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# Legal Solution to the Electric Power Crisis: Controlling Demand Through Regulation of Advertising, Promotion, and Rate Structure

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# A LEGAL SOLUTION TO THE ELECTRIC POWER CRISIS: CONTROLLING DEMAND THROUGH REGULATION OF ADVERTISING, PROMOTION, AND RATE STRUCTURE

*By David H. Permar*[*]

## I. The Electric Power Crisis—Conservation versus Burning Kilowatts[1]

The ever upward growth of the electric power industry has been a much discussed topic in recent years. Figures released by the Federal Power Commission (FPC) in connection with their 1970 National Power Survey indicate that peak demand will go from 277,921,000 kilowatts in 1970 to 1,056,000,000 kilowatts in 1990.[2] They are predicting an average annual growth in consumption of 7.1%, a doubling in consumption every ten years.

In the past, we as a nation have greeted such news with unrestrained enthusiasm. The growth of the electric power industry has meant more jobs, a higher gross national product, and a higher standard of living. Daily we find new uses for electric power which enable the consumer to do more work in less time.

Recognizing these blessings of electric power, the nation, through government and private industry policies, has encouraged more and more consumption of electric power. We have priced electricity so cheaply and made it so readily available that rarely does the homeowner, industry, or commercial establishment consider electricity as a major factor of operation. Virtually no one other than Lyndon Johnson has ever made a serious effort to reduce electrical expenses by reducing usage. (President Johnson's effort to turn out unused lights at the White House was a notable failure.)

The recent national concern with environmental matters has revealed that producing electric power is a mixed blessing. The fossil-fuel electric-generating plant is second only to the automobile as an air polluter. Nuclear power plants create difficult-to-dispose electric wastes and pose the threat of nuclear accidents. The power industry and the Federal Government are now taking pollution seriously, and it appears that air pollution from fossil-fuel plants will be significantly reduced and that adequate controls will be placed on nuclear plants.

There is another aspect of the electric power industry which is not so easily handled: sheer size and rapid rate of growth. This creates at least four major problem areas. The first is that in some areas, particularly the East Coast, the electric utilities have become so large that they cannot build fast enough to keep up with their present 7–10% rate of growth. Boston, New York, Philadelphia, Baltimore, and Washington have all experienced voltage reductions and blackouts during peak demand periods in the last two years. Each year the utilities promise that more power plants will be available next year, but when next year comes they find that increases in demand have matched or exceeded increases in capacity.

The second problem created by growth in the electric power industry is a lack of space for power plant siting.[3] Virtually every electric utility has difficulty locating new sites for power plants which bring no reasonable objections from some competing interests for the land.[4] But the problem is more serious than that. The Committee for Environmental Information, using very conservative figures, has calculated that all land in the United States will be covered by power plants in less than two centuries at the present rate of growth.[5] Other calculations indicate that the problem is even more serious. Using the FPC predictions for peak demand in 1990,[6] and assuming 400 acres for a 3,000 megawatt installation,[7] over six percent of all land and water area in the United States (including Alaska, Hawaii, and all possessions) will be occupied by power plants in 1990. (This does not include transmission lines.) As a comparison, at present all cities, towns, highways, railroads, airports and sites for industry occupy only four percent of the land and water area. Assuming a doubling every ten years after 1990, we will run out of land and water space by 2040, less than seventy years away.

A third problem area is that of waste heat disposal. At present,

about eighty percent of our electric power capacity is in steam-electric generators.[8] They are expected to be 93% of capacity by 1990. Steam-electric generators, whether nuclear or fossil-fuel, are extremely inefficient converters to electric power. Approximately two-thirds of the energy converted is lost as waste heat.[9] According to the Committee for Environmental Information, "In the year 2000, if power consumption continues to increase at the present rate and there is no great increase in overall efficiency (which there is unlikely to be), power plants of all kinds will produce roughly enough heat to raise by twenty degrees the total volume of the United States in a year."[10]

The fourth problem area is that of waste materials. Although we are developing means to control and dispose of the more deadly wastes, the rapid growth rate threatens to overwhelm these efforts. We may now be building plants which put fewer sulfur and nitrogen oxides into the air, but the growth rate in the power industry may result in a net increase in these pollutants. Moreover, less dangerous waste materials such as carbon dioxide will, through volume, become a difficult problem.[11]

It would be comforting if there were technological solutions available for these problems. In fact, there are many imaginative ideas (solar energy, tidal energy, and fuel cells) which hold the promise of solution, but none may be implemented today. Even if we embark on an ambitious development program, it would be highly unlikely that we would have an operational solution by the turn of the century. Nuclear power provides an example. The Atomic Energy Commission has spent billions for nuclear development in the last twenty years. Today nuclear power is producing less than two percent of our electric power, and it will be thirty more years before nuclear power is producing over half of our electrical needs. We are building today the plants which will serve our needs in the year 2000.

It is clear that the electric power industry cannot continue to grow at its present rate for much longer. Our natural resources are finite; we have a limited amount of land, air, and water to serve all of the demands that society places on them. Electric power cannot claim all of these resources. In fact it must be limited to a small percent of them if we are to be able to enjoy the many benefits of electric power.

Unfortunately, many of those who have considered the power problem accept the present rate of growth as absolutely necessary

to meet our future power needs. The president of American Electric Power Company, Inc. recently expressed this opinion:

> It has been suggested that environmental considerations may require a reduction or stabilization in the demand for electric power. This is sheer nonsense. . . . Our economic and social system is high energy-oriented, and it is not going to change. The public will either have an unlimited supply of electric power or there will be a lot of new faces in both utility board rooms and government offices, both state and federal.[12]

Mr. Cook sees no conflict between a pollution-free environment and an unlimited supply of electricity.[13]

There is a direct conflict between clean environment and uncontrolled growth in the electric power industry. The electric power industry is rapidly approaching the point where each increase in its size takes resources from other activities. The value of these activities may be considerably greater than the value of increasing generating capacity. Thus, we must set an absolute limit on the number of electric-generating plants in the United States.

## II. The Problem—Growth in Demand

### A. *Factors Beyond the Control of Utilities*

Population would, at first blush, seem to be a primary factor. Decisions which influence population growth remain with the individual, although governmental policies may have a more direct effect in the future. It seems plausible that one could control the demand for electricity by controlling population.

However, population growth has not been responsible for the mass of growth in electric power.[14] In recent years the rate of population growth has shown a marked decrease; at the same time, the rate of growth in demand for electricity has been increasing. Per capita consumption of electricity has been increasing five times as fast as population growth.[15] Unfortunately, much of this per capita increase in consumption of electricity does not result in an increased standard of living. Instead we substitute higher power consumptive products for lower power consumptive products.[16] This is particularly true of the growth in the use of aluminum, cement, and chemical products, which now consume 18% of all electric power produced in this country.[17]

A second factor beyond the control of the utilities is the

economy. This factor includes employment, income, gross national product, industrial production and construction.[18] The relation between increases in the economy and increases in electrical production is a mutually beneficial one. But as with population, advances in the economy are not responsible for most electrical power growth. Measured in constant dollar terms, GNP has been increasing at one-half the rate of electric power.

A third factor is the shift from other energy sources to electric power. This shift is due in part to the decreasing cost of producing electricity. It also reflects the fact that many jobs can be done more safely, more cleanly, or more efficiently electrically. Recently, some shifts by industry from direct burning of fossil fuels to electricity have been motivated by a desire to solve an air pollution problem. This, of course, only shifts the air pollution from the factory to the electric utility since utilities primarily use fossil fuels to generate electricity.

A fourth factor is the influence of governmental policies designed to increase electrical energy use.[19] The Rural Electrification Program is the outstanding example. The efforts of the Atomic Energy Commission with respect to the promotion of nuclear power are also well-known.[20] In addition, there are numerous tax incentives, depreciation allowances, and loan policies which have the effect of stimulating the use of electricity.

It should be noted further that many of the programs necessary to clean up the environment will also increase the use of electricity In particular, if electric vehicles were ever to come into common use, the demand for electricity would receive another large boost.

### B. *Factors Controlled by Utilities*

In addition to the factors discussed above, there are three other factors which influence demand: promotion, advertising, and pricing. Unlike the previously mentioned factors, however, these are exclusively under the control of the utilities.

The electric utilities are most reticent to discuss the influence of marketing activities on growth in demand. They would prefer the public to consider the demand for electric power as a necessary result of our rising affluence and expanding economy. Yet these factors have a decisive effect on demand growth, and, as the utilities discovered long ago, they are easily manipulated.

In explaining why its 1980 electrical demand forecast made in 1969 was 60 million kilowatts higher than the 1980 forecast made in 1964, the Federal Power Commission stated:

> The updated figures make greater allowances for growth in electric air conditioning and space heating, reflecting widespread promotional efforts of electrical utilities across the Nation.[21]

Similarly, the Load Forecasting Methodology Committee,[22] in discussing marketing policy effects on load forecasting, had this to say:

> So far load characteristics have been dealt with as if the utility had no control over emerging patterns. There are, however, many ways in which the utility can help shape the changes taking place in its service territory.
>
> a. *Promotion*
>
> Promotional effects on load can be divided into two types: short-term and long-term. Most systems use some sort of annual sales quota which may take a variety of forms such as appliance units, annual energy requirements, connected load or estimated annual revenue. For the most part, these will not have a significant effect on the total load character of the system except in the case of major residential appliances and certain industrial devices.
>
> In the longer term, promotional policies are aimed at changing people's buying and living habits. In such cases, even smaller electrical usage devices could have a significant impact on load patterns. Such promotional policies could be aimed at either of two objectives: gaining acceptance for an entirely new application or expanding the electric share of the market for existing applications.
>
> b. *Pricing*
>
> Pricing can be part of a promotional program but is also a separable variable affecting long-term load growth characteristics. Declining electric energy costs vis-a-vis competitive energy forms offer opportunities for increasing penetration of all markets.
>
> This may take two different forms: (a) an increase in existing applications in residential, commercial and industrial markets and (b) increased acceptance of new electric energy-consuming devices which compete with other energy forms, such as the use of electric space heating in residences and commercial structures.[23]

The Committee apparently includes advertising under its discussion of promotion. It distinguished between long-term and short-

term effects of marketing policies by pointing to the obvious fact that pricing and promotion will have a greater influence on load characteristics (demand) over the long-term.

It should be noted that the Committee has included a discussion of declining energy costs under pricing. The Committee has apparently confused electric energy costs with pricing; while electric energy costs reflect primarily technological factors, pricing reflects revenue-producing factors, i.e., how charges are allocated to various consumers. Although the mistake may not have been inadvertent, it is understandable since both factors make electricity more competitive with other energy forms, and since the utilities often use declining costs to justify a promotional pricing policy.

## III. Why Utilities Strive for Maximum Growth in Peak Demand

It is a peculiar phenomenon of the electric utility industry that at a time when there is an inadequate electric power supply, the industry as a whole, as well as the individual companies, continue to advertise, promote, and price their product in a manner designed to increase peak demand. This should be contrasted with non-regulated industries which, when confronted with the same situation (demand in excess of supply), normally close advertising and promotional activities and raise prices. Despite the wasted resources and lost revenues sustained through such policies, the electric utilities have several cogent reasons for making every effort to maximize demand whether or not they can supply the power.

An electric utility's profits (return on investment) is determined by multiplying the rate base (capital investment) times the rate of return (determined through a regulatory process, normally 6–7%).[24] Thus, a utility increases its profits by increasing its rate base or its rate of return. The value of the rate base falls between two extremes: original cost and cost of production. In other words, when placing a value on an electric generating plant for purposes of determining the rate base, the regulatory commission will consider the original cost of building that plant and the cost of reproducing it today. Under inflationary conditions (what has been and is expected to be the normal condition for the future) the commission will favor the lower original cost, while the utilities will favor the higher cost of reproduction. Since the Hope Natural Gas case,[25] a majority of the state commissions

use original cost, one uses reproduction cost, and the rest use some value in between.[26]

Thus, for an electric utility to make profits and prevent its rate base from stagnating, it must build more new power plants. Or, as one economist put it, "To the extent that a utility's permitted rate of return exceeds the cost of capital to it, the utility will wish to acquire additional capital, as long as it goes into the rate base."[27] If a utility does not build any new plants for a considerable period of time and its rate base is valued at something less than reproduction cost, then the utility's rate of return *today* is determined by *yesterday's* cost of building a plant. This can mean a substantial reduction in profits to the extent that inflation has occurred between the time the plant was built and the present.

In order to build the greatest number of power plants possible, the electric utilities maximize demand for their product and prevent the generation of electricity by anyone else within their service area. We have already discussed how utilities maximize demand through advertising, promotion and pricing. The utilities control electricity generation in their service area with the same basic tools of marketing. For example, in New York, Consolidated Edison Company refuses to sell natural gas to office buildings, shopping centers, and apartment houses if they are going to use the natural gas to generate electricity. Across the river in Brooklyn, where gas and electricity are not controlled by the same company, the Brooklyn Union Gas Company does sell gas to large developments which use their own turbines to generate electricity and heat or air-condition the buildings.[28] The electric utilities that do not control gas distribution can often achieve the same effect by offering "special" prices to developments which might consider generating their own power. Often this special price is disguised in the form of promotional allowances.

An additional problem created by the use of the rate base is that utilities will resist any technological advance, such as regional interconnecting power grids or fuel cells, which does not include a need for large capital investments by the local utility.[29] This suggests that it may be necessary to find an alternative to the rate base. (Such an investigation, however, is not within the scope of this article.)

All utilities must, from time to time, seek an increase in their rate of return from a regulatory commission. In addition, there

is a growing trend to have utilities seek permits before constructing a new power plant.[30] In proceedings on such matters, it is extremely helpful to the utilities if they can justify the rate increase or the expanded facilities in terms of the needs of the service areas and the demands of their consumers. For these purposes, the higher the demand growth rate, the better.

Over a set period of time, the demand for a utility's electricity varies considerably, while the utility's ability to supply electricity is constant. This is referred to as the load factor. Normally, an electric utility will have peak demand periods in the summer and winter and low points in the spring and fall. It is very desirable in terms of efficiency and profits to even out these peaks and valleys so that demand will, at all times, roughly correspond with supply. In practice, the utilities attempt to raise both the peaks and the valleys. To the extent that the valleys approach the level of supply, the utilities will profit from a more efficient operation. If the peaks reach or exceed the capacity of the utilities this becomes justification for the new plant building necessary to augment the rate base. If peak demand actually exceeds capacity, a utility has nothing to lose economically. In fact, it enhances the utility's position vis-a-vis the regulatory commission. The utility's public relations will suffer, but, unlike non-regulated industries, bad public relations will not translate into economic loss. A utility's customers cannot go to another supplier.

A utility's total revenue is determined by adding costs and the return on investment. Thus, increasing or unnecessary expenses have no effect on a utility's profits. Economists refer to this as a disincentive.[31] This disincentive goes a long way in explaining why an electric utility continues to advertise and promote its product when it no longer has any power to sell. This, of course, is a complete waste of resources. Due to the nature of the rate-determining process, the cost of this waste is paid, not by the utility, but by the utility's rate-payers.

A final reason why an electric utility will push for maximum expansion was expressed by Galbraith in reference to public corporations in general:

> This goal [expansion] also commends itself strongly to the self-interest of the technostructure. Expansion of output means expansion of the technostructure itself. Such expansion, in turn, means more jobs with more responsibility and hence more promotion and more

> compensation. When a man makes decisions leading to successful expansion, he not only creates new openings but also recommends himself and his colleagues as particularly suitable candidates to fill them! The paradox of modern economic motivation is that profit maximization as a goal requires that the individual member of the technostructure subordinate his personal pecuniary interest to that of the remote and unknown stockholder. By contrast, growth, as a goal, is wholly consistent with the personal and pecuniary interest of those who participate in decisions and direct the enterprise.[32]

Galbraith's comments are even more applicable to the typical utility where profits are regulated and risk practically nonexistent.[33]

## IV. Failure of Regulatory Controls

No regulatory commission in the United States has ever attempted to regulate utility advertising, promotion, or rate structure for the purpose of controlling demand for electric power or controlling the commensurate utility growth. Recently, a few commissions have attempted to regulate promotional activities, but this was for the purpose of protecting the consumer and competing energy forms from unfair trade practices and unfair competition. These actions have left the utilities relatively unencumbered in their advertising and promotional efforts to increase demand.

With respect to rates, a study by George J. Stigler and Claire Friedland reveals that regulatory activity has no influence on rate discrimination which acts to increase electrical consumption.[34] In comparing regulated and unregulated states, they found no differences in discriminations made between large and small quantity consumers or between residential and industrial consumers. Apparently, regulatory commissions allow the utilities to make any rate discrimination they desire if it is for the purpose of increasing sales.

This failure of the commissions is not surprising. It has only been in the last four years that we have been experiencing electrical power shortages. Moreover, it has only been in the last two years that the factors expressed in Part I of this paper have become a matter of general knowledge and concern. Throughout its history, the electric power industry has decreased cost while increasing production. Thus, maximum expansion has always been in the consumers' interests. Unfortunately, times have

changed. For the larger utilities, increasing capacity now means increasing costs, and maximum expansion is no longer in the public interest.

"Regulation is a substitute for competition and should attempt to put the regulated industries under the same restraints competition places on nonregulated industries."[35] We are dealing here with two situations where the commissions have not so restrained the utilities. The first is where demand within a utility's service area exceeds the utility's ability to supply electric power (a situation which exists for several utilities today). In a non-regulated competitive situation the utility would normally stop advertising and promotion, since such activities would no longer be needed and would, therefore, be a wasteful expense. The utility would also be expected to raise prices to achieve maximum revenue and to absorb up the excess demand. As explained in Part III above the utilities in fact continue to advertise, promote, and price their product as if they had an infinite supply.

The second situation is one where costs increase with increased production. In a non-regulated competitive industry a firm would again cease advertising and promotion and raise prices so that it could limit production. A regulated electric utility would take the opposite approach, however, since increased costs which would go into the rate base would result in increased profits and since increased costs which would not go into the rate base would be operating expenses paid by the rate-payers.

Finally, the commissions have failed to regulate properly the allocation of true cost. The commissions have cooperated fully with the utilities in their efforts to provide electricity at lower prices. If this effort were limited to helping the utilities achieve lower costs through technological gains, it would be in rate-payers' interests. In most instances, however, lower prices are achieved by changes in accounting procedures, government subsidies, loans or tax policies, or by leaving costs to be absorbed by the general public. Such costs include treating air and water pollution, funding research and development, and installing underground lines.

## V. Advertising and Promotional Activity

In recent years, there has been a significant upsurge in the advertising and promotional practices of the electric utilities. For the most part this has been an effort to capture the space-heating market, an area dominated by the gas utilities, fuel oil

and bottled gas dealers. With lesser success, the gas utilities have attempted to retaliate by capturing some of the air-conditioning market. The result has been increased interfuel competition using not only pricing, but installation and appliance allowances, advertising allowances, financial assistance and cash payments. Most of these payments or discounts are given by electric utilities to developers for the building of all-electric homes.

This promotional activity has been the subject of recent Congressional hearings,[36] and a report by the Federal Power Commission.[37] The FPC report concludes that, ". . . this review of recent state commission actions indicates a trend toward more restrictive policies with respect to acceptable practices."[38] However, none of these state commission actions were taken for the purpose of controlling demand for electricity. "The primary regulatory consideration at present seems to be the effect on the utilities and their customers, while the fallout effects on other private sectors may or may not be considered."[39] The actions of the commissions, while providing some minor impediments to utility activity, have had little if any effect on the utility's efforts to stimulate demand. As the FPC report states, "Related questions such as the advisability of utilities engaging in certain promotional practices in a period of strain on the available supply of electricity, are outside the scope of the report."[40] As was discussed in the previous section, such questions in practice are outside the scope of the regulatory commissions also.

The electric utilities usually justify their advertising and promotion by saying that they are not increasing peak demand for electricity, but only attempting to improve the load factor (the use of electricity during off-peak periods). This is at best only a half-truth. The utilities are most interested in increasing peak demand because that is the primary means of increasing the rate base, which in turn is the primary means of increasing their profits. Improving the load factor only gives increased profits on a short-term basis; such profits will be eliminated in the next rate adjustment by the regulatory commission.

The primary goal of utility promotion and advertising then is increase in peak demand. In fairness to the utilities, there is no reason to believe that they spurn a balanced load factor in favor of peak demand. An improved load factor does mean decreased costs and a reduction or holding down of rates. This, of course, is beneficial to both the utility and the rate-payer.

The problem with using advertising and most promotional ac-

tivity to balance a utility's load is that neither of these activities is sufficiently selective. The advertising or promotion will advocate the use of a certain appliance, but the utility cannot control *when* the consumer will use it. The appliance sold by the advertising may become a part of the peak or off-peak loads. It is possible that some appliances are primarily used at only a certain time and never contribute to peak loads. To the extent that this is true, utilities should be permitted to advertise and promote this type of use. No utility, however, has ever clearly demonstrated through empirical evidence that its advertising a certain appliance will only improve the load factor and not increase peak demand.

There is another way in which advertising and promotion is not so discriminating as to improve load balance without increasing peaks: when only one electric appliance is promoted, other appliances will likely be used more frequently. For example, if a utility advertises space-heating, there will probably be an increase in air-conditioning use as well. This development was shown in Joseph Fry's findings that customers prefer not just one product, but all similar products in a brand line.[41] Brand name (electricity), in other words, acts as a medium through which consumers generalize loyalties from one category of products to another. This was also recognized by Potomac Electric Power Company in its answer to a recent complaint: "Pepco admits that its advertising and promotional activities designed to increase sales of electric space-heating may also incidentally increase sales of electric air-conditioning."[42]

Finally, the load factor argument was described in the following manner in a recent California Superior Court Decision:

> The Department sought to justify this advertising approach on the ground that it would lead to closing the gap between the peaks and valleys of electricity use or load during the year; that it was designed to produce a more even load on the system throughout the year. But the fallacy of this approach is that as the valleys are raised, so are the peaks. If more electricity is used during slack or off-peak periods then that much more is used during the expected summer and winter periods.[43]

Recently two legal actions have explicitly recognized the effect that advertising and promotion has on peak demand. On October 8, 1970, the Vermont Public Service Board issued a Notice of Proposed Rule-Making which would prohibit gas and electric utilities from employing any promotional activities in-

cluding advertising.[44] The Board's reasons for the proposed rule were simple and persuasive:

> The Board believes it unwise for utilities to incur costs for advertising or in actively promoting the use of a service which is in short supply, when costs are rising, when production of the service adversely affects the natural environment, and when such promotional practices may be violative of the antitrust laws.[45]

The Board's proposed rule met with heavy opposition by the gas and electric utilities. As a result, the Board modified the rule "along the lines of the National Association of Regulatory Utility Commissioner's (NARUC) model rule[46] and will be issuing it shortly."[47] There is serious question whether the NARUC model rule will adequately protect consumers and utilities from unfair trade practices. It will have no effect on advertising and in promotional activities designed to increase demand,[48] and in that respect it differs sharply from the Board's original stated intention in issuing the proposed rule.[49]

The other action is the decision of the California Superior Court of Los Angeles County quoted previously. The case involved the efforts of the Los Angeles Water and Power Department to obtain a variance from a rule of the Los Angeles Air Pollution Control District so that it could build a large fossil-fueled steam-electric generating plant which the Department maintained was necessary to meet electricity demand between 1972 and 1976. "The crucial point which this Court must determine . . . is whether there is a danger of a shortage of electricity . . . which will outweigh any benefits to the residents of the Los Angeles Basin from holding the line on additional stationary sources of air pollution."[50] The Court determined that the difference between the population growth (1.75%) and the electric demand growth (7.6%) was "due primarily to the aggressive advertising of the Department, urging a greater use of electricity by every resident."[51] The court further determined that, "There will be no danger of blackouts, total or partial, for the City of Los Angeles if the Department of Water and Power will stop its advertising programs and cease urging customers and potential customers to use more electricity. The money spent for advertising an increase in the use of electricity could well be spent in urging Los Angeles residents to use less electricity. If this were done the peak demands projected for 1972 to 1976 could be revised downward substantially and the need for additional generating resources would be proportionately less."[52] Accord-

ingly, the Court denied the Department's request for a variance that would enable it to build a new power plant.

It should be noted that the Los Angeles Department of Water and Power finally succeeded in gaining a permit to construct additional power generating facilities by making alterations which the Los Angeles Air Pollution Control District considered acceptable. As a result, further judicial proceedings were abandoned. A deputy attorney general for the State of California notes that "a few people have grumbled about LAAPCD's decision, but nobody has publicly taken issue with them."[53]

## VI. Rate Structure

Any discussion of efforts to reduce the growth rate of demand for electricity must ultimately examine the rate structure of the utilities. A few salient characteristics of the rate structure should be recognized at this point. Utilities usually divide their customers into three main categories—residential, commercial, and industrial. The residential customers are charged on the basis of kilowatt hours (kwh) used. The price per kwh is determined by the number of kwh used. Thus, for 0–200 kwh the charge may be 5¢ a kwh; 200–400 kwh—4¢ a kwh; 400–600 kwh—3¢ a kwh; and so on. This is referred to as a decreasing block rate. The industrial and commercial customers are charged in a similar manner except that the number of kwh consumed by each customer is considerably larger and the rates are significantly less. In addition, industrial and commercial customers often pay a demand or load charge—a charge on the number of kilowatts they consume at one point in time.

The utilities justify the use of the decreasing block rate system by saying that theirs is a decreasing cost industry and that such rates will encourage more consumption which will lead to even lower costs and, therefore, even lower prices to consumers. This is the practical application of the economists' marginal pricing theory. Historically it has worked very well for the utilities and their consumers; that is, it has allowed the electric utilities to become the largest industry in the United States and to achieve large economies of scale while, at the same time, rewarding the consumer with lower real prices for electricity.

There are several cogent reasons for questioning whether the electric power industry, particularly the large electric utilities with rapid growth rates, is still a decreasing cost industry. Generators have gotten so large they offer little if any economies

of scale. Costs of labor, materials, and money for financing have increased significantly. Accordingly, more and more utilities are asking for substantial rate increases.[54] For these reasons, both the Vermont Public Service Board[55] and the Director of the Energy Policy Staff of the Office of Science and Technology[56] have questioned whether the industry is still one of decreasing costs.

Determination of the cost of service to a specific class of customers (e.g. residential consumers using 800–1,000 kwh a month) depends largely upon the accounting system used. Naturally, the industry uses the system which allocates the least cost per kwh to the largest customer. There is, then, no demand charge for residential users. Factors such as the greater percentage of plant capacity necessary to serve high demand users, and other commensurate costs are not considered. Moreover, the utilities use a rolled-in average figure in allocating plant costs to each consumer. This does not take into account the fact that the newer plants cost many times more than the older plants; these higher costs should be allocated to those who make the new demands which cause the plants to be built.

Nor do the electric utilities adequately assess environmental costs. In addition to allocating environmental costs disproportionately with respect to new and old customers and to high and low demand customers, the utilities simply do not assess for environmental damages which they can avoid paying (e.g. sulfur dioxide which escapes pollution control equipment and ultimately damages the public). Barry Commoner refers to these as social costs.[57] Although it is understandable that the utilities would ignore these costs, the regulatory commissions should in the public interest see that these costs are included in rates, and if excess revenues result, the commissions should see that these funds are used to mitigate the public damage. To do otherwise results in the misallocation of resources referred to previously, and allows public injury to go uncompensated—a double loss.

Finally, the cost argument is often no more than a rationalization for self-serving policy. The utilities use marginal costing only when it suits them. According to William J. Jefferson, Director of Rates and Data Control for the Consumer Power Company, "In designing a rate schedule, we price those services closer to marginal costs that have a low value of service [low demand elasticity], and we price those services further away from marginal costs that have a high value of service."[58] While this makes

good sense economically (if costs are decreasing), it is in violation of the regulatory requirement of reasonableness and fairness in rate structure.

The only real requirement on a rate structure is that total revenue be equal to all costs and a reasonable return on investment. Beyond that, the nature of the rate structure depends upon the goals to be achieved. If maximum expansion is to be achieved, then marginal pricing is the best guide for the rate structure. But to the extent that control on growth is desired, marginal pricing must be abandoned.

At the suggestion that the rate structure be used to control demand, the electric utilities normally argue that demand for electricity is inelastic, i.e., that a change in price will have little or no effect on demand. This argument has been supported by an econometric study which concluded that residential and commercial demand for electricity in both the short- and long-run was inelastic.[59] The same study, however, concluded that short-run industrial demand for electricity was significantly elastic.

Additionally, there are two possible weaknesses in this study. In the first place, it covered the period 1946–57. Per capita consumption has increased significantly since then, and consumers now must be receiving electricity for lower value uses. Secondly, the study did not consider space-heating, the largest appliance user of electricity, and the reason for expected continued high rates of expansion by the electric power industry. In fact, another, more recent study determined that the demand for electric space-heating was highly price-elastic.[60] The older study is also refuted by an econometric study prepared by Phyllis Kline of the FPC's Office of Economics, which determined that the relation of electric to gas prices has a significant effect on long-run residential demand.[61]

William J. Jefferson had this to say about the Fisher/Kaysen study, "I find the results of this study very hard to believe. Two of the largest energy consumers in the home—the electric hot water heater and electric space heating—have such an elastic demand that many electric utilities have had to set rates for these appliances at or near marginal costs to stimulate their use."[62] Finally, it should be noted that utilities' spokesmen are usually willing to argue that lower prices will increase demand while, at the same time, maintaining that higher prices will not decrease demand. Such reasoning is illogical.

The recent increased pressure from public interest groups has

caused at least one electric utility holding company to commission a study of the feasibility of using increasing block residential rates to limit demand.[63] The study concludes that using price to control demand growth rate would be impractical and ineffective. However, after a discussion of marginal costing and the load factor, the arguments in the study become specious. For example, they argue that increasing block rates would penalize low and moderate income families;[64] that utilities would not be able to determine how many new power plants to build if increasing block rates were used;[65] that increasing block rates would be unjustly discriminatory;[66] that increasing block rates might stimulate consumption by low volume users and create excess revenue.[67] The study is devoid of any statistical or empirical data that would support any of these arguments.

The most conclusive proof that electricity consumption rates are influenced by prices comes from an examination of varying characteristics of electrical consumption in different geographic areas of the United States. A *Business Week* report in 1969 contained a chart showing average cost for 250 kwh and average annual use in kwh for sixteen utilities around the country.[68] With few exceptions, all of which can be explained by varying meteorological conditions and marketing practices, an increase in price resulted in a decrease in consumption. There was remarkable elasticity.

## VII. A Solution

It would seem that sometime in the next ten years we will have to take some steps to limit the growth of electrical power generation. Such controls will have to remain in effect until we develop a means of producing electrical power which does not create the problems described in Part I. Unfortunately, the period during which such controls will be necessary is likely to stretch indefinitely. The following program is suggested to limit the growth rate; it has the advantage of combining the present regulatory system and the market place in order to determine electric energy allocation.

The regulatory commissions should examine factors which influence growth in demand and which are beyond the utilities' control,[69] and they should set a maximum growth rate for each utility in their jurisdictions. Then the commissions should require each utility to adjust those factors which influence demand and which are controlled by utilities[70] so that the actual growth

rate would fall below the regulatory-determined, maximum growth rates. A system of substantial pecuniary penalties and rewards should be established in order to insure that each utility makes a conscientious effort to conform to the maximum growth rate and in order to counter the utilities' complaint that growth limitations will frustrate management.[71] Assume, for example, that the commission sets a maximum growth rate of 5% for a utility. If the utility's growth rate for that year is actually 6%, the utility will be penalized the value of the increase in the rate base necessary to accomodate that 1% difference in the growth rate multiplied by the rate of return. In other words, the utility will end up with the same return on investment as if it had only grown the required 5%. Similarly, if a utility's actual demand growth rate is only 4% for that year, it will be rewarded as if its rate base increased enough to accommodate a 5% demand growth rate. With such a system, the utilities will likely make more than a good faith effort to control demand.

The utilities would control demand with those marketing tools referred to throughout this paper: advertising, promotion and rate structure. For those large metropolitan utilities which are now growing at a rate of 7–10% a year, the maximum growth rate would probably be set somewhere in the range of 3–5% a year. For these utilities, the regulatory commissions should initially ban all advertising and promotion and institute a rate structure which is neutral with respect to increases in consumption. Since, even with these changes, the actual growth rate would probably exceed the regulatorily-determined one for several years, an escrow fund should be established to deposit the excess revenue attributed to the excessive growth. This escrow account would then be available to provide funds for the utilities to supplement their revenues when the actual growth rate would fall below the maximum growth rate. The utilities would still be allowed to make rate discriminations between the various classes of users (residential, commercial, industrial and several special classes such as municipal lighting, and transit companies). These discriminations would have to be watched closely, however, in order to insure that all large consumers pay well above marginal cost and that they work actively to conserve electricity and produce their own power (or switch to another source if more economical).

One of the problems with manipulating demand in this manner

is that surprisingly little empirical information is available as to the precise effects on demand of advertising, promotion and rate structure. An initial period with a neutral rate structure and with no advertising and promotion would serve two purposes: (1) it would curtail the present growth rate to some degree, and (2) it would allow the gathering of data on a base period in which demand was not being stimulated. After a three-to-five year period with an advertising and promotion ban and a neutral rate structure, the commissions and utilities would be in a better position to determine what further steps, if any, would be necessary to bring actual demand growth in line with that set by the commissions. In time, the utilities could be expected to become expert in adjusting their growth rate through minute changes in rate structure, promotion or advertising.

In the past year, several public and private groups have urged the development of a national energy policy. The Energy Policy Staff of the Office of Science and Technology in the Executive Office of the President is charged specifically with developing such a policy. It seems clear that controlling the growth rate of the electric power demand will be a primary goal of such a policy. Mr. S. David Freeman, Director of the Energy Policy Staff, has advocated controlling demand growth rate through rate structure in a recent speech.[72] The New York Environmental Protection Administration has also called for a "rational energy policy and environmental action plan" for New York State which has proposals very similar to those made in this paper;[73] such proposals should fit very neatly into any future energy policy.

It is worth considering for a moment what must be the weak link in this proposal, namely the regulatory commissions. The commissions are the only organizations that now have the necessary expertise and experience in this field. Most of them already assume some control over rate structure and promotional activities, although not for the purposes of controlling demand. It should not be too difficult for each commission to develop a regulatory procedure for determining what the maximum demand growth rate should be and then oversee the utilities' efforts to comply. This process would be similar to their present functions. It is not the purpose of this article to consider whether or not the commissions now have the necessary authority to control the demand growth rate. It should be pointed out, however, that all commissions do have a mandate to require the utilities to provide

safe and reliable service. If this mandate is inadequate to require each utility to limit its demand growth rate, then the commissions should seek the requisite legislative authority.

It might be argued that controlling electric power growth should be done on the national level. It is unrealistic though to expect that Congress will give this type of authority to any national agency when the state commissions have always acted in this field. Moreover, the state commissions are in the best positions to determine the power needs of their areas, since each area requires a different demand growth rate and different policies to reach that rate. The national role should be one of coordination, only entering the local arena when the state regulatory agencies have failed to act. This procedure would be similar to that used in the air and water pollution control fields and would make even more sense here, where the state commissions are more active.

In light of the factors presented in Part I, it is apparent that most of the major metropolitan utilities will have to take steps to control their growth sometime during the next twenty years. Whether the utilities will act of their own initiative or on the instigation of governmental agencies, and whether they will control growth on an *ad hoc* basis or through a comprehensive plan such as is suggested here remains unclear. It is clear, however, that the sooner the utilities act, the better it will be for all concerned, since early action will provide more lead time for finding solutions to the problems and will permit a less drastic curtailment of the growth rate. The question that remains is when will such action be taken.

FOOTNOTES

❖ George Washington University National Law Center, Class of 1972.

[1] This argument has been stated previously in the following sources:

P. H. Abelson, "Costs versus Benefits of Increased Electric Power," *Science*, Dec. 11, 1970, Vol. 170 at 1159.

S. David Freeman, "Energy Use and Environmental Protection—Issues for the Regulators." A speech delivered at the annual convention of the National Association of Regulatory Utility Commissioners, Las Vegas, Nevada, Nov. 19, 1970.

Much of the factual material has been given in more detail in these sources:

P. M. Boffey, "Energy Crisis: Environmental Issue Exacerbates

Power Supply Problem," *Science*, June 26, 1970, Vol. 168 at 1554–1559.

R. W. Holcomb, "Power Generation: The Next Thirty Years," *Science*, Jan. 9, 1970, Vol. 167 at 159–160.

The Committee for Environmental Information, "The Space Available," *Environment*, Mar. 1970, Vol. 12, No. 2 at 4.

[2] Federal Power Commission News Release, No. 16323, Sep. 24, 1969.

[3] Consolidated Edison is now planning to place power plants in the Atlantic Ocean. "Con Ed Says It Will Confine Ads to Urging Power Conservation," *The New York Times*, Apr. 21, 1971, at 1.

[4] For a general discussion of the problems of siting, see *Electric Power and the Environment*, sponsored by the Energy Policy Staff Office of Science and Technology, Aug. 1970, at Ch. V.

[5] Committee for Environmental Information, *supra* note 1 at 4.

[6] Federal Power Commission News Release, *supra* note 2.

[7] This is a representative figure for nuclear powerplants. See *Electric Power and the Environment*, *supra* note 4 at 4. Nuclear power plants are expected to produce almost half of all electric power by 1990. A coal fueled power plant requires much more space while a gas or oil fueled one will take less. See Working Committee on Utilities "Report to the Vice President's Council on Recreation and Natural Beauty" at 116.

[8] *Electric Power and the Environment*, *supra* note 4 at 26.

[9] *Id.* at 34.

[10] The Committee for Environmental Information, *supra* note 1 at 4.

[11] *Id.*

[12] D. C. Cook, "Capability of Electric Utilities to Fulfill Future Needs," *Public Utilities Fortnightly*, July 16, 1970, Vol. 86, No. 2 at 18.

[13] *Id.* at 20–21.

[14] B. Commoner, M. Corr, & P. J. Stamler, "The Causes of Pollution," *Environment*, Apr. 1971, Vol. 3, No. 3 at 2.

[15] *Electric Power and the Environment*, *supra* note 4 at 2.

[16] B. Commoner, *et al.*, *supra* note 14 at 15.

[17] *Id.*

[18] *The Methodology of Load Forecasting*, prepared by the Technical Advisory Committee on Load Forecasting Methodology for the National Power Survey, Oct. 1969, at IV-6.

[19] *Electric Power and the Environment*, *supra* note 4 at 48.

[20] C. F. Phillips, Jr., *The Economics of Regulation* (1969) at 590.

[21] Federal Power Commission News Release, *supra* note 6.

[22] The Committee is composed of electric utility representatives and is assisted by the FPC staff. It was formed to assist the FPC in preparing an update of the 1964 National Power Survey.

[23] *The Methodology of Load Forecasting*, *supra* note 17 at III-3.

[24] For a good discussion of the rate base, See C. F. Phillips, *supra* note 19 at Ch. 8.

[25] Federal Power Commission v. Hope Natural Gas Co., 320 U.S. 591 (1944).

[26] C. F. Phillips, *supra* note 19 at 241.

[27] *Utility Regulation, New Directions in Theory and Policy* (ed. W. G. Shepherd and T. G. Gies 1966) at 33.

[28] Letter from Gerald R. Coleman, Commissioner New York City Planning Commission (Jan. 8, 1971).

[29] *Id.*

[30] *Electric Power and the Environment, supra* note 4 at 57.

[31] *Utility Regulation, New Directions in Theory and Policy, supra* note 26 at 30.

[32] J. K. Galbraith, *The New Industrial State* (1967) at 171.

[33] See *Utility Regulation, New Directions in Theory and Policy, supra* note 26 at 32.

[34] G. J. Stigler and C. F. Friedland, "What Can Regulators Regulate? The Case of Electricity," *The Journal of Law and Economics*, Vol. 5, 1962, at 1–16, reprinted in *Utility Regulation, New Directions in Theory and Policy, supra* note 26 at 195–99.

[35] C. F. Phillips, *supra* note 19 at 125.

[36] House Report No. 1984, 90th Cong., 2d Sess. (1968), *Promotional Practices by Public Utilities and Their Effect Upon Small Business.*

[37] *Promotional Practices of Public Utilities: Survey of Recent Actions by State Regulatory Commissions*, prepared by the FPC Office of Economics, Mar. 1970.

[38] *Id.* at 7.

[39] *Id.*

[40] *Id.* at IV.

[41] J. Fry, "Family Branding and Consumer Choice," *Journal of Marketing Research*, 1967, Vol. 4 (3) at 237–147.

[42] Answer of Potomac Electric Power Company before the Public Service Commission of the District of Columbia, Feb. 16, 1971 at 4.

[43] Los Angeles Water and Power Department v. Los Angeles Air Pollution Control District, California Superior Courts, Los Angeles County, 1 ER 1580 at 1624 (1970).

[44] *Proposed General Order Prohibiting Practices by Electric and Gas Utilities*, State of Vermont Public Service Board, Notice of Proposed Rule Making, Oct. 8, 1970.

[45] *Id.* p. 2.

[46] *Model State Commission Rules and Regulations Governing Promotional Practices of Electric and Gas Public Utilities*, adopted by NARUC at its 82nd annual convention in Las Vegas, Nevada, Nov. 19, 1970.

[47] Telephone conversation with Ernest W. Gibson III, member of the Utility Service Board of Vermont, Aug. 12, 1971.

[48] To quote from the first paragraph of the *Model Rules, supra* note

46: "The promotion of goods or services offered the public is an inherent and important part of the economy of this State and Nation."

[49] *Proposed General Order Prohibiting Promotional Practices by Electric and Gas Utilities*, *supra* note 43.

[50] Los Angeles Water and Power Department v. Los Angeles Air Pollution Control District, California Superior Courts, Los Angeles County, 1 ER 1580 at 1623 (1970).

[51] *Id.* at 1624.

[52] *Id.*

[53] Letter from Nicholas C. Yost, Deputy Attorney General Department of Justice, State of California, June 4, 1971.

[54] "Your Bill Seems High? Just Wait," *Business Week*, Nov. 29, 1969, at 60.

[55] *Proposed General Order*, *supra* note 44.

[56] S. David Freeman, *supra* note 1 at 6.

[57] B. Commoner, "The Social Significance of Environmental Pollution" *The Explorer*, Vol. II No. 4 (1969) at 2.

[58] *Performance Under Regulation* (ed. H. M. Trebing, 1969) at 103.

[59] F. M. Fisher and C. Kaysen, *Demand for Electricity in the United States* (1962).

[60] "The Demand for Residential Electric Space Heating," National Economic Research Associates, Inc., discussed in "Demand for Electricity and Natural Gas" by D. Gujarati, *Public Utilities Fortnightly*, Jan. 30, 1969, at 19–22.

[61] *The Methodology of Load Forecasting*, *supra* note 17 at Appendix B-1.

[62] *Performance Under Regulation*, *supra* note 58 at 104.

[63] *An Evaluation of Increasing Block Residential Electricity Rates As a Means of Preserving Environmental Quality*, prepared for Northeast Utilities, Hartford, Connecticut, by Charles River Associates, 16 Garden Street, Cambridge, Massachusetts.

[64] *Id.* at 8.

[65] *Id.* at 16.

[66] *Id.* at 22.

[67] *Id.* at 23.

[68] "Your Bill Seems High? Just Wait," *supra* note 54.

[69] See Part II. A. *supra*.

[70] See Part II.B. *supra*.

[71] *An Evaluation of Increasing Block Residential Rates As a Means of Preserving Environmental Quality*, *supra* note 63 at 24.

[72] S. David Freeman, *supra* note 1.

[73] M. Stern, "State Club Urged on Electrical Use," *The New York Times*, Apr. 20, 1971 at 1.