PLANNING GOVERNMENT INSTITUTIONS: THE CREATION OF REGULATORY INCENTIVES FOR EFFICIENT PROVISION OF ELECTRICITY

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B.A., Johns Hopkins University

1970

L.L.B., Harvard Law School

1974

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF CITY PLANNING

of the

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

June, 1975

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Department of Urban Studies and Planning, May 9, 1975

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Page 81

TABLE OF CONTENTS

Abstract

I Introduction

II The Regulatory Commission: A Model of the Rate Regulatory Process

III The Firm: Models of Management Behavior

IV Incentives and Disincentives for Efficiency Under the Regulatory Model
A. The Effect of Regulation on Short Run Efficiency
B. The Effect of Regulation on Long Run Efficiency

V Regulatory Methods of Inducing Efficiency
A. Disallowance of Unreasonable Operating Expenditures
B. Exclusion of Imprudent Investments from the Rate Base
C. Refusal to Approve Securities to Finance Inefficient Investments
D. Operating Ratio Regulation
E. Varying Allowed Rate of Return With Level of Efficiency
Rewarding Efficiency With Return Above the Cost of Capital
Penalizing Inefficiency by Reducing Return Below the Cost of Capital
Sliding Scale Rate of Return
F. Promulgation of Standards for Utility Performance
Scope of Review
Dimensions of Performance
The All or Nothing Quality of Compliance

VI Conclusion

Footnotes

Bibliography

ABSTRACT

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submitted in partial fulfillment of the requirements for the degree of Master of City Planning of the Massachusetts Institute of Technology, June 1975

Because of their monopoly control over the generation, transmission, and distribution of electricity, a virtual necessity of modern life and an essential element of land and industrial development, electric utilities have traditionally been subject to more comprehensive government regulation than other industrial companies. Electric utilities are required by law to provide adequate electric service sufficient to satisfy public energy needs at just and reasonable rates. State and federal regulatory agencies review utility rates and service to ensure that this responsibility is met. But in most cases electric utilities in the United States are privately owned and operated and thus are constitutionally protected from deprivation of property without due process.

Particularly in light of public concern over rising utility rates, the regulatory process must be designed to encourage efficient provision of electricity. The public is unlikely to accept necessary increases in utility rates unless it is convinced that the utility companies are required to service public needs at the lowest possible cost. Any system of regulatory incentives for efficiency must take account of the dual, public-private character of the electric utilities.

Only in an inflationary economy does the traditional rate regulatory process create strong incentives for efficiency and in some conditions excessive investment in capital goods may be inadvertantly encouraged. While no single method of regulation seems likely to ensure maximum efficiency, efficiency incentives could be increased through a program of : strict disallowance of inefficient operating expenditures; review of the feasibility and efficiency of major capital investments prior to construction (possibly coupled with the use of performance standards) and exclusion of inefficient investments from the rate base; and rewarding of extra margins of return based on the degree of efficiency achieved.

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I INTRODUCTION

Just as the planning profession has expanded its scope beyond physical land use planning to include concern with health care delivery, education, poverty, and environment, planners cannot afford to be oblivious to the increasing cost and unavailability of energy, an essential element in urban and industrial development. As in these other areas planners must be concerned that government institutions dealing with energy problems are designed to serve the public interest. This study will examine the regulatory commissions, the institutions most directly concerned with one important segment of the energy industry, the electric utilities.

While all industrial companies are in some degree regulated by state and federal government, certain industries, such as electric utilities, have traditionally been subject to particularly comprehensive regulation. Because they are "natural" monopolies controlling a virtual necessity of life, electric utilities are required by state and federal law to provide the public with adequate service sufficient to satisfy public electricity needs at just and reasonable rates. State and federal regulatory bodies review utility rates and service to ensure that this responsibility is met. And yet, in most cases, electric utilities have been allowed to remain private businesses constitutionally protected from deprivation of property without due process.

Regulatory bodies have been designed to take account of this dual character of electric utilities. A major concern of regulation has been to ensure that the utilities do not earn monopoly profits but only a reasonable return on their capital investments. Until recently technological advances and the low cost of fossil fuels ensured that, despite healthy utility profits, rates were stable or even declining. Rate hearings attracted relatively little public attention.

But because of general inflation and rapidly rising energy costs, the regulatory commissions no longer face a complacent public.[1] Public resistance to further rates increases, even increases that may be necessary to ensure a reasonable return, is now a major factor with which the regulatory commissions must contend. The question of whether the electric utilities are efficient has become particularly important.

Since, even if the regulatroy process does not encourage efficiency, management may have incentives for efficiency outside of, or even in spite of, the regulatory system, the most direct way to approach this quesiton would seem to be to measure the current level of efficiency to determine if it is satisfactory. Efficiency should be reflected in price levels since inefficiency causes higher costs requiring higher prices. However, efficiency is a relative not an absolute concept; any quantitive measure of efficiency must be compared with some qualitative standard of efficiency if it is

to have any meaning. Thus, if a utility is able to produce and deliver electricity at a given price, this price must be compared with a second price, such as the price charged by another utility that provides comparable service under comparable conditions or an optimum price that reflects the most efficient possible mode of operation under such conditions. It is the lack of a standard of comparison that makes determinations of utility efficiency difficult.

Since electric utilities are usually granted monopolies in their respective geographic areas, there are rarely any competing utility companies with which a comparison can be made. It is questionable whether meaningful comparisons can be made among utilities in different geographic areas since differences in their costs may reflect differences in their service areas rather than in their efficiency. Unless the cost effects of such factors as load distribution, density of customers, type of customers (whether industrial and commercial or residential), economies of scale due to the size of the service area, and fuel costs can be accounted for, the variation in cost levels is not a relaible measure of management efficiency.[2] A company that appears to be more efficient than a second company, if subject to the same external conditions as the second company, might be unable to provide the same amount and quality of service at a lower or even at the same cost as the second company.

Even if valid comparisons can be made among utility companies, conclusions as to their efficiency would be of limited validity if regulation itself causes inefficiency. Since all electric utility companies are subject to essentially the same regulatory process, although conducted by different governmental bodies, any negative effect the regulatory process might have on efficiency would be masked by intercompany cost comparisons. A theoretically possible but impracticable approach (at least for this study) would be to analyze each utility company's system and develop an optimum system and an optimum price with which to compare the existing system and current rates.

Rather than attempting to directly measure efficiency, this study will focus on the regulatory process itself to see what incentives or disincentives it creates for efficiency. An assumption underlying this approach is that without sufficient regulatory incentives management will have no reason to seek to improve its level of efficiency and therefore will not provide electricity at the lowest possible cost. Utility management may in fact maximize efficiency because of professional pride and orientation which offsets any disincentives for efficiency that regulations might create. However, in light of the difficulty of demonstrating that utilities are efficient much less that management psychology provides sufficient motivation for maximizing efficiency, it seems important to have a regulatory process that encourages

efficiency. Further, the public is, legitimately or not, skeptical of the efficacy of management commitment to efficiency unless the level of profits is affected by the level of efficiency. It may be necessary to be able to demonstrate to the public that the regulatory process effectively rewards efficiency and punishes inefficiency before the public will accept rate increases that regulators find to be justified and necessary.

This study analyzes the efficiency incentives and disincentives created by the traditional procedure for regulation of utility rates. Although informal discussions, negotiations, and agreements between the utility company and the commission underlie decisions made through the formal rate review process, the study is confined to the formal process through which rates are set. Some possible modifications to the traditional review procedure are then examined as to their effect on efficiency and as to legal limitations on their implementation.

Utilities are regulated both on the state and federal level. Under the Federal Power Act, 16 U.S.C. §§791a-828e (1970), the Federal Power Commission had jurisdiction over facilities used for interstate sale and transmission of electricity and reviews all rates and charges in connection with such sale and transmission. Facilities for generation, intrastate transmission, and local distribution are left to state regulation. Federal Power Act, 16 U.S.C. §824(b); see Connecticut Light and Power Co. v. Federal Power Commission, 324 U.S. 515 (1945). Although most states have by statute cre-

ated a state regulatory commission with jurisdiction over public utilities within the respective state, the commissions in California, Florida, Michigan, and New York are used as representative examples of rate regulation in this study. Decisions concerning other state commissions and the Federal Power Commission are also noted where appropriate.

II THE REGULATORY COMMISSION: A Model of the Rate Regulatory Process

Regulatory commissions are required by statute[3] and case law to set rates that are "just and reasonable," which the United States Supreme Court in Federal Power Commission v. Hope Natural Gas Co., 320 U.S. 591, 603 (1944), described as follows:

> "(T)he fixing of 'just and reasonable' rates involves a balancing of the investor and consumer interests...the investor interest has a legitimate concern with the financial integrity of the company whose rates are being regulated. From the investor or company point of view it is important that there be enough revenue not only for operating expenses but also for the capital costs of the business... the return to the equity owner should be commensurate with returns on investments in other enterprises having corresponding risks. That return, moreover, should be sufficient to assure confidence in the financial integrity of the enterprise, so as to maintain its credit and to attract capital."

Aside from this general standard, the regulatory commissions are "not bound to the use of any single formula or combination of formulae in determining rates... Under the statutory standard of 'just and reasonable' it is the result reached not the method employed which is controlling...if the total effect of

the rate order cannot be said to be unjust and unreasonable, judicial inquiry...is at an end." Federal Power Commission v. Hope Natural Gas Co.320 U.S. at 602.

Although rates must yield sufficient gross revenue to cover operating expenses, interest costs, and fair return on equity investment, the commissions are not required to accept unreasonable expenditures as operating expenses to be recovered through permitted rates. Acker v. U.S., 298 U.S. 426 (1935). The capital investment of the utility (which may be measured by original cost, "fair value," or reproduction cost) may also be reviewed by the commission as to its reasonableness. Only capital investment that is "used and useful" in the regulated business can be included as part of the rate base on which a return is earned. Denver Union Stockyard Co. v. U.S., 304 U.S. 470 (1938). The commission may disallow capital investments for which there is no present or imminent use. Columbia Gas & Fuel Co. v. Ohio Public Utility Commission, 292 U.S. 398, 406-407 (1934).

In setting just and reasonable rates, most commissions apply a cost of service analysis. In regard to the Federal Power Commission see South Carolina Generating Co., 16 FPC 52 (1956), reviewed and remanded on other grounds as South Carolina Generating Co. v. Federal Power Commission, 249 F.2d 755 (4th Cir. 1957). A representative test period, usually the twelve months immediately prior to initiation of the rate review, is selected and expenditures during the period for the operation of utility facilities are examined as to their reasonableness and, in some cases, adjusted for anticipated

future conditions. Unreasonable expenses and unusual expenses unlikely to be repeated in the future are disallowed.

The cost of acquiring the capital necessary to construct the utility's facilities is similarly reviewed. The cost of capital, which is treated as a percentage of the utility's rate base, includes interest on debt obligations, dividends on preferred stock, and return on common stock (i.e., dividends plus undistributed surplus) necessary to attract equity investors. The cost of capital is a function of the anticipated return and risks to the investors providing the capital and will necessarily vary from case to case. "Ultimately, the recommended rate of return is an exercise in judgement, based on educated knowledge of the utility company under consideration and its relative position (in terms of risk) vis-a-vis alternative companies competing for capital."[4] While the cost of debt and preferred stock is determined by looking to their average embedded costs (i.e. the average cost per capital dollar paid by the company for all outstanding debt or preferred stock respectively), the determination of the cost of common stock requires an evaluation of the return currently required by prospective equity investors.

The utility company is then allowed to increase its rates or required to decrease its rates depending on whether total allowed operating and capital costs were less than or exceeded total revenues during the test period. Total test period revenues may be adjusted for unusual conditions not expected

to reoccur during the next rate period. (e.g.,City of Pittsburgh v. Pennsylvania Public Service Commission, 187 Pa. Super. 341, 144 A2d, 648, 658 (1958). Rates are set so that they would yield in the test period revenues sufficient to cover allowed expenses.

The rate review process is primarily concerned with the level of net profit of the utility company and not with the question of from which customers such profits are realized. Although many state statutes prohibit discriminatory rates (e.g., California §728; Florida § 366.06; Michigan §460.557; New York §66(5)), rate design (or the variation of rates with the level of consumption and type (industrial, commercial, or residential) of customer) is left largely to the companies so long as total profit for the test year under the requested rates would not exceed allowed operating and capital costs. Recent concern over energy conservation has led some commissions to question traditional rate design policies, such as declining rates per kilowatt hour as usage increases. E.g. Michigan Department of Commerce News Service, p. 267 (January 23, 1975) (Commission studies on rate structure design including time of day, pricing, and inverted residential rate). This study is confined to examining the effect of the process of profit regulation on company efficiency and does not go into issues of rate design.

III THE FIRM: Models of Management Behavior

The economic model of competition assumes that in any given market area there are many producers, each of whom produces only a very small portion of the total amount of the product that is demanded, so small in fact that changes in the output of a single company has no effect on the market price of the product. Under such conditions the firm must minimize its operating and capital expenses per unit output in order to survive. Customers can purchase the same product from any of a large number of competing firms and will buy from the firm offering the lowest price. The company's survival depends on its ability to reach a level of efficiency at least equal to that of its competitors. If the company must sell at a higher price than other companies in order to cover its costs, all its customers will switch to the lower price producers. Even if a company is already as efficient as or more efficient than its competitors, it must still be concerned with possible future cost cutting by competing firms or with the entry of a new firm that can produce at a lower cost per unit output.

Because of the difficulty of new entry due to the high cost of duplicating electric generation, transmission, distribution systems and because most commissions assign exclusive service areas, electric utility companies are not under the same kind of market pressure as a firm in the competitive model.[5] The economic model of momopoly provides a better basis for predicting utility behavior than the competitive model.

Traditionally, economists have assumed that the monopolist, like the competitive firm, is a profit maximizer. As the only supplier of a given product in a particular market, the monopolist can determine market price by adjusting his output. He tends to reduce his production, and thus total supply, below the level in a competitive market in order to raise the market price to his profit maximizing price, which is higher than the price a competitive market would yield. As the monopolist cuts production, the price rises and his profit per unit sold increases. But with higher prices there is less demand (depending on the price elasticity of demand) and fewer units are sold. At some point, i.e., the profit maximizing price, total profit, which is profit per unit times total units sold, reaches a maximum.

While his economic survival does not depend on his efficiency, the level of profits the monopolist will realize varies with his ability to minimize costs. If his operating and capital costs decline, he can make more profit per unit while selling the same number of units by keeping the price the same or make the same profit per unit but sell more units by reducing his price.

The monopoly model must be modified if the assumption of profit maximization is dropped. In an effort to account for actual business behavior, economists have developed alternative behavioral assumptions.[6] If the managers of a company are not

major stockholders, the consequent separation of ownership and management means that the persons with immediate control over the level of company efficiency are not the prime beneficiaries of increased profit from cost cutting. The manager is rewarded for his efforts more by salary, status, power, prestige, and fringe benefits, which may vary more with the size of the company than with its profitability, than by dividends and capital gains from stock.[7] Thus, he may be more interested in maximizing total sales than net profit. Or he may want to increase his fringe benefits rather than minimize such costs in order to minimize company profits.

Further, whether or not the manager is a major stockholder, he may value his leisure and peace of mind more than the extra profits possible through constant vigilance over company costs and therefore may be content with less than maximim possible profit. Finally, he may accept less than maximim profit because he fears that such a high level of profits would attract public attention and result in strict regulation of his profits or in antitrust actions.

But even under these alternative models of management behavior, management cannot be completely oblivious to profitability. While management may not be interested in maximizing profit, the stockholders would like to maximize the return on their investment and have the power to remove management when they are dissatisfied with its performance. But stockholders tend

to be geographically dispersed and disorganized and not knowledgeable about the company or its potential for profit. So long as the level of profit seems to be reasonable, they are not likely to threaten to remove current management.[8] Thus, while management may not be motivated or pressured to maximize profit, profits and efficiency must still be kept at a reasonable level so as not to arouse the stockholders. A management that seeks to maximize sales may strive for maximum efficiency, depending on the price elasticity of its product, although it will not limit production to keep the price at the profit maximizing level.

The validity of the behavioral theories that are alternatives to the profit maximization assumption seems to depend on the particular circumstances under which a given manager acts (e.g., the method of compensation or the value placed on leisure) making it diffucult to use such theories to draw any general conclusions about management behavior. Because of the difficulty of applying these alternative theories and since their predictions of management behavior differ from those under the profit maximizing model only after a reasonable level of profit has been reached, this study will assume that electric utility managements seek to maximize company profits. However, even with this assumption, the traditional monopoly model must be modified in order to apply to the regulated monopolist.

IV INCENTIVES AND DISINCENTIVES FOR EFFICIENCY UNDER THE REGULATORY MODEL

Before examining how regulation affects management behavior

and utility efficiency, it is necessary to develop some concept of what is meant by the term "efficiency." Efficiency can be viewed both from a short run and a long run perspective. Short run or operating efficiency involves operation of existing plants to produce a given output, i.e., sufficient electricity to meet public needs at a given time, at the minimum cost. The short run is too brief a period for a utility company to make any major change in or additions to its physical plant although adjustments can be made in the use of these facilities. A company could change the amount of electricity it generates itself relative to the amount of energy it purchases from other utility systems or might convert some plants from one type of fossil fuel to another.

Long run efficiency, or efficiency of capital investment in physical plant for generation, transmission, and distribution, involves the choice of the future mix of factor inputs, i.e., natural resources, land labor, capital, and technology, which yields the minimum cost of meeting future public electricity needs. In the long run physical plant can be significantly altered; the number and capacity of facilities can be changed and entirely new technologies can be adopted. A utility company can also alter the extent to which plant construction and generation and transmission are coordinated with other utility systems.

While long run and short run efficiency can be conceptually distinguished, there is no precise boundary between them.

Both are reflected in the rates charged by a utility company at any given time since allowed costs often include both present operating costs and capital costs on funds borrowed for the construction of plants not yet in operation. Further, a company's choice of technology in future capital investments involves tradeoffs between the required level of capital investment and cost of operating such facilities once they are in operation. For example, while nuclear plants require a larger investment of capital than fossil fueled plants, this disadvantage may be offset by the lower cost of operating and fueling the nuclear plant.

A. The Effect of Regulation on Short Run Efficiency

The electric utility company is a monopoly but one which is subject to state and federal regulation. Electric utilities have traditionally allowed, or even required, to be monopolies because they were considered to be "natural" monopolies, i.e., monopolies resulting from the nature of the industry rather than from any anticompetitive conduct on the part of management. If competition were allowed in such an industry and the companies did not refrain from vigorous competition, the economies of scale inherent in the technology of the industry presumably dictate that eventually monopolies would emerge. But in the interim the public would suffer from: either destructive competition resulting in prices so low that no company would have sufficient revenue to ensure safe and adequate service or prices higher than if economies of scale

were fully realized; concentration of companies in lucrative markets resulting in lack of service in less lucrative markets (a process known as "cream skimming"); and in unnecessary and costly duplication of massive capital investments such as generating plants and transmissions lines.[9] But in the absence of competition government regulation was considered necessary to prevent the utility company from acting like a monopolist, i.e., reducing output and increasing price above the competitive level in order to realize a monopoly profit. The regulatory commission requires that service to the public be adequate to meet public needs and limits the rates that can be charged so that only a reasonable profit is earned. Rates must cover operating and interest costs and yield only a reasonable rerurn on equity which is at least equal to the cost of attracting capital investment.

Although the commission has the power to disallow expenses it considers unreasonable, commission give their principal attention to limitation of profits rather than costs[10] so the regulated company operates under virtually a cost plus contract. The utility seems to have no incentive to reduce operating costs since the return allowed by the commission does not vary with the level of costs but is solely a function of the cost of capital and the amount of the rate base. (The feasibility and effect on efficiency of strict disallowance of inefficient operating and capital expenditures will be examined along with other possible modifications of the rate setting

process. See infra. section IV(A)).

However, rates are set prior to the provision of the service for which they may be charged and are set so as to cover an estimate of the operating costs for the future rate period. The utility can increase its profits by reducing total operating costs per kilowatt hour below the level anticipated by the rate makers. For example, if in the test year operating expenses are $1,000, output is 100 kilowatthours, capital investment is $10,000, and the cost of capital is 10% (5% going to debt holders and 5% to equity holders), total allowed revenue equals $2,000 and the average kilowatthour will be priced at $20. This price embodies a ratio of $10 operating expenses and $100 capital investment per kilowatthour. If output is doubled without additional capital investment and operating expenses increased only 50%, gross revenues under the current rates will total $4,000, net revenues equal $15,000, and the ratio of operating expenses to output declines to $7.50 per kilowatthour. The rate of return on total capital investment increases to 15%, with return to equity rising to 10%. Rates embody both the test year ratio of operating expenses to output (or operating cost ratio) and the test year ratio of capital investment to output (or capital investment ratio) and changes in these ratios during the rate period from their test year levels result in earned rates of return different from allowed return. See, North Carolina ex rel. Utilities Commission v. Morgan, 278 N.C. 235, 179 S.E.2d 419, 420-421(1971). A decrease in the operating

cost ratio results in an increased earned return if there is no offsetting increase in the capital investment ratio.

Profits earned above the expected reasonable rate of return are revenues from rates which the commission by statute could allow to become effective only after finding them to be just and reasonable. Such excess profits are the exclusive property of the utility and cannot be recaptured by the commission attempting to retroactively repeal its own enactment. Arizona Grocery Co. v. Atchison, Topeka, and Santa Fe Railway Co., 284 U.S. 370, 389 (1932). Similarly, if the utility is unable to earn the profit allowed by the commission this deficit cannot be made up by a more than reasonable allowed return for the next rate period although it will certainly influence the commission's decision as to what is a reasonable level of allowed costs or return for the next rate period.[11]

The incentive to cut costs is dampened by the fact that the lower operating cost ratio actually realized in the rate period will then be reflected in estimated operating expenses on which rates for the next rate period will be based. The savings from increased operating efficiency will then be passed on entirely to the public in the form of lower rates and will no longer benefit the company.

Only if the company is able to constantly reduce costs will its profits continue to be greater than that of a less efficient

company. In a competitive market the firm that succeeds in making certain cost reductions retains a profit advantage until its competitors are able to achieve comparable economies. The regulated monopolist must in effect compete with his own previous performance rather than with the performance of other firms. The utility with the highest profit is not the one which is the most efficient but the one that has most improved its efficiency over its last test period. And that utility will then find that if it only maintains and does not further improve on this level of efficiency, its profit for the next period will drop back to its cost of captial, the same return that is allowed for utility companies of average efficiency.

But commissions are not required to review rates unless a utility company files a request for a change in the rates or a consumer complains that current rates are not just and reasonable. During periods of declining or stable costs and technology rate reviews may be relatively infrequent.[12] Further, since the rate review procedure is lengthy and complex, there are often long delays between changes in actual operating costs since the rates were last reviewed and compensating adjustments through new rates. And the test period on which the new rates are based may not fully reflect costs at the time the rate review process is completed since the test period, consisting of the 12 months immediately prior to the initiation of the rate review, may be outdated if costs continue to change during the long rate hearings. The longer the delay in reflecting full costs, or regulatory lag, the greater the amount of profits that can be

retained as a result of lower than expected costs and the greater the incentive to cut costs. On the other hand, when inflation of costs during the lag period threatens the firm's ability to earn even the "reasonable" return allowed by the commission to cover the company's cost of capital, the pressure on the utility to be more efficient becomes comparable to the pressure competing firms put on each other; the regulated utility must be efficient in order to survive. In recent years many utilities have been unable to earn their allowed return even though rate reviews have been more frequent than in previous years when costs were relatively stable or declining.

Thus, regulation seems to create some incentive for greater operating efficiency. This incentive is particularly strong when a company faces long regulatory lag during an inflationary period. However, this incentive is largely the result of weaknesses in the regulatory system rather than of a conscious institutional effort to induce efficiency. While these weaknesses strengthen incentives for efficiency, they also have the undesirable result of making it difficult for utilities to earn a reasonable return during an inflationary period regardless of how efficient they are. Recognizing this problem, many commissions have begun to make changes in their regulatory procedure. Rate review is being streamlined and simplified in order to reduce regulatory lag. Reform has been proded by statutes limiting the time within which state regulatory commissions must make their final rate determinations (e.g.,

Michigan §460.6a(3) (Supplement 1974); New York §66(12) (Supplement 1974)) and by court decisions requiring that test year expenses truly reflect future expected costs and that rates of return include a margin for the effects of inflation on operating expenses.[13] Some commissions now make adjustments in the test year costs to account for future inflation.[14] Often fuel cost increases are passed on directly to the customers through fuel adjustment clauses without any prior rate hearings.[15] While these reforms will make it more likely that utilities will be able to earn their allowed return since allowed rates will more accurately reflect actual costs for the period during which they are effective, they will also reduce the pressure on management for greater short run efficiency.

B. The Effect of Regulation on Long Run Efficiency

Just as a company can realize excess profits by reducing its operating cost ratio, return can be increased by a reduction in the capital investment ratio. The commission estimates the dollar cost of capital by multiplying a percentage cost of capital times the average or year end test period rate base. No estimate is made of additional capital investments to be made in the future period and percentage cost of capital is based on the embedded cost of debt and preferred stock and on the current cost of common stock (i.e., the return equity investors would demand on the next additional share).

The commission apparently assumes that the cost of acquiring additional capital will not vary significantly with the amount

of new capital investment to be made by the company during the rate period. Perhaps this assumption is necessary because estimates of the cost of capital are too imprecise for adjustment to be made for the effect of varying amounts of additional capital investment. Also the amount of addition to the rate base in the future is somewhat speculative since commissions include in the rate base only completed physical plant and sometimes either the value of plant under construction or interest payments on plant in construction. E.g., Shevin v. Yarborough, 274 So.2d 505, 510 (1973). Companies are often unable to meet their construction schedules. But see Rochester Gas and Electric Corp., 96 PUR 3d 475, 480 (New York Public Service Commission 1972) (permitting nonrevenue producing facilities to be completed in the near future to be included in the current rate base).

The commission also assumes that the ratio of capital investment to kilowatthour output will remain the same during the rate period as during the test year. If, as in the previous example, the test year operating expenses are $1,000, output is 100 kilowatthours, capital investment is $10,000, and the cost of capital is 10%, total allowed revenue equals $2,000 and the average kilowatthour will be priced at $20. This price embodies an assumption of a capital investment ratio of $100 per kilowatthour. If the ratio is reduced, e.g., if new physical facilities produce more kilowatthours per dollar invested than existing facilities, without any rate increase company return would increase to

the extent that the reduced capital investment ratio is not offset by an increase in the operating cost ratio. If new plant which doubles output costs only $5,000, revenues under current rates will total $4,000 and the capital investment ratio will decline to $75 per kilowatthour. If operating expenses per kilowatthour increase only proportionately with output so that net revenues equal $2,000, the rate of return on total capital investment of $15,000 increases to 13.3%, with the increase going to the equity holders. Thus, a company may realize excess profits by reducing the capital investment ratio, i.e., by increasing the efficiency of their capital investment decisions.

As in the case of operating expenses, the incentive to maximize efficiency is weakened by the fact that savings from a reduced capital investment ratio are realized only until the commission reviews current rates and adjusts them to reflect the capital investment ratio. But regulatory lag lengthens the time during which savings can be retained.

Further, if allowed return on capital exceeds the cost of capital, overinvestment in capital goods may be inadvertantly rewarded sufficiently to offset any potential savings from capital investment efficiency. Since the dollar amount of profit varies with the dollar amount of capital invested, if the cost of attracting additional capital is less than the return on additional capital allowed by the commission, the company has an incentive to use more capital than the amount that would achieve maximum long run efficiency. In effect, the cost to the company of using additional capital is reduced by a subsidy allowed by the

commission in the form of an inflated estimate of the future cost of capital. It is to the benefit of the company to extract this subsidy from the public so long as the price, indluding the subsidy, that is charged to the public is lower than what would be the profit maximizing price if the company were an unregulated monopolist. If the price remains below the profit maximizing price, any reduction in demand resulting from a higher than necessary price is more than offset by the greater profit per unit sold and the company can increase its total dollar profits by overinvesting.[16] Since the cost of capital is the return investors would earn on other investments of comparable risk and the allowed return is above the cost of capital, the company is able to earn for its shareholders a return on economically inefficient investments that is higher than they could earn on alternative investments of similar risk.

If the commission correctly estimates the cost of captial for the rate period, there is no incentive for management to overinvest in capital goods. But, as noted earlier, the determination of the cost of capital, particularly that portion relating to the return to equity, cannot be precise and is more in the nature of a judgement or rough educated guess than a calculation. The likelihood of a commission erring on the high or low side would seem to depend at least in part on the economic and political pressures on the commission at the time of the rate hearings. If company has had difficulty selling its securities or must raise large amounts of new capital, the commission might tend to add

a margin to its estimate of the cost of equity in order to be on the safe side.[17] On the other hand, a public concerned with inflation may bring strong pressure against rate increases with the result that the commission sets return on the low side.

Further, a margin between actual cost of capital and allowed return on capital will create an incentive for overinvestment only if the company is able to earn in the rate period a return equal to the allowed rate of return (or at least higher than the actual cost of capital) on the enlarged rate base. Two conditions are necessary for the company to earn the allowed return. First, the commission must permit the company to raise rates after the additional capital investment is made.[18] Since current rates are based on the test period capital investment ratio and overinvestment by definition increases the amount of capital per kilowatthour, rates must be increased if the high allowed rate of return is to be earned on the increased rate base.

For example, if in the test year operating expenses are $1,000, output is 100 kilowatthours, capital investment is $10,000, the cost of capital is 10%, and allowed return is 15%, the average kilowatthour is priced at $25 and the capital investment ratio is $100 per kilowatthour. If new facilities are constructed that double output but cost $20,000 and the operating ratio remains constant, net revenues under current rates will total $3,000. Earned rate of return on the new total capital investment of $25,000 is only 10%, which is equal to the cost of capital. The company has reduced its rate of return below what it would have otherwise earned since it can realize an excess

rate of return on its new investment only after rates are increased. The longer the lag between rate adjustments, the longer the period of reduced rate of return. Until rates are increased, overinvestment could increase the capital investment ratio sufficiently to reduce earned return below the cost of capital, e.g., if the new facilities in the example cost more than $20,000. The company must sacrifice a temporarily reduced rate of return for future excess return and presumably will be reluctant to overinvest to the point that earned return is below the cost of capital for any significant period of time.

A second condition for earning allowed return is that operating costs allowed by the commission must be at least as high as actual operating costs until the next time the commission revises rates. Since any excess of actual costs over the allowed costs reduces actual return, inflation of costs that is not anticipated in the level of operating costs allowed by the commission will reduce the ability of the company to earn a rate of return greater than its cost of capital. In recent years many utilities have not been able to earn their allowed return because of inflation and lag in regulatory response to cost increases.[19] Even if allowed rate of return is set higher than the cost of capital, the earned rate of return may be below the cost of capital and the incentive for overinvestment eliminated.

Commissions have tried to reduce the adverse effect of inflation on earned rates of return by permitting rates to increase monthly with increases in the cost of fuel through fuel adjustment clauses. Since increases in fuel costs can be

recovered almost immediately and often without a hearing while increases in capital costs can be recovered only through lengthy, public rate hearings, there may even be some management bias toward new facilities that are less rather than more capital intensive if a company is unable or unwilling to sustain short term reductions in rate of return. But reforms reducing regulatory lag as to other operating and capital costs increases the likelihood that allowed return can be realized on over-investment and reduces the period of depressed return created by an increased capital investment ratio.

Overinvestment in an inflationary period may be undesirable for a second reason. Because of public sensitivity to price increases, the utilities may find it necessary to maximize long run efficiency in order to keep to a minimum the rate increases they will need and so increase the likelihood that the commission will grant increases that are unavoidably necessary. As a result of growing demand for electricity (which continues to grow although, because of recent energy conservation and economic recession, at a lower rate than that of previous years), inflation of construction costs, new standards for environmental protection, and the need to convert from usage of increasingly scarce fossil fuels, the electric utilities will need vast amounts of new capital if they are to meet public energy needs.[20] Without increased rates the companies may be unable to acquire this needed capital.

In order to attract capital, a utility must have sufficient

return to capital. Long term capital is raised primarily through the sale of bonds and common stock (and to some extent preferred stock). A prime determinant of interest on utility bonds in the bond rating assigned by bond rating companies, which grade bonds according to risk of default on repayment on principal and interest. The higher the rating, the lower the interest demanded by prospective purchasers of the bonds. Ratings depend heavily on the ratio of net income before interest to total interest payments owed by the company (which is known as the income ratio).[21] Inflation brings a rise in interest for new bonds issued by the company and in interest on short term borrowing as well as an increase in operating costs, all of which increases reduce income coverage and so threaten the rating of the company's bonds unless revenues are increased sufficiently through a rate increase. If the rating of the company's are downgraded, the consequent increase in interest necessary to sell bonds only further threatens income coverage. This vicious cycle may culminate in the reduction of income coverage to the point where no further bonds can be sold.

Bonds are issued under a bond indenture, which is essentially a contract between (1) existing and prospective bondholders represented by a trustee (usually a bank) and (2) the company, in which the company makes certain promises in order to induce purchase of the bonds. In most cases the indenture provides that the bonds be secured by the physical assets of the company and that add-

itional bonds may be issued from time to time as the company adds new physical assets so long as the amount of additional bonds is limited to a given percentage of the additional physical assets.[22] The indentures also usually require that a minimum income coverage ratio be maintained before additional bonds can be issued.[23] This provision will prevent a utility from issuing bonds if its income coverage ratio had been eroded to the minimum level.[24] The electric utilities have experienced a downward trend in both income coverage[25] and bonds ratings[26] since 1965 and in many cases are approaching the minimum coverage required by their outstanding indentures.

Reduced income coverage also reduces the attractiveness of utility stock since it increases the risk that there will be insufficient income after interest to yield the return on equity anticipated by the equity holders. Because of this increased risk potential stockholders demand greater return per dollar that they invest. In order to induce them to purchase stock the utility must lower the price of its shares, increasing the earnings per invested dollar since each share is entitled to the same percentage of net earnings regardless of the price paid for the share.

A second cause of the demand for higher return to equity and thus lower share prices is the general rise in what can be earned through other investments, e.g., the rise in interest rates on utility bonds or bonds in other industries. Bonds have a legal claim prior to equity's claim to earning in that dividends and earned surplus are the residue of gross income once operating

costs and bonds interest are paid and distributions are discretionary. Since bond holders also have a prior claim to company assets if the company goes into bankruptcy and reoganization (Bankruptcy Act, 11 U.S.C. §§ 501-799 (1970)), the equity holder bears a greater risk than the bond holder and so demands some margin of return over bond interest to compensate for that risk. As interest rates rise, return to equity must also rise to maintain that margin.

But if the price of new shares falls below the net assets or book value per share, the holdings of current shareholders are diluted. Dilution takes place when the earnings per share decline. Since the allowed return on equity is fixed by the commission for a given rate period, earnings per share will not rise unless the commission increases the allowed equity return by raising rates (or unless the level of operating or investment efficiency is improved). If shares are sold below book value, the company's earnings must be divided among a greater number of shareholders but these earnings will not increase proportionally with the increase in share holders since the newest shareholders contributed less capital per share on which the company earns the allowed return. For example, while the number of shares is increased by 10%, the amount of capital and thus the amount of allowed earnings increases less than 10%. The share holder who paid an amount equal to or greater than book value for his shares has lower earnings per share than he had prior to the sale of stock at below book value. Many utilities have found it necessary to offer their new shares at a price below book value to

attract investors.

But prospective investors may become reluctant to purchase utility shares even at such a low price if the utility's earnings do not seem likely to improve in the near future. Although it is the current shareholder's holdings that are being diluted in order to attract the prospective investor, when the company attempts to raise further equity in the future, the company may have to offer shares at a price even lower than the current below book price, diluting the shares that are currently being offered. As a result, investors may be reluctant to buy the shares at any price unless the commission increases allowed return.[27]

Although commissions are legally required to set rates to yield a return at least equal to the cost of capital so that the companies can raise needed capital, commissions have significant discretion in setting return to capital since the "cost of capital" is such an imprecise concept. And the courts will not substitute their judgement for that of the commission but will uphold commission decisions so long as they are supported by the evidence. The actual return earned by the company in the period for which the rates are set is also affected by the commission's determination of what costs will be recognized, a decision which also involves significant discretion. Any excess of actual costs over allowed costs must come out of allowed earnings. A commission that is pressed by public concern over rising utility rates

may tend to resolve questions of the appropriate level of allowed costs and return on the low side. But the lower the rate increase requested, the more likely the commission will grant the amount requested and amounts requested in the future. Since it is therefore in the interests of the company to minimize the rate increases it needs, the company will not be able to afford the luxury of overinvestment to increase the rate base.

In summary, in an inflationary economy with public hostility to rate increases, the incentive to increase the rate base in order to increase allowed earnings is reduced. The companies have sufficient difficulty raising essential capital without adding to that burden through overinvestment, and they can realize savings by reducing the capital investment ratio below the ratio embodied in the rates until the next rate review. Regulatory reforms that reduce the financial pressure on utilities also reduce the need for investment efficiency. Thus, as in the case of short run efficiency, the incentive for long run efficiency is the result of the regulatory system faltering in the face of inflation rather than the result of a conscious effort to encourage efficiency.

V. REGULATORY METHODS OF INDUCING EFFICIENCY

It seems desirable that the rate regulation process be designed to encourage short run and long run efficiency in the generation, transmission, and distribution of electricity. Six possible methods of inducing efficiency through the regu-

latory process will be examined as to their economic effect and their administrative and legal feasibility.

A. Disallowance of Unreasonable Operating Expenditures

Most state regulatory commissions are required by statute to ensure that the public receives adequate service at reasonable rates. Since operating costs, including taxes consume a major portion of gross revenues (72% as of 1972)[28], it would seem that the body charged with limiting rates to a "reasonable" level should concern itself with the reasonableness and economy of test year operating expenses claimed by the utility and which, if not disallowed for some reason, must be covered by rates for the future rate period.

When a portion or all of a particular test period expenditure is disallowed for rate purposes, revenues earned during the test period are not affected. Such revenues are the proceeds of rates which the commission previously determined to be just and reasonable so that the commission has no authority to reduce past revenues by the amount of expenditures now found to be unreasonable. However, the utility has an incentive not to repeat the disallowed expenditure in the next rate period. Since the new rates only provide sufficient revenue to cover the lower allowed level of expenditures plus a given rate of return, expenditures above that level must come out of allowed return.

Whether or not a commission disallows inefficient operating expenditures, company incentive to seek out on its own initiative

means of minimizing operating expenditures is weakened by the fact that the company retains the savings from reduced expenditures only until the next rate review. If the commission carefully eliminates unnecessary and inefficient expenditures from allowed operating expenses, the company is forced to reduce expenditures which the commission finds have not been reduced to a reasonable level.

Historically the ability of regulatory commissions to disallow operating expenditures made by the utility companies has been limited by federal due process as interpreted by the courts. Although the public utilities are burdened with statutory duties to the public and are subject to public regulation, they are in most cases privately owned and constitutionally protected from deprivation of property without due process so that the investors' interest in receiving return on their capital investment cannot be ignored by the regulatory commission. Federal Power Commission v. Hope Natural Gas Co., 320 U.S. at 603; Bluefield Water Works and Improvement Co. v. Public Service Commission of West Virginia, 262 U.S. 679, 692 (1922); Chicago, Milwaukee and St. Paul Railway Co. v. Minnesota, 134 U.S. 418, 454 (1889). The right to property was interpreted to include the right to use one's property as one saw fit. Thus, the commission was to protect the public interest but had not right to substitute its judgment for that of the owners and management. The public through the commission was not to act as the general manager of the regulated company since it was not "clothed with the general power of management incident to ownership."

State of Missouri ex rel. Southwestern Bell Telephone Co. v. Missouri Public Service Commission, 262 U.S. 276, 289 (1923). See also Chicago Milwaukee and St. Paul Railroad Co. v. Wisconsin, 238 U.S. 491, 501 (1915); Interstate Commerce Commission v. Chicago Great Western Railway Co., 209 U.S. 108. 118 (1908).

Since a commission could not interfere with the business judgement of private management, it could not disregard actual expenditures made by the company unless such expenditures were an abuse of discretion because they had been made in bad faith. State of Missouri ex rel. Southwestern Bell Telephone Co. v. Missouri Public Service Commission, 262 U.S. at 289. By requiring the commission to show bad faith or fraud and not simply bad judgement, the courts erected a substantial obstacle to the use of disallowance as a means of inducing management efficiency. Motivation is always difficult to prove. Further, inefficiency that is caused by carelessness or laziness or mistake could not be reached under the Southwestern Bell Telephone standard.

The business judgement doctrine was primarily grounded in an interpretation of due process that strictly limited the extent to which the state could interfere with private business and held that certain substantive areas of private economic activity were inviolate. The state could not set a minimum wage since due process included the freedom to negotiate and contract for employment of labor. Adkins v. Children's Hospital of the District of Columbia, 261 U.S. 525 (1923). Similarly, a statute limiting the hours per day that employees could work was con-

trary to due process. Lochner v. New York, 198 U.S. 45 (1905). But because the Supreme Court found that the doctrine of substantive due process required the Court to judge the desirability of statutory efforts to solve economic and social problems and to impose its economic and social philosophy on legislatures, the Court revised its due process standard. Rather than prohibiting the legislatures from intervening in certain substantive areas, the Court would uphold statutes if they had a reasonable relation to a proper legislative purpose and were not arbitrary or discriminatory. E.g., Nebbia v. New York, 291 U.S. 502 (1933) (holding that fixing of prices of businesses that are not public utilities is not per se unconstitutional); West Coast Hotel v. Parrish, 300 U.S. 379, 391 (1937) (upholding a minimum wage statute for women and overruling Adkins); U.S. v. Carolene Products Co., 304 U.S. 144, 152 (1938) (upholding a statutory ban on shipment of milk mixed with nondairy fats or oils); Olsen v. Nebraska, 313 U.S. 236, 246 (1941) (upholding a statutory limitation on the fee charged to job applicants by private employment agencies); Lincoln Federal Labor Union v. Northwestern Iron and Metal Co., 335 U.S. 525, 536 (1949) (upholding a state constitutional amendment forbidding denial of employment for failure to join a union); Day Brite Lighting Inc. v. Missouri, 342 U.S. 421 (1952) (upholding a statute entitling employees to be absent from work without deduction in pay in order to vote); Williamson v. Lee Optical of Oklahoma, Inc., 348 U.S. 483, 488 (1955) (upholding a statute making it unlawful for persons

other than licensed opthalmologists or optomologists to fit or replace lenses and prohibiting sale of eye glasses by use of advertising and rental of space in retail stores to offer eye examinations).

With substantive due process largely removed as an obstacle to state intervention in economic activity (except where such intervention encroaches on rights specifically protected by the first ten amendments to the Constitution[29]) the limitations on disallowance of expenditures also were loosened. While in Southwestern Bell Telephone the Court refused to allow a commission to disallow payments made by a utility to its parent company, in Smith v. Illinois Bell Telephone, 282 U.S. 133 (1930), the Court held that a commission need not prove bad faith in order to disallow payments by a utility to its parent but could inquire into the reasonableness of the net earnings of the parent from such transactions. A showing that the price charged was no more than that charged by independent sources could be treated as insufficient to establish reasonableness.

The case of payments by a subsidiary to its parent company seems to be a particularly easy case for allowing commission inquiry beyond determination of whether expenditures were made in good faith. If, as was the case in Smith, the subsidiary is subject to state regulation of its profits but the parent is outside the jurisdiction of the state, statutory limitations on rates and profit can be easily circumvented if the profit earned by the parent from services and materials provided to its subsidiary is automatically included in the allowed expenses

of the subsidiary, The parent company could charge the subsidiary, and indirectly the public serviced by the subsidiary, a price which includes a monopoly profit and which the subsidiary would not be allowed to charge if the subsidiary, rather than the parent, would retain such profit. The shareholders who own both the subsidiary and the parent are indifferent as to whether they earn excess profits through the subsidiary or through the parent and the public is harmed to the same degree regardless of which entity is allowed to retain the excess. Because of this clear opportunity for abuse, the Court held that a commission could require a showing of the reasonableness of such transactions "although this may involve a presentation of evidence which would not be required in the case of parties dealing at arm's length and in the general and open market subject to the usual safeguards of bargaining and competition." Western Distributing Co. v. Public Service Commission of Kansas, 285 U.S. 119 (1932).

However, the loosening of due process restrictions on disallowance was not limited to transactions between subsidiary and parent. In Acker v. U.S.,298 U.S. at 431, the Court upheld a disallowance of certain expenses on the grounds that they had been found to be "extravagant and wasteful." Although this involved state interference with matters of managerial judgement, regulation could not be "frustrated by a requirement that the rate be made to compensate extravagant or unnecessary costs."

Also see Chicago and Grand Trunk Railway Co. v. Wellman, 143 U.S. 339, 346 (1892). Commission judgment as to the proper allowances would be unheld so long as they were not "without substantial support in the record." Acker v. U.S., 298 U.S. at 431.

Thus, the substantive due process test was transformed into largely a procedural requirement. The commission could not simply substitute its judgment for that of the management but had to show substantial evidence of inefficiency, improvidence, or negligence before it could disallow expenditures that management had determined to be necessary. The courts would overturn any disallowance lacking a basis in evidence. West Ohio Gas Co. v. Public Utility Commission of Ohio (No. 1), 294 U.S. 63 (1935).

State commissions have disallowed all or a portion of various types of expenditures. Transactions between affiliates are closely scrutinized and in some cases are disallowed to the extent that the unregulated affiliate earns a profit greater than that allowed to the regulated utility. Pacific Telephone and Telegraph Co. v. California Public Utilities Commission, 44 Cal. Rptr. 1, 401 P.2d 353, 58 PUR3d 229 (1965); Southern Bell Telephone Co., 66 PUR3d 1, 37 (Florida Public Service Commission, 1966); Michigan Bell Telephone Co., 85 PUR3d 467, 474 (Michigan Public Service Commission 1970); General Telephone Co. of Upstate New York, Inc. v. Lundy, 17 N.Y. 2d 373, 271 N.Y. S.2d 216, 218 N.E. 2d 274, 64 PUR3d 302 (1966). Salaries are reviewed as to their reasonableness. Pacific Telephone and Telegraph Co. v. California Public Utilities Commission, 401

P.2d at 260; Florida Crown Utility Services, Inc. v. Utility Regulatory Board of City of Jacksonville, 274 So. 2d 597, 598 (1973) (but disallowed only if substantial evidence). Advertising and promotional expenses are disallowed if they were unnecessary. City of Los Angeles v. Public Utilities Commission, 497 P. 2d 785, 102 Cal. Rptr. 313 (1972) (allowed expenses for advertising that is informative but not for advertising aimed merely at creating a good public image); Promotional Activities by Gas and Electric Companies, 68 PUR3d 162 (New York Public Service Commission 1967). And charitable contributions are similarly scrutinized. Some states have concluded that contributions should never be included in allowed operating expenses regardless of the beneficiary or amount. Pacific Telephone and Telegraph Co. v. Public Utilities Commission of California, 401 P.2d at 374; City of Miami v. Florida Public Service Commission, 208 So.2d (1968); Detroit Edison Co., 83 PUR3d 463, 488 (Michigan Public Service Commission 1970); Accounting Treatment for Donations, Dues, and Lobbying Expenditures, 71 PUR3d 440 (New York Public Service Commission 1967).

A further indication that the courts allow the commissions broad powers in reviewing management decisions is that company capital structure, which was traditionally considered virtually the exclusive domain of management, is now recognized by many state courts as the legitimate concern of the regulatory commissions.

The composition of capital structure affects a company's cost of capital since debt financing is generally less costly than

equity financing. The higher cost of equity is a result of both (1) a higher before tax cost due to the priority of debt's claim on earnings and assets and (2) the deductibility for tax purposes of company interest payments (as distinguished from the treatment of dividends and earned surplus as taxable income). Internal Revenue Code, 26 U.S.C. §§ 163 and 312 (1970). Because of the difference in tax treatment, a company taxed at the 50% rate must earn $2 before interest and taxes in order to retain $1 for every $1 to be paid in interest.

As equity is replaced by debt, the total cost of capital declines. But as the percentage of debt in the capital structure increases, the risk of inability to meet interest and principal payments, and therefore the return required by prospective stock purchasers, increase. Similarly, interest demanded by prospective purchasers of additional bonds increases. Thus, as the proportion of debt rises, the savings from greater use of debt are offset to an increasing extent by a simultaneous rise in the cost of equity and in bond interest rates due to the greater investment risk associated with higher debt. After a certain level of debt is reached, net savings drop to zero and total cost of capital begins to increase. Given the relationships between cost of debt and cost of equity and proportion of debt, there seems to be an optimum or lowest cost capital structure.[30]

Many state commissions have concluded that increased use of debt up to a certain optimum debt percentage reduces the

total cost of capital and, when determining the cost of capital and the return to be allowed, have based the estimated cost of capital for the test period on a hypothetical optimum capital structure if they felt that the company was overly conservative in its use of debt financing. State courts have upheld the use of a hypothetical capital structure because the percentage of debt financing directly and significantly affects the rate of return required and thus the level of rates. E.g., Southern Bell Telephone Co. v. Louisiana Public Service Commission, 239 La. 175, 118 So.2d 372,381 (1960) (citing from Alabama, Connecticut, Idaho, Illinois, Maryland, Massachusetts, Mississippi, Nebraska, New Hampshire, New Mexico, Pennsylvania, South Dakota, Tennessee, Texas, Utah, Vermont, and Washington, D.C.).

Further evidence that substantive due process is not an obstacle to disallowance of inefficient expenditures is provided by the Federal Aviation Act, 49 U.S.C. §§1301-1542 (1970), which requires that the Civil Aeronautics Board set "reasonable" rates for carriage of persons and property by air carriers including transportation of mail by aircraft (§§1373, 1374, 1376(a)). "In fixing and determing fair and reasonable rates (for mail carriage)...the Board shall take into consideration, among other factors...the need of each such carrier...for compensation... sufficient to insure the performance of such service, and together with all other revenue of the air carrier, to enable such air carrier under honest, economical, and efficient management,

to maintain and continue the development of air transportation to the extent and of the character and quality required for the commerce of the United States, the Postal Service, and the national defense." §1376(b). Thus, the Board is required to set mail rates sufficient not only to recompense carriers for their services but also for a "broader, bigger, program in the national interest." American Overseas Airlines v. Civil Aeronautics Board, 254 F.2d 744, 749 (D.C.Cir. 1958).

Although the Board cannot set aside the judgement of management merely because it would have handled certain expenditures differently, the Board is empowered to disallow expenditures for rate making purposes when they are due to dishonest, inefficient, or uneconomical management. Transworld Airlines, Inc. v. Civil Aeronautics Board, 385 F.2d 648, 656 (D.C.Cir. 1967), cert. denied 390 U.S. 944 (1967) (upholding the Board's disallowance of certain expenditures). Even though the burden of proof is on the commission, the regulated company can be assigned the burden of coming forward with information reasonably requested by the regulatory body, which can use such data to make comparisons between companies by providing adjustment for areas of difference. Transworld Airlines, Inc. v. Civil Aeronautics Board, 385 F2d at 657-658. A utility commission could similarly review the efficiency of test period expenditures without infringing on the property rights of an electric utility company under its jurisdiction. The Court noted that the efficiency standard under the statute is "not fundamentally different from that applicable

in conventional utility rate regulation where the commission may disregard waste and improvidence but must not usurp the role of management." Transworld Airlines, Inc. v. Civil Aeronautics Board, 385 F.2d at 656.[31] Although some state regulatory statutes do not expressly require that efficiency be a consideration in rate setting,[32] the requirement that rates be "just and reasonable" has been interpreted to include consideration of what revenues would be required under "efficient and economical management." Bluefield Water Works and Improvement Co. v. Public Service Commission of West Virginia, 262 U.S. at 693.

The commissions seem to have both the constitutional and statutory authority to disallow inefficient operating expenditures. However, effective exercise of this power depends on the ability of the commission to detect inefficiency and to present evidence sufficient to satisfy the requirements of procedural due process. Operating efficiency is the product of many decisions some of which are made in day to day operations. The commissions lack the resources to examine each decision and lack the information to detect any but the more extreme cases of inefficiency. Effective review of expenditures would require virtual duplication of utility management on a commission level.[33] At best a commission can examine total expenditure in various categories and, if they seem unreasonably large in comparison with the level of similar expenditures in other utilities, the commission can demand an explanation. Even if the utility is unable to explain the difference to the satisfaction of the commission,

the commission must be able to establish the reasonableness of the comparison if disallowance of the expenditure is to be upheld by the courts. As discussed earlier, such comparisons are difficult to make since utilities rarely operate in the same service area and differences in costs are at least as likely to be due to characteristics of the service areas as to management efficiency. Even if the commission can establish the reasonableness of certain intercompany comparisons, only the more extreme instances of inefficiency are likely to be discovered.

B. Exclusion of Imprudent Investments from the Rate Base

A public utility is entitled to a fair return on property it dedicates for public use. But just as the commission may examine operating expenditures the utility claims are necessary to service the public, the commission need not accept without question the amount of capital investment on which the utility claims a return. Under due process a utility company is entitled to rates "sufficient to yield a reasonable rate of return upon the value of property used, at the time it is being used, to render the services...But it is not entitled to have included any property not used and useful for that purpose." Denver Union Stockyard Co. v. U.S., 304 U.S. at 475; see also Federal Power Commission v. Natural Gas Pipeline Co. of America, 315 U.S. 575, 590 (1942). The commissions can exclude from the rate base an investment that is not necessary for the services which the company is required to provide to the public (Denver Union Stockyard Co. v. U.S., 304 U.S. at 476-477) or property that once was but no longer is

used and useful (Los Angeles Gas Co. v. Railroad 289 U.S. 287 (1933); St. Joseph Stockyards Co. v. U.S., 298 U.S. 38 (1936)) or property that is acquired for future but no present use (Pacific Telephone and Telegraph Co. v. California Public Services Commission,401 P.2d at 255); Columbia Gas and Fuel Co. v. Ohio Public Utility Commission, 292 U.S. at 406-407).

While the "used and useful" standard seems to have been applied generally to exclude property that is not needed at the time that rates are being fixed, there seems to be no obstacle to excluding all or part of an investment as unnecessary because it is an inefficient expenditure. Commissions have been permitted to reduce the value of the rate base on the grounds that defects or inadequate or poor design of facilities has resulted in inadequate service. North Carolina ex rel. Utilities Commission v. General Telephone Co. of the Southwest, 285 N.C. 671, 208 S.E. 2d 681, 689 (1974). As discussed earlier, due process does not exclude inquiry into the efficiency of management decisions but merely requires that the commission base any exclusion on substantial evidence of inefficiency and not simply on the fact that the commission members would have acted differently. Just as operating expenditures may be disallowed on grounds of inefficiency, inefficiency capital investment presumably could be treated as not "used and useful." Neither an operating expense nor a capital investment is beyond scrutiny merely because it in fact was made or used for the purpose of servicing the public. The Supreme Court has suggested that efficiency may be a factor in determining

whether an investment is used and useful. In McCardle v. Indianapolis Water Co., 272 U.S. 400, 411, (1926), the Court noted that the reasonable cost of a system of waterworks, "well-planned and efficient for the public service," is good evidence of the value of a system for the purpose of determining the rate base. See also Los Angeles Gas Co. v. Railroad Commission California, 289 U.S. 287, 300 (1933).

As in the case of disallowance of operating expenses, the major obstacle to effective exclusion of inefficient capital investment appears to be the difficulty of determining whether a given investment is inefficient and of assembling sufficient evidence to back up such a determination. However, review of long run efficiency may be more feasible than review of short run efficiency. While operating efficiency is the product of a vast number of management decisions, which do not individually have a major impact, long run efficiency seems to involve fewer decisions, but each having a greater impact and fewer options. Because of the huge size and cost of new facilities, particularly generation facilities, a company makes relatively few important investment decisions. Further, there is a limited number of technological options available. Because of the importance of any single capital investment, commission review of the major investment decisions might have a significant impact on the long run efficiency of a utility company. And by limiting itself to major investments a commission would be better able to consider the decisions in detail, enabling it to make more refined judgements as to their efficiency and have a greater impact than if opera-

ting decisions were reviewed.[34]

The economic effect of rate base exclusion is similar to that of disallowance of expenditures. The commission forces the company to increase efficiency when it excludes inefficient investments because such exclusion reduces the rate of return on actual investment. If allowed return is 10% but one fourth of the company's investments are excluded from the rate base, return on total investment is reduced to 7.5%.

C. Refusal to Approve Securities to Finance Inefficient Investments

In many states regulatory statutes provide that a public utility may not issue or sell securities without prior approval of the state utilities commission.

In California:

> "The power of public utilities to issue stocks...or other evidence of interest or ownership and bonds ...or other evidence of indebtedness and to create liens on their property...is a special privilege, the right of supervision, regulation, restriction, and control of which is vested in the State, and such power shall be exercised as provided by law under such rules as the commission prescribes." §816
>
> "A public utility may issue...evidence of interest or ownership, and...evidence of indebtedness payable at periods of more than 12 months after the date thereof, for any one or more of the following purposes and no other:
> (a) For acquisition of property.
> (b) For the construction, completion, extension, improvement of its facilities.
> (c) For the improvement or maintenance of its services.
> (d) For the discharge or lawful funding of its obligations.
> (e) For the reorganization or readjustment of its indebtedness or capitalization upon a merger, consolidation, or other reorganization.
> (f) For the retirement of or in exchange for one or more outstanding stocks...or other evidence of interest or ownership..., or bonds...or other other evidence of indebtedness of such public utility...

(g) For the reimbursement of moneys in the treasury of the public utility not secured or obtained from the issue of...evidence of interest or ownership ...or...indebtedness for the aforesaid purposes except maintenance of service and replacement." §817.

"No public utility may issue evidences of interest or ownership, or...evidences of indebtedness payable at periods of more than 12 months after the date thereof unless...it shall have first secured from the commission an order authorizing the issue, stating the amount thereof and the purposes to which the issue or the proceeds thereof are to be applied, and that, in the opinion of the commission, the money, property, or labor to be procured or paid for by the issue is reasonable required for the purpose specified in the order, and that...such purposes are not...reasonable chargeable to operating expenses or to income." §818.

"(N)o public utility as defined in Section 201(e) of the Federal Power Act...shall, without the consent of the commission, issue notes payable at periods of not more than 12 months after the date of issuance...if such notes and all other notes payable at periods of not more than 12 months...would exceed in aggregate amount 5 percent of the par value of other securities then outstanding." §823(c) (Supplement 1975).

The Florida statute grants the Public Service Commission "jurisdiction to regulate and supervise each public utility with respect to its rates, service and the issuance and sale of its securities except a security which is a note...maturing not more than a year after the date of such issuance..., and aggregating (together with all other outstanding notes...of maturity of one year or less...) not more than five per cent of the par value of other securities outstanding."§366.04.

The Michigan Commission is required to "grant authority for issuance of securities" payable more than 12 months after date of issuance if it is "satisified that the funds derived from such issue...are to be applied to lawful purposes (which are essentially the same as those listed in the California statute)

and that such issue and amount is essential to the successful carrying out of such purposes." §460.301 (parenthesis added). Securities payable not more than 24 months after issuance can be issued for proper purposes without commission approval.

The New York statute provides that a utility may issue securities payable at a more than 12 months from issuance when necessary for statutory purposes (which are also analogous to the purposes lawful in California) provided that "there shall have been secured from the commission an order authorizing such issue, and the amount thereof, and stating the purpose to which the issue or proceeds thereof are to be applied, and that, in the opinion of the commission, the money, property or labor to be procured or paid for by the issue...is or has been reasonably required for the purposes specified in the order, and that...such purposes are not...reasonably chargeable to operating expenses or to income." §69 (Supplement 1974).

As an alternative to reviewing the efficiency of investment decisions to determine which investments should be included in the rates, it seems that a commission might prevent inefficient investment by refusing to authorize securities proposed to raise long term funds for nonoptimal investments. If the company is merely seeking to refinance short term notes used to finance construction, the refusal to allow financing through long term securities (which is less costly) increases the borrowing expenses of the company and reduces return if this increased cost is disallowed. If the proceeds of the securities are to be used for

initial funding of construction funds, refusal prevents construction.

While exercise of such authority would not seem to be prohibited by federal due process, it is not clear that the regulatory statutes actually grant the commissions this authority. The California, Michigan, and New York statutes require review of the purposes to which proceeds of proposed issues are to be applied. Proceeds must be for the purpose of financing acquisition or construction of facilities; the statutory purposes are not limited to the financing of efficient facilities. So long as the company proposes to use the proceeds to construct a facility related to the provision of electricity, the requirement of statutory purpose would seem to have been met.

However, the commission must also find that the amount of the proposed issue is reasonably required or essential for a statutory purpose. A commission might find that a facility that a utility proposes to finance could be constructed at a much lower cost and therefore that the amount of proposed securities is not reasonably required. It would seem more difficult under the statutory standard for a commission to refuse to authorize securities where the type of plant the utility proposes to construct does not embody the most efficient technology (still a statutory purpose) but the cost of construction is reasonable for that type of plant.

The New York Commission has been upheld when it prohibited the issuance of securities to finance facilities for which no

certificate of public convenience and necessity (which is required by New York law prior to construction). People ex rel. New York Edison Co. v. Willcox, 207 N.Y. 86, 100 N.E. 705 (1912). But the court stressed that the certificate was a condition precedent to the right to construct and operate facilities. Without the certificate construction could hardly be considered a statutory purpose. There is no statutory provision that expressly makes commission review of the efficiency proposed facility a precondition to the right to construct and operate the facility.

While the state statutes seem to limit commission review to a determination of the purpose of the issuance and of the reasonableness of the amount for such purpose, the commissions have also used their power of disapproval to protect the interests of investors in the soundness of the securities and consumers in the cost of financing. The purpose of requiring commission approval is the "prevention of corporate abuse and protection of the public against excessive rates for services, the overcapitalization and the watering of securities, the establishment of a reasonable basis in operating expenditures, and the maintenance of investment security." People v. Liberty Light and Power Co., 121 Misc. 424, 201 N.Y.S. 302, 304 (1923). The commission should limit the amount of issuance to the value of the property of the utility. Hillsdale Light and Fuel Co. v. Michigan Public Utilities Commission, 220 Mich. 101, 189 N.W. 893 (1922); Smith, 45 California Railroad Commission 353 (1944). The commission must determine not only to what extent there is property

of value behind the securities but also whether there is a reasonable assurance that the company will be able to earn under proper management a return on the securities. New York State Electric and Gas Corp., 67 PUR(NS) 321, 342 (New York Public Service Commission 1946); Bridge Bus Lines Corp., 40 California Railroad Commission 542 (1937).

The commissions review the terms of proposed securities to determine whether they are fair to existing and prospective investors (Soledad Warehouse Co., 49 California Public Utility Commission 23 (1949); Associated Telephone Co., Ltd, 44 California Railroad Commission 19 (1942); New York State Electric and Gas Corp., 67 PUR(NS) at 351) and to ensure that the cost of financing is not unreasonable (Consolidated Cargo Co., 42 California Railroad Commission 480, 482 (1940); Soo-Snows Railway Co., PUR1923B 430, 434 (Michigan Public Utilities Commission 1922); Brooklyn Union Gas Co., 55 PUR(NS) 3 (New York Public Service Commission 1944)). Some commissions condition their approval of securities on the use of competitive bidding in the sale of the securities. Compulsory Competitive Bidding Rule,46 California Railroad Commission 281 (1946); Case No. 4761, Decision Nos. 3814 (1946), 49941(1954), 81908 (1973) and Case No. 4761-5 (California Public Utilities Commission); New York Electric and Gas Corp., 67 PUR(NS) at 354.

But the commission cannot deny or condition approval of securities because of matters that do not go to the "marketability or stability of the securities" since this would go beyond the

statutory purposes of commission authority over securities issues. Rochester Gas and Electric Corp. Maltbie, 273 App. Div. 114, 76 N.Y.S. 2d 671 (1948), affd. 298 N.Y. 867, 84 N.E.2d 635 (1949) (overruling approval conditioned on writeoff of excess of book value over actual cost of some purchased property and on use of straight line depreciation). In Brooklyn Union Gas Co. v. Public Service Commission, 8 A.D.2d 210, 187 N.Y.S.2d 207, 210 (1959), affd. 8 N.Y.2d 815, 202 N.Y.S.2d 322, 168 N.E.2d 390 (1960), the Court held that the Commission could not deny approval of common stock under an option plan for officers and key personnel merely because the Commission felt that the device of a stock option plan was "not adaptable to the public utility situation" since it would lend itself to "manipulation." The refusal to approve the issue was upheld only because the stock was to be used for compensation, which is an operating not a capital expense and therefore under the statute could not be financed through issuance of securities. Similarly, a commission might not be allowed to refuse to authorize securities to be used for the construction of a facility merely because the commission felt that the facility was not the most efficient type of facility that could be built.

Only if a commission can show that the alleged inefficiency of a proposed investment will adversely affect the marketability or stability of the proposed securities could it refuse authorization on grounds of inefficiency. In determining the value of fac-

ilities that will underlie proposed securities the commissions are not limited to the cost of the facility but may inquire into its fair value. A commission could "consider whether the cost of properties were reasonably incurred. To that end data on reproduction cost, fair value of tangible property, and original cost are factors to be considered." Southern Nebraska Power Co., PUR1925B 278, 281 (Nebraska State Railway Commission 1824). A commission might find that a facility which cost more than it should because of poor planning or inefficient construction is overvalued and limit new securities to the cost of an efficiently planned and constructed facility. If the facility cost no more than an efficiently constructed facility of that type but the commission disagrees with the choice of type of facility or technology, the commission might hold that the fair value of the facility is not its cost but rather the cost of an efficiently constructed facility of another type, which would perform the same function at a lower cost.

Whether the commission reviews the efficiency of capital investments through the process of approval of long term securities or through determination of the rate base, the commission must be concerned about the effect of such review on the risk of investment and thus on the cost of capital. If the commission waits until substantial resources of the utility have been committed to a particular investment, the cost of excluding it from the rate base so that no return can be earned on it or of refusing to allow long term financing so that the company is forced to use more costly short term financing may be so high

that the commission is reluctant to use its powers of review. While purchasers of utility securities already bear the risk that the investment financed by these securities may be disallowed from the rate base as not used and useful, if the commission allows all investments that are related to provision of electricity, this risk is relatively low so long as management is not dishonest and commits no gross errors of judgement.

But if the commission sets a stricter standard of review which excludes investments that are used in servicing the public but are inefficient or not optimal, the likelihood of disallowance greatly increases. Investors might find that all or a portion of the investment is excluded from the rate base, reducing the rate of return on total actual investment. Since the risk that a company will be unable to earn sufficient return on invested capital is increased, investors will demand a greater return before they will purchase any new securities, raising the cost of capital that must be covered by the rates. If a utility has borrowed significant amounts of short term capital to finance new facilities, the likelihood that the company will be unable to convert expensive short term financing to less costly long term financing through the issuance of new securities is increased if the commission requires that the investment meet a standard of efficiency. If rates are not increased to cover the increased cost of borrowing to finance huge capital investments that must be made, the resulting reduction in the return of the company might be large enough to jeopardize the

financial soundness of the company. Thus, it seems important to review large capital investments before significant resources have been committed and certainly as early as possible in the life of a given investment.

Whether commission review of a given investment comes earlier when review is in the form of a determination of the rate base or in the form of authorization of securities depends on the method of financing used by the company and on whether uncompleted facilities are included in the rate base. If the rate base includes facilities under construction or interest on facilities under construction, the decision to make the investment may be reviewed before construction is very far along. (Not all states allow interest during construction or uncompleted plant to be added to the rate base. See, e.g., North Carolina ex rel. Utilities Commission v. Morgan, 179 S.e. 2d 419, 422-423 (1971).) If construction is initially financed through short term debt, the commission authorization of issuance of such debt is usually not required. By the time the company requests permission to issue long term securities, it may have already invested substantial capital in the project. Review of efficiency through the process of exclusion of inefficient investments from the rate base seems superior to efficiency review at the time the utility is ready to issue long term securities since the former is more likely to occur early in the construction of a given project.

But since a utility might decide to raise capital initially through long term securities rather than short term debt (e.g., New York State Electric and Gas Corp., 98 PUR(NS) 251 (1963) (where a utility requested permission to sell long term securities rather than using short term debt because of the favorable terms then available on long term securities), it may be important that a commission be willing to review the efficiency of any investment during either rate hearings or during hearings on proposed securities, whichever occurs earliest in the life of a given project.

D. Operating Ratio Regulation

Since an important potential source of utility inefficiency is the relationship between company profit and the dollar value of the rate base, it might seem desirable to shift away from the rate base method of regulation. In the transit and trucking industries operating ration regulation has been used instead of rate base regulation because the major risk of such businesses was perceived to lie in the operating margin, i.e., the margin remaining after operating expenses, rather than in the amount of fixed capital. Operating expenses consume a much greater portion of revenues than return on the relatively small capital investment required in such industries and level of operating expenses is much more volatile.[35] Therefore, profit is fixed at a given percentage of gross allowed revenues, which is calculated by setting total allowed operating expenses as a percentage of allowed gross revenues and subtracting the percentage from 100%.

For example, an operating ratio of 95% (i.e., where operating expenses are set at 95% of gross revenues), profit is 5% of total revenues.

The operating ratio seems to have several conceptual weaknesses even when applied to a low capital investment. Other than their capital investment, what is the contribution that company owners make for which they deserve a return? Any management services that they might provide are presumably already compensated through salaries. Any additional compensation must be for the use of their capital and logically such return should vary with the risk of the investment and the amount they have put at risk and not with gross revenues. Even if dollar return is determined by an operating ratio the prospective equity investor has to convert the operating ratio to a return on capital before he can evaluate the desirablility of the investment and compare it with alternative investments. And it is also important for the commission and the public to calculate the return on capital that is inherent in the allowed operating ratio since an operating ratio that appears reasonable on its face may actually conceal an unreasonably high rate of return. For example, dollar return on capital may only be 5% of total revenues but if revenues equal $1,000 and invested capital equals $50, the return on capital is 100%. A major reason for the use of the operating ratio method seems to be that it emphasizes the size of expenses relative to revenue rather than rate of return, with the result that commissions tend to allow an operating ratio that yields

a higher return than they would accept if they directly set the rate of return.[36]

Further, the use of an operating ratio would seem to exacerbate rather than ameliorate the problem of inefficiency. If profit is a percentage of gross revenues, return increases when all expenses, operating and capital, increase. The incentive to minimize any expenses is thus diminished.[37]

E. Varying Allowed Rate of Return With Level of Efficiency

If a utility company knew that its allowed rate of return would depend at least partially on its efficiency during the previous rate period, it would seem to have a strong incentive to maximize its efficiency. The effect on short run efficiency would be similar to the effect of disallowance of inefficient operating expenses in that under either procedure revenues remaining after operating expenses and interest are reduced when the commission discovers that inefficient expenditures have been made. If the expenditures are disallowed, the actual rate of return is reduced only if the disallowed expenditure is repeated or the allowance for some other category of operating expense is exceeded. But if the rate of return is adjusted based on the performance of the utility during the rate period, the utility is penalized during the next rate period regardless of whether the inefficient expenditures are repeated.

Similarly, inefficient capital investment decision would be penalized. The effect of varying the rate of return with long run efficiency would be similar to the effect of excluding inef-

ficient investments from the rate base. The rate of return on total invested capital is reduced if inefficient investments are made. The commission would continue to allow a relatively low rate of return until operating or investment efficiency is improved. Direct adjustment of rate of return provides greater flexibility for the commission than indirect adjustment through disallowance or exclusion since once an expenditure or investment is disallowed or excluded, it would seem difficult for a commission in a future rate review to hold that, because of improved overall efficiency, the expenditure or investment will be recognized as legitimate and included in the new rates.

Rewarding Efficiency With Return Above the Cost of Capital

The ability of a commission to vary allowed rate of return is limited by federal due process. In Bluefield Water Works and Hope Natural Gas the Supreme Court held that a public utility was entitled to rates that would permit it to earn a return on capital commensurate with the returns earned on investments of comparable risk and sufficient to ensure the financial soundness of the utility so that it can maintain its credit and attract capital. However, since the cost of capital cannot be precisely determined and since the commission and not the courts, were delegated the responsibility to set rates, there is no single rate of return that is reasonable to the exclusion of all other rates of return. Instead there is a range of returns or a zone of reasonableness within which a commission must select the return to be allowed to a particular utility. Montana-Dakota Co. v.

Northwestern Public Service Co., 341 U.S. 246, 251 (1951); Michigan Bell Telephone Co. v. Michigan Public Service Commission, 332 Mich. 7, 50 N.W.2d 826, 834 (1952). A commission can set the allowed rate of return at the high or low end of the zone depending on how efficient the company appears to be. E.g., Public Service Coordinated Transport, 5 N.J. 196, 74 A.2d 580,595 (1950); New England Telephone and Telegraph Co. v. State, 104 N.H. 229, 183 A.2d 237 (1962); LaSalle Telephone Co. v. Louisiana Public Service Commission, 245 La. 99, 157 So.2d 455, 458 (1963).

The effectiveness of the incentive for cost cutting created by the rewarding of an extra margin of return for efficiency depends first on how significant a margin can be offered by the commission. It is difficult to determine exactly how much variation in return the courts would allow or how wide the commissions assume the zone of reasonablness to be since few court or commission opinions expressly delineate its boundaries. It is often stated that the rate of return cannot be "more than the reasonable worth of the service supplied" nor "so low as to be confiscatory." E.g., Public Service Coordinated Transport, 74 A.2d at 595. Since the courts recognize that rate setting is primarily the duty of the commissions and therefore tend to defer to the judgement of the commission so long as it is supported by the evidence, the zone of reasonableness includes "a substantial spread between what is unreasonable because too low and what is unreasonable because too high." Montana-Dakota Co. v.

Northwestern Public Services Co., 341 U.S. at 251.

Given sufficient discretion, a commission can sufficiently vary the rate of return in relation to company efficiency so that utilities will try to maximize their efficiency. If a company succeeds in reducing its costs, it immediately realizes savings since its actual costs are then lower than the anticipated costs on which the rates then in effect are based. When the commission reexamines the rates and determines the test period costs that must be covered by the new rates, the amount of allowed expenses is reduced to reflect increased efficiency but the company retains a portion of the savings produced by its increased efficiency in the next rate period through an increase in the allowed rate of return for that period. The company continues to enjoy extra return so long as it maintains its superior level of efficiency. If its performance declines, the commission may reduce the return to a slower point within the zone of reasonableness. While each company is concerned that if all companies raise their level of efficiency commission standards for rewarding additional return may rise, no company is willing to reduce its cost cutting efforts for fear it will be the only company unable to meet a higher standard once it is set. Also, it would sacrifice additional return that it could realize from further efficiency under current standards.

Even assuming that the extra margin of return available is sufficient to induce management efforts to meet the requirements set by the commission, greater efficiency will result only if the commission is able to effectively and accurately evaluate utility efficiency and thus know when to award a higher rate of return.

Those commissions that claim to reward efficiency generally do not reveal how they determine the level of efficiency. Rewards of higher rates of return seem to be based on the commission's general impressions as to the adequacy of service and the level of costs.

The Florida Public Service Commission in General Telephone Co. of Florida, 44 PUR3d 247, 255 (1962), made one of the few attempts to expressly formulate a standard for measuring efficiency: "a public utility is operating efficiently if it has a minimum number of service complaints, is continually improving service, but is still able to produce earnings on lower rates than comparable or similar utilities in the same general area." But utilities even in the same general area may have very different service areas in terms of load distribution, density of customers, distribution between residential and industrial or commercial customers, and other factors that are at least partially beyond the control of management. Apparently no attempt is made to adjust the cost data of "comparable" utilities before a comparison is made.

It is doubtful that other commissions use a standard that is much different from or more sophisticated than the Florida standard. Thus, what is perceived as differences among utilities in efficiency may not be due to relatively higher or lower levels of management efficiency. Rewards based on factors beyond management control will not elicit greater efforts by management; if efficiency is not what is actually rewarded, efficient behavior is not what will be elicited.

Further, the Florida standard rates companies as either "efficient" or "inefficient" and apparently makes no distinctions as to degree of efficiency or inefficiency. Only if one company exceeds a second company on all three criteria is it clearly the more efficient. The standard seems to be aimed at a determination of which utilities have achieved some reasonable level of efficiency. Once a company reaches that level, there is little incentive to improve further since it is doubtful that the standard is sufficiently sensitive that a commission would notice the difference.

If rewards of higher return are based on a commission's general impressions of a company's efficiency, the utilities may direct their efforts more toward public relations and public image than toward real improvement in their operations. There would seem to be a greater incentive to achieve the more visible and immediate types of cost reductions than those which could have a significant cumulative effect over time. In summary, the incentive for efficiency will be weak if the companies feel that the commission can not really tell if they are more or less efficient.

Even assuming that the commission can measure the efficiency of a utility, one last condition for the creation of effective incentives is a strong expectation on the part of company management that their cost cutting efforts will in fact be rewarded in future rate hearings and some concert of the amount of that reward. Given the analysis of company efficiency in commission opinion, it seems that few commissions have formally committed themselves to a policy of rewarding efficiency, much less to a scale of rewards based on the

degree of efficiency. Without a more formalized program of rewards for efficiency a company is less likely to be able to force a commission through the courts to grant the reward it has earned in the event that the commission is unwilling to allow additional return which it has granted other companies for increased efficiency. If, based on the precedent set by past instances where the commission rewarded efficiency, a court is willing to require higher return for a company that met the commission's standard of efficiency, court review of the commission's determination as to whether that standard had in fact been met would be largely ineffective if the standard is based on vague and subjective judgments. In reviewing commission decisions courts are unwilling to substitute their judgments for those of a commission. If a commission decision is based on some objective and explicit criteria, a court is more willing to overrule the decision on the grounds that the commission did not meet its own standards. If court review of commission decisions is made too difficult because of the failure of the commission to explain why and how much it is adjusting rate of return, a court might overturn the commission's decision as arbitrary and capricious. A commission cannot avoid review merely by concealing in a vague opinion exactly what actions it has taken. City of Los Angeles v. Public Utilities Commission, 102 Cal.Rptr. 313, 497 P. 2d 785, 795 (1972) (requiring the commission to specify the amount of rate of return that it is rewarding for efficiency); North Carolina ex rel. Utilities Commission v. Morgan, 277 N.C. 255, 177 S.E.2d 405, 418 (197), affd. 278 N.C. 235, 179 S.E. 2d 419 (1971) (requiring the

commission to specify the effect given in a rate decision to inadequacy of service).

Ironically, the attempt to reward efficiency through a higher rate of return could increase the incentive for inefficiency. As discussed earlier, since return is a function of the rate base, a company might find it profitable to expand its capital investments beyond the optimal point if the allowed return on capital is greater than the cost of capital. The incentive to increase the rate base is dampened considerably by the effects of inflation. See supra. section IV(B). But the extra return awarded for past efficiency might raise the return sufficiently above the cost of capital to induce future long run inefficiency. Once the commission realizes that company efficiency has declined and that the company no longer deserves a higher return, the company would find itself both without the extra return for which it made the additional investment and burdened with the higher level of fixed capital costs resulting from the investment.

But if a commission can measure nothing more precise than gross, overall efficiency, it may take many inefficient decisions on the part of management before the commission's favorable impression of company efficiency is changed. Management would not feel under pressure to maximize efficiency and would feel free to overinvest so long as it avoided gross inefficiency that might be easily discovered. But, as noted earlier, efficiency of investment decisions may be more easily evaluated than operating efficiency so that careful commission review of major capital investments could

discourage overinvestment and rewards of additional return would encourage efficiency.

The potential counterproductive effects of rewarding extra margins of return to equity raises the question of why the stockholders should be the beneficiaries of increased company efficiency. The management, not the stockholders, controls daily operations and makes the investment decisions. The stockholders tend to become involved in company affairs only when earned return to equity is so low as to be unacceptable. Even then their involvement is probably limited to choosing a new management rather than directly affecting operating or investment practices.

Increased return to stockholders is merely an indirect method of inducing management to act in the desired manner. From the point of view of the stockholder, the extra return is a windfall if the allowed return without the efficiency reward is adequate to meet the cost of capital. By definition a return just equal to the cost of capital (which is the lowest end of the zone of reasonableness) provides sufficient return to attract equity capital and meet the expectations of equity investors. Anything above that return is unnecessary to keep them satisfied and to attract additional needed capital.

The commission's evaluation of the company's efficiency might have a greater impact on company management, and thus on company policy and practices, if a portion of the reward for efficiency were paid directly to management. The impact would be greatest if a portion of the basic salary of management personnel was dependent on

the efficiency achieved by the company. It is not likely that the courts might hold that commission involvement in management salaries violates the due process rights of what is still a privately owned company. Due process is largely a procedural requirement, and the courts have apparently not overturned statutes allowing a commission to disapprove and make ineffective contracts made by a utility with an affiliated company. E.g., New York §110(3)(requiring filing of management, construction, engineering, or similar contracts with affiliates and authorizing the commission disapproval of contracts found not to be in the public interest). If a commission can set standards that must be met if contracts for goods or services with affiliates are to become effective, a commission may also be able to make certain requirements as to management employment contracts without violating due process.

But specific statutory authorization for such actions would be required by the courts even if due process is not an obstacle. The power to disallow expenditures for rate making purposes, which is inherent in the power to set just and reasonable rates, does not include authority to regulate the terms of utility contracts other than contracts to provide utility service. Pacific Telephone and Telegraph Co. v. Public Utility Commission, 34 C.2d 822, 215 P.2d (411) (1950); General Telephone Co. of Upstate New York, Inc. v. Lundy, 218 N.E.2d 274. As an alternative to modifying the terms of management employment contracts, a commission might disallow a portion of expenditures on management salaries on the grounds that management had not run the company efficiently and should be paid no more than

the value of their services. Such disallowance would reduce return on capital but not directly affect management compensation.

A commission might reward management efficiency through bonuses rather than through basic salary. Commissions already grant "bonuses" to stockholders by allowing extra margins of return for past efficiency. The California Public Utilities Code §456 specifically authorizes the Commission to allow a utility to "profit" from "any economies, efficiency, or improvements which it may make" and to distribute such profits "by way of dividends or otherwise" when the Commission deems it "wise for the purpose of encouraging economies, efficiencies, or improvements." Other commissions have been held to have the power to grant extra return to encourage efficiency although their enabling statutes contain no explicit authoriziation. E.g., Public Service Coordinated Transport, 74 A.2d at 595; New England Telephone and Telegraph Co. v. State, 183 A.2d 237; LaSalle Telephone Co. v. Louisiana Public Service Commission, 157 So.2d at 458. But by granting bonuses to management, a commission would in effect be ordering a utility to use a portion of its allowed return to increase management salaries. The courts might well require specific statutory authorization before they would uphold commission authority to make such an order.

Penalizing Inefficiency by Reducing Return Below the Cost of Capital

A second way of increasing management concern over the commission's evaluation of its efficiency would be to penalize utilities for their inefficiency by reducing allowed return below the cost of

capital or denying a rate increase necessary to increase actual return to at least its cost of capital. Several commissions have refused to grant rate increases that they deemed to be reasonable or necessary until the companies brought their service up to an acceptable level. E.g., Key System Transit Lines, 17 PUR3d 505, 509 (1957), Citizens Utilities of California, 4 PUR3d 97, 104 (1954) (California Public Service Commission); New York Telephone Co., 84 PUR3d 319 (New York Public Service Commission 1970). But few commissions explicitly set the rate of return at a level below the zone of reasonableness. But see Southern Bell Telephone and Telegraph Co., 26 PUR3d 55, 113 (Louisiana Public Service Commission 1958).

Two major legal objections have been raised against the reduction of rate of return below the zone of reasonableness in order to force more adequate service. First, some courts have held that the statutory powers to review the adequacy of service and to set just and reasonable rates are separate and that, in the absence of express statutory authorization of joint consideration of service and rates, no power to consider the adequacy of service in a rate hearing will be implied. Florida Telephone Corp. v. Carter, 70 So.2d 508 (1954); General Telephone Co. v. Michigan Public Service Commission, 341 Mich. 620, 67 N.W.2d 882 (1954)(This decision may not be applicable to regulation of electric utility rates since the statutory provisions for electric utility regulation provide that the Commission, in determining rates, may consider, among other things, the "value of service to the consumer." §460.557); Elyria Telephone Co. v. Public Service Commission, 158 Ohio St. 441, 110 N.E.2d 59 (1953). Only

after the Florida statute was amended by the addition of the following provision did the courts allow the Florida Commission to withhold approval of rate increases until service was improved (see United Telephone Co. of Florida v. Mayo, 215 So. 2d 609 (1968), appeal dismissed 394 U.S. 995 (1969)):

> "In fixing the just, reasonable and compensating rates... the...Commission is authorized to give consideration, among other things, to the efficiency, sufficiency, and adequacy of the facilities; provided that no public utility shall be denied a reasonable rate of return upon its rate base." §366.041(1).

However, other courts have held that the power to consider adequacy of service when setting rates is necessarily incidental to the authority of commissions to require utilities to provide adequate service at just and reasonable rates. E.g., New Jersey Traction Co. v. Board of Public Utility Commissioners, 96 N.J.L. 90, 113 A. 692, PUR1921D 391, 398 (1921); North Carolina ex rel. Utilities Commission v. General Telephone Co. of the Southeast, 285 N.C. 671, 208 S.E. 2d 681, 685 (1975)(holding that the statute is a "single, integrated plan", whose provisions must be construed together so as to accomplish its primary purpose"). This seems to be the more reasonable interpretation of the state regulatory statutes. The Florida and Michigan cases holding to the contrary were based on a strict interpretation of their respective statutes. Although the Michigan statute vests the Michigan Commission "with complete power and jurisdiction to regulate all public utilities in the state," as to "all rates, fares, fees, charges, services, rules, conditions of service, and all other matters pertaining to the formation, operation,

or direction of such public utilities..."(§460.6 Supp. 1974), the courts considered this provision merely an "outline of jurisdiction" of the Commission and not "a grant of specific powers." Huron Portland Cement Co. v. Michigan Public Service Commission, 351 Mich. 255, 88 N.W.2d 492, 497 (1958). Apparently only powers specifically granted could be exercised by the commission.

The more prevalent view is that the regulatory commission has only powers expressly or impliedly conferred by statute although any reasonable doubt as to the lawful existence of a particular power must be resolved against the commission. E.g., City of Cape Coral v. GAU Utilities Inc. of Florida, 281 So. 2d 493 (1973). If the courts are unwilling to allow commissions to exercise authority necessarily implied by statutory language and provisions, legislative intent will be easily thwarted since a legislature is unlikely to successfully enumerate each and every power necessary to accomplish the objectives it sets for the commission. Fogarty Brothers Transer Inc. v. Boyd, 109 So2d. 883, 886 (1959). The court in Florida Telephone Co. v. Carter apparently did not agree that the power to consider service in a rate hearing was necessarily implied by the responsibility to ensure adequate service at reasonable rates. But the attempt to separate service and rate review seems illogical. How can a commission determine whether a particular rate is reasonable if it cannot examine what is being offered at that price? Rates are not just and reasonable if they are more than what "the services rendered...are reasonable worth." Smyth v. Ames, 169 U.S. 466, 547 (1898).

The argument that consideration of management efficiency is inherent in the express authorization of commissions to set just and reasonable rates is at least as strong as the argument that the power to consider adequacy of service is implied by commission rate making authority. State commissions are permitted to disallow unreasonable operating expenses and to exclude unnecessary capital investments for rate making purposes, although often neither action is expressly authorized by statute. It is doubtful that a court would hold that efficiency cannot be considered in a rate review.

Due process is a much stronger obstacle to attempts to tie rates to quality of service or to level of efficiency. Due process requires that rates be reasonable, i.e., that they cover operating expenses and yield a reasonable return, which is one that is commensurate with returns on investments of corresponding risks and sufficient to attract capital. On its face, this constitutional requirement seems to require that a return at least equal to the cost of capital be allowed regardless of the adequacy of service or any other considerations. Most courts that have allowed commissions to deny rate increases because of inadequate service have stopped short of holding that the allowed rate of return could be set below the cost of capital, which is the lowest end of the zone of reasonableness. E.g., North Carolina ex rel. Utilities Commission v. General Telephone Co. of the Southeast, 208 S.E.2d at 688 (holding that, since the current rates were not confiscatory, it was not necessary to decide whether a rate increase could be denied if current

rates provided a return at the confiscatory level); Baltimore Transit Co. v. Public Service Commission of Maryland, 206 Md. 533, 112 A.2d 687, 697 (1955)(holding that value of service may not be relied on to set return outside the zone of reasonableness); New Jersey Central Traction Co. v. Board of Public Utilities Commissioners, 113 A. at 400 (upholding a refusal to increase rates where the commission found that, if the utility was properly equipped and operated so as to provide good service, the current rates would produce sufficient revenue to cover operating expenses and yield a fair return on capital).

Some courts have held that rates set at the maximum "reasonable worth" of the service rendered cannot be confiscatory regardless of the resulting return on capital. E.g., Gay v. Damariscotta-Newcastle Water Co., 131 Me. 304, 162 A. 264, 266 (1932); Hamilton v. Caribou Water Light and Power Co., 121 Me. 422, 117 A. 582, 584 (1922). In Market Street Railway Co. v. Railroad Commission of California, 324 U.S. 548 (1944), the Supreme Court upheld a commission refusal to raise rates above what the commission found to be the "value of the service" although the company could not earn an economic return as required by Hope Natural Gas. On its face, this holding seems to permit a commission to reduce return below the cost of capital where the quality, and thus the value of the service, was sufficiently low. However, the Court found that this was not a case of a commission denying a company the opportunity to earn a return sufficient to attract capital. The company's financial condition was so serious that it could not attract capital at "any possible rate." Due process requires only that rates and return be set to make it "possible for

the company to operate successfully." Due process does not guarantee that a profit will be earned so a commission can set rates that yield a return that does not meet the Hope Natural Gas standard if "that is all the company can earn." Market Street Railway Co. v. Railroad Commission of California, 324 U.S. at 566. Although the company was unable to earn sufficient return, even with a rate increase that had been recently granted, the commission set rates back to the previous lower level because the higher rates had caused patronage of the company to decline. Since the higher rates did not bring better service, the price of the service had exceeded the value the public put on it and the company was not receiving increased revenues under the increased rates. "Under these circumstances the Commission did not put a monetary value... (on the service) as the basis of the fare... Certainly the due process clause of the Constitution is not violated when a commission takes into consideration practical results to the public of advances which it has allowed in rates." Market Street Railway Co. v. Railroad Commission of California, 324 U.S. at 563 (parenthesis added). Clearly, the Supreme Court created a very limited exception to the Hope Natural Gas standard and did not hold that inadequacy of service could be grounds for denying a rate increase necessary to bring return up to the cost of capital.

One of the few cases to hold that service inadequacy could justify a confiscatory return is D.C. Transit System, Inc.v. Washington Metropolitan Area Transit Commission, 466 F.2d 394, 419 (D.C. Cir. 1972), cert. denied 409 U.S. 952 (1972). In holding that "the utility's fulfillment of its service commitments is a sine qua non

to constitutional protection under confiscation principles," the Court seemed to embrace a contract theory of rate regulation. The legislature through the commission promises to allow rates reasonably calculated to yield in the future gross revenues sufficient to meet operating expenses and provide a return on investment at least equal to the cost of capital and in exchange the utility promises to provide adequate service to meet the public needs. See Citizens Utilities Co. of California, 1 PUR3d 244, 247 (California Public Utilities Commission 1953). As with any contract, when one party fails to substantially perform as it promised, the other party is entirely relieved of the duty to perform its promise and may seek damages. A contract itself may provide relief in case of breach so long as such liquidated damages are not merely punitive but reasonably reflect actual injury.[38]

However, the D.C. Transit System decision does not go so far as to hold that rates may be "scaled in proportion to the public worth of the utility's service." D.C. Transit System, Inc. v. Washington Metropolitan Area Transit Commission, 466 F.2d at 422. The Commission had found that management decisions had resulted in an unstable financial structure that contributed substantially to seriously deteriorated service and uneconomic and inefficient operations. Because of its financial condition the company was unable to replenish its capital stock or provide sufficient personnel but had ignored previous Commission warnings of the need to improve its capital structure and failed to comply with orders to purchase

new equipment. In the opinion of the Commission, a rate increase alone would not remedy the situation. Although it found that a rate increase was necessary to provide a nonconfiscatory rate of return, the Commission, as a precondition to any rate increase, required that the company raise $2.4 million for the purchase of new equipment through other than debt securities and reduce outstanding debt by $4 million. The Court did not hold that rates could be reduced because of poor service but only that a rate increase necessary to raise return above the confiscatory level could be postponed until service improvements were made. Such postponement was not contrary to due process since "(a)ction rationally subserving a substantial governmental concern draws condemnation on due process grounds only if it is arbitrary or unreasonable." D.C. Transit System, Inc. v. Washington Metropolitan Area Transit Commission, 466 F.2d at 422 and n. 313.

The contract theory is applicable to cases where a commission attempts to set a confiscatory rate of return because of company inefficiency. Since it is the statutory duty of a utility to provide adequate service at reasonable rates, it violates that duty if it is inefficient and so requires higher rates than otherwise necessary. The failure to perform would be even clearer if the utility operates in a state whose statute specifically requires that service be efficient. E.g., Florida, §364.03.

The Hope Natural Gas and Bluefield Water Works standard does not preclude such a theory since neither of those opinions was

addressed to the case of a utility that was found to be inefficient. Further, in Bluefield Water Works the Court required that return be "adequate, under efficient and economical management, to maintain and support its credit and enable it to raise the money necessary for the proper discharge of its public duties." Bluefield Water Works and Improvement Co. v. Public Service Commission of West Virginia, 262 U.S. at 693 (emphasis added). Under this standard commissions can disallow expenses that are uneconomic and exclude from the rate base portions of investments that are unnecessary and calculate the cost of capital based on a hypothetical capital structure. Such actions have the effect of reducing earned return on actual capital invested even to the point where earned return is less than the company's current cost of attracting such capital. Due process only requires that the utility have the opportunity when operating in an efficient and economical manner, to earn a return equal to the cost of capital; an inefficient company is not guaranteed such a return. If a commission can reduce earned return on actual investment below the company's cost of capital through disallowance or exclusion or use of a hypothetical capital structure, why should it be a violation of due process to accomplish the same end by directly reducing the allowed rate of return below the cost of capital? The Supreme Court in Federal Power Commission v. Hope Natural Gas Co., 320 U.S. at 602, noted that a commission "is not bound to the use of any single formula or combination of formulae in determining rates...Under the statutory standard of 'just and reasonable' it is the result reached not the method employed which is controlling...If the total effect of the rate order cannot be said to be unjust and unreasonable, judicial inquiry...is at an end."

It seems that a commission could penalize inefficiency by disallowing expenses, excluding investment, and/or reducing the allowed rate of return below the cost of capital so long as the net effect under the rates set by the commission is that an efficient company could earn a return at least equal to the cost of capital under a reasonable capital structure. The Hope Natural Gas standard does not preclude the use of any particular method to arrive at this result but it does limit the extent to which a commission can penalize an inefficient company. A commission could not disallow all inefficient expenditures, exclude all unnecessary investments from the rate base, determine the optimal capital structure and then also set an allowed return below the cost of capital under such a capital structure. This limitation on the penalty that a commission can extract for inefficiency seems anlogous to the contract doctrine, previously noted, that damages for breach must be limited to actual damages (which in the case of an inefficient utility is the higher cost of service that the public would have to bear if rates were set at a level necessary to meet all actual expenditures and provide an earned return on actual capital invested equal to the actual cost of acquiring such capital) and that liquidated damages will not be enforced if they are merely punitive.

Sliding Scale Rate of Return

One attempt to set up a system of rewarding efficiency was the sliding scale rate of return, which was used in several American cities, most notably Washington, D.C. Allowed return is tied to the

level of actual earnings in the previous rate period. First the commission sets an initial rate level which will yield sufficient revenues to meet test year operating and interest costs and to yield a reasonable rate of return. If the company cuts its costs during the rate period, its actual rate of return will then be higher than the allowed return for that period. When rates are again reviewed by the commission, recognized costs are reduced to reflect the efficiency achieved in the past rate period but allowed rate of return is raised to reflect the higher than expected earnings in that period. For each incremental increase in actual rate of return above the allowed return for that period, the return allowed for the next rate period is increased by a predetermined percentage of the excess return. For example, in Potomac Electric Power Co., 48 PUR(NS) 437, 442 (District of Columbia Public Utilities Commission 1943), the Commission and the company agreed that if rates yielded net revenues in excess of 6% on the rate base, rates would be adjusted so as to reduce revenues by:

50% of the excess over 6% return and not in excess of 7.25%;

60% of the excess over 7.25% return and not in excess of 8%;

75% of the excess over 8%.

If return was less than 5 1/2% for a twelve month period or less than 5 3/4% in each of two consecutive years, the Commission would increase rates to yield a 6% return.

Although one of the alleged virtues of the sliding scale method was that it provided incentive for efficiency, the primary reason for its adoption, at least in the District of Columbia, apparently

was that such an automatically functioning system of rate making might reduce the need for time consuming and complex hearings.[39] Allowed rate of return would be set according to the terms of the sliding scale and the terms of the scale would be reviewed only periodically. The D.C. Commission planned to review the terms of the sliding scale once every ten years.

While concern over efficiency was not the primary reason for its use, the sliding scale seems to increase the incentives for efficiency. With or without the sliding scale the company retains all savings from cost cutting through the end of the rate period. When rates are set for the next rate period, a commission using a sliding scale splits these savings between the company and the public by reducing allowed costs to reflect 100% of the savings but increasing allowed rate of return to include a portion of the cost savings, according to the terms of the sliding scale. If rate of return is not adjusted upward, the utility loses all of the benefit of its cost cutting and has less incentive to increase its efficiency. No limit is put on the return a company might be allowed as a result of such sharing of efficiency savings so that the incentive for efficiency does not vanish as the company's allowed return approaches a ceiling. Once a company reached a ceiling on allowed return, the company can receive no greater reward in the next period for greater efficiency. There might be a temptation to reduce efficiency in hopes that the commission would not notice the reduction and would set allowed costs at a higher than the most efficient level, permitting the company to maximize efficiency in the next rate period

and retain as profit that portion of revenue incorrectly allowed by the commission.[40]

Sliding scale regulation is really a more formalized version of a policy of awarding extra return to companies that appear to be efficient and, like such a policy, it creates an efficiency incentive whose effectiveness depends on the sufficiency of the reward, the accuracy with which the commission detects the level of efficiency, and the degree to which the company can be certain that efficiency will in fact be rewarded. Although adoption of a sliding scale strengthens expectations of reward, the sliding scale, as conceived in Washington, D.C., is not based on a reliable measure of efficiency.

Company net earnings is no more accurate a measure of efficiency than comparative price level or general impressions of the level of efficiency. Many factors other than management efficiency will cause fluctuations in company earnings. The D.C. Commission found that increased customer density and better load distribution due to rapid population growth in the Washington area caused allowed return under the sliding scale to skyrocket to politically unacceptable levels, necessitating a downward adjustment in the terms of the scale long before the expected ten year review. Potomac Electric Co., 8 PUR3d 76, 96, (District of Columbia Public Utilities Commission, 1955). Inflation had the opposite effect. Rates of return dropped so low that the Commission and the utility company agreed to abandon use of the sliding scale. Potomac Electric Power Co., 8 PUR3d 76, 96 (District of Columbia Public Utilities Commission 1955).

One of the few attempts to adjust utility cost differences for factors beyond the control of management was made by William Iulo in his study, Electric Utilities: Cost and Performance (Olympia: Washington State University Press 1961). Through regression analysis the portion of interutility cost differences that was explained by factors external to management activities was subtracted from the total variation in actual output costs. That portion of cost differences that remained (which in Iulo's study was 20% of the total cost variation), was assumed to be accounted for by differences in management efficiency.[41]

Since the efficiency measure is a residual of unit output cost after the effect of certain factors has been removed, the choice of such factors is determinative of the accuracy of the measure. Only if all factors beyond management control, and only if such external factors have been removed can the measure be accurate. Of the factors selected by Iulo as external to management to be tested for their significance in explaining interutility variability, only the following were found to be significant: size of steam generation unit, percentage utilization of capacity, cost of fuel, percentage of customers that are residential and percentage commercial or industrial. Among the other factors that Iulo tested were: size of enterprise as measured by total assets, total property, total electric utility property, total kilowatthour sales, or generating capacity; cost of construction; level of technology as measured by fuel consumed per unit output; cost of debt, type of generation; relative use of purchased and self-generated power; capital investment; wage rates; consumption density of the service area; and geographic location.[42]

These factors were selected because Iulo felt that they were not amenable to rapid change by management.[43] Iulo was concerned with efficiency under a relatively short time perspective. As one moves from measuring short run efficiency to measuring long run efficiency, the number of factors that management cannot affect diminshes and virtually every factor examined by Iulo can at least be modified by management. Even price levels and consumption patterns can be affected to some extent through contract negotiations and pricing policies.[44] Since there are likely to be tradeoffs between short and long run efficiency, one must select a time perspective with which to view and measure efficiency. Once a time perspective is chosen, Iulo's factors must be refined to the extent that they are wholly or partially amenable to change by management. For example, the factor, fuel cost should be the general market level of price rather the particular price paid by a utility company so that if the utility negotiated a price above or below the general market price, the effect of such negotiations would remain in the residual cost after the external factors are removed.

Closely related to the problem of the choice of "external" factors is the problem of selecting a method of measuring the chosen factors. Only if an accurate method of factor measurement is used will the effect of the factors be accurately accounted for. While Iulo uses fuel per unit output as a measure of level of technology, he expresses doubt as to whether this is a sufficiently accurate measure. If the measure is not at least a good approximation, the effect of level of technology will not be removed from the residual

output cost and perhaps some factor that should have remained in the residual will be inadvertently eliminated.

If the problems of selection of external factors and method of measurement of such factors can be overcome, Iulo's efficiency measure might be used in a sliding scale system to replace company earnings as the variable on which allowed return is based. For a given reduction in adjusted output cost (i.e., actual output cost less than portion of cost variation of a given company over time that is explained by management efficiency), the commission would agree to increase the rate of return a given portion of the savings. It should be noted that, while Iulo's study compared intercompany cost differences at a particular point in time, a sliding scale would be based on intracompany cost comparisons over time, which might change the external factors found to have a significant effect on actual unit output cost. For example, while at any given time all utilities might tend to have a similar level of technology so that technology explains little of intercompany cost differences, technology used by any single company might change significantly over time and therefore would be important in explaining intra-company cost variation.

Using Iulo's efficiency measure and given the constitutional limits set by Bluefield Water Works and Hope Natural Gas, a commission might set a minimum efficiency level necessary for a utility to be allowed a return equal to the cost of capital and vary allowed return from that level of return depending on the variation of

company efficiency relative to the minimum efficiency level. Although the resulting sliding scale might provide an objective method of rewarding extra return, it could not be applied mechanically. Since the measure of efficiency is based on the residual after the effect of all known external factors is removed, the measure could include the effect of unrecognized or incorrectly measured external factors as well as management efficiency. The measure is not an infallible measure of efficiency but merely refines the analysis a commission would make in appraising a utility's level of efficiency. The commission would have to examine each utility to determine if the Iulo measure of efficiency should be adjusted for the particular circumstances of a utility's operations.[45] In order to satisfy due process requirements a commission must demonstrate that its appraisal of company efficiency is a reasonably accurate one and supported by substantial evidence. A court must be convinced that the efficiency measure on which a sliding scale is based reasonably approximates the level of management efficiency and does not instead reflect factors beyond management control for which management should not be rewarded or penalized.

Mechanical application of the sliding scale also might raise other due process problems. Some courts have held that the refusal to increase the rates until service is improved is arbitrary and unlawful where such a refusal would make it difficult for the utility to improve its capital equipment. E.g., Elyria Telephone Co. v. Public Utilities Commission, 110 N.E.2d at 62. The court in Elyria Telephone held further that service could never be considered

in a rate case under the Ohio statute but many of those courts that have held that rates could be affected by adequacy of service also held that poor service did not require that the commission refuse to increase rates. A commission might conclude that a rate increase is "an appropriated step in the improvement of the service," (North Carolina ex rel. Utilities Commission v. Morgan, 177 S.E.2d at 41) or that one cause of poor service might be the inability to attract capital due to inadequate rates (Askew v. Bevis, 283 So.2d 337, 340 (1973); Township Committee of Township of Lakewood v. Lakewood Water Co., 54 N.J. Super. 371, 148 A.2d 885 (1959); Village of Apple River v. Illinois Commerce Commission, 18 Ill.2d 518, 165 N.E.2d 329, 333 (1960)).

It does seem unreasonable for a commission to find that service is inadequate or inefficient because of insufficient or deteriorating capital equipment and condition a rate increase on improved service or efficiency and then to fix the rate of return at so low a level as to make it virtually impossible for the company to acquire new capital. In effect what the courts are holding is that a commission cannot require a company to do the impossible. E.g., City of Elizabeth v. Board of Public Utilities Commissioners, 123 A. 358, PU 1924C 524, 527 (1924)(holding that a utility was under no obligation to obey a commission order to make certain capital improvements where return was insufficient to attract the necessary capital). This argument would not apply to the case where a commission conditioned a rate increase on improved service or efficiency which could be achieved without significant capital outlay.[46] Thus, a commission applying a

sliding scale or any other policy of varying return with efficiency must be careful not to penalize inefficiency to the point of precluding the possibility of the improvement required by the commission. A commission might agree to raise rates gradually as the company shows evidence of good faith efforts to improve efficiency.

It is also important that a commission periodically review the terms of any sliding scale to refine the scale so that it will yield reasonable returns. The first attempt at setting the terms of the scale may well have to be modified in light of experience under sliding scale regulation. Rewards for efficiency, for example, might have to be adjusted downward if overly generous rewards resulted in an unreasonably high rate of return. And the allowed rate of return of any particular company must remain sufficiently below the maximum within the zone of reasonableness so the company will continue to have an incentive to further improve its efficiency. In order to preserve flexibility as to the terms of the sliding scale, the commission should not adopt a sliding scale in the form of a contract between the commission and the utility company, as was done in Washington, D.C. Instead, if a sliding scale were to be used, it should be promulgated as a formal policy or rule of the commission. Even if the commission retains the ability to make adjustment in the terms of the sliding scale, the promulgation of a policy of sliding scale regulation would provide some certainty that a utility would be rewarded in a reasonably predictable manner for increased management efficiency.

Assuming a commission can overcome the methodological difficulties in creating a sliding scale system, its statutory duty to set just and reasonable rates would seem to grant authority for the commission to adopt such a system in setting rates. Some state statutes specifically permit the use of a sliding scale although they seem to envision an automatically functioning sliding scale such as that adapted in Washington, D.C., rather than a sliding scale policy requiring adjustments by the commission in light of the particular circumstances of each rate case. E.g., California §457 (permitting a utility to enter "into an agreement for a fixed period for the automatic adjustment of charges...in relation to the dividends to be paid to stockholders of such corporation"); New York §65(4)(analogous to the California provision) and §66(16)(permitting automatic adjustment of rates for a period not more than four years based on the relationship between net income and fair value of property used and useful); Pennsylvania Statutes Annotated §66.1147 (1959)(permitting a sliding scale of rates or other methods for the "automatic adjustment" of rates "as shall provide a just and reasonable return on the fair value of the property used and useful").

F. Promulgation of Standards for Utility Performance

Rather than attempting to encourage efficiency by a system of incentives and disincentives, a commission might order the utility to act in a particular manner that the commission has determined embodies maximum efficiency. A performance standard sets requirements which management must satisfy or be faced with fines or a reduction in the rate of return. Three aspects of performance standards

must be examined before any conclusion can be drawn as to their feasibility: the scope of review inherent in a standard; the dimensions of performance that are regulated; and the all or nothing quality of compliance with their requirements.

Scope of Review

The management and operation of an electric utility can be conceptualized as a pyramid of decision making, beginning at the top with relatively few major decisions, which will significantly affect company operations perhaps even over a period of several years, followed by more numerous decisions with less impact, and ending at the base with relatively numerous, even daily, decisions, each affecting primarily the immediate activities in the context of which they are made. These decisions interact in that a series of relatively minor decisions may effectively determine the resolution of a more major problem and a major decision in turn must be carried out through, and so determines the content of many smaller decisions. The broader the decision, i.e., the more decisions and decision makers it affects, the higher up in the management hierarchy it tends to be made.

Since performance standards require that management decision making achieve certain results, the use of standards necessarily implies commission review of the management decision for which standards are set. The more important the decision for which a standard is set (i.e., the higher in the decision pyramid such standard intervenes), the greater the number of decisions the standard indirectly affects and the greater the effect such standard

is likely to have on overall company efficiency. A decision as to the technology to be used in new generation facilities has more far reaching consequences for efficiency than does a decision as to management salaries or as to the timing of shut down periods for generation plants for maintenance and inspection. Thus, for a commission to ensure that efficinecy is at a given level, many more decisions would have to be reviewed if the standard is directly concerned with intermediate or low level decisions than if the standard directly concerns high level decisions.

It is important to minimize the number of decisions that a commission must review since, as the scope of necessary review grows, so too does the size of the bureaucracy necessary to carry out that review. At a certain point the commission would have to virtually duplicate the management structure of the utilities it regulates. While the commission might realize economies of scale through centralization of decision making for all utilities in the state, clearly the bureaucracy necessary to develop and enforce standards for a large portion of company decsiion making would be immense.

As the size of the commission staff approaches the size of company management staff and more of company decisions are directly reviewed by the commission, it seems logical to eliminate the duplication and have the commission directly manage the company, i.e., to put the utilities under public ownership. However, it is not clear that public management would be any more efficient than private management. Unless one assumes that managers hired by the government

will all be so public spirited that they will automatically seek every possible means of maximizing efficiency (and this seems no more likely to be true than an assumption that all private managers will be imbued with a professional management ethic that dictates maximization of efficiency), the government faces the same problem of motivating efficiency maximizing behavior on the part of managers it selects as it faces with private managers.

Review of decision making does carry the risk that it may interfere with the effectiveness of business decision making and thus create the very inefficiency it was meant to eliminate. By necessity many important business decisions are not objectively precise or verifiable but instead involve discretion and business intuition. Management must make decisions as to actions that will be affected by future conditions about which they can make only educated guesses. Time is often of the essence so the decision must be made despite great gaps in their knowledge of important factors. If they waited until the gaps were filled in, the decisions would come too late to be implemented. For example, because of long lead time necessary in the construction of new generation plants estimates of demand must be made relatively far into the future and electric systems planned assuming a given level of future demand and construction costs. Commission standards and review may discourage innovative and independent thinking persons from being managers and may stifle exercise of creative discretion. The delay involved in review may prevent some decisions from being finalized in time. But

these problems are inherent in any review and do not mean that there should be no review of decision making but only that the scope of review should be as limited as possible to achieve the desired effect on efficiency.

Dimensions of Performance

Performance standards can vary not only as to the scope of review they imply but also as to the choice of dimensions of company performance that they regulate. The choice of dimension affects the extent to which a particular standard leaves to the company the determination of how best to meet commission requirements. A standard for overall efficiency that sets a maximum unit output cost would give management broader discretion than a standard prescribing a particular capital-labor mix or maximum fuel cost or maximum energy loss over transmission lines. The Michigan Public Service Commission has considered setting a series of standards relating to construction planning and implementation, financial planning and performance, utilization of electronic data processing equipment, utilization of work force and labor-management relations, safety practices, and purchasing practices.[47]

Since maximization of efficiency or minimization of output price is the ultimate goal of efficiency performance standards, the use of a single cost standard avoids the problem of setting multiple standards that may be incompatible with each other and with the purpose of using standards. Just as unit output cost sums the effects of all levels of decision making, unit cost also is the net product of

decisions affecting all dimensions of company performance. While at any given point the targets set for various dimensions of company performance may be compatible with each other and with cost minimization, as conditions change the targets may begin to conflict. For example, if the cost of labor rises, a company attempting to meet a labor productivity standard (output per labor dollar) may have to reduce labor per unit capital to the point that capital productivity (output per capital dollar) falls below its required level. Or an attempt to reduce operating costs to the targeted level result in overly intensive use of capital (and thus reduced efficiency) as plants become increasingly automated.

Unless the commission adjusts the various standards, incompatibilities may arise, particularly if there is a large number of standards. Conflicts can also arise among standards involving different levels of decision making since decision making on one level affects and is affected by decisions made on other levels. The need for constant readjustment of standards to ensure mutual compatibility only adds to the burden on commission staff and resources.

Although regulation of an entire national economy certainly creates problems of a much larger scale than regulation of a single industry in a single state, the Soviet experience with performance standards provides some insight into the difficulty of setting compatible standards. The Soviet economy is fully planned; national performance standards or targets set by a five year plan are

elaborated into targets for each plant and each industry. Prices are fixed by the government rather than by the market and goals are set in terms of labor productivity, total output, total wages paid, total investment, introduction of new technology, and product assortment.[48] Management bonuses which make up a significant portion of management salaries are awarded upon achievement of the targets. In order to ensure that certain targets are not pursued to the neglect of others, some are made preconditions for the award of bonuses for the achievement of other targets.

Prior to 1965 output was measured in physical terms such as yards of cloth or tons of appliances and not in terms of market value. But it was found that in trying to meet output targets managers were producing cloth that was long but too narrow and appliances that were too heavy. Physical output goals were achieved at the expense of satisfaction of consumer needs, which was the ultimate goal of consumer goods production.[49] For this reason after 1965 the output targets were rephrased in terms of value instead of physical measures and profitibility was introduced as a measure of performance.[50] But since prices do not reflect true market value these changes have apparently not solved the problem of conflicting targets.[51]

The difficulty of ensuring compatible performance standards does not mean that a unit output cost standard is the only feasible standard. On the contrary, the difficulty of measuring management efficiency through cost data (see supra. section V(E)) may dictate the use of standards based on other dimensions of company performance. It may well be easier to set standards for certain types of decisions,

e.g., capital investment decision, than for overall efficiency. But the fewer the standards required by the commission, the less intractable the problem of ensuring that they are not inherently inconsistent.

The choice of the levels of company decision making and the dimensions of company performance that are to be regulated by performance standards raise questions both of due process and statutory authority. It is doubtful that regulation of particular dimension of performance or type of decision is per se contrary to due process. While there may be a limit on the amount of company decision making that a commission can review without violating the property rights of the owners of the company, it is more likely that due process is satisfied if commission review has a rational purpose (e.g., increased utility efficiency) and the standards are grounded in substantial evidence of their rationality. No new statutory authority would be necessary if the standards are to be merely rules of thumb used by the commission in disallowing expenses, excluding investment from the rate base, or setting return but then a company could not be penalized merely for failing to meet the standards. It would have to be demonstrated that the violations caused inefficiency and that the company was not able to achieve a comparable level of efficiency through its own methods of operation. But if the performance standards are to be precise requirements that must be met by the company, standards could be set only for those aspects of company performance which the commission is specifically authorized by statute to regulate.

Many states grant authority over utility operating practices

and facilities but the extent of authority varies. In California whenever the Commission,

> "after a hearing, finds that the rules, practices, equipment, appliances, facilities, or service of any public utility, or the methods of manufacture, distribution, transmission, storage, or supply employed by it are unjust, unreasonable, unsafe, improper, inadequate, or insufficient, the commission shall determine and, by order or rule, fix the rules, practices, equipment, appliances, facilities, service, or methods to be observed, furnished, constructed, enforced, or employed." §761

The California Statute also authorizes orders: for addition, repair, or change in physical property to promote the security or convenience of employees or the public (§762); and for safety devices and construction and operation of facilities to safeguard the health and safety of employees and the public (§768(Supplement 1975)).

The Florida Public Service Commission has the authority:

> "to prescribe fair and reasonable...standards of quality and measurements, and service rules and regulations to be observed by each public utility;...to require repairs, improvements, additions and extensions to the plant and equipment of any public utility reasonably necessary to promote the convenience and welfare of the public and secure adequate service or facilities." §366.05(1); see also §366.06(3).

> "If the Commission determines that there is probable cause to believe that inadequacies exist with respect to the energy grids developed by the electric utility industry, it shall have the power after finding that mutual benefits will accrue to the public utilities involved, to require installation or repair of necessary facilities." §366.05(8) (Supplement 3, 1973).

The statute that abolished the Michigan Public Utilities Commission and replaced it with the Michigan Public Service Commission was intended to grant the new commission "precisely the same powers as the old." Huron Portland Cement Co. Michigan Public Service Commission. 88 N.W. 2d at 497. The jurisdiction of the Michigan

Public Utilities Commission included "the control and regulation, including the fixing of rates and charges, of all public utilities within the state, production, transmitting delivering, or furnishing steam for heating or power...purposes for public use." §460.54. The only specific grant of authority over facilities or practices refers to electric utilities engaged in the "business of transmitting and supplying" electricity. §460.555 (authority to order improvements in "method" employed as necessary to secure good service and safety of public and employees) and §460.557 (authority to fix "just and reasonable rules and conditions of service"). Other than the provisions as to rates and charges, no other provisions refer to authority over generation activities of any public utility.

The New York Public Service Commission is granted much broader authority. The Commission has the power to:

> "examine or investigate the methods employed by...(electric corporations) in manufacturing, distributing, and supplying... same, and...to order reasonable improvements as will best promote the public interest, preserve the public health, and protect those using such...electricity and those employed in the manufacture and distribution thereof." §66(2), and
>
> "prescribe...the efficiency of the elctric supply system, of the current supplied and of the lamps furnished by...corporation...generating and selling electric current." §66(3).

Most of the statutory provisions seem to provide only limited authority for performance standards. Most are concerned with safety not efficiency, or refer to regulation of quality of service to the public rather than operating and investment practices. A commission would probably have to seek statutory amendments before it could implement a program of performance standards.

The All or Nothing Quality of Compliance

Performance standards that set limits on unit output cost as a measure of efficiency, seem to resemble the sliding scale and other methods of inducing efficiency by varying return with efficiency level. However, one fundamental difference remains between the two approaches. While a commission varying rate of return with efficiency relies on the incentives and disincentives it creates to induce the companies to be as efficient as they can, a commission using performance standards dictates what level of efficiency the companies must reach. Even if the orders are enforced by direct or indirect (e.g., through fines which are disallowed in rate making) reduction in the rate of return, this difference between an incentive and an order system of regulation remains.

For an order system to achieve maximum efficiency the goals ordered must be neither impossible nor too easy to reach. If the commission has made requirements that are less than the manager is capable of achieving, he has no reason to continue improving once he has reached the required level since he gets no greater reward for surpassing the goal. In fact, he has every reason to stop his efforts since the commission will base its next set of goals on whatever evidence it has of the capabilities of the company and a level of overachievement is likely to become the minimum requirement for the next period.[52] The manager will then have to work even harder in the next period and with a greater risk of failure and for no greater reward than if he had not exceeded the initial standard.

If a manager is faced with what he sees as an impossible goal, he has no reason to even try to reach it since he is rewarded only if he actually reaches the goal and is penalized no matter how close he gets to it. Although he may not realize at the beginning of the goal achievement period that the goal is not within his capabilities, as he attempts to meet the requirement, the further the goal is from what is feasible, the sooner he is likely to realize the uselessness of his efforts. He might decide not to get too close to the goal since the lower the capabilities of the company appear, the lower the standard is likely to be for the next period.

Because the commission must set goals for the future, the standards are unlikely to be more than roughly accurate. And the more accurately the standards are to reflect the efficiency capabilities of the utility, the more detailed and precise the information the commission must collect. Because of the difficulties and cost of getting sufficient, accurate information and setting accurate standards, the likelihood of accuracy in goal setting seems relatively low while the consequences of error are serious.

An incentive system poses similar problems of information collection and accuracy but mistakes are less likely to adversely affect the level of efficiency. Since all reasonable costs of the company are covered by the rates, it should not be difficult to set rewards high enough to elicit efforts at increasing efficiency. The more important problem is to avoid setting incentives at too high a level so that the company recaptures a larger portion of the efficiency savings than necessary to induce efficiency efforts.

While it is undesirable for the public to pay the company any amount more than the minimum necessary to induce efficiency maximization, even in the event of error the public will still benefit from improved efficiency, although less than if no error had been made. The problem of the all or nothing quality of performance standards dow not preclude their use but suggests that they should be limited in their application.

VI CONCLUSION

Rate base regulation does create some incentive for operating and investment efficiency in that savings from reductions in the actual operating cost and capital investment ratios below the ratios of the test period are retained by the utility until rates are again reviewed. Increases in these ratios during the rate period reduces the rate of return. But this incentive is reduced as regulatory lag is shortened and, in the case of long run efficiency, is at least partially offset by the ability to earn excess return by overinvestment.

None of the methods of increasing efficiency alone provides a solution to the problem of creating sufficient efficiency incentive. What seems to be required is a combination of the various methods. It is clearly important that a commission disallow inefficient expenditures as test year expenses although its ability to discover inefficiency seems limited to the more extreme cases. A commission has broad legal authority to disallow unnecessary and inefficient expenditures, limited primarily by the requirement that grounds for disallowance be supported by substantial evidence.

Inefficiency in capital investments poses a more serious problem than operating inefficiency since overinvestment may be inadvertantly rewarded when allowed return exceeds the cost of capital. While the efficiency of all investments should be scrutinized when the rate base is determined, it seems desireable to review major investments

in facilities before substantial resources have been committed to their construction. Such review could take place in the context of rate base determination (if uncompleted plant or interest on plant under construction is included in the rate base), or review of securities but in order to ensure early review of such projects it seems more appropriate to require review of the feasibility and efficiency of major investments in a separate hearing before any construction has begun, just as, in many states, they are reviewed as to their location and environmental impact. E.g., California Public Resources Code §§25000-25903 (Supplement 4, May 31, 1974); Florida §§403.501 - 403.515 (Supplement 1974); New York §§120-130 (Supplement 1972), and §§140-143 (Supplement 1974). Whether a commission sets up performance standards for such investments or uses such standards as rules of thumb, additional statutory authority to conduct a separate efficiency review.

A commission also should institute a formal policy of rewarding more efficient companies an extra margin of return varying with the degree of efficiency. Such a policy does run the risk of increasing allowed return sufficienty above the cost of capital that over-investment is stimulated but careful commission review of major capital investments in the context of rate base determination, securities review, or separate efficiency review of proposed facilities could substantially reduce the opportunity for over-investment. Particularly in an inflationary economy, an extra margin of return is of great value to management and would provide significant

incentive for operating and investment efficiency. In order to make such incentives most effective, commissions must develop an efficiency indicator or measure. The most promising method evaluating efficiency seems to be the approach developed by Iulo but it does require assemblage of large amounts of data.

Commissions could improve their ability to evaluate efficiency simply by being careful to temper their comparisons of the costs of various utilities with consideration of factors external to management efficiency. Whether or not the Iulo approach is used formally, intercompany comparisons would be facilitated by collection of data on utilities in and outside of the state as to various components of output cost, e.g., investment in generation and transmission and distribution facilities, labor costs, administrative cost, fuel cost, return to equity, interest on debt. Such data would make it easier to pinpoint causes of cost differences.

Although reduction of rate of return below the cost of capital does not seem to be per se contrary to due process, it may be more difficult to avoid violation of the due process limitation if allowed rate of return is directly reduced below the cost of capital than if it is indirectly reduced by disallowance of inefficient operating expenditures and exclusion of inefficient investment from the rate base. If a commission reduces allowed operating costs and rate base to the levels that would be required by an efficient company and then sets allowed return at the cost of capital, it is clear that due

process has not been violated. Rates have been set so as to provide a company under efficient management the opportunity to earn a reasonable return.

This is more difficult to demonstrate if instead of disallowance and exclusion, or in conjunction with some disallownace and exclusion, the allowed rate of return is dropped below the cost of capital. In order to determine if due process has been violated, one must compare the rates resulting from this approach with the rates that would result if one calculated the levels of expenditure, investment, and return which would be necessary for an efficient company. The commission might as well use the latter approach in the first place.

But a company may be unwilling or unable to penalize inefficiency to the full extent of its legal authority. While in a competitive market inefficient producers are penalized by declining profit and eventual bankruptcy, the importance of electricity to the public and dependence of thepublic on the existing utility in each service area precludes a commission from allowing such an extreme economic result. In a sense when the public through the commission penalizes a company for being inefficient, it is penalizing itself since the ability of the company to provide electricity at reasonable rates is further impaired by any decline in the financial health of the company. Within certain limits the return to equity can be directly or indirectly reduced without seriously jeopardizing the financial standing of a healthy company. When utilities are weakened because of inflation, regulatory lag, and public opposition

to rate increases, the ability of the commission to exact punishment for past or present inefficiency is greatly reduced.

A commission could increase its ability to penalize inefficiency if a portion of the reward-punishment system were administered through management salaries.[53] If a portion of management salaries depended on the efficiency level achieved by the company, management, and not the company as a whole, would suffer the consequences of management inefficiency. Statutory amendments would be required to implement such a policy.

FOOTNOTES

1. "Representation of the Public Interest in Michigan Utility Proceedings," 70 Michigan Law Review 1367 (June 1972). One prominent example of public pressure against utility rate increases was the personal intervention of the then Governor of Connecticutt in a Commission rate hearing. On June 8, 1973 former Governor Meskill, describing the Commission's approval of interim rate relief to two electric utility companies as "outrageous," filed a Motion for Recision of Interim Order and publicly supported a petition drive organized by opponents of the rate increase. He testified at the rate hearing that "the situation facing every homeowner, every retired person, and every taxpayer is so serious that we must not overlook any opportunity to grab ahold of the ever mounting cost of living." Testimony of Thomas Meskill on the Request for Rate Increases by Connecticutt Light and Power Company and Hartford Electric Company (Hartford; press release, Governor Meskill's Office 1973).

2. William Iulo, Electric Utilities: Costs and Performance (Olympia; Washington State University Press 1961).

3. California Public Utilities Code §728 (1956).
Florida Statutes Annotated §366.06 (1968).
Michigan Compiled Laws Annotated §§ 460.58, 557 (1967).
New York Public Service Law §66(5) (1955).
Unless otherwise indicated, all references to California, Florida, Michigan, or New York statutes concerning public utilities are from the above cited codes and editions.

4. Georgia K. Ledakis, Rate of Return Testimony, FPC Docket No. E-85522, Delmarva Power and Light Co., p. 16 (May 1974). See also Alfred E. Kahn, The Economics of Regulation: Principles and Institutions, Vol. 1: 42-44 (New York; John Wiley & Sons, Inc. 1970).

5. In many states electric utility companies cannot construct new facilities without first obtaining from the commission a certificate of public convenience and necessity, which is usually required for the purpose of ensuring that utilities do not interfere with the service areas of other utilities. E.g., California §1001; Michigan §460-502; New York §68. In Florida there is no requirement of prior certification of proposed facilities but the Commission has statutory authority to approve or resolve territorial disputes between utilities, rural cooperatives, and municipal utilities. §366.04(2)(d)(3)(Supplement 3, 1974).

   Limited competitive pressure is exerted by municipal utilities in that a municipality might choose to operate its own utility facilities rather than allowing a private utility to furnish electricity to its residents. In rural areas customers have the alternative of joining rural electric cooperatives. While such potential competition has served as the basis for antitrust actions

against certain practices of some privately owned utilities (e.g., Otter Tail Power Co. v. United States, 410 U.S. 366 (1973)), only a minor portion of the market served by most privately owned utilities is affected.

6. Clement G. Krouse, "Complex Objectives, Decentralization, and Decision Processes of Organization," 14 Administrative Science Quarterly 544, 552 (1969).
Milton Z. Kafoglis, "Output of the Restrained Firm," LIX American Economic Review 583 (September 1969).
Oliver E. Williamson, The Economics of Discretionary Behavior: Managerial Objectives in a Theory of the Firm (Englewood Cliffs; Prentice-Hall, Inc. 1964).
R. Joseph Monsen, Jr. and Anthony Downs, "A Theory of Large Managerial Firms," 73 Journal of Political Economy 221 (June 1965).

7. Oliver E. Williamson, The Economics of Discretionary Behavior: Managerial Objectives in a Theory of the Firm at 32, 34.
Frederick M. Shearer, The Weapons Acquisition Process: Economic Incentives, p. 161 (Boston; Harvard Graduate School of Business Administration 1964).

8. Oliver E. Williamson, The Economics of Discretionary Behavior: Managerial Objectives in a Theory of the Firm at 22-25.
R. Joseph Nonsen, Jr. and Anthony Downs, "A Theory of Large Managerial Firms," 73 Journal of Political Economy at 266.

9. Alfred E. Kahn, The Economics of Regulation: Principles and Institutions, Vo. 2 at 268. Kahn discusses at length the validity of these rationales for restricting entry into industries traditionally treated as natural monopolies. See chapters 4 and 5.

10. Alfred E. Kahn, The Economics of Regulation: Principles and Institutions, Vo. 1 at 29.

11. Federal Power Commission v. Natural Gas Pipeline Co. of America, 315 U.S. 575, 590 (1942).
Pacific Telephone and Telegraph Co. v. Public Utilities Commission, 44 Cal.Rptr. 1, 401 N.W.2d 353, 362-366 (1946).
Michigan Bell Telephone Co. v. Michigan Public Service Commission, 315 Mich. 535, 24 N.W.3d 200 (1946).
Board of Commissioners v. New York Telephone Co. 271 U.S. 23 (1925) (past profits cannot be used to sustain confiscatory rates for the future).

A statute might empower a commission to adjust rates retroactively. E.g., Oklahoma Natural Gas Co. v. Oklahoma, 258 U.S. 234 (1921) (permitting a commission to rebate a portion of company revenues to customers who received gas under inadequate

pressure; the Oklahoma Supreme Court had interpreted the Oklahoma statute to grant the commission "supreme" power to regulate rates "subject only to limitations imposed by the Legislature;" see Georgia Public Service Commission v. Atlanta Gas Light Co., 205 Ga. 863, 55 S.E.2d 618, 633 (1949)). Also see Dayton-Goose Railway Co. v. United States, 263 U.S. 456, 484 (1923)(upholding a statute providing for recapture of excess profits); Great Northern Railway Co. v. Sunburst Oil and Refining Co., 287 U.S. 358. 361 (1932)(upholding a statute providing for retroactive review of rates.

12. Paul L. Joskow, "Inflation and Environmental Concern: Structural Change in the Process of Public Utility Price Regulation," XVII Journal of Law and Economics 291 (1974).

13. E.g., Southern New England Telephone Co. v. Public Utilities Commission, 29 Conn.Sup. 253, 282 A.2d 915 (1970)(Commission required to adjust test year on basis of subsequent actual experience since the test year and ascertainable expenses that will be realized in the near future); New England Telephone and Telegraph Co. v. State, 113 N.H. 127, 302 A.2d 814 (1973) (in setting rate of return Commission required to consider whether attrition due to operating expenses or plant investment rising faster the revenues will prevent realization of allowed return for a reasonable time in the future); Public Service Co. of New Hapmshire, 311 A. 2d 513 (1973) (Commission required to adjust rates for inevitable fuel cost increases); LaSalle Telephone Co. v. Louisiana Public Service Commission, 245 La. 99, 157 So.2d 455, 457 (Commission cannot ignore mandatory or reasonable and justifiable increases in expenditures that will occur subsequent to the test year and will reduce net revenues in the projected year).

14. The Federal Power Commission requires submission of estimated revenue for twelve months and anticipated significant changes in facilities, operatings, and cost of service for eight months subsequent to the twelve month test period. 18 C.F.R. §35.13(b)(4)(iii)(April 1, 1973). The California Commission has permitted use of a projected test year. Pacific Gas and Electric Co., 97 PUR3d 321, 327 (California Public Utilities Commission 1972). The Florida Commission allowed submission of projected test year data which, because rate review proceedings extended for more than one year, was current by the time the final rate order was made. Florida Power and Light Co., 98 PUR3d 441, 443 (Florida Public Service Commission 1973).
The Michigan Commission recenty required use of a projected test year in all future rate proceedings. Michigan Department of Commerce News Service, p. 5 (January 23, 1975). In New York the Commission has permitted submission of projected test year data consisting of 6 months actual experience and 6 months forecast, which included no allowance for projected price inflation and for which there was adequate proof of reliability. Consolidated Edison Co. of New York, Inc., 12 N.Y.P.S.C. 630, 634-639 (1972).

15. The Federal Power Commission allows fuel adjustment clauses that meet the standards set out in Rule 35.14 18 C.F.R. §35.14 (April 1, 1973).
Twenty-nine states presently allow fuel adjustment rate increases without hearings. Edward Cowan, "Senators Say Utility Bills Leapt $9.6 Billion in '74'", New York Times, p. 49, col. 7 (March 24, 1974). But recently in many states fuel adjustment clauses have been challenged in court and bills have been introduced to abolish them or restrict the amount that can be passed through to the customer. Reginald Stuart, "Fuel Cost Adjustment Clause of Utilities Is Under a Wide Attack," New York Times, p. 49, col. 2 (March 3, 1975).
The California Commission does not allow fuel adjustment clauses to go into effect automatically but holds expedited hearings in order to approve fuel adjustment increases. See, e.g., San Diego Gas and Electric Co., Decision 895(1)(California Public Utilities Commission 1973).
Florida has allowed utility rate schedules to include an automatic adjustment for changes in the cost of fuel adjusted for changes in generating efficiency and energy losses in transmission and distribution. Gulf Power Co., Docket No. 6014-EU, Order No. 2891 (Florida Public Service Commission 1960). However, on October 9, 1974, the Attorney General of Florida announced that, in his opinion, automatic fuel adjustment clauses were illegal because they would have the effect of a rate increase without a public hearing before the Commission as required by §366.06 of the Florida statute. On October 22, 1974, a public hearing was held by the Commission on the subject and, as a result, the Commission suspended further automatic fuel adjustments and decided to hold hearings periodically to review future requests for fuel adjustments.
The Michigan Commission allows self-adjusting fuel clauses for residential and nonresidential rates (Consumers Power Co., Case No. U-4262 (1973) and is considering a proposal to allow automatic adjustment for the cost of purchased and net interchange power and to permit monthly adjustment based on estimates of future costs (Consumers Power Co., Case No. U-4621 (1974)).

The New York Public Service Law allows the Commission to prescribe rates embodying automatic adjustment clauses effective for not more than four years. §66(16). New York electric utility rates include an automatic adjustment for changes in fuel cost and in the power purchased at a total charge equal to or less than the utility's avoided fuel cost. 16 New York Codes, Rules, and Regulations §§36.55, .56, as amended (1974).

16. Harvey Averch and Leland L. Johnson, "Behavior of the Firm Under Regulatory Constraint," LX American Economic Review 117 (March 1970). Alfred E. Kahn, "The Graduated Fair Return: Comment," LVIII American Economic Review 170 (March 1968), suggests that the tendency to overinvest in physical might be a desireable and necessary offset

to the tendency of a monopoly to avoid risk taking innovation and to restrict output in order to raise price. But the incentive for capital investment would bias the company toward innovation involving large capital investments which may or may not be the most efficient choice. The potential advantage to the monopolist of restricting output would seem to be eliminated when the commission limits price to operating costs plus capital costs rather than allowing rates to fluctuate depending on the interaction of supply and demand. However, because of regulatory lag in adjusting to changes in cost and because the companies, and not the commissions, determine rate design, regulation might only limit rather than eliminate the tendency of a monopoly to restrict output.

17. United Fuel Gas Co., 100 PUR(NS) 405, 425 (Federal Power Commission 1953).
New England Telephone and Telegraph Co., 42 PUR3d 57, 62 (New Hampshire Public Utilities Commission 1961).

18. Alfred E. Kahn, The Economics of Regulation: Principles and Institutions, Vol. 2 at 56.
Some commissions increase allowed return on capital in order to prevent a decline in rate of return due to an increase in rate base over the rate base of the test period (such decline is called "attrition" or "erosion"). State v. New Jersey Bell Telephone Co., 30 N.J. 16, 152 A.2d 35 (1959).

19. Pamela Archbold, "Utilities Money Shortage," New York Times (March 17, 1974).

20. W. Donham Crawford, President, Edison Electric Institute, speech (January 17, 1973).
William G. Rosenberg, Chairman, Michigan Public Service Commission, "Utilities Need Help - Now!", Wall Street Journal (January 8, 1975).

21. Eugene W. Meyer, Vice President and Director, Kidder, Peabody, and Co., Inc. Direct Testimony in Re United Telephone Company of Ohio (1973).

22. See, e.g., Article 2, Section 28(V) of the Pacific Gas and Electric Company First and Refunding Mortgage dated December 1, 1920 with Wells Fargo Bank, National Association, and First National City Bank as Trustees, as amended; Article 5, Section 5.04 of the Tampa Electric Company Indenture of Mortgage dated as of August 1, 1946 with State Street Bank and Trust Company of Boston, Massachusetts and Marine Bank & Trust Company of Tampa, Florida as Trustees, as amended; Article III, Section 4 of the Mortgage and Deed of Trust dated as of October 1, 1924 between Detroit Edison Company and Bankers Trust Company, as Trustee, as amended; and Articles 1 and 4 of the Indenture of Mortgage and Deed of Trust dated as of September 1, 1951 from Long Island Lighting Company to City Bank Farmers Trust Company (now First National City Bank), as Trustee, as amended.

23. See e.g., Article 2, Section 28 of the First and Refunding Mortgage dated as of December 1, 1920 between Pacific Gas and Electric Company and Wells Fargo Bank, National Association, and First National City Bank as Trustees, as amended; Article 1, Section 1.09 and Articile 5, Section 5.04 of the Indenture of Mortgage dated as of August 1, 1946 between Tampa Electric Company and State Street Bank and Trust Company of Boston and the Marine Midland Bank & Trust of Tampa, Florida as Trustees, as of the Mortgage Indenture dated as of September 1, 1945 between Consumers Power Company and First National CIty Bank, as Trustees, as amended; and Article 4, Section 4.01(f) of the Mortgage Trust Indenture dated as of April 1, 1946 between Consolidated Edison Company of New York, Inc. and The National City Bank of New York (now First National City Bank), as Trustee, as amended.

24. See, e.g., Prospectus for $150,000,000 of First and Refunding Mortgage Bonds, Series 00, Due March 1, 2004, Consolidated Edison Company of New York, Inc., p. 4 (March 7, 1974).
Utility companies also raise relatively small amounts of long term capital by selling preferred stock, which differs from a bond only in that there is generally no legal obligation to pay the dividend fixed for preferred shares (while there is a legal obligation to pay bond interest and principal) and the bond holder has priority over the preferred holder in the event of bankruptcy. Both as to dividends and equity (in bankruptcy) the preferred shareholder has priority over the holder of common stock. The issuance of preferred shares must be authorized by the Articles of Incorporation of the utility and they may contain an income coverage requirement for issuance of additional preferred shares similar to the coverage requirement in bond indentures. See, e.g., Article 6, Section 3(c) of the Restated Articles of Incorporation of Southern California Edison Company; Article 5, Section 8(B) of the Charter of Florida Power Corporation; Article X, Section E-1 of the Certificate of Incorporation of Consumers Power Company; and Article 5, Section A(IV) of the Restated Certificate of Incorporation of Consolidated Edison Company of New York, Inc.

25. Utilities Bulletin (New York; Smith Barney and Co., June 12, 1973).

26. Moody's Investor Services, Inc. and private communication, Standard and Poor's Corporation (1973).

27. Fergus J. McDiarmid, "Utility Financing in an Age of Inflation," Public Utilities Fortnightly 25, 27 (December 20, 1973).

28. Questions and Answers About the Electric Utility Industry (Edison Electric Institute 1973), p. 28-29.

29. John A. C. Heatherington, "State Economic Regulations and Substantive Due Process of Law" in Selected Essays on Constitutional Law, Association of American Law Schools (ed.) p. 499 (St. Paul; West Publishing Co. 1963).

30. Modiglian and Miller argue that the cost of capital for a given company reflects that company's overall level of investment risk. Since the total business risk of the company remains the same regardless of how total capital is divided between debt and equity, a change in the ratio of debt and equity should not affect the total cost of capital. However, many economists and financial managers reject this conclusion because it assumes perfect functioning of the capital markets. The Modiglian-Miller thesis also assumes the absence of corporate taxes. Modigliani and Miller agree that, when the effect of taxes is built into their model, the cost of capital can be lowered by increased use of debt financing. See James C. VanHorne, Financial Management and Policy, p. 157-164 (Englewood Cliffs; Prentice-Hall, Inc. 1968).

31. Although the Court in Transworld Airlines, Inc. v. Civil Aeronautics Board, 385 F.2d 648 (D.C. Cir. 1967), notes that there might be some distinction for due process purposes between traditional rate regulation and §1376(b) to the extent to which it provides for a subsidy beyond a reasonable return on investment, this distinction apparently does not go to the ability of a commission to disallow inefficient expenditures.

32. The California, Michigan, and New York statutes make no express requirement of efficiency.

33. Alfred E. Kahn, The Economics of Regulation: Principles and Institutions, Vol. 1 at 29-30.

34. Because actual construction costs vastly exceeded the estimated cost of construction, the Michigan Public Service Commission is in the process of reviewing the decisions of one of the gas utilities under its jurisdiction to build a new gas reforming plant. Consumers Power Co., Case No. U-4331, p. 10-13 (November 8, 1973).

35. Charles Alan Wright, "Operating Ratio - A Regulatory Tool," 51 Public Utilities Fortnightly 24 (January 1, 1953).

36. "Operating Ratio - A Rate Base for the Transit Industry," 51 Iowa Law Review 417, 422-423, 432 (1966).

37. Laurence S. Knapper, "Transit Operating Ratio - Another View," 51 Public Utilities Fortnightly 485 (April 9, 1953). Frederick M. Scherer, The Weapons Acquisition Process: Economic Incentives at 141.

38. Lawrence P. Simpson, Handbook of the Law of Contracts, p. 392, 399, 405-406 (St. Paul; West Publishing Co., 1965).

39. Potomac Electric Power Co., 8 PUR3d 76, 95 (District of Columbia Public Utilities Commission 1955).
Report of the Special Commission Established to Investigate Relative to the Sliding Scale Method of Rates for Use by Public Utility Corporations Engaged in the Distribution of Gas and Electricity, p. 221 (Boston; January 1936)(address by Riley E. Elgen, Chairman of the District of Columbia Public Utilities Commission, November 7, 1935).

40. Alfred E. Kahn, The Economics of Regulation: Principles and Institutions, Vol. 2 at 60.

41. William Iulo, Electric Utilities: Costs and Performance, p. 163 (Olympia; Washington State University Press 1961).

42. William Iulo, Electric Utilities: Costs and Performance, at 162.

43. William Iulo, Electric Utilities: Costs and Performance at 140.

44. Alfred E. Kahn, The Economics of Regulation: Principles and Institutions, Vol. 2 at 63-64, n. 45.

45. William Iulo, Electric Utilities: Costs and Performance, at 157.

46. Note: The Duty of a Public Utility to Render Adequate Service: The Scope and Enforcement", 62 Columbia Law Review 312, 320 (1962).

47. Michigan Public Service Commission 1974-75 Budget, Management Surveillance Proposal.

48. George R. Feiwel, The Soviet Quest for Economic Efficiency: Issues, Controversies, and Reforms, p. 260 (New York; Praeger Publishers 1972).

49. Alec Nove, The Soviet Economy: An Introduction, p. 143-144 (New York; Frederick A. Praeger, 1969).

50. George R. Feiwel, The Soviet Quest for Economic Efficiency: Issues, Controversies, and Reforms at 163, 260.

51. Janos Kornai, Overcentralization in Economic Administration, p. 126 (Oxford University Press, 1959).
George R. Feiwel, The Soviet Quest for Economic Efficiency: Issues, Controversies, and Reforms at 160.
Alec Nove, The Soviet Economy: An Introduction at 181.

52. Alec Nove, The Soviet Economy: An Introduction at 172.
Joseph S. Berliner, Factory and Manager in the USSR, p. 82 (Cambridge; Harvard University Press, 1957).

E. G. Lieberman, "Cost Accounting and Material Encouragement of Industrial Personnel," in Myron E. Sharpe (ed.), Planning, Profit, and Incentives in the USSR, Vol. I, p. 10 (White Plains; International Arts and Sciences Press, 1966).

53. Management salaries based on company performance are not completely foreign to American industry. A significant portion of the salaries of top executives in American automobile companies is made up of bonuses that vary with the level of company profits. Agis Salpukas, "Compensation to G.M. Officials Reduced by 68.3% Last Year," New York Times, p. 1, col. 7 (April 19, 1975).

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