actual cost and revenue experiences. Formal COSI hearings were held each year to make final COSI surcharge decisions. Any excess charges were refunded to consumers with interest.

Criteria: The COSI reflected changes in rates based on projected and actual costs the Commission incurred. These costs were used to revise rates up to an increase of 5% without a formal audit and review.

Incentives: PNM enjoyed automatic rate relief so long as the increases did not exceed 5% in a given review period. PNM's return on equity would be more constant and more predictable.

Issues: The program was eliminated by the New Mexico legislature in 1982 partly because consumers were overwhelmingly against the automatic rate increases.

The effect of COSI was to reduce regulatory lag and provide an incentive to achieve sufficient operating efficiency to stay within the 5% increase limitation.

Although COSI was originally intended to reduce administrative time, two to four times more auditing time was devoted to the program than normal rate cases, however, other costs including legal and expert witnesses were reduced.

NEW YORK

Title: Productivity and Thermal Efficiency Guidelines.

Status: Ongoing study and company review since 1977; official guidelines established 1982.

Coverage: All electric utilities.

Description: The goal of this program is to improve power plant productivity and efficiency. The PSC efficiency guidelines issued in 1982 key on:

- o Identifying factors that contribute to inefficiency and low productivity
- o Analyzing causes of the problems
- o Weighing the costs and benefits of actions for improvement
- o Developing procedures to modify activities.

The program involves reviewing plant operations during regular rate cases and fuel adjustment clause hearings, and as such, there is no system of specific rewards or penalties. However, the reviews have resulted in penalties when the commission believes fuel costs are the result of inefficiency. One case resulted in the requirement that a utility institute a comprehensive maintenance program. In another case, a utility company was ordered to return \$16.8 million in fuel charges, and on another date to refund \$33.7 million dollars because of an extended outage in a nuclear plant.

Criteria: Measures of productivity are determined by the PSC staff through a set of definitions and formulas that key

on capacity factors, outage rates (both forced and scheduled), operating availability, equivalent availability, and heat rate.

Incentives: Since there are no objective rewards or penalties, or specific targets to meet, the incentive is to avoid a penalty that the commission may impose if it determines plant outages or inefficiencies were the result of management decisions.

Issues: The commission has established an ongoing working group on power plant productivity and is searching for ways to officially institute these issues into fuel clause hearings. The group is made up of the PSC staff, New York utilities, and independent consultants. They are considering:

- o Power plant outage events and performance
- o Costs and other impacts associated with outages
- o Documenting and developing regulatory policies and procedures
- o Establishing target performance levels, as well as rewards and penalties.

Reference

Interview, State of New York, Public Service Commission, Office of Research, Chief of Regulatory Research, July 1983.

Construction

See Nov. 28 NARUC Bulletin

NEW YORK

Title: Construction Cost Control Incentive Program for the Nine Mile Point Unit 2 Nuclear Station.

Status: Instituted February 1982.

Coverage: The Nine Mile Point unit 2 nuclear power plant.

Description: This program, to control the power plant construction costs, was instituted because of escalating construction costs and uncertainty of completion dates. The program keys on sharing revenue requirements growing out of cost overruns or underruns.

A target price of \$4.6 billion was negotiated and set for the project; the utility will be rewarded for reducing that cost and penalized for exceeding it. The commission also installed a site team to report progress toward the completion date and milestones along the project's critical path.

Criteria: Construction costs actually incurred on the project will be measured against the target level. The company may keep 20% of savings if the final cost is under the target and must absorb 20% of cost overruns.

Incentives: The incentive is to share in the benefits by bringing the project in under the targeted amount, and to avoid absorbing 20 percent of cost overruns.

Issues:

The program was instituted well after construction began at a time when it was difficult to obtain accurate and unbiased cost estimates for construction.

The investment community has not been enthusiastic about the program because it is felt that the PSC may have given up authority to assure a reasonable return on invested capital.

References

State of New York, Public Service Commission, Opinion No. 82-7, Case 28059 - Proceeding to inquire into the financial and economic cost implications of constructing the Nine Mile Point No. 2 Nuclear Station, April 16, 1982.

NORTH CAROLINA

Title: Power Plant Productivity Performance Review.

Status: Initiated 1978; discontinued May 1981.

Coverage: All electric utilities.

Description: The program goal was to improve plant productivity by linking semi-annual Fuel Cost Adjustment Hearings to special hearings on reviewing power plant performance. The special hearings were triggered if performance was consistently low. A 60 percent target capacity factor was set for nuclear units; fossil units were included, but no minimum capacity factor was specified. The utility was required to justify deviations from standards in written reports used in the hearings.

A series of orders emanating from fuel adjustment hearings resulted in penalties being levied against a utility for alleged management imprudence in maintaining the capacity factors for several coal-fired units. These orders were struck down by the State Appeals Court which nullified procedures to review power plant performance in Fuel Cost Adjustment Hearings.

Criteria: The criteria used were extracted from monthly reports on generation mix, outages, causes, timing, duration, cost, and remedial actions taken. Fossil units were judged on historic performance and the 60 percent capacity factor for nuclear units was established because it is near the national average for all nuclear plants. The commission used its judgement and testimony by staff and

experts to determine if plant outages were the result of imprudent management decisions.

Incentives: The incentive in this program was to avoid penalties. Most penalties were in the form of disallowed replacement fuel expenses that the company could have recovered under normal circumstances.

Issues: The program was struck down because the court felt that fuel adjustment proceedings were not an appropriate forum to judge power plant efficiency. The court, however, allowed that efficiency may be judged as a part of a general rate case.

Reference

Interview, North Carolina Utilities Commission, Electric Division, Senior Utilities Engineer, July 1983.

OHIO

Title: Semi-Annual Electric Fuel Component Rate (EFC).

Status: Initiated February 1982; continuing.

Coverage: All electric utilities.

Description: The program goal is to obtain the maximum energy per fuel dollar. The program established semi-annual electric fuel component rates based on a set of complex formula ratios designed to measure the cost effectiveness of plant operations. The efficiency incentive factor sets the amount of monthly system loss costs that a utility may recover through system loss adjustments. The program was designed by the staff and accepted by the commission.

Criteria: The EFC program formula is complex. There are five major factors that make up the formula, and each is computed separately. The factors are expressed in the form of ratios measuring efficiency of economic dispatch, fuel utilization, fuel pricing policies, fuel procurement, sales for resale, power purchasing, net generation, and plant operating efficiency.

Utilities are also required to submit individual power plant performance data for operating availability, equivalent availability, capacity factor, forced outage rate, and heat rate. These data are reviewed by the commission staff.

Incentives: The system operates as a reward only, and utilities are not penalized for decreases in the formula factors. The

program allows system loss recovery for the utility and is structured so that there may be refunds to customers, as well. It is also possible that a utility can recover a portion of increased system loss on a semi-annual basis, rather than annually.

Issues: The utility and regulatory commission must have staff resources devoted to computing formula factors and describing the results. Additionally, data for the review of individual power plant performance by the commission staff must be gathered, analyzed, and submitted by the utility.

In a study published in May 1981, the PUC evaluated the benefits of improving power plant productivity and concluded that incentive programs should have the following attributes:

- o Rewards rather than penalties
- o Long-term results
- o Encourage high performance and improvement
- o Flexibility
- o Be nonformulaic
- o Use verifiable data
- o Track benefits.

References

Public Utilities Commission of Ohio, Final Report: Costs/Benefits of Improved Power Plant Productivity Program, May, 1981.

Public Utilities Commission of Ohio, Documentation and Final Report: A Regulatory Program for the Improvement of Power Plant Productivity in Ohio, April 1982.

Public Utilities Commission of Ohio, Assessment of Power Plant Performance: An Update Report, November 1982.

OHIO

Title: Target Thermal Efficiency Mechanism.

Status: Initiated October 1974; discontinued February 1981.

Coverage: All electric utilities.

Description: The program goal was to improve power plant efficiency. Thermal efficiency measures were used as criteria for making decisions in fuel recovery clause hearings. The efficiency targets were based on measuring heat rates of generating units in the system. Targets were set by the commission after an analysis of the utility's historic performance, maintenance, new plant and equipment additions, and other data.

Criteria: Target measures for thermal efficiency were based on calculations for average heat rates for each utility. The averages were computed from 12-month rolling data for units dispatched into the system. Extreme 12-month values were used as boundaries for the lowest anticipated heat rate value from the preceding 12 months; these figures were projected 12 months into the future to set target and variation limits.

Incentives: Since the information was used in fuel cost adjustment clause hearings, the incentive was to avoid a penalty and recapture full fuel costs by meeting the thermal efficiency standards. The commission could disallow costs if efficiency targets were not met. The Ohio commission has also reviewed management decisions relative to the utility's generating plant performance.

Issues:

This incentive mechanism was discontinued because the program resulted in consequences originally unforeseen by the commission. In the late 1970s, the Environmental Protection Agency required pollution control equipment and fuel-use practices that resulted in substantially altering the relationship between KWH costs and heat rates for selected plants. These changes meant choosing between dispatching plants for target thermal efficiency or for minimizing fuel costs; both goals could not be met simultaneously and the program was discontinued in 1981.

References

See the preceding Ohio Semi-Annual Electric Fuel Component Rate program description.

OREGON

- Title: Power Cost Adjustment Program.
- Status: Initiated 1980; continuing.
- Coverage: Portland General Electric Company.
- Description: The goal of this program is to reduce fuel and purchased power costs. During regular rate case proceedings base targets are set for estimated fuel and purchased power costs using historical data, and the company is subsequently measured on the degree to which the targets are met.
- The company is rewarded by retaining a portion of the fuel cost savings and is penalized by absorbing a portion of costs above the target. There were numerous discussions between the commission staff and the utility company to establish the program, design standards and set target levels.
- Criteria: The criteria used to measure performance are fuel and purchased power costs. Targets are based on historic data and are set during rate case proceedings.
- Incentives: The company may keep 20% of savings incurred by keeping costs under the base target. Conversely, the company must pay for 80% of fuel and purchased power costs that exceed the base target set in the rate case.

References

Interview, Oregon Public Service Commission, Division of Economics Research and Financial Analysis, Division Director, July 1983.

PENNSYLVANIA

- Title: Coal Conversion Incentive Program.
- Status: Initiated 1980; continuing.
- Coverage: All electric utilities.
- Description: The goal of this program is to encourage the conversion of oil-fired power plants to coal. During a regular rate case the Commission reviews the status and progress of coal conversions. A reward is granted to companies making conversions and there is no penalty associated with the program at this time.
- Criteria: Investments made by the utility in coal plant conversion are substantiated in the context of a general rate case. The commission staff, consultant experts, the utility and intervenors review and debate the material during the proceedings.
- Incentives: When the commission has approved a project there are three incentives provided. First, CWIP is allowed in the rate base, second, accelerated cost recovery is permitted, and third, there is no PUC tax assigned to the new plant equipment.

References

Interview, Pennsylvania Public Utility Commission, Bureau of Conservation, Economics and Energy Planning, Bureau Director, July 1983.

TEXAS

Title: Fuel Cost Adjustment Clause Incentive Program.

Status: Initiated 1979; continuing.

Coverage: Southwestern Public Service Company.

Description: The program goal is to reduce fuel costs by enhancing heat rate efficiencies. During a regular rate case proceeding, the commission sets system-wide heat rate targets and estimates fuel costs using historical plant-specific performance data. During the year, dollar for dollar fuel costs are passed through, and fuel revenues will exceed anticipated fuel costs if the heat rate targets are met.

Criteria: Historic data are used to establish heat rate targets and to estimate fuel costs.

Incentives: The company is allowed to retain the fuel savings revenue if the heat rate targets are met or if performance exceeds the target. If the targets are not met and excess fuel costs result, the company must absorb the costs.

Issues: This program is selectively applied. The commission staff reported that for the program to be effective, the lowest cost fuel type must be used with the most efficient units. If there is a mismatch, i.e., gas may be more efficient; but more expensive, the results could be more costly over time.

References

Interview, Texas Public Service Commission, Engineering Division,
Senior Engineer, July 1983.

UTAH

Title: Total Factor Productivity Cost Factoring.

Status: Initiated June 1983; 2 year trial basis.

Coverage: Utah Power and Light Company.

Description: The goal of this program is to reduce overall utility operating costs. A four part regression model estimates expected annual costs from a 5 year history data base using FERC Form 1 information. The cost categories include:

- o Power production O&M expenses
- o Service cost O&M expenses
- o Capital investment for generation plants
- o Capital investment in T&D and other facilities.

The program was initially proposed by the commission staff and was later revised by the utility company. After extensive study, the program was initiated on a 2 year trial basis. The utility company is currently developing a procedure guidebook.

Criteria: Costs are computed by category in the regression equations to arrive at expected costs and to establish a tolerance band for normal fluctuations. The estimated costs are compared throughout the year with actual costs realized by the utility.

Incentives: Rewards to the company are granted when the costs are lower than expected; when costs are higher there is no

penalty. Rewards are divided equally between customers and the company.

Issues: Because of the complex nature of the regression model there may be interaction between the categories, and the method does not specify of the source of enhanced performance.

References

Issues in Regulating Utility Efficiency, Kenneth B. Powell, Manager, Engineering and Rates, Utah Public Service Commission, Proceedings of the Third NARUC Biennial Regulatory Information Exchange, Ohio State University, 1982.

Interview, Utah Public Service Commission, Kenneth B. Powell, July 1983.

VIRGINIA

Title: Fuel Recovery Costs Based on Plant Performance and Fuel Price Index.

Status: Initiated January 1979; continuing.

Coverage: All electric utilities.

Description: The program goal is to improve power plant productivity and reduce fuel costs. The fuel recovery clause is based on a fuel price index and generating performance criteria measured by equivalent availability and unit heat rates. First, the 13-month average procured fuel price is checked against the fuel price index. The index compares the cost per BTU for various fuel types with costs for the mid-Atlantic and south-Atlantic regions of the country.

Second, target ranges are set for equivalent availability and unit heat rates using a computer simulation of the economic dispatch of the utility's system. This enables the staff to derive an estimate of the fuel expense for a given value of equivalent availability. The resulting estimate is used to test the reasonableness of the utility's projected and actual fuel expenses.

The program was designed by the commission staff and the company made comments during hearings.

Criteria: The criteria used in this program are:

- o Fuel Price Index - cost per BTU of individual fuel types for the mid-Atlantic and south-Atlantic regions and a 13-month weighted average of the utility's fuel costs by type.
- o Equivalent Availability - the benchmark is set at about 75% according to the unit's fuel type, size, vintage, and design.
- o Heat Rate - the target range is set according to the unit's historical performance, as well as other units of comparable size and scope.

Incentives: While there is no specific set of rewards or penalties, the performance criteria affect regulatory decisions on fuel costs.

At the annual fuel recovery clause hearing the utility's fuel account for the previous 12 months is settled. If cost underrecovery is the result of poor performance due to factors within management's control, complete recovery may not be allowed. If actual performance is on target, the time lag for recovery is reduced.

Reference

Interview, Virginia State Corporation Commission, Office of Public Affairs, July 1983.

FERC

Title: Performance Incentive Provision.

Status: Initiated June 1983; 3 year trial basis.

Coverage Virginia Electric and Power Company, wholesale sales.

Description: This program's goal is to improve system-wide power plant productivity by comparing actual performance against established standards. The standards are set by making two runs of the company's production simulation model.

Comparisons between actual and standard performance result in adjustments to the fuel expense level. The adjustments occur when performance deviates outside the accepted performance range (dead band), and are translated into an equivalent change in the rate of return on equity. There is a limit of 100 basis points for any reward or penalty.

Criteria: The production simulation model is capable of comparing actual to standard plant performance characteristics. Historic data inputs for each plant include:

- o Fossil units - forced, planned and scheduled outage rates, and heat rate.
- o Nuclear units - capacity factors.

On an annual basis, actual fuel expense levels are compared to the fuel expense level based on performance at the standards; a dead band of $\pm 5\%$ is set to accommodate

normal fluctuations. A formula is used to translate the performance measures into fuel credits or charges which are shared equally between the company and its customers. Next, the effective fuel credit or charge is transformed to an adjustment to the company's ROE, limited by 100 basis points.

Incentives: The company may be rewarded or penalized according to the performance comparisons by as much as 100 basis points of the allowed return on equity.

References

FERC Proceeding, Virginia Electric and Power Company, Docket no. ER82-423-000, Performance Incentive Provision, apper ax B.

6.0 ANNOTATED BIBLIOGRAPHY

6.1 William P. Pollard, "Rate Incentive Provisions: A Framework for Analysis and a Survey of Activities," National Regulatory Research Institute, Prepared for Pennsylvania Public Utilities Commission, November 1981

This report identifies possible rate incentive provisions for improving power plant productivity and controlling cost overruns in nuclear power plant construction. It describes considerations necessary to plan and implement such provisions.

A review of the provisions being implemented or investigated by several states suggests some recurring and unifying ideas that are central to rate incentive provisions. The following nine criteria summarize these ideas:

- o The incentive should be directed toward the interests that motivate the utility's behavior
- o The incentive should address those aspects of the utility's performance under the control of its management
- o To the extent feasible, the utility should be given a clear expectation as to how its performance under the incentive provisions will be evaluated and rewards or penalties conferred
- o Application of the incentive provision should result in a positive net benefit to the utility's consumers and society as a whole
- o The information necessary to evaluate the desired behavior should be free from tampering and ambiguity
- o The goal and method of application should stand in a clear and logical relationship to one another
- o The goal and method of application should be neutral in their effects and have no unintended consequences
- o The incentive should be consistent with other goals and incentives embodied in current regulatory practices

- o The incentive should address and eliminate disincentives that currently exist in present regulatory practices.

The purposes of the criteria is to aid commissions in assessing current regulatory practices and designing rate incentives that improve performance.

6.2 National Economic Research Associates, "Measuring Productivity of Electric Utilities," Prepared for Wisconsin Electric Power Company, May 1982

After discussing some major conceptual and empirical issues in measuring electric utility productivity, this document describes a range of approaches to measuring productivity. These techniques include simple ratios of outputs to inputs, regression analysis, total factor productivity analysis, frontier cost and production functions, and management audits. The discussion of each technique covers the strengths and weaknesses of alternative approaches and provides examples of applications by regulators and researchers.

The authors recommend that the measures used annually to evaluate utility productivity should:

- o Focus on the factors that current management decisions can affect
- o Allow for variations in factors other than those measured such as climate, labor markets, and environmental restrictions
- o Either be comprehensive (covering all areas of productivity in a single measure) or interactive (considering all the components of an interactive system)
- o Be stable (e.g., minor respecifications should not affect the answer) and yet adaptable (e.g., as environmental regulations, regulatory requirements, and available technology change so must the measure)

- o Use data that are readily and contemporaneously available, and consistent among utilities and over time
- o Finally, rely on straight-forward calculation procedures. The characteristics of the measure and the factors which influence it should be well understood so it can be properly interpreted.

6.3 Resource Consulting Group, "Incentive Regulation in the Electric Utility Industry," Draft Report Prepared for Federal Energy Regulatory Commission, October 15, 1982

The objective of this study is to design an incentive regulation program aimed at encouraging provision of electrical service to customers at the lowest possible price, consistent with satisfactory quality of service. The researchers identified and analyzed a set of fundamental issues that are critical to the design and implementation of an incentive regulation program. The issues include:

- o What aspects of utility performance should be the focus of an incentive regulation program?
- o How should performance be measured and evaluated in the context of an incentive regulation program?
- o How should the economic outcomes (i.e., reductions or increases in the firm's cost of service) or the performance results achieved under an incentive program be shared between a utility and its ratepayers?
- o Should the sharing mechanism in an incentive program include both a reward and a penalty?
- o How should an incentive mechanism be structured to reward or penalize a firm for superior or inferior performance?
- o How should rewards or penalties to a firm be distributed between management and shareholders?
- o How should the incentive regulation program adjust for factors or events that are beyond a firm's control in rendering rewards or penalties for superior or inferior performance?

The analysis of these issues and the formulation of the FERC incentive regulation program grows out of reviews and evaluations of:

- o Numerous incentive regulation programs implemented by regulators
- o Several management incentive compensation programs implemented by electric utilities
- o Incentive programs proposed by industry analysts
- o Alternative approaches for measuring and evaluating utility performance as a basis for incentive regulation, including total factor productivity indexes and other aggregate measures
- o Other potential performance measures and incentive mechanisms.

6.4 Thomas A. Cowing and Rodney E. Stevenson, "Productivity Measurement and Public Utility Regulation," Public Utilities Fortnightly, July 31, 1980

This brief article introduces different methods of efficiency and productivity measurement. The authors discuss applications of productivity and performance measures within the regulatory system. For instance, simply by making public the results of performance studies, there is increased pressure for improvement in utility performance. Productivity studies can be used to refine adjustments to historical test-year results to reflect known out-of-test period changes. Performance measures can be used to structure automatic adjustment clauses and to build rewards for productivity advancements.

A survey of the state public utility commission, undertaken by the authors, reveals that approximately 56 percent of the commissions used management audits, while 40 percent used engineering assessments of operating procedures as its tool to evaluate utility efficiency and productivity. The article describes other survey results, as well as how commissions most frequently tend to use the results of its utility efficiency and productivity studies. The survey shows the regulatory

commissions are increasingly addressing utility efficiency and productivity. Although commission efforts in this area are limited by staffing and funding levels, some states are currently developing more sophisticated approaches to productivity measurement.

6.5 Edgar M. Roach, Jr., Darla B. Tarletz, and David R. Hostetler,
"Review by Regulatory Agencies of Management Performance," Edison
Electric Institute, Rate Research Committee, Spring 1983

The first part of this paper reviews commission actions related to management decisions. The authors outline guidelines for determining the reasonableness of expenditures--the guidelines are as follows:

- o Good faith is presumed
- o Decisions must be reviewed based on facts known at the time, not on hindsight
- o Decisions must be viewed in the context in which it was made
- o The standard is neither perfection nor the "best achievable result."

The paper summarizes recent commission reviews of the reasonableness of management decisions related to fuel procurement, plant performance, plant outages, abandoned plant, and plant construction.

The second part of the paper describes the application of efforts of performance standards at both the Federal Energy Regulatory Commission (FERC) and the State Commissions to measure utility productivity. The activity at the state level is primarily aimed at generating unit performance standards, while FERC activities involve a generic review of possible methods to measure overall utility productivity.

6.6 Edgar M. Roach, Jr. and Darla B. Tarletz, "The Application of Generating Plant Performance Standards in Ratemaking Proceedings--An Update," Edison Electric Institute, Legal Committee Meeting, Spring 1982

This paper reviews state, FERC, and District of Columbia activities to apply generating plant performance standards in ratemaking proceedings. Investigations of individual outages of base-loaded generating units, implementation of incentive programs in fuel adjustment proceedings, and adjustments in general rate cases based on plant performance all reveal a growing interest in the operating performance of electric generating units. Subjective evaluations of management prudence, comparisons to industry averages, applications of commission-selected performance ranges, and implementation of incentive formulas are examples of the standards currently being used. The choice of a standard and the way in which it is applied influence the magnitude of potential penalties.

In addition to the state-by-state summary of use of performance standards, the paper describes ways other jurisdictions assess power plant performance. Some states require regular report on performance parameters such as heat rate, capacity factor, equivalent availability factor, and forced outage rate; those parameters are compared to those of other utilities in the state or to national averages. Several states consider thermal efficiency in their fuel cost recovery mechanisms. In addition to a brief discussion of FERC activities in this area, the paper summarizes work by the National Regulatory Research Institute (NRRI) to evaluate power plant performance and to promote improved plant productivity.

6.7 George L. Smith, Jr. Ed., "State Regulation and Power Plant Productivity: Background and Recommendations," National Regulatory Research Institute, Working Group on Power Plant Production, September 1980

The authors intend this report to serve as a guide to current state efforts to promote increased availability of electrical generating power plants. The publication defines standard measures of plant performance and discusses the nature of data bases that report such measures.

It provides summaries of current state, federal, and industry programs to enhance power plant productivity and offers more detailed information about programs in seven states.

Based on its research, the working group recommends that, depending on local conditions, regulatory agencies should implement the following actions to promote cost-effective power plant productivity improvements:

- o Develop a commission position or policy statement to encourage productivity improvements by utilities
- o Coordinate state efforts with ongoing industry and government programs to improve the acquisition of power plant performance data and the maintenance of quality information systems
- o Acquire the capability to perform independent analyses of power plant productivity
- o Direct the establishment of productivity improvement programs, including explicit performance objectives for both existing and planned power plants, and a performance assurance program
- o Establish a program of incentives to motivate productivity improvement activities
- o Participate in ongoing efforts at all levels and initiate new actions to promote productivity improvements.

6.8 Working Group on Power Plant Productivity, "Recommendations for Regulatory Actions to Promote Power Plant Productivity Improvements, National Regulatory Research Institute, August 1979

The objective of this document is to provide recommendations for regulatory actions to promote cost-effective power plant productivity improvements and to furnish state commissions with a report that assists in evaluation of such programs. The working group reviewed existing mechanisms for assessing and improving productivity and surveyed data systems and analytical methods. The researchers developed a generic program aimed at promoting power plant productivity improvements; they assessed current industry, federal, and state programs. The findings of this study are:

- o Power plant productivity has been adversely affected by power plant design and manufacturing deficiencies
- o No single index is sufficient to assess plant performance
- o The major existing data bases is the generation availability data system (GADS)
- o None of the existing plant performance data bases provide sufficient information with which to determine the fundamental causes of plant outages
- o Comparisons of performance by unit size, type, and vintage can be made from the existing data bases
- o Cooperative studies conducted by DOE and state agencies have demonstrated that the expected benefits of improved power plant productivity are substantial
- o The opportunities for actions by state regulatory agencies may be limited by technical and statutory constraints.

The generic program designed and recommended by the working group requires regulatory agencies to take the following actions to promote power plant productivity improvements:

- o Acquire and support the development of power plant performance data and information systems
- o Acquire the capability to perform independent in-house analysis of performance
- o Direct the establishment of productivity improvement programs, including explicit performance objectives for existing and planned power plants
- o Develop a system of performance assurance
- o Establish a system of incentives, sanctions, and/or penalties
- o Participate in on-going efforts and initiate new actions to promote productivity improvements.

6.9 John R. Reilly and Alvaro V. Domingos, "Electric Power Plant Productivity Related to Plant Availability," Pennsylvania Public Utility Commission, Bureau of Conservation, Economics and Energy Planning, December 1980

The Pennsylvania Public Utilities Commission studies the potential for electric power plant productivity benefits from improved power plant availability associated with improved forced outage rates. The investigation addressed the following topics for coal units over 300 MW that are fully or partially owned by Pennsylvania, New Jersey, Maryland Interconnection:

- o The cause of lost output (MWH) and determination of improvement actions
- o The costs of improvement programs
- o The gross savings in generation costs and oil consumption from improvement programs
- o Evaluate the benefits/costs associated with improvement programs.

They estimated both the costs and potential improvements in forced outage rates associated with each unit and improvement program. The

basic study approach was to simulate operations, using production costs with current unit availability forecasts for 1982 and 1987 base cases.

The findings of the study are:

- o The estimated potential PJM pool net benefits in 1980 constant dollars for 1982-87 range from \$428 million to \$704 million for a given improvement program aggregate
- o There would be about 2.8 to 4.4 million barrels per year estimated reduction in the PJM pool oil consumption
- o The potential energy cost savings from improvements of the study units are very sensitive to the difference between coal and oil prices
- o The potential savings are sensitive to the percent composition of oil generation in the system, because the latter determines the percent of time that oil is being burned and hence can be displaced
- o Under the present regulatory climate, the estimated cost savings would be passed along to customers, without necessarily reflecting the offsetting changes in utility expenditures required to achieve the power plant productivity improvements
- o It is recommended the commission consider holding generic hearings or establishing a regulatory/utility study group to develop candidate policies to promote power plant productivity improvements.

6.10 Governor's Task Force on the Fuel Adjustment Clause, "The Fuel Adjustment Clause Question: A Report and Recommendation on Reform of the Fuel Adjustment Clause in Massachusetts," Mass. Department of Public Utilities, January 1981

The goal of the Governor's Task Force on the Fuel Adjustment Clause was to design a clause that minimizes the cost of fuel used in the production of electricity, consistent with the principles of minimizing the

total overall cost of a reliable supply of electricity to Massachusetts consumers. The task force adopted eight recommendations and endorsed statutory language to affect those recommendations. The purpose of the recommendations and legislation was to: 1) restructure the regulatory framework, 2) provide adequate funding to enable the Department of Public Utilities to regulate utility fuel use more effectively with that structure, and 3) set forth a standard of review to be applied by the DPU in reviewing utility fuel use.

The task force's recommendations are as follows:

- o The adoption of a uniform standardized fuel data reporting mechanism
- o The creation of annual, broad-based performance goals to monitor utility efficiency relating to fuel procurement and use
- o The continuation of quarterly FAC hearings and an expansion of regulatory oversight in those hearings
- o The establishment of a quarterly task force, within the DPU to conduct the performance review and quarterly hearings
- o Continued itemization of fuel charges on consumer electricity bills
- o Periodic review by the DPU of regional power exchange procedures
- o Adoption of procedures by the DPU to promote greater public accessibility to fuel adjustment clause proceedings.

6.11 Proceedings of the Third NARUC Biennial Regulatory Exchange, Ohio State University, 1982

The proceedings include papers on each of the following subjects:

- o Issues in regulating utility efficiency
- o A review of developing rate incentives to improve power plant availability
- o An incentive plan to control power plant construction costs
- o An analysis of incentives in fuel cost adjustment clauses.

In addition to describing in detail the model developed by the Utah Public Service Commission and summarizing other state incentive programs, the paper on utility efficiency describes some of the tradeoffs between different approaches to the measurement of efficiency.

The paper on incentives to improve power plant availability offers the recommendation that state regulatory agencies should consider incentives only as temporary vehicles for change, not as an on-going part of the rate structure.

The paper on incentives for controlling power plant construction costs highlights and compares the generic properties of three recent incentive programs designed to limit the cost of major facilities.

According to the paper on fuel cost adjustment clauses (FCAC), although computer simulation of financial outcomes of alternative FCAC provisions are helpful, other things being equal, a clause that is easy to understand and inexpensive to implement is highly desirable.

6.12 Pennsylvania Electric Utility Efficiency Task Force, "Lieutenant Governor William W. Scranton, III," Vol. I of II, March 1983

The task force concluded that the following principles should guide regulatory reform efforts to increase efficiency in the electric utility industry.

- o A utility's profits should be based not only on the book value of its assets, but also on the effectiveness with which those assets are used to meet service needs.
- o The regulatory agency should establish a mechanism that would allow electric utilities to receive explicit and prompt cost recovery and earnings incentives for productivity improvement programs.
- o Conservation and load management programs should be considered as a viable electric utility supply option.

- o Utilities should be allowed to earn from small-scale power production and cogeneration facilities the same PURPA rate that the utility pays similar generating facilities owned by competitive private firms.
- o Utilities should be encouraged to negotiate voluntarily the sale and purchase of assets at a fair market price.
- o Electric utilities should have the financial flexibility and capability to:
 - Redeploy assets and liabilities if necessary
 - Remain financially healthy
 - Meet the need for power in the future.
- o Well-designed experiments should be conducted to determine whether various forms of competition can increase electric utility efficiency.

6.13 Harry M. Trebring, Ed., Challenges for Public Utility Regulation in the 1980s, Proceedings of the Institute of Public Utilities 12th Annual Conference (East Lansing, Michigan: Michigan State University, 1981)

The general topics addressed by the papers contained in this document include:

- o Public utilities industries in transition
- o Conservation, efficiency, and public policy
- o The economics of cogeneration
- o Indexing and automatic adjustment clauses
- o Consumerism, regulatory reform, and welfare
- o Capacity planning, reliability, and outage costs in electricity supply
- o Issues in electric utility regulation, such as time-of-use-rates and regulatory alternatives for treating project cancellations and premature retirements.