New Challenges to Public Utility Management
NEW CHALLENGES TO
PUBLIC UTILITY MANAGEMENT

Institute of Public Utilities
Proceedings of the Sixth Annual Conference
24-25 April 1973

1974
MSU Public Utilities Papers

Division of Research
Graduate School of Business Administration
Michigan State University
East Lansing, Michigan
Contents

Part I
Marketing Policies for Electric and Gas Utilities

What Role Should Marketing Play during a Period of Constrained Supply? Robert A. Grayson

Are Marketing and Advertising Inconsistent with Ecology? Arch P. Pettit

Discussants: Gilbert P. Goetz
D. E. Wallin
Charles E. Olson

Part II
Forecasting Change in Gas and Electricity

Validity of Natural Gas Forecasts: Statistical Measures in an Uncertain Future John J. Schons

A Critique of Projections in the Electric Power Industry with Particular Reference to the National Power Surveys Thomas H. Burbank

Discussants: Robert W. Greenleaf
Donald A. Murry
Reed S. Reynolds
Part III
Impact of Competition on Communications Carriers

Marketing Functions in Telecommunications under Conditions of Growing Competition
Samuel E. Bonsack

Marketing and Planning Problems Confronting Independent Telephone Companies
D. R. Casey

Discussants: James C. Henderson
Burton A. Kelb
Charles E. Olson

Part IV
Social Responsibilities of Public Utilities

Social Responsibilities of Public Utility Management — How to Do Well while Doing Good
Lee C. White

A Critical View of Management’s Assumption of Social Responsibilities
Walter A. Morton

Discussants: Warren J. Sanuels
Russell C. Youngdahl

Contributors
What Role Should Marketing Play During a Period of Constrained Supply?

Robert A. Grayson

As I outlined this address, I could not help being reminded of these famous words:

Cannon to the right of them,
Cannon to left of them,
Cannon in front of them
Volleyed and thundered.
Stormed at with shot and shell,
Boldly they rode and well,
Into the jaws of death.
Into the mouth of hell
Rode the six hundred.

I have identified five of the biggest cannons as: (1) consumers, who want lower prices, or at least stable prices, or at least prices that do not
rise too fast; (2) consumerists, who do not want whatever you want and vice versa, as long as the wire services carry the stories; (3) the environment itself, which, with increasing hostility, refuses to digest its coal, oil, and gas at reasonable prices; (4) the environmentalists, who would see all progress stop for the sake of a bird watchers' club in Cornwall while six million people sweeter during a summer heat wave. And what list of cannons would be complete without naming (5) the government, specifically, the government's regulatory bodies. Having been ordained by a higher authority as a regulator they see their role as that of having to increase regulation at a growth rate equal to the rise in Gross National Product.

Unlike the British soldiers at Balaklava, however, the power companies need not fight against these cannons with swords and pistols. The weapons at their disposal are far more powerful and come from an arsenal called marketing. And the marketing man always leads the attack.

The Up-To-Date Marketer

Traditionally, the marketer's job was to create and maintain demand. For the power industry, he is now concerned with the anatomy of the demand, which means the level and amplitude as well as the timing. Just like Goldilocks, the marketer may be faced with demand that is too hot, too cold, or just right.

His weapons for defending the net profit projections are called the marketing mix, and the battle plan works like this. First come the objectives, which are expressed in terms of share, volume, profits, or whatever measurable quantity ties the short-term plan to the corporate long-range plan. For example, one objective of a power company might be to increase electric power consumption by 12 percent. Of course, each objective must be tied to the long-term corporate objectives, and each annual plan should contribute its share of the total. (Incidentally, the long-range planning horizon, which recently has increased about 50 percent due to various activist groups who block most of your moves.)

Next in the battle plan is the strategy or the way in which the marketing man can plan to achieve the goals he has set for himself. For example, he might say to himself: "In order to increase electric power consumption by 12 percent, I must increase net plant and factory location by x kWh within our power area." His strategy might have been different, increase residence consumption, increase nonpeak utilization while holding peak, and so forth, if, for some reason, it was not feasible to expect new factories to locate in his area.

Once the goals of the company have been identified, it is traditionally the responsibility of the marketing department to execute the agreed-upon strategies. The marketing man has at his disposal a number of important tools which can be utilized to meet the corporate goals. These tools, usually lumped together and called the marketing mix, are the following: advertising; price; promotion; package; distribution; service; sales; and product.

Obviously, not all of these apply to the power business. Where distribution is fixed there is no package, and the product cannot be varied. The remaining five components — advertising, price, promotion, service, and sales — are carefully manipulated in various ways to achieve the goals of the company. For example, a reduction in the number of sales staff members frees money that can be used for advertising, promotion, and so forth. A reduc-
tion in the advertising budget means that more salesmen can be hired. Lower price might mean reduced service, and so on. In other words, the marketing man manipulates the various components of the marketing mix. He uses the tools in combination with each other to do just one thing: optimize firm profits.

The real test of the marketing man is his ability to make the right series of decisions, decisions about not only the amount of money to be spent on each phase of the mix but also the manner in which the money is to be spent. For example, having allocated the "right" budgetary appropriation for advertising, the marketing man must select the most effective message and medium. Should he tell his public about abundant energy, cheap energy, a competent labor force, superior transportation, ready markets, or a beneficial tax rate? Selection of the appropriate message requires some sophistication (and possibly some research) on the part of the marketer to know which is the "hot" button to push. With knowledge like this he can optimize within each segment of the mix.

Marketers Do Many Things

The skillful marketer will use the mix to directly attack the problem, not simply fiddle with the symptoms. For example, rising rates are not the problem; they are a symptom of a much bigger problem — inefficiency, high fuel costs, pollution control costs, insufficient off-peak load, and so forth. Assuming for the moment that the first three items are at their irreducible minimum, off-peak load remains the problem to be attacked. And as a marketer, I can tell you my mouth waters at that challenge! Which part of the mix shall I use? Advertising is the prime candidate, of course; promotion is a strong second, especially in the sales of appliances and Gold Medallion homes. But I would really love to get my teeth into price. Following the lead of Ma Bell, a little fiddling with the rates most likely could do wonderful things for your companies.

Having heard all that, I am sure the representative from Oklahoma is just dying for the chance to tell me about the advertising restriction imposed by the public service commission in his state. Unencumbered by the facts of the situation, I only can reason that surely the commission would not doom the residents of Oklahoma to higher and higher rates and a lower standard of living if they understood the marketing process. I would like to spend a moment reflecting on the standard of living, or quality of life, which I think a more appropriate term. If one stops for a while and seriously contemplates what he is doing here on earth, how long he has to do it, and how he can get the most good, or the least bad, out of it, electricity plays a major role. Along comes the commission and says: "Don't sell dishwashers!" "Convince them to shut off air conditioners!" "Better still, don't tell them of the virtues of this machine in the first place." Well, I for one cannot buy that philosophy. I am for more and more consumption; if some of it is wasteful, well, that may be the price I have to pay. There is a trade-off for everything. All of those luxuries are not luxuries anymore; I need them, and I am delighted that I do. They really make life worth living.

If one thing is true about your business, it is that the only way rates go down is by increased consumption, and advertising is the primary tool for increasing consumption. Suppose, for example, that it becomes imperative to balance the load factor. What better way is there to do it than by
taking the message directly to the public through advertising? How can the power company tell the public about its cuts in the after 6 p.m. rate if not through advertising? More important, how can power companies test the effectiveness of various ways of communicating to the public if advertising is outlawed?

But misuse will make matters worse. Into an area which most likely has the saddest record of service (and the most publicity thereof) comes Save-a-Watt. The marketing mix was used, during a period of constrained supply, to market which discouraged total usage. Instead, syncomarketing, which was designed to alter the demand pattern to fit the generating supply pattern, could have been used. So total consumption goes down, on the peak and in the valley, and rates go up.

The important thought to keep in front of the public is the wise use of energy, with emphasis on usage, not the diminution of use. If rates go up, what does that personally mean to any of us? Surely no more than a few dollars a month. But what about the poor? Can they pay higher rates because someone has decided that total consumption should go down? The fallacy of reduced consumption is so obvious that it hardly merits discussion.

Hopefully, it should be evident by now that if marketing had done its job, we might very well not have had an energy crisis, or constrained supply. Remember, it is marketing’s function to keep supply and demand in balance: supply, by altering management by way of forecasts as to the future demand, including the level and amplitude, and demand, by using the marketing mix to help the corporation achieve its goals.

Recall a word mentioned earlier: demarket,

which is another way of saying "unsell your product." It is bad enough that we have as much non-selling as we do, but to deliberately go out of one's way to diminish sales seems to me to be an intolerable form of fiscal hara-kiri. I maintain that if marketing men had been given the problem of balancing the loads, peak demand, and so forth, this speech might not ever have been given.

To support this premise, we need only look at the telephone company. Their investment problem is similar to that of the power companies, and their peak load demand is similar. Now consider night rates. I would never accuse Mother Bell of being the world’s best marketer, but the Bell System took price — one of the components of the marketing mix — adjusted it downward to encourage off-peak utilization, spent a lot of money advertising the benefits (another part of the mix), and thereby removed some of the pressure from their daytime peaks.

In a marketing-oriented company the strategy would be this: Our objective is to increase consumption so that rates can be kept down - that will best serve our consumers. However, we must do this within two constraints: irregular demand and overfull demand. How do we obtain low rates plus good service? By fully utilizing more plants and equipment. Along with this strategy, the marketing man must inspire more effective energy management. After all, he is in a competitive environment, and he must serve his customers well or they will, in the long run, take their business elsewhere.

One of the best ways to create more effective energy management is by eliminating the power salesmen and replacing him with an energy businessman who is equipped to sell a customer how to obtain maximum power at the least cost with the minimum waste. Running certain equipment at off-hours or
establishing new configurations for the manufacturing process are two ways to help. If the technique serves the consumer well, it also will serve the power company well. That is what it means to be marketing oriented: The consumer is king, and we are only here to serve him well. If we do so, by providing him with the best service at the lowest rates, the consumer will be satisfied. Actually, they will not be satisfied, but they will pick on someone else. The environmentalists must be answered by nuclear energy, and the sooner we get at it, the sooner we will eliminate the crises and the attendant hysteria. (I really do not mean to be unkind to the environmentalists; they do serve a valuable function. I am simply anxious for us to spend our efforts accomplishing the greater good for humans. We must learn to work with the environmentalists within a framework of moderation.) Finally, we must consider the regulators, who, by law, are obliged to "stand in the place of competition." It is my feeling that too often they stand in the way of progress, primarily because of the politics involved behind the scenes. But, that is the subject of another speech.

As I reread the "Charge of the Light Brigade," I was delighted to find a reprise in the 11th stanza which goes like this:

Cannon to right of them,  
Cannon to left of them,  
Cannon behind them,  
Volleyed and thundered.  
Stormed at with shot and shell,  
While horse and hero fell,  
They that had fought so well,  
Come through the jaws of death,  
Back from the mouth of hell.

All that was left of them  
Left of six hundred.

They were led by a marketing man, I suppose.

Are Marketing and Advertising Inconsistent with Energy?

Arch P. Pettit

The other night my wife and I were watching one of the television talk shows. The guests were taking turns complaining about every condition of our society, and it seemed that there was nothing which met with their approval. Whatever the condition, they took a particular delight in agonizing over it. After twenty minutes of this, my wife said: "If things are all that bad, how come I feel so good?" Naturally, I told her that it was because I was her husband. This did not satisfy her, and we settled into a discussion ranging from man's very primitive beginning to his expectations for the future.

In the course of this discussion I turned to my standard reference to determine just how far man
had progressed in thousands of years upon the earth. The Lord has a controversy with the inhab-

itants of the land. There is swearing, lying, kill-
ing, stealing, and committing adultery. They
break all bounds and murder follows murder. There-

fore, the land mourns and all who dwell in it lan-
guish and also the beasts of the field and the
birds of the air, and even the fish of the sea are
taken away  

(Hos. 4:1-3, RSV). Although written centuries ago, these same views, in slightly dif-

ferent words, might have been heard on this morn-
ings Today Show.

Now about this from the prophet Isaiah: "The

earth mourns and withers, the world languishes

and withers; the heavens languish together with

the earth. The earth lies polluted under its inhab-
itants; for they have transgressed the laws, vio-
lated the statutes, broken the everlasting covenant.

Therefore, a curse devours the earth and its inhab-
itants suffer for their guilt" (Isa. 24:4-6, RSV).

It seems as though man has always had a struggle and a difficult time coping, not only with himself, but also with his environment.

Essentially, the human being as we know him can only exist and progress in a social environ-

ment. As different societies of man interact with their physical and social environment, distinctive patterns of human behavior develop. These patterns are generally referred to as the culture of that particular society. The culture of any society contains within it the underlying beliefs and val-

ues of the society. These are molded by the envi-

ronment in which that society develops and exists.

The development of scientific thought helped to shape and mold Western man's beliefs. Through the aid of scientific knowledge, Western man has

been able to conquer his environment. New skills

and knowledge, aided by the availability of rich

and abundant resources, have provided the American culture with a social environment that encourages achievement, production, innovation, and economic freedom for the individual.

The basic economic entity of this society is the business enterprise. It is this entity to which society entrusts its human and natural re-

sources to be blended by management and returned to society in the form of usable goods and services.

The social and political organizations of the soci-

ety, in turn, pay their greatest rewards to those

who supply their needs for goods and services.

Thus, very early in his history Western man came to

be respected for economic success more than for his

achievements in the realm of religion, music, or

the arts. Striving for economic success and a

higher standard of living became a basic motivation of modern man, and today's marketing efforts are

another strong manifestation of this basic tene-

dency. True marketing orientation comes about through knowing what the customer wants, what he considers to be of value, and what he will pay. Advertising is the communications arm of marketing. Its pri-

mary purpose is to communicate to the customer the availability, use, benefits, and price of a good or

service.

If we are to discuss marketing and advertising and their compatibility with ecology, it is first necessary to examine each of these major terms and then discuss their relationship with society in general and the utility industry in particular.

Each of these terms affects the other, and if there is a drastic change in one, then all must change.

True marketing recognizes that change in the environmental situation is inevitable. It further
recognizes that, more and more, the social, economic, political, and even physical factors in the environment will have a marked and increasing bearing on every decision required to be made. Taken in this context, the marketplace then becomes the interface between business and society.

There is much misunderstanding about exactly what marketing is. As a discipline, marketing is the study of the behavior of man and his social institutions as they relate to the transfer of goods and services. As a science, marketing deals with man's attempt to systematize his knowledge through observation, study, and experimentation and relates this knowledge to the marketing discipline. Through the science of marketing man attempts to establish the fundamental principles underlying the transfer of goods and services. Marketing, from the viewpoint of business, is the attempt to manage motivated human transactions to the benefit of both society and the business enterprise.

As a management concept, marketing concerns itself with discovering human needs, likes, wants, desires, and satisfactions, and then with focusing the total business enterprise toward satisfying these criteria, hopefully earning a profit in the process. It is, then, readily apparent that trying to be precise in a marketing concept is about as easy as trying to catch a boa constrictor in a lard factory.

Perhaps it could be summed up in this way. The marketing concept is an "attitude" and a framework applying to all businesses. A true marketing application keeps one eye focused on the marketplace, monitoring and evaluating the customer, the competition, and the environment, and the other eye on the business enterprise itself. The purpose is to provide the management of the business enter-

prise with a frame of reference as a guide toward governing or influencing the policies, decisions, and actions of all those engaged in providing the goods or services — an "attitude," if you will, governing the whole business and all of its separate functions. It should be pointed out that marketing as a management framework is not a specialized activity at all. It is much more than this. It is a concept, a way of thinking and viewing the very nature of business enterprise as that enterprise functions in society for the good of the individuals of that society. A true marketing orientation is knowing what the customer wants, what he considers to be of value, and what he will pay. It means managing the entire business toward fulfilling these expectations of the customer so that he is satisfied, tells others, and comes back to buy again and again.

Customer orientation is only one aspect of a true marketing orientation. Many times, customer orientation implies a complete focus on the customer. The true marketing orientation suggests a much broader view, however, in which a proper balance is achieved between external market conditions and the internal requirements of the business. If this balance is to be achieved, then the ability of the business enterprise to provide a good or service must be viewed in relation to the customer's needs and must be evaluated in light of the competitive situation, environmental situation, and the anticipated operating results required.

We have said that the marketplace is the interface between business and society. With a proper marketing orientation, a business enterprise can find itself in one of several circumstances as it relates to this interface. A business may have an offering to sell and customers who want to buy. This is an ideal situation. The basic problem to
be resolved is a mutually agreeable price. There is no need to create customer desire nor establish the benefits of the offering. The demand is there, the customer is ready, and the marketing function revolves around serving, not building, a market.

Imagine yourself a part of a business enterprise that has an offering to sell but for which there are no customers seeking or wanting the product. Your company has a few problems. It must create a market for its offering. To do this, it must first locate and identify types of consumers who might be interested in the product. Having done so, it must establish the benefits of the offering sufficiently to create a desire strong enough to cause consumers to purchase the product. Here, our previous situation is reversed. The marketing function focuses on building a market rather than simply serving an established market. Note the customer is not forced to buy the product, as critics so often claim, either by manipulation or exploitation. The customer remains free to exercise his own preferential judgment with regard to the purchasing decision. The customer may be buying for a variety of reasons. But when a purchase is made, he evidently feels that exchanging his money for the product provides more value to him than avoiding the transaction. Although the customer did not conceive of the offering on his own initiative, it must have had value to him or he would not have purchased it in the first place.

A third type of marketing situation that may exist is sometimes referred to as demarketing. This occurs when a company offering the good or service would like to discourage, temporarily or permanently, some of the demand for its product. The attempt to discourage the demand may be focused on a certain group of customers or on all customers in general. The marketing function now revolves around matching the supply of the offering to the demand of society. This, in reality, is the essential nature of marketing—managing the level of consumption and demand facing the business enterprise to the mutual benefit of all concerned.

Demarketing may be undertaken by a company when it wants to discourage overall demand for its product. This comes about because there is a temporary shortage of the offering, a tremendous unanticipated acceptance of the product, or the company actually may want to eliminate the product or some aspect of it. Under these circumstances, a company obviously needs to manage the demand and maintain customer good will.

The fourth type of marketing situation is known as selective marketing. It occurs when a company would like to control the demand from certain segments of society or at certain times of the year. It does not, however, want to reduce the level of the overall demand and may even desire to increase the overall level.

The utility operating within the true concept of marketing finds itself in a very enviable position. Consider, if you will, electric utility offerings from the customer's viewpoint. First, he cannot see, smell, feel, taste, or hear the product. If he should touch it, he is liable to get hurt. It is delivered through a meter which the company owns, maintains, operates, and certifies to be correct. The customer does not know how he is charged, nor have any idea of how much of the product he has used. He does not know what he did with it when he got it. To make matters worse, he receives a bill with agonizing regularity, in ever-increasing amounts, even if he has been away on vacation. As if this were not enough, when he gets upset with the company, he cannot go down the street to the
friendly competitor.

This product requires real marketing skill. If you doubt that, then think about this. The customer sees no benefit coming from the purchase of the product since all benefits are related to the device producing whatever it is that the customer wants. No one, but no one, has any use for a kilowatt-hour or a cubic foot of gas; they are but means to an end.

The marketing oriented utility is at some time faced with any or all of the four types of marketing. First, the utility, with its existing customers, is essentially servicing an established market. Second, with new devices, the need arises to create a market. Third, in times of short supply and emergency, the marketing effort comes into play. Last, selective marketing is used to fill valleys or promote off-peak sales and more fully utilize plant facilities.

There are several differences between electric utilities and other types of businesses. First, the facilities required to produce the product are extremely expensive per unit of capability. Delivery is instantaneous and on demand, at the customer's control, and there is no product inventory. The distribution and price of the product is fixed by regulation and franchise. Thus, in the normal sense of the word, there is no need to create a demand since every customer located in the franchise area will, to all practical purposes, automatically become a customer. Tenth, utility companies have the only control over the time of energy consumption, and influence the form in which energy will be delivered. The customer is satisfying his wants, establishes the level of his consumption. Once the customer's decision has been made, the utilities are in the marketplace. Out of fairness to its stockholders and its customers, the utility must see that its energy receives a fair share of the customer's consideration.

The marketing effort of the utility has very little influence on its existing customers. These already have purchased their energy utilizing devices. The manner in which they are used and the amount of service consumed is at the total discretion of the purchaser. It becomes apparent, then, that the real emphasis of the marketing effort is on the long-range viewpoint. Only over long periods of time can the utility's marketing effort have any appreciable effect. Existing customers compose such a large base for its product, and new customers normally are added so slowly, that only over long periods can marketing affect the total system's operation.
Generally speaking, advertising is any paid form of nonpersonal presentation of ideas, goods, or services by an identified business enterprise. It is the tool used by marketing to communicate to consumers the availability, benefits, and price of an offering. Advertising usually is associated with the mass communications media — television, radio, and newspapers. The economics are such that mass media are very attractive to business enterprises. In fact, it is because the enterprise must present its message to as large an audience as possible, at the lowest possible cost, that mass communications quickly become the most conspicuous marketing activity in a free enterprise economy.

As a result, advertising presents a very visible target for attack by the critics. Although selling is a part of the marketing concept, it remains relatively unscathed. The activity of selling usually takes place in a face-to-face relationship and, therefore, is not ever-present for all of society to view. It should be remembered, however, that criticisms of advertising are criticisms of all marketing effort.

I accept, without question, the premise that a high standard of living is not only desirable, but also is something that people in our society work toward attaining. Given this premise, I am convinced that motivational influences on the buyer, that is, advertising, are both necessary and desirable. Regardless of what an individual's idea of a high standard of living is, he cannot realize that level unless he is given knowledge of the availability, benefits, and price of the products necessary to attaining his goal. The means by which this knowledge is conveyed is advertising. In my judgment, advertising merely reinforces the values of society as they relate to the attainment of a higher standard of living. It directs these values toward specific products and services so that their production and sale become feasible — so that business enterprise will be encouraged to provide these products.

There are two aspects of advertising that should not be overlooked. First, most new products do not enjoy instant acceptance in the marketplace. Stated another way, the buyer adoption of new offerings is slow. Effective advertising can be influential in speeding up public acceptance of a product. Second, most business enterprises do not enter the marketplace for a one-shot, hit-and-run sale. A product to be continuously advertised requires a mass market of satisfied users, and maintaining quality in that product is essential for repeat purchases. This is the advertising theory on which brand label identity is built. Customer loyalty cannot be generated unless quality is maintained.

Critics attacking advertising usually have based their arguments upon two premises: the creation of an artificial need and the emotional swaying of the purchaser's judgment. The critics would have us believe that the ends toward which advertising is directed are often unacceptable and contrary to the best interests of society. There are those who insist that vacuum cleaners, bathtubs, dishwashers, and electric toothbrushes are mere luxuries. Notice, however, that this is a very personal judgment of what an individual's idea of the goods and services which other members of society consider to be valuable, important, and perhaps even essential.

The marketplace responds to the desires and wants of consumers with goods and services that consumers want, whether the reason is basic or ele-
vating, good or bad. It is unfair to criticize the marketplace and business enterprise for attempting to satisfy these desires when, clearly, the defect, if there be a defect, lies in the wants, desires, and values of the individuals making up that society. In our society, the freedom of the individual is undeniably exercised, even in the freedom of people to do foolish things, insofar as these things harm no one else. The freedom of economic choice is essential to our free enterprise system.

I consider it improper to attack the values of society by criticizing those who speak to the values of society. Although it is easy to do, it is irresponsible to ridicule and denounce business enterprise for attempting to satisfy the members of certain segments of society simply because the critic subscribes to a different set of values. It is as unfair as blaming waiters for being overweight.

There are those who argue that advertising somehow gets around logical buying decisions. There is also a myth floating about that all of the benefits offered by a product are somehow restricted to the physical aspects of the product itself. Conveniently overlooked is the fact that goods and services are purchased on the basis of objective and subjective criteria. There are the external features of the offering and there are the individual's perceptual judgment of these features. If we accept the premise that buyer behavior can be interpreted and evaluated as objective and subjective reactions of the individual purchaser, then these criteria cannot be viewed as anything but realities of the marketplace. To do otherwise would be to ignore the evidence.

It is sometimes intimated that advertising is contrary to the good of society since it has the ability to persuade people to act in a manner inconsistent with their desires and wants. This, I feel, attributes far more to the effectiveness and persuasiveness of advertising than exists, at least in the real world. Competent researchers have demonstrated that persuasion which is contrary to the predisposition of the customer will, in all probability, be avoided, misperceived, ignored, or selectively recalled in a manner that is consistent with those predispositions. Just as the individual makes his thoughts known at the voting booth, he makes his thoughts known in the marketplace by casting his vote of economic choice. A business enterprise that does not heed by criticizing those companies that speak to the society for any great length of time. Critics who do not agree with what they see in the marketplace must recognize that change will come about only as the individuals of that society change their economic vote.

Since we have been thinking about advertising in general, let us look at its specific application to the utility marketing situation, remembering that advertising is only one aspect of the total marketing concept. In order to properly understand advertising as practiced by the utility business, it must be viewed from its historical perspective.

After the introduction of the electric lamp into the marketplace and the development by Mr. Edison of his electrical generating station, the industry began a long history of improved technology and development. In the early days, there were no business enterprises manufacturing products that used electrical energy. As these products were developed in order to take advantage of this new energy source, advertising served the function of creating an awareness in the consumer's mind that these devices were, in fact, readily available and had benefits. This is an application of new product introduction and marketing. Utility adverti-
ing in the early introduction stages of a new de-
vice plays an extremely important function. It in-
form the customer that such a device is available
and the customer is then free to use his own per-
sonal judgment in deciding which business enter-
prise's product, if any, he will use. Once the de-
vice has been accepted by society, then, in my
judgment, utility advertising no longer plays such an
important role. The various manufacturers of
the accepted product compete in the marketplace for
the favor of the customer.

The purpose of advertising in a utility
changes over the dimension of time and must relate
to the overall marketing efforts of the company.
Although it may seem difficult for you to believe,
there are still many people who do not realize that
water can be heated electrically and that homes can
be heated and cooled electrically. The need to do
these tasks has been demonstrated is a very realis-
tic fashion by customers, yet, through lack of
knowledge, some people have not considered satis-
fying the need electrically. Advertising, then,
can perform the very real function of making the
customer aware of alternative devices for accom-
plishing and satisfying his needs. Those critics of
utility advertising who present the argument
that "advertising stimulates additional consumption" refuse to recognize this fact.

It becomes obvious that if electrical consump-
tion by the consumer is to be stopped or decreased,
that consumer must be willing to give up the satis-
faction of some of his needs which he has deter-
minded to be of value to him. Stated another way,
generally speaking the objective and effect of con-
merchandising electric utility advertising is not
the promotion of an increase in the total aggregate
use of electrical energy. In fact, the overall
level of energy consumption is basically predeter-
mined by established standards of living and the
inherent customer demands for the end products of
that energy use, such as heat, light, cooling, and
the products of machine power, on which utility ad-
vertising has virtually no effect.

Nevertheless, it is only through advertising
that utilities can communicate to most customers
the alternatives available to them when selecting
among the various types of energy that might be em-
ployed for these uses and which are offered by both
regulated and unregulated suppliers. As a general
rule, the providing of information and knowledge
about available alternative sources of energy tends
to promote the public interest.

Since total electric advertising has been
criticized as causing additional consumption, let
us look at another company which advertises, the U-
Haul-It Company. On television, they state: "If
you are going to move across the country or across
town, be sure to use ABC U-Haul-It." Certainly,
this type of advertising does not stimulate you to
move across town or across the country. However,
if you are in need of such a service, you might
want to give ABC U-Haul-It Company a call. Much
the same is true of utility advertising: "Heat
your home electrically." I know few people who
would go out and purchase or build a home so that
they could take advantage of electric heating.
However, once they have decided that they will have
a home, we are, of course, back to the same point
—that heating will be done. It is now only a
question of what kind of heating will be employed
and what type of energy will be used. Energy se-
lection is almost always a secondary decision.
Perhaps without realizing it, most existing custom-
ers already have made a long-term commitment to en-
ergy usage. The most that utility advertising
could be expected to accomplish would be to alter
the relative amounts of that predetermined energy usage.

Regardless of what energy source is used to satisfy the needs of people, there is no question that utility production and delivery facilities to some extent intrude upon or affect the environment. It must be kept in mind, however, that our concept of marketing implies the management of demand facing the industry so that the growth will be both orderly and in the best interest of society and its environment.

Apparent oversight by the critics is the fact that the purpose and effect of advertising is to promote uses of energy that can be provided by otherwise idle utility plant capacity. Utility plant capacity is necessarily determined by peak load demands and, therefore, is fully utilized only when demands reach this peak, which is only for brief periods during a year. If different energy suppliers have peak demands at different times, the total capacity required can be reduced by shifting demands from peak usage to off-peak usage. For example, if some demands for energy for heating purposes can be shifted from gas, for which peak demands occur in winter because of heating, to electricity, for which there is excess capacity in the winter months, the total gas and electric plant required to provide all energy requirements will be reduced in the long term, thus minimizing the ecological impact.

Ecology is a rather fascinating word. It is the branch of biology that deals with the relations between living organisms and their environment. In sociology, it is the relationship between the distribution of human groups with reference to material resources and the consequent social and cultural patterns. We readily can see that ecology is not a static concept. Rather, it is a dynamic one. Basically, the context in which we are using the word is in reference to man — man’s relations with his environment. Transformations always are taking place between human societies, business enterprise, and the environments in which they exist. One aspect of these transformations is the economics of managing resources, particularly physical resources.

The concept of resources is not as straightforward as you might think. Man is constantly struggling in an attempt to properly define the term as it relates to their effective availability to society. Over the dimension of time, our resources, our societies, and our circumstances change. What has taken place in the past is very often not a valid consideration when attempting to predict the future. Many times, future circumstances are ill defined.

Since man does not live in an isolated context, it is difficult to talk about some of these things without looking at their interrelationships. It is difficult, for example, to talk about resources without talking about technology. Many ecologists are prone to think of the earth and its environment comprehensively. The physical environment is viewed as somewhat static, without any real appreciation of man’s ability to think, his ability to use existing knowledge and even acquire new knowledge, and with little regard for his ingenuity in using various skills to shape his physical environment. From the viewpoint of economic and social activity, the environment is not the totality of physical resources but only that part of the total which man conceivably can use now or at some future point in time. Actually, our environment at any point in time is shaped and limited by our skills in using it. It is, therefore, inexorably related to the development of technology.
The environment is molded by man's ability to acquire and use knowledge and skills. A very important aspect of human evolution lies in this fact. Human societies not only select but also make their environment. History indicates that the process by which man survives can best be viewed in light of those procedures by which he has been capable of transforming his environment. Human evolution is dynamic. Man and the environment react upon each other, and both are transformed.

The technological skills existing at any particular point in time can be projected into the future for an appreciable time frame, but such projections are always constrained by the qualification that the estimates represent our present perspective. We do not always recognize that the projections are limited and bounded by the application of knowledge of the known technological techniques of the past and the present. It is here that ecologists seem to get fooled up. It would seem, today, that many ecologists fail to recognize these boundary conditions in attempting to describe and analyze the physical resources of the environment. They are all too eager to view the past and the future in terms of existing knowledge. In so doing, they adopt a misleading and inaccurate concept of the environment.

At some particular point in time, the environment always belongs to some specified social group, however primitive or however sophisticated. If we place our present society in proper perspective, we are forced to the conclusion that it occupies only a very small portion of time in man's total existence on the planet Earth. The twin concepts of technology and resources have interacting effects on each other. 'Technology, under the guidance of man's mind, expands on time. Resources appear to be determinate and limited in amount. The total amount of apparent actual resources can be viewed as being available as either actual or potential reserves. We hear a great deal about these resources being finite in nature. This is true, but it does not follow that the limits are absolute. The limits of resources are constrained only by our knowledge and skills, and these limits may be modified as man develops new technology and insights into the structure of the world in which he finds himself. As man's knowledge continues to advance in many areas of activity, constraints in the physical resources of the environment will be toppled.

If history is any indication, the exclusive adaptation to a particular environment does not pay in the long run. It imposes severe and in the end perhaps fatal restrictions on the possibilities of life. What is essential to man is the capacity for adaptation to changing circumstances. Such adaptation is bound up with the growth of man's knowledge and skills. He is the only creature in the ecological context which has the judgment and ability to modify his environment. In a general sense, again reviewing history, it would appear that animals evolved over time by changing themselves to adapt to the particular environment, whereas man modified his environment to accommodate his rather frail body.

There are those who would like to preserve things just as they are, and there are others who would like to eliminate everything from the environment that would appear in any way to be harmful to man. I really have no quarrel with either of these points of view. The real effect on our environment is what human concern dictates. There is no question that it is easier to be against something than it is to be for something. It is easy to be against things when you are not required to be totally cor-
rect, when you are not required to suffer the con-
sequences of error, and when you will not be held
responsible. It is much more difficult to be for
something since you then are required to be respon-
sible, to advance irrefutable evidence, and, more
important, to suffer the consequences of your er-
rors. It is unrealistic to expect to live as we do and
have what we have without change and without
production. It is possible to live without elec-
tricity, automobiles, airplanes, and hundreds of
other things, but it is not realistic. It is real-
istic to assume that in our society people desire
individuality — individuality to work as they can
best perform and to live as they choose. For these
things there must be production and distribution of
goods and services, and there will be.

It is mandatory that there be changes in the
environment and ecology, but they do not have to be
harmful changes. Some things are harmful to man.
These should be reduced and, when possible, done
away with. Some tsings are beneficial to man and
should be continued, but continued with measured
consideration, thought, and care. Both should be
consistently reviewed, for what is acceptable today
may be entirely unacceptable tomorrow. It is not
that marketing and advertising are bad for our en-
vironment. It is the effect of man, the thought-
less or ill-advised actions of man, that are detri-
mental, whether these actions are in production and
marketing or in the enjoyment and use of the envi-
ronment.

What is needed now is a realistic approach to
our situation. It is time that we end the era of
opposition — stop building lines, stop building
generating plants, stop this and stop that — and
that we begin an era of effort to produce as desir-
ed and needed in a manner compatible with ecology
and the environment. The task of harmonizing mar-
ketag, man, and the ecology is difficult and is
compounded by mutual antagonisms, but it is absolu-
tely essential for man's long-term survival.
Marketing is the bridge between rational decision
making and the utopian approach of attaining future
human goals. If we are correct in assessing that
the true character of marketing is that of managing
the level and consumption of demand facing the bus-
iness enterprise, then marketing as a concept should
be expanded and fully developed.

It goes without question that providing elec-
trical energy to a constantly increasing number of
people is one of the major thrusts of society. This
transformation of energy for human use has been
viewed in the past as an engineering and technolog-
ical problem. In the future, it necessarily will
become as economic, political, and moral problem.
It is an economic one because energy has become an
essential to man's needs and, indeed, his very sur-
vival. It is a political one because it is the
responsibility of elected officials to determine
how available resources will be allocated: Who will
transform power? Who will distribute it? Who will
own the resources? What will the cost be? These
are political questions, and to pretend otherwise
is to lose contact with the real world. It is a
moral problem because others live in this society
too.

One other point that I would like to make is
that man and his environment, whether present or
future, is not simply a matter of ecology defined in
narrow, psychological and physiological terms.
It also must be considered in terms of the cultural,
social, political, and spiritual aspects. The
present environmental problems of pollution, plant
sitting, air pollution, waste disposal, and land use
are but symptoms, and, as such, they are unimpor-
tant except as they lead to the cause of their
being. As Homo sapiens we must confess, realize, and admit that man is our basic and primary concern and that the protection of man and his continuation and existence is our primary aim. To propagate man, all other forms of plant and animal life must be evaluated as to their cost-benefits ratio with respect to their value to man. There are those who seem to think that the environment and everything in it that is susceptible to management are quantifiable in numbers — either black or white, good or bad, without degree or relative importance.

Marketing, being compatible with man's desires and needs, furnishes a solution to his wants and serves his purpose in assisting to mold and control his environment and, therefore, is compatible with that environment. A true understanding of the marketing concept as a modus operandi for business enterprises has many benefits. It normally will lead to improving the jobs and services available to society. Viewed in the context in which we have tried to present it, the chief characteristics of the marketing concept are concerned with the needs and desires of the groups that are being served by business enterprise. The marketing orientation also will tend to improve efficiency in the accomplishment of human and organizational goals. True marketing orientation also might help a business to improve its public accountability and its accountability to society in general. Again, a true understanding of the marketing concept, in all probability, would help in the task of securing proper legislative support.

Business, to survive in a free enterprise society, must have the support of the society in which it functions. Regardless of the environment within which we live, marketing, if successful, will contribute to that environment and will pro-duce growth and change: growth in kind or in type and change in the size, number, and type of production facilities. Growth and change are the things on which man has survived and on which he will continue to survive. Marketing is the management of the level of consumption and demand facing the business enterprise and facing society. The question of whether marketing and advertising are consistent with ecology is, in reality, a question of whether man will use good judgment in the selection of his needs and wants and exercise his moral and ethical obligations in the satisfaction of those wants and needs to the benefit of the environment in which he lives.
New Challenges to Public Utility Management

Gilbert P. Goetz

Recently I came upon a comment by a psychiatrist, Dr. Roy Menninger, president of the famed Menninger Foundation, which probably should be framed and hung in the office of every business executive. "A crisis," he said, "is an event that challenges entrenched ways of thinking. A crisis produces a teachable moment — a time when a person or company is open to a new idea. It is an excellent learning situation."

Utilities today are indeed in a period of crisis, a time challenging our established ways. Traditionally, utilities have relied on sound economic laws — economies of scale, for example — to improve both the status of our business and the standard of living. Economies of scale allowed us
to sell more electricity to more people at ever lower costs.

Before the turn of the century, Samuel Insull built a utility empire on the same principle. He reasoned that he could sell more electricity if he could lower the cost per kilowatt-hour, and he could lower the cost if he could build larger, more efficient generating plants. He was right, and a thousand companies since also have applied the principle successfully.

In 1900 less than 5 percent of the energy in fuel was converted to electricity; today our best plants approach 40 percent efficiency, and the average is around 33 percent. During that same period, the cost of electricity decreased steadily, and our standard of living increased correspondingly. Economics of scale served us well.

Now, however, we seem to have come full circle, and the law of economies of scale no longer applies. Larger and larger plants do not raise efficiency dramatically. Even when technological efficiencies are improved, the cost per unit of electricity does not drop. Instead, soaring construction costs, labor costs, and operating expenses push our cost per unit upward. Environmental costs, since they do not contribute at all to the inexpensive mass production of electricity, are directly added to the cost per unit. Fuel prices rise, without equal increases in the amount of energy we can extract from primary fuel. And we are forced to finance our strenuous efforts to meet increasing demand with higher priced money. Add to this situation the elements of consumerism, rate discrimination, charges, regulatory lag, and doubling demand, and indeed we have arrived "at the teachable moment" of the crisis.

The New York Times last week summarized the situation this way: "Thus, the basic issues of the energy crisis involve all the problems associated with the nation's transition from a time of cheap and plentiful energy, to a time of husbanding the remaining fossil fuel and developing new sources of energy — while at the same time maintaining a quality environment."

Our present situation represents a difficult and distasteful concept to most Americans. We have been conditioned to believe that bigness is greatness, more is better, all or any growth is good. I believe that the attitude will cause us to strive for technological breakthroughs that will permit economies of scale to again come into play, although certainly not as dramatically as before.

This already has happened in the construction of skyscrapers, for example. The Empire State Building capped the first skyscraper age in the 1920s before such large buildings became economically impractical. We had gone as high as we could go and still make a profit. Now, however, primarily due to the introduction of new materials and new construction techniques, skyscrapers are again in vogue. The World Trade Center in New York is taller than the Empire State Building, and the Sears Building in Chicago soon will be. After a forty-year hiatus, skyscraper economies of scale are again operative.

I hope our hiatus does not last forty years. With the intensive, industry-wide research and development now getting under way through the Electric Power Research Institute, I do not think it will. I think we will have much of the technology we need much sooner than that.

The first lesson learned, then, in this
"teachable moment" for the electric power industry, is that we must adjust policy and direction for the interim period while waiting for the advanced technology. With that basic understanding, what is the solution for the interim period?

I do not believe there is a single "correct" course to follow because I do not believe we have all arrived at the same degree of crisis simultaneously. In New York the situation is not the same as in Detroit, and a utility dependent on coal as primary fuel is not necessarily in the same position as one dependent on hydro power.

Aggressive energy conservation is certainly one course to follow, although it need not go to the extent of complete elimination of sales forces and advertising. Early in 1973 the Edison Electric Institute compiled a partial list of electric companies which had adopted some form of a power conservation program. More than 80 companies were named. Some of these have adopted Save-A-Watt, the most vigorous energy conservation plan presently in practice.

I know Save-A-Watt is an anathema to many marketing men, who view it as a direct threat to their livelihood. When Con Edison introduced Save-A-Watt in 1971 it disbanded its sales force and discontinued sales promotion efforts. That seemed drastic, but the reasoning was simple and sound — a business should not try to sell something it does not have. Con Edison was in that position. Any other utility in similar circumstances and any other business with no inventory and no immediate prospect for building one should follow the same course of action.

Obviously, an energy conservation program as ambitious as Save-A-Watt requires considerable marketing skills. Instead of selling electricity, which has become a natural instinct, energy conservation requires the marketing of totally new ideas and concepts. The marketing aim of a program like Save-A-Watt is to enlist the total population of a given area in a common effort for the common good. It asks individuals, groups, and residential, commercial, and industrial customers to sacrifice, to share. And the sacrifice is not specific, not limited in time, it is not even tangible. The results are not tangible either! They come in the form of figures published in a newspaper showing that total electric load in a given area has increased more slowly than usual. Reading an item like that is not at all the same as reading about your country's armies winning an important battle. Most of the motivation for a program like Save-A-Watt then, has to be generated by skilled, imaginative marketing men. It is the kind of challenge that makes a good marketing man's mouth water.

Let me elaborate for a moment on the size of that challenge. When Con Edison introduced Save-A-Watt in 1971, the goal was a 10 percent reduction in 1971 summer peak load. Every marketing resource was marshalled. Since the goal was judged worthy and noble, the city's press, politicians, environmentalists, consumer advocates, and other leaders enthusiastically entered the campaign. I do not know of any other massive commercial marketing campaign with that kind of active, visible support. And remember, all this was against a background of blackouts, brownouts, and voltage reductions. Still, the 10 percent goal was not reached. Who would have thought any commercial product would be popular enough to resist such an onslaught?

Although the original goal proved too ambitious, the program was successful. Peak day demand that year was lowered by 200,000 kilowatts and sum-
In the second year of the program, again with every marketing technique available, peak day demand was lowered by 400,000 kilowatts, and summertime consumption was lowered by about 300 million kilowatts. Largely as a result, Con Edison now boasts a 24 percent reserve, which should allow plants to operate closer to their most efficient, profit-making levels.

As another example of the marketing challenge before us, the current energy crisis gives every indication of increasing demand for our product even as it makes it more difficult and costly for us to produce that product. Last winter, Consumers Power Company announced it no longer could guarantee home heating gas for new construction in the Detroit area. Since then, Detroit Edison, in Oakland County, has received many times more requests for information about electric home heating than normal. Last week Detroit inventor and businessman Robert Aronson announced he will begin assembly line production of an electric car next fall. Other electric car manufacturers also claim to be ready to market their products on a large scale.

While we are struggling to meet a demand which is rising at a rate of 7 percent a year and which is expected to double again in ten years, we may have had two new markets dumped in our laps. In addition, there are the demands of environmental energy and transportation. Under these circumstances there can be no greater marketing challenge than matching supply with demand in a way that produces both a reasonable rate of return and satisfied customers.

Although Save-A-Watt and other energy conservation programs are only one alternative among many to meeting our current crisis, any solution must be underpinned by strong, effective communications. Here, then, is the very first step the industry must take at this "teachable moment": Build credibility and public understanding regardless of marketing circumstances.

About 18 months ago Detroit Edison introduced a program of full-disclosure communications. Our decision was that we not only would tell the truth but also would do so convincingly, consistently, and with complete candor. William G. Reese, President and Chief Executive Officer, summed it up for security analysts in New York this way: "We are going to see that the public and our customers know our position and why we take the steps we do. My Company faces many serious problems, but through the process of communications and general public education we will bring to the public both sides of the story and let them judge the merits of the kind of service we are planning for them in the future."

One of the early challenges for our new full disclosure policy involved our Greenwood Energy Center, near Port Huron, Michigan, about 60 miles north of Detroit. When completed, the center’s two nuclear units and one oil-burning unit will have a capability of 1.3 million kilowatts. Bird and wildlife sanctuaries are included in the total land use plan, and every effort has been made to improve the surrounding environment rather than detract from it, a policy we call "environmental enhancement." Only one-thirtieth of the six-square-mile area will be used as a power plant site; the remainder will be a buffer zone.

On 25 May 1971 we held a public meeting, before purchasing any of the land, to announce a 34-mile-long transmission corridor from Greenwood to the city of St. Clair. We revealed the exact route of the proposed transmission corridor. The assembled
civic and political leaders, newsmen, and landowners were shown, with visual aids, every detail of our plans.

I do not think you have to be a real estate expert to understand that our actions, judged by the conventional wisdom, encouraged skepticism within and outside the company. Not only did we tell landowners we wanted their land, we made it clear we had already invested a considerable sum of money for studies to determine the best of all possible routes. We put both our cards and our money on the table at the start of the game. A man with a piece of land in the proposed route knew at that moment that we badly needed this land and that we could not easily threaten to take our corridor elsewhere if he asked an exorbitant price for his property. I have to believe, as I am sure you do, that the poker players in the audience felt they had been dealt four aces.

Before talking about the outcome, let me dwell for a moment on the route studies mentioned. When we decided to announce in advance where our transmission lines would go, we had to be sure — very sure — that the route would meet every scrutiny. It had to be the best way to go financially, environmentally, aesthetically, and politically. Secret plans can be changed without embarrassment or loss of credibility. We were not giving ourselves that option. Any errors we made would be exposed to the public eye. Therefore, we had an engineering firm with extensive experience in transmission line engineering and environmental design find the best of all possible routes.

The crucial point here was that full disclosure became a management tool, a way to maximize efficiency. It caused us to put forth an extra effort, to go the extra mile. We knew things not only had to look right, they had to be right, and we made sure they were. Extending that thought, the public relations values were derived from what we did, not what we said we did, or the way that we said it.

Since our announcement last May, 92 percent of the land we need has been purchased. That is a rate of purchase at least twice as fast as we expected had the conventional buying method been used. Our Greenwood experience was a clear-cut example of the benefits of full disclosure. It gave our company officers and employees understanding of and confidence in full disclosure as a policy. In a sense, it paved the way for bigger challenges to come. And believe me, they were not long in coming.

In December 1972 Detroit Edison had to prepare an announcement that we would apply to the Michigan Public Service Commission for a 7.9 percent rate increase. The increase in rates plus other measures added up to a $59 million annual revenue increase. That would be bad news for the customers of any utility, at any time, but it was made doubly bad by the fact that our rate relief request would come just four months after a $39 million increase. Nevertheless, we had an honest story to tell. Careful, detailed plans were made on how best to communicate our position.

We started from the basic premise that we would hold nothing back, including full discussion of rate design. Our next decision was to infuse our communications efforts with vigorous affirmative action; we would avoid the defensive and would figuratively grab the public by the arm, sit it down, and say: "Let us tell you the facts before you arrive at conclusions about this matter."

Two comprehensive communications plans were
devoted on these principles. The plans themselves are as candid about the problems as the full disclosure policy they were designed to implement. The first plan begins with these words: "Because of past practices and attitudes, Detroit Edison still suffers from the trailing image of being a closed corporation. We have a reputation for being secretive as well. The reaction of the press media has been to write about us from an adversary position. Among the public, opinion leaders and the financial community, our reputation could be greatly improved. There has been a serious credibility gap that we are just beginning to overcome with our new policy of fully informing the public."

The cornerstone of the plan was a major media effort, begun on 15 December 1972 with a Detroit press conference. Then, and in the weeks following, every question asked was answered fully and with complete candor and honesty. Answers also were volunteered to numbers of questions the press did not know or think to ask immediately, but which were relevant to the rate request and likely to surface during the lengthy public service commission hearing. Having seized the initiative, we held it with direct communications with our customers, employees, shareholders, political leaders, and various special interest groups. Press and public reaction was moderate, especially considering the number of rate hikes we had received in recent years. Press coverage featured not only the news of our filing but also why we filed.

Although the outcome of our rate case will not be decided for months, we already feel our aggressive full disclosure policy has had significant impact. We are receiving large doses of predictable criticism, but we are by no means under siege. Many members of the public disagree with our positions, but their respect for our credibility has grown. More growing needs to occur in this respect, but we really feel we now have a strong base from which to build.

To do less is to stumble from one credibility crisis to the next. We might suffer nuclear plant licensing and operation delays due to the protests of citizens who refuse to believe we are not building atomic bombs; see rate relief requests cut in half or denied altogether because the public believes we are lying about how much we really need; be forced to equip plants with expensive and unnecessary devices to protect against pollution where no potential for pollution exists; and be faced with myriad other problems.

Let me emphasize that full disclosure is not an advertising program, it is not a traditional public relations selling job. We do not try to embellish the truths we tell. We do not try to make our points through exaggeration. We do not argue our position, we simply state it. Although the program is affirmative, even aggressive, it is also studiously low key. Adjectives like "major," "significant," and "important" are stricken from writers' copy unless the actions they describe are objectively major, significant, or important.

The crisis faced by utilities today, this "teachable moment," can and should be the springboard to a successful and satisfying future for us and the public we serve. With the supply and the cost situations of electricity have changed dramatically in the last few years, requiring new attitudes on the part of both the producers and the customers. Adjustments must be made and flexibility must be maintained. We never again can allow the public to view utilities as closed corporations operating in the public interest only when forced to. We must earn and hold trust and understanding.
If we can learn to do these things now, our future only can be bright. As a closing thought, Thomas Jefferson once said: "Only an informed public can make wise decisions!"

Comments on the Role Marketing Should Play

D. E. Wallin

Dr. Grayson advocates the formal market plan approach to developing markets for a utility. That is, he references certain components of the plan which many of you will recognize, such as the statement of objectives, statement of strategy, action programs, and so forth. I must say that I am in substantial agreement with the use of this approach. It can and does work in the utility business.

Parenthetically, I believe that this formal market planning method represents the most systematic, organized approach to planning for market development that exists. Of course, as many of you may recognize, the approach has been used for more than a quarter of a century by some of the largest
companions in the nonregulated sector of the U.S. economy.

Grayson further recognizes the critical importance of the marketing mix, that is, the need to creatively vary the mix of the support vehicles (personal selling, advertising, sales promotion, direct mail, product, and so forth) required to achieve the marketing objectives.

Furthermore, Grayson should be commended for his suggestions that power salesmen should be replaced by energy salesmen who, in turn, would emphasize the more efficient use of scarce resources rather than promote product per se. Grayson also identified and commented meaningfully, I believe, on the key elements in our society which marketing management must deal with, including consumers, environmentalists, and regulators.

On the negative side, with reference to the title of the presentation, "What Role Should Marketing Play during a Period of Constrained Supply?" it would appear that the role to be played is somewhat ill-defined. There is an admitted emphasis on the current "concern with the anatomy of demand, level of amplitude, and timing," but there was no specific prescription for action.

Grayson's plea appears to be for more and more consumption, and this at a time of acknowledged, widespread scarcity of several forms of energy. He asserted that advertising is the primary tool for increasing that consumption, but a question at least should be raised about the other elements of the marketing mix. The determination of the primary tool required to increase consumption of a product or service, it seems to me, depends upon the nature of that product or service, target audience, and the prevailing market conditions. Surely, many of us opted to use personal selling in commercial and industrial markets in favor of advertising when we were in a position to promote increased consumption in those areas of the marketplace.

In a general view, I would like to make some observations relative to present conditions in several existing energy industries. First, there is a major supply/demand imbalance. Demand is far outstripping supply, which is resulting in significant shortages. Second, there appear to be few, if any, short-term solutions in sight to this supply deficiency.

The theory in practice of marketing is needed under these conditions to shape demand, that is, to move toward demand constraint and not stimulation of demand. Some call this approach "creative de-marketing," which means that the design of marketing is required to shape demand or cool demand in energy-short industries. There is a need to sharply moderate, in most areas of the country, promotional product-type selling in favor of customer service programs. These should stress suggestions to, and specific customer aide for, more efficient use of energy, better maintenance and operation of fuel-burning equipment, and conservation.

I further suggest the need for marketing programs aimed at achieving at least several of the following objectives: (1) Inspire confidence in the gas industry's ability to maintain and secure an increasing supply of natural and synthetic gas; (2) gain acceptance of the need for the increasing cost of gas within the context of the increasing cost of all fuels and energies; (3) promote conservation of gas by all users; (4) support national policies and actions needed to increase gas supplies; (5) provide information regarding the use and maintenance of gas appliances and equipment and
research and development efforts in the consumer's interest; (6) inspire confidence in the appliance manufacturing community relative to the natural gas industry's ability to (a) obtain new supplies of gas and (b) effectively introduce new equipment that offers product conservation or pollution control features; and (7) implement advertising designed to secure only replacement of gas-fired appliances in markets where the saturation is high, specifically, the replacement of gas ranges, water heaters, and space heating equipment.

There is a need to keep channels of communication open to the several market segments served in order to preserve the market in the long term. It is important to capture a share of people's minds today in order to preserve a share of tomorrow's market.

There is a need for communication programs to inform and educate consumers about vital, relevant issues such as the energy supply outlook, customer service, utility involvement in community affairs, public safety, and environmental protection or quality of life. In most areas of the country there is, indeed, a need to minimize product-type communications or advertisements.

On the whole, I consider Grayson's comments instructive. While his main theme must and should be questioned, I found his talk informative. Mr. Pettit's objectives are to "examine each of these major terms and then discuss their relationship with society in general and the utility industry in particular." My comments, in turn, will focus primarily on his observations as they relate to the utility industry.

I was in substantial agreement with the following observations, assertions, and/or conclusions reached by Pettit: "As a management concept, marketing concerns itself with discovering human needs, likes, wants, desires, and satisfactions, and then with focusing the total business enterprise toward satisfying these criteria, hopefully, earning a profit in the process." "More and more the social, economic, political, and even physical factors in the environment will have a marked and increasing bearing on every decision required to be made."

"The true marketing orientation suggests... a proper balance... between external market conditions and the internal requirements of the business. If this balance is to be achieved, then the ability of the business enterprise to provide a good or service must be viewed in relation to the customer's needs and must be evaluated in light of the competitive situation, environmental situation, and the anticipated operating results required."
The five different types of circumstances faced by a business enterprise relative to customer inclination, propensity to buy, marketing, and selected marketing are well defined by Pettit, if not entirely original.

Let us turn to Pettit's treatment of utility marketing. He states that "it is not utility marketing that establishes the need for the product." I agree that utility marketing does not establish primary demand for energy, but it certainly does establish selective demand for particular forms of energy. As such, this marketing activity assumes a key role and is capable of making a major contribution to the business enterprise.

Pettit asserts that the "marketing effort of the utility has very little influence on its existing customers." Perhaps in some markets this may be the case, but I would hope that the speaker has not overlooked the role of marketing in the develop-
dment of replacement sales, especially with reference to appliances. From actual experience, I can say that replacement sales marketing programs can have noteworthy effects on existing customers' buying decisions.

Pettit avers that utility advertising is important in creating awareness of new products, ... but plays a less important role after the product is established. Indeed, advertising does represent a significant factor in establishing and creating awareness. It is also important to bear in mind that established products require "reminder" advertising that re-enforces product claims, including the benefits of one fuel over another. Personally, therefore, I would not be too quick to diminish the role of advertising for established products.

Advertising, of course, also can contribute to stimulating additional consumption for a particular energy form insofar as it contributes to conversations among established residential, commercial, and industrial customers. In other words, insofar as advertising aids in securing buying decisions in favor of one fuel over another, it contributes to incremental consumption for the prevailing fuel. I agree with Pettit when he stated that "marketing and advertising are (not) bad for our environment. It is the effect of man, the thoughtless or ill-advised actions of man, that are detrimental." I think that is placing the matter in the proper perspective. In refusing the tools at his disposal, man creates the difficulties, maladies, and shortcomings of man.

Pettit later stated: "If we are correct in assessing that the true character of marketing is that of managing the level and consumption of demand facing the business enterprise, then marketing as a concept should be expanded and fully develop-
ed." I concur fully. As I indicated previously in my comments on Dr. Grayson's presentation, it is critical to view marketing as having the capability of shaping demand at all times and in all seasons. It can represent a promotional and expansionary force concerned with demand creation. However, it also can serve as a force for creative demarketing in dampening down demand in periods of critical shortage. It is this last concept of the nature of marketing that seems to most frequently elude those who comment on this subject.

Finally, Pettit asserts that marketing, if successful, will produce growth, and growth is all that marketing can accomplish. Generally, this comment would appear to represent a kind of contradiction if one believes in the possibility of creative demarketing to dampen down demand. Marketing in theory and practice can do much more than produce growth. It can affect the level and quality of consumption both upward and downward. Certainly it would seem important to recognize this, particularly during a period of supply deficiency and in an economy of scarcity.

My overall assessment is that Pettit has presented us with a thoughtful, articulate, and comprehensive view based on several marketing fundamentals. His effort is to be applauded and his work recommended for wider distribution.
Comment

Charles E. Olson

The articles by Robert Grayson and Arch Pettit present their views on the appropriate role for marketing by electric power and gas utilities during a period of constrained supply and environmental concern. Both favor continued utility marketing activities, but for somewhat different reasons. These comments briefly will analyze their recommendations in light of the current economic situation in the energy field.

Grayson's paper cannot be taken seriously. After opening with inaccurate remarks on consumerists, environmentalists, and regulators, he briefly reviews the concepts of elementary marketing. He then goes into his views on the marketing of elec-
tricity. Apparently he disagrees with those regulatory commissions that have banned advertising practices because he is for more and more consumption. He needs those appliances because they are not luxuries, and they really make life worth living.

Grayson then makes the statement that the only way rates go down is by increased consumption. Herein lies the fallacy in most of his thinking. The electric power industry is no longer experiencing decreasing costs in its operations. This fact requires some explanation as it is a simplified view of the industry that has caused problems in understanding its cost structure.

Changes in the cost of supplying electricity can result from changes in one or more of the following factors: (1) technology; (2) the shape of the long-run average curve; (3) plant utilization; (4) the price level; and (5) government regulations on environmental controls. To an economist, there are decreasing costs if the long-run average cost curve is declining, that is, if larger units of a given technology cost less at a given load factor than do smaller ones. To a noneconomist, decreasing costs mean lower prices over time, or perhaps lower costs with more output. Grayson apparently means that costs decrease as plant utilization increases, which occurs by definition when production is increased with fixed plant. What he does not understand is that utilization improvements which may be taking place are not enough to offset the sharp increases in the cost of new plant and fuel.

Today the cost of electric energy is rising because of inflation, the shortages of low sulfur fuels, and environmental requirements. Prior to the 1968-1970 period, technological improvements and economies of scale offset inflationary cost in-

creases, and there were few environmental restrictions. As a result, unit costs declined. Currently, however, unit costs are rising sharply because scale economies and more efficient plants (to the extent that they exist) are not offsetting the costs of new plant. Further increases are inevitable because current costs are well above embedded costs and still are rising. This means that as output is expanded and new plants are built, costs will increase. Therefore, the promotion of electric power will increase unit costs unless the added consumption is clearly off-peak. In the residential market the only clear-cut usages that are off-peak are electric heat (in most areas) and controlled water heating. Other uses are just as likely to be on the peak as off of it. Therefore, marketing in the way in which Grayson would use it would help to increase prices. Surely this is not a consumer-oriented approach.

Grayson’s attacks on demarketing and Save-A-Watt also are unwarranted. To the extent that electricity sales will not increase as rapidly as they might with marketing or non-selling, demarketing will increase profits. This will happen because the combination of increasing sales, increasing costs, and regulatory lag do not allow authorized rates of return to be earned. If a lower growth rate would (ex ante) result in higher unit profits than a higher one it should be preferred. Grayson’s conclusion that demarketing will produce fiscal hara-kiri is at best unsupported.

Grayson is correct in recommending that the emphasis be on energy management. This approach would focus on telling customers how to get maximum usage at the least cost with minimum usage. This is what marketing is all about. It also would seem that Save-A-Watt has this orientation as well as being a means of improving the load factor and re-
ducing pollution. Regardless, Grayson seems inconsistent in attacking demarketing and encouraging wise energy use.

Pettit does not seem to think that marketing and advertising are inconsistent with ecology. He also seems to be of the view that utilities have little control over their demands. If this is the case, it would appear that utility marketing is uneconomic. But let us assume that it does have an impact and continue.

Pettit's emphasis is on technology and the way in which it has and (in his opinion) will change to make more and more electricity production compatible with the environment. He believes marketing and advertising are consistent with ecological considerations because technology will result in methods for producing that output which are not harmful to the environment. While this has been true in the past, it may or may not be true in the future. No one, including Pettit, knows whether there will be means of supplying electricity that will be compatible with maintaining a high quality environment.

The question that must be asked here is whether it is responsible to push ahead with marketing programs that will increase electricity output when technology might result in more ecologically sound means of producing power. In my view the answer should be no. We should know what the impact of more and more energy production will be before we decide that more should be marketed. Technology may result in cleaner energy sources, but the consequences of this not happening are too great to move "forward" blindly.

PART II
Forecasting Change in Gas and Electricity

Chairman:
John L. O'Donnell
Professor of Finance
Michigan State University
Validity of Natural Gas Forecasts:
Statistical Measures in an
Uncertain Future

John J. Schanz

I am sure that for business forecaster and executive alike each era in our industry, at that point in
time, has seemed to be an occasion when the need
for reliable forecasts was never more urgent, while
the likelihood of being accurate was at its lowest
ebb. No doubt this reflects in some measure the
natural inclination to feel that current uncertain-
ties are much more threatening than those of the
past coupled with the always present sense of meth-
odologic inadequacy in being able to penetrate the
veil that hides the future. Yet it is difficult
for anyone involved in forecasting the contemporary
U. S. energy system not to feel that current uncer-
tainties are truly different both in character and
degree than anything with which we have had to con-
tend for at least two or more decades.
With that in mind, I would like to direct my discussion both forward and backward in time, with a brief visit to the present. For the past, I think it is useful to examine briefly both the inadequacies and improvements in the natural gas industry's forecasting of its own future. For the present, it seems appropriate to examine the current state of the forecasting art. For the future, I would be remiss if I did not attempt to identify the variables and dimensions that will challenge our current forecasting efforts. I would like to take advantage of my association with the Future Requirements Committee of the U.S. gas industry to comment on the evolution and current goals of that particular activity. I also should note that I will direct my attention toward intermediate or long-term forecasts of five to twenty-five years rather than to short-term or annual forecasts.

If one examines U.S. energy forecasting in general and natural gas forecasting in particular for the period 1950-1970, one finds that the more significant forces of change commonly were "frozen" through a set of simplifying assumptions which left only a few fairly stable or reasonably predictable variables to be dealt with in the forecast. A common preamble to most forecasts made during those years included the following stipulations: Technology would not exhibit any revolutionary change; there would be no major war; there would be no severe depressions of long duration; there would be no major shift in current governmental policies or regulations; the supplies of primary energy resources would be adequate for the period considered; and the price relationships among competing energy forms would remain essentially constant.

If one reflects about the impact of this list upon the forecasting process, it becomes apparent that only a few variables remained. To be specific, only two things needed to be done. First, establish the growth patterns in industrial activity, income, and population, and, second, find the proper linkage between these key variables and energy. Analysis of the post-World War II historical data reveals that for most energy sources and most market sectors there was little statistical advantage in adding any additional variables to energy forecast equations. Moreover, projections or extrapolations of the past worked rather well because of the inherently stable, exponential growth patterns during those years of the key variables—industrial activity, income, and population. Obviously these factors could and did change through time, but not so abruptly as to cause drastic errors in a five- or ten-year energy forecast.

Despite this apparent simplicity, I do not think anyone examining the forecasting efforts of the 1950s and 1960s by individuals, government, or industry would label them as unqualified successes. Past failures can be categorized as follows: Basic correlations were ignored or the proper growth rate was missed; conservatism in the long-term led to "curve-bending"; and individual fuels were forecasted in a "vacuum."

It is quite surprising in retrospect how many early energy or fuel forecasts tended to be straight graphical extrapolations of the past growth of total energy or an individual fuel. The fact that the sum of the various projections for the individual fuels made by the forecaster from various energy industries added up to more or less than was reasonable for total energy did not seem to be a deterrent to the industry's forecasters.

It was not until the 1960s that it became common to forecast by beginning with the energy needs of the individual market sectors and using appropriate economic and population forecasts as the independen-
ent variables. This process then was followed by forecasting the market share each primary or secondary energy form would obtain. However, this approach based upon the energy/GNP relationship did not assure automatic success because the growth rate in the GNP itself frequently was underestimated.

Almost all forecasters are afflicted with some degree of conservatism when they go beyond a ten-year forecast and succumb to the temptation to become "curve-benders." The sheer magnitude of the absolute numbers produced in using exponential growth rates of 4 percent or more can lead to a gradual hedging by the forecaster through altering the rate. I am sure everyone has seen the use of a 4 percent growth rate in the first ten years, then a 3 percent rate in the next ten years, a 2.5 percent rate in the next five years, and so on.

Although perfection has evaded us in energy forecasting, the largest errors in the forecasting record have been in the individual fuels. Here the forecaster has encountered not only the usual perils of the energy forecaster but also additional ones. Naturally, if correlations with the key independent variables were ignored or if the wrong growth rates were assumed or derived from historical trending, the forecasts for a specific fuel were just as incorrect as for total energy. In addition, there have been problems with forecasters' tunnel-vision. The industry or company forecaster has appeared upon occasion incapable of detecting the possibility of regional expansion or market capture. The resulting rash of low forecasts then were followed by a period of high forecasts after the regional expansion was completed or market saturation was reached. This is illustrated by the gas industry's underestimates of the 1960s and the oil industry's overestimates of the late 1950s and early 1960s.

Dr. Helmut Frank of the University of Arizona has examined a number of gas forecasts made in the 1960s to see if he could detect whether any particular group or methodology proved more successful than another. In general, Frank found that the more complex approaches did not seem to offer any great advantage in forecasting the gas industry's performance. Basically, it seems that a simple approach based upon a fundamental appreciation of the energy/economic growth relationship was all that was needed for a reasonably accurate forecast between 1950 and 1970. Furthermore, Frank found that the gas industry forecasted its own future somewhat better than did "outsiders" or "objective" forecasters. I would suspect that the natural upward bias of the gas industry forecasters very well may have compensated for any lack of their in being able to account for market capture or regional expansion. As a consequence, their less conservative forecasts proved to be more accurate.

Before concluding this short appraisal of the characteristics of the forecasting effort of the past twenty years, I would like to review briefly the forecasting efforts of the Future Requirements Committee (FRC) between 1962 and 1971. For those not familiar with the FRC, it constitutes an effort by a group of industry people from the producing, distribution, and transmission companies to forecast the future gas requirements of the United States. Forecasts have been published in 1964, 1967, 1969, and 1971. The initial report was prepared by a small committee of about 20 men. Since then the group has grown to approximately 150 members representing all regions of the nation as well as the producing segment of the industry.
Three characteristics of the FRC data should be noted in particular. First, it is a measure of national need or demand under certain specified circumstances, not a forecast of future gas consumption. Second, adequate supply and constant relative prices have been assumed. Third, the national totals are obtained by aggregating forecasts for each individual gas delivery system rather than by direct forecasts. As has been noted by both the Senate and House committees studying energy, the energy industries are not noted for preciseness in their use of the terms consumption, demand, production, supply, and so forth. The FRC has tried to be definitive in describing what it is measuring within the term requirements.

The early efforts of the gas companies in preparing their FRC forecasts were marked by a heavy reliance upon straight-line projections of the absolute volumes of gas they were delivering from their existing systems. These estimates were refined in the near term by adjustments based upon local intelligence concerning new commercial ventures, residential construction, expansion of existing industry, or the appearance of new industrial firms. In preparing the long-term portions of the estimate little or no attention was paid to economic growth, the gas share of the regional energy total, or the territorial expansion of the system. Only a few gas companies had any experience in forecasting beyond five years for their own internal use.

The limited forecasting capability and time perspective of the typical gas company as of 1967, particularly compared to the efforts of the major oil companies, was not too surprising. Except for the California companies or an occasional individual company effort such as the special studies published by Texas Eastern Transmission, there was little need for an intensive long-range forecasting effort by the gas industry. Most distribution and transmission companies could comfortably ride the long-term market momentum of the industry. The only basic need was for three-year internal forecasts to be used in engineering, budget planning, and supply acquisition efforts. The long-term future of the industry could be depended upon to take care of itself.

In the FRC forecasts of 1969 and 1971, the major gas companies were encouraged and found it in their own self-interest as their future became more uncertain, to upgrade their forecasting efforts. Percentage growth rates replaced the use of absolute gas volumes, downward "curve-bending" without some market justification became less common, the relationships between gas market growth and population or economic growth were checked, and monitoring of market shares and measurement of saturation became customary. Finally, data now are becoming available so that companies can begin to correlate gas with regional or state total energy trends.

The progressive improvement in the quality of the FRC effort has been quite marked, as shown in Table 1.

The requirements estimates of the FRC in the first two volumes should have approximated actual consumption for the period through 1970 because supplies were adequate and the relative prices did not change markedly. However, the estimates were well below actual use even within the first year or two. It was not until the 1969 and 1971 reports that the inherent conservatism of the companies' individual forecasts finally was conquered. The requirements estimates in 1969 were much higher than in the previous two reports, while the 1971
### Table 1. FRC Forecasts, 1966–1995

<table>
<thead>
<tr>
<th>Year</th>
<th>Volume number, trillions of cubic feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>1966</td>
<td>16.3</td>
</tr>
<tr>
<td>1967</td>
<td>16.8</td>
</tr>
<tr>
<td>1968</td>
<td>17.3</td>
</tr>
<tr>
<td>1969</td>
<td>17.9</td>
</tr>
<tr>
<td>1970</td>
<td>18.4</td>
</tr>
<tr>
<td>1975</td>
<td>20.6</td>
</tr>
<tr>
<td>1980</td>
<td>22.9</td>
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<tr>
<td>1985</td>
<td>—</td>
</tr>
<tr>
<td>1990</td>
<td>—</td>
</tr>
<tr>
<td>1995</td>
<td>—</td>
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</tbody>
</table>

Note: Volumes 1 and 2 were not on a 1,000 BTU basis.  
*Actual

Estimates were slightly higher than those of 1969. The estimates made in early 1969 for 1969 and 1970 were within less than 1 percent of the actual consumption in those years. Unfortunately, now that supply and price circumstances no longer match the FRC assumptions, we no longer can expect actual gas consumption to track the FRC requirements estimates.

As a footnote to the FRC forecasts, it is interesting to recall that in 1967 most critics indicated that the basic price assumption would cause a deviation between actual gas consumption and the estimated gas requirements. Little was said at that time about the supply assumption. As we all recognize, the anticipated increases in the relative price of gas did not occur, and it is now apparent that gas demand probably would not have been too sensitive in any case. The supply situation, on the other hand, has proved to be the major determinate in the level of gas consumption.

With the end of the 1960s and the beginning of the 1970s, the forecasting models based upon simple projections and fairly straightforward regression analysis no longer seemed adequate to cope with the changing circumstances and the necessity to deal with the complexity of the energy system. Thus, simple mathematical equations were left behind and policy models, total energy models, supply or demand models, corporate models, and so on, began to appear.

I will not attempt to review the current status of energy models in general. The effort at the moment is widespread and largely uncoordinated, making it difficult, at best, to appraise where we stand. Moreover, it may be too early to determine what kind of strides actually have been made in developing analytical tools that are not only more complex but also more reliable and accurate in both forecasting and simulating events. Some models, of course, are not designed for forecasting purposes, which excludes them from this discussion in any case.

Although all the models dealing with energy by necessity have a gas component, I would like to direct my attention toward identifying current activities which are directed at gas in particular. Actually, the current effort focused on gas is not too extensive. Because of the need for a model that could be used as part of the regulatory process, the National Science Foundation has funded the development of a model suitable for the determining the consequences of regulatory actions. This work is being directed by a group from MIT. Another major endeavor is being funded by the American Gas
Validity of Natural Gas Forecasts

Association at Decision Sciences Corporation in Jenkintown, Pennsylvania. The TERA model, as it is called, is basically designed to determine the consequences for the gas industry of basic changes in price, supply, and/or national policies. The gas industry is the core of the model. The interfaces between gas and all other energy sectors are part of the model design. There are a number of individual efforts. J. D. Khazoom and E. W. Erickson have both developed supply models, and Khazoom is now working on a gas demand model.

Naturally, it is to be expected that individual oil and gas companies are testing or have tested econometric gas industry models in terms of their own internal needs. However, this kind of activity is not publicized in sufficient detail to determine what kind of success the private sector may be having.

Since two of the basic simplifying assumptions that have kept past forecasting more manageable—constant price relationships and adequate supply—are no longer acceptable, there has been an acceleration in the effort to try to develop a better understanding of what the supply and demand curves of our various primary fuels and market sectors actually look like. If econometric models are going to perform with anything like the precision we hope to demand of them, the generalized curves of economics textbooks and professional papers are going to have to be replaced with more specific, real measures of the price elasticity of demand and supply.

On the gas supply side, we are harassed by the difficulty of dealing with a physical environment that is only partially understood. For gas the following circumstances prevail: We do not know the total magnitude of the supply; we have only a rough idea of how that supply may be distributed with respect to cost; past relationships reflect the exploratory effort that price will stimulate, not the supply it will yield; there is considerable uncertainty about future success ratios; finally, there is the problem of the extent to which oil and gas supply curves are independent of one another.

On the demand side, one would hope that the past would be more indicative of the future than is the case for supply. Unfortunately, historical price-demand relationships involved market circumstances where changes in the price of gas were relatively small and frequently well below the cost of obtaining BTU's from competitive energy sources. Consequently, the most likely price circumstances of the future are expected to fall outside of the range of past experience. Furthermore, in studying gas demand we are not dealing with a homogeneous market. The short-term elasticity of gas demand is different from that of the long term, while each market—residential, commercial, industrial—has its own price-demand behavior pattern. Gas demand analysis is further complicated by the regulated rate-making process, the behavior of companies seeking to achieve internal economies, and the desirability of operating under a balanced load.

Seven econometric studies conducted over the past 20 years have attempted to examine the responsiveness of gas demand to changes in gas prices. In so doing they encountered several problems. 1 (1) The geographical units chosen were states, regions, or entire industries, nationwide. This meant that the gas quantities, prices, incomes, and other data all represented very broad aggregates and not specific observations for one location and supplier. These aggregates and the prices derived from them were therefore a composite of many supplying companies. (2) No account was taken, in
most cases, of the differences in cost of equipment or the differences in conditions facing old versus new users. (3) In several cases the number of variables used was large relative to the number of observations resulting in the possibility of a "forced fit." (4) It is difficult to interpret the price elasticity coefficients obtained, particularly with respect to the form of the data versus the transformation used and the possibility of autocorrelation. (5) The relationships between price and quantity in some instances were shown to be insignificant or even in the wrong direction. (6) Considering the limitations of the data and the techniques used, even those results that appeared to be reasonable did not lead to confidence that the elasticity had been measured with any great degree of precision. In general, there is considerable doubt that the coefficients obtained from mathematical relationships based upon the past can be assumed to remain stable for any more than two or three years, which severely limits their usefulness in long-range forecasting.

Despite the limited success of these studies published between 1953 and 1969, renewed efforts are being made toward achieving quantitative measures of gas supply and demand elasticity. E. W. Erickson and R. M. Spann have published a series of articles in recent years on the response of oil and gas discoveries to changes in price. In a 1972 report they suggested that a 10 percent increase in oil prices would cause a 0.7 percent change in oil discoveries and a zero increase in gas discoveries. A 10 percent increase in gas prices, on the other hand, according to their work, would cause a 31 percent increase in gas discoveries and a zero percent increase in oil discoveries. Although they have acknowledged that the demand side of their model is not as satisfactory as the supply side, they estimated that in 1972 the market clearing price would have been between 37 and 50 cents per MCF. They have projected a market clearing price of 69.3 cents per MCF (real price) in 1980 and 92.9 cents per MCF in 1985.

Stanford Research Institute's energy economics group, under the direction of Sherman H. Clark, has been studying both gas supply and demand for a number of years.9 The methodology used and their detailed results are proprietary in nature, but the information they have released seems to indicate that, in particular, the demand relationships they portray are probably based on empirical data. Curves have been developed for individual states for residential, commercial, farm industrial, interruptible industrial, and power plant gas demand. In addition, SRI has attempted to estimate the future U.S. gas supply and demand curves to the year 2000. They have estimated an equilibrium point for U.S. gas in 1980 of approximately 70 cents per MCF on the average in the field and a $1.00 average at the city gate. This agrees reasonably well with the Erickson-Spann model. However, unpublished studies by the Department of the Interior, using a range of assumed supply and demand elasticities, indicate that the equilibrium price could be as low as 40 cents per MCF.

The National Petroleum Council in its recent study has adopted a supply-oriented approach to energy using four cases, each having different assumptions with respect to physical, economic, and policy factors. The NPC did not make a direct determination of the price that would elicit a given supply of oil or gas; rather, it estimated what amount of exploratory effort would result from given oil and gas prices and rates of return on investment. The estimated exploratory effort when combined with varying success ratios yielded estimates of the oil and gas supplies that might result.
On this basis, assuming a 15 percent rate of return, the council determined that gas field "prices" might have to range from 31 to 59 cents per Mcf in 1985 to achieve the exploratory activity assumed between Case I (optimistic) and Case IV (pessimistic).

The Distribution Advisory Technical Task Force of the Federal Power Commission's National Gas Survey recently has completed an empirical study of the price sensitivity of the demand for gas. Using over 30 major companies that deliver gas in various regions of the country, the Task Force requested that each company indicate in its judgment how the growth rates in their requirements projections submitted to the FPC in 1971 would have been modified if the prices of the various energy sources in their area would have changed between 1970 and 1980 according to a specified schedule. A later phase of the study reversed the question and asked what change in the price of gas or the appropriate competitive fuel would have been required to bring about certain percentage gains or losses in the various markets.

In the first phase of the study, where all retail fuel prices were assumed to increase 50 to 100 percent between 1970 and 1980, with gas increasing 10 or 40 percent more than competing fuels, the impact on the national gas requirements was negligible. Although some regions and certain markets were more sensitive than others, this was not enough to alter markedly the national total. However, when the relative price of gas was assumed by the Task Force to vary upward or downward an additional 25 percent, the national gas requirements varied by approximately 10 percent from the FPC estimates. It is interesting to note that under this price assumption gas requirements were reduced to a point approximately equal to the National Petroleum Council's domestic supply estimate in its most optimistic case. However, the field price assumed in the NFC Case I does not necessarily equate very well with the retail price assumed by the Task Force to bring about the reduction in gas requirements as shown in the National Gas Survey exercise.

Turning to some contemporary forecasts, a selection of typical estimates of U.S. energy demand for the years 1985 and 2000 is shown in Table 2.

<table>
<thead>
<tr>
<th>Source</th>
<th>1985</th>
<th>2000</th>
</tr>
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<tbody>
<tr>
<td>National Petroleum Council</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>112.5</td>
<td>170.0</td>
</tr>
<tr>
<td>Intermediate</td>
<td>124.9</td>
<td>200.0</td>
</tr>
<tr>
<td>High</td>
<td>130.0</td>
<td>215.0</td>
</tr>
<tr>
<td>Resources for the Future</td>
<td>—</td>
<td>190.0</td>
</tr>
<tr>
<td>Department of the Interior</td>
<td>116.6</td>
<td>191.9</td>
</tr>
<tr>
<td>Shell Oil Company</td>
<td>131.5</td>
<td>—</td>
</tr>
<tr>
<td>TAPS Impact Study</td>
<td>131.0</td>
<td>—</td>
</tr>
<tr>
<td>Chase Manhattan</td>
<td>135.0</td>
<td>—</td>
</tr>
</tbody>
</table>

As discussed previously, these energy forecasts tend to be rather consistent regardless of source and methodology. For 1985 the highest and lowest forecasts shown only vary about 10 percent above and below their midpoint. This variation in the extremes only increases to about 12 percent in the forecasts for 2000. It can be noted that forecasts of Shell Oil, the oil companies contributing data to the Alaskan pipeline impact study, and Chase Manhattan all tend toward the high side, but they are normally part of the group that is fairly bullish on energy growth patterns. Also, it can be observed that the more recent the energy study, the lower the 1985 projections tend to be, reflecting
the influence of higher prices and the current emphasis toward conservation attitudes on the forecaster. Some recent estimates of total U.S. gas supply in 1985 are shown in Table 3. Of the total gas supply for 1985 estimated by NPC, 5.9 quadrillion BTU's of the gas would be obtained from foreign sources to achieve a gas balance in Case I. This

<table>
<thead>
<tr>
<th>Source</th>
<th>1985</th>
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<tbody>
<tr>
<td>National Petroleum Council</td>
<td></td>
</tr>
<tr>
<td>Case I</td>
<td>41.1</td>
</tr>
<tr>
<td>Case II</td>
<td>35.5</td>
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<tr>
<td>Case III</td>
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<td>Chase Manhattan</td>
<td>27.2</td>
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<tr>
<td>Department of the Interior</td>
<td>30.4</td>
</tr>
</tbody>
</table>

increases gradually through Cases II and III, becoming 6.6 quadrillion in Case IV. Under these circumstances gas imports would range from 14 to 29 percent of total U.S. gas supply.

The greater uncertainty in forecasting the individual fuel components of total energy is illustrated by these gas supply forecasts. The highest and lowest forecasts from the NPC vary almost 30 percent from their midpoint, compared to the 10 percent swing in the various energy forecasts shown.

It is obvious as of early 1973 that if we wish to forecast the future of natural gas we no longer can take the easy way out and hide behind an array

of simplifying assumptions as we have done for the past 20 years. Of the six common assumptions listed previously, only the avoidance of a major war and a 1930s style depression seems to be justifiable assumptions today. This thrusts upon the gas forecaster a host of uncertainties that he has never had to cope with before and may be methodologically ill equipped to handle now.

The unlimited domestic supply assumption must be dropped. In recognition of this, the FPC in a special section of its 1971 report stated that companies felt that by 1975 contracted and reasonably assured gas supplies would only provide 24.6 trillion cubic feet of the estimated regional market requirements of 28.5 trillion cubic feet, a 14 percent shortfall. The 1973 study now in preparation will permit forecasters to assume limited supply and changing prices.

Market necessity demands that we should expect individual fuel prices to continue to bear some relationship to one another. However, the relative ordering of these prices must be expected to change as all fuel prices increase. It seems inconceivable that gas can remain the least expensive BTU for very much longer, although cost averaging of the various gas supplies temporarily could cushion the impact.

Even if we could make a fairly precise forecast of future prices for gas and its competitor fuels, the form and environmental values of gas mean that simple comparisons of costs per delivered BTU are not really very definitive. Although we are working on a better understanding of the various elasticity measures of gas supply and demand, it still seems a bit early to judge how much better our new models will be. How much reduction in gas demand and stimulus to supply can be expected due
to price increases are key events for which we have no assured measurements for either degree or timing.

The history of man's needs for materials and energy has been marked by dramatic changes in technology when the pressures have become greatest. We must not assume that the rather undramatic pace of energy research of the past twenty-five years will continue. Already expectations of a few years ago that gasification of coal would not become important until the mid-1980s have been moved up perhaps five years. The old priority in federal and industrial research and development funding, which gave synthetic gases a back seat to the development of synthetic liquid hydrocarbons, has been reversed. Given the proper emphasis we should not exclude the possibility of a future dramatic or unexpected development in some phase of gas production, transportation, or utilization.

For energy and gas forecasts that reach beyond ten years, it no longer seems prudent to merely assume some standard behavioral pattern for population, economic activity, and per capita energy utilization. We must assume that birth rates, life styles, and attitudes toward consumption may be going through an alteration that is enduring rather than transient in character. This coupled with the unknowns concerning national productivity and the deteriorating capability of the United States to compete for world markets in international trade magnify the uncertainties in the fundamental economic framework in which all energy forecasts must be placed.

Naturally, the most pervasive element in forecasting the future of gas will be the policies that emerge from the governmental sector. In this area there is a myriad of questions for which we have no answers; yet we know that policy decisions will exert tremendous leverage on the course of future events. What will be the nature of future federal incentives or disincentives for gas exploration, capital investment, and research and development? Will new gas well prices at the wellhead be deregulated as suggested by President Nixon? In the regulated portion of the gas industry what will be the future prices? Can we continue to regulate effectively at the federal level when only a portion of the industry is subject to control? To what extent will the new gas sources or delivery systems for gas be regulated? How will the new, higher cost gas supplies be allocated and brought into the rate structure? Will we ultimately restrain reliance on foreign gas because it is a threat to national or regional security? How can we implement policies directed toward establishing use-priorities for gas? What will environmental standards be and how stable will they be? Will we be forced to pursue a more gradual course in achieving environmental objectives?

To sum up this brief review of the art of gas forecasting and the uncertainties for the future, I think most of you will agree that we seem to arrive at only one certainty. We appear to be entering a turning point in U.S. energy which will impact on all parts of our energy economy. It seems to me that natural gas, one of our more limited energy resources, cannot remain very long the "number-two" fuel, satisfying approximately one-third of our national needs. If I am correct, the decline of natural gas in the not so distant future as a major primary energy source very well may be the first event of a series of happenings which will mark the beginning of the end of the fossil fuel era.

Major turning points are, of course, very frightening events for forecasters. If you call one correctly you have it made. But the number of
forecasters who are incorrect usually exceeds those who are right in these circumstances. So I presume that most of us regret that we no longer can ride those comfortable, stable trends of the past. Although top management in oil and gas customarily has felt more comfortable with a single trend or numerical forecast than with a range or a set of possible answers, I think we are going to see more multiple-answer forecasts. The high-low-most likely forecast, the contingency forecast, the scenario, the set-of-cases forecasts, will all appear with increasing frequency. What we are saying as forecasters is: "Take any combination of basic assumptions you want and we will give you a forecast or set of probabilities that fits them." Is this merely a reflection of a greater degree of sophistication and improved forecasting tools? Perhaps. For my part, I am inclined to feel that it is to a significant degree one manifestation of today's uncertainties.

Notes


A Critique of Projections in the Electric Power Industry with Particular Reference to the National Power Surveys

Thomas H. Burbank

Forecasters in the electric utility industry often have been accused of being simple extrapolators who will attempt to project growth for an entire decade during one morning's coffee break. Indeed, there are people who make such extrapolations and who can argue that their past records for accuracy compare well with those of much more sophisticated methods. However, we know that one of the primary purposes behind any rigorous forecasting exercise is to understand and come to grips with the underlying causes which determine a future trend line, even if the ultimate result is very similar to what one would have obtained by simple extrapolation. It is the knowledge thus acquired that gives us the means to predict the effect on future electricity requirements of changes in the economics and social...
environments.

My presentation cannot possibly cover the subject of forecasting in the detail necessary to fully appreciate the efforts being made by the electric utility industry to understand its future. Instead, I shall briefly review some of the major projections of electric energy requirements produced during the past two decades and, in particular, offer some comments on the two National Power Survey forecasts. I also shall discuss briefly some of the more general methodologies of forecasting. Finally, I shall take a look at some of the new factors on the horizon which are likely to make the forecaster's job an increasingly difficult one.

Review of Major Forecasts

Although numerous authoritative sources regularly produce forecasts of kilowatt-hour requirements for periods of ten or more years into the future, today I am focusing attention on those prepared since 1954 by the electric utility industry. I include in the context of "industry" the work done by the Federal Power Commission. Among these forecasts, the 1964 and 1970 National Power Surveys merit particular attention because they represent the most comprehensive efforts yet undertaken by industry and FPC experts working together. However, the FPC has issued its own projections from time to time and was especially prolific during the 1950s and early 1960s when revised forecasts were released almost every two years.

In Figure 1 these projections are portrayed graphically along with the Edison Electric Institute's 1959 forecast. Note that six of the eight were made for periods of twenty years or longer. Only the FPC's 1962 projection and the 1964 National Power Survey were limited to time spans of fifteen to twenty years.

The use of semilogarithmic scales immediately reveals what growth sentiments were at the time each of these forecasts was made. For example, all of the FPC projections prepared between 1955 and 1960 assumed future growth rates noticeably lower than those which had been realized historically. Although each succeeding projection in this particular series was adjusted upward to account for growth prior to the date of the forecast, all four future trend lines have similar slopes and share the characteristic "bend" which implies a decreasing rate of increase.

The tendency to impute a declining growth rate to forecasts of electricity requirements is a common one, undoubtedly grounded in the belief that all growth curves ultimately must approximate an S form such as a Gompertz or Pearl-Reed type. This is apparent when several projections made at various intervals over a long period of time are arrayed on the same graph. Invariably what is sometimes referred to as a "horsetail" of curves appears, with each succeeding forecast somewhat higher than the previous, but nevertheless bending after a decade or two.

Intuitively, assuming an eventual decline in the rate of growth of electricity use seems sound. The long-term growth rate of ultimate energy requirements in the United States has been approximately half that of electricity consumption. As a result, each year electricity consumption accounts for a slightly larger portion of ultimate energy use. Eventually, electricity will account for such a large share of final energy consumption that the growth rate of electricity requirements will approximate the rate of increase of final energy use. The key question, however, is when will this point
be reached?

Today, electricity sold by utilities represents only some 10 percent of all ultimate BTU consumption. Given the technological possibility of substituting electricity for fossil fuels in most major applications, including land-based transportation, we should admit, at least theoretically, that electricity has only begun its penetration of the end use market. Growth rates nearly twice those of final energy demand could persist for quite some time, perhaps into the next century.

In Figure 1 it can be seen that, beginning in the 1960s, forecasters made some substantial revisions in their views about future growth and began to issue projections with noticeably steeper trend lines than those projected in the 1950s. EIE in 1959, the FPC in 1962, and both the 1964 and the 1970 National Power Surveys projected much growth with trend lines which form a fairly tight bundle as they push out to 1980 and beyond. It also is clear that the trend of actual consumption to date fits well within the "tunnel" described by EIE's 1959 projection and the NPS 1970 forecast.

Forecasting Techniques and Methodology

It seems almost presumptuous to tackle the complex subject of forecasting techniques and methodologies in so brief an article. Nevertheless, I will attempt some generalizations in order to convey an idea of the alternatives available to the electric utility industry forecaster.

An initial step in a discussion of methodologies is to group them as either global or sector buildup approaches. A good rule of thumb is to try both when forecasting electricity requirements and then compare the results.
plication here is that, given reliable forecasts of personal income and population, projecting total electricity requirements becomes relatively simple. Needless to say, other people's forecasts of personal income and population may not always prove to be reliable.

**Sector Forecasts**

At EEI the sector buildup or class-of-service approach was used in 1959 to produce the last major long-term projection. To date no revisions have been attempted for the kwh part of this forecast for the simple reason that it has proven remarkably accurate, with a cumulative error as of 1971 of only some 0.8 percent.

A few examples based on EEI's forecasting work may serve to illustrate the sector buildup method of projecting electric energy requirements.

In aggregating statistics on electricity consumption, EEI uses three main categories of consumption: residential, commercial, and industrial. The latter two classes correspond roughly to the former breakdown of small light and power and large light and power, although the use of meter reading may mean that some residential use is included in these two categories. However, for forecasting purposes, the three classes of service are sufficiently homogeneous, and the main problem is identifying the proper index or economic series with which each can be correlated.

To project industrial use of electricity, a logical series to examine is the FRB index of industrial production. In fact, a very good correlation exists between the two, which is apparent from the information shown in Figure 3. To obtain a useable correlation, however, an important adjust-

ment must be made to the industrial electricity consumption data. Use by the Atomic Energy Commission's gaseous diffusion plants must be deducted from the total. Over the past 25 years, kwh consumption by these installations has accounted for as much as 20 percent of reported kwh sales to industry in a given year. Since most of the AEC use was for defense production and did not vary as a function of the business cycle, it would distort historical trends if it were not removed from the series. For the period 1956-1968, the coefficient of correlation between industrial kwh use (less AEC consumption) and the FRB index exceeds 0.90.

Figure 4 shows the regression line for a plot of residential kwh sales versus disposable personal income. Again, the period is 1956-1968, and again a high coefficient of correlation is evident.

Finally, to project small light and power sales, the best correlation is achieved using the services component of personal consumption expenditure. Figure 5 illustrates the relationship of these two series for the years 1959-1971. In this particular case, the coefficient of correlation is 0.99.

Sector relationships between kwh requirements and appropriate economic series enhance the use of sensitivity analysis to determine the effect on total requirements resulting from changes in the parameters. Nevertheless, relying on correlations such as these can be criticized as attempting to see the future in the past, and in that sense it shares some of the shortcomings of simple extrapolations. This criticism is reinforced by the fact that previously unforeseen uses for electricity have appeared with surprising regularity, and certain known potential applications have yet to materialize. There thus exists the possibility that
the growth of future requirements may be influenced significantly by uses which have not been present previously and are therefore not included in any of the quantitative bases used for forecasting. Environmental protection measures are an example. Factoring these potential developments into a long-term forecast can be done only in a speculative manner, and it is my personal opinion that the wise forecaster ignores them when producing his basic projection. If desired, he can later suggest possible increments to total requirements based on judgments as to the timing and rate of introduction of major new applications.

One such potential application which comes readily to mind is electric propulsion. The energy market for surface transportation is one of the largest in the economy. At present, electricity is virtually absent from this market, with the exception of a small amount of railroad electrification. Nevertheless, serious efforts are underway to develop electric road vehicles, and steady progress is being made in this direction. Should these efforts result in a sudden breakthrough which would make electric vehicles equal competitors with their gasoline fueled counterparts, all forecasts of electricity usage would be subject to dramatic revision.

Technological forecasting of events such as the appearance of a fully competitive electric vehicle is a rapidly developing science which one day may provide the industrial forecaster with more reliable inputs for use in his own projections. For the moment, however, forecasts for industries like the electric utility industry are best made using measured relationships between the various categories of consumption and the appropriate economic indices or components of GNP.

Thomas H. Burbank

National Power Surveys

As already indicated, the 1964 and 1970 National Power Surveys represent perhaps the most comprehensive efforts yet to forecast the nation's needs for electricity and to translate those needs into terms of fuel, capacity, and capital. The first such survey was carried out in the mid-1950s, but its look into the future was limited to the period necessary for the economy to return to pre-depression levels of activity. The second National Power Survey was issued in 1964 and the third in 1970. A fourth survey currently is underway.

Both the 1964 and 1970 surveys included long-term forecasts of electric energy requirements; the 1964 projection ran through 1980 and the more recent projection through 1990. It is interesting to compare these two forecasts as well as some of the thinking behind them, especially since we now have historical data covering half of the 1964 survey's forecast period.

The 1964 projection called for total requirements of 1.48 trillion kWh to be supplied by the electric utility industry in 1970 and 2.69 trillion kWh in 1980. Average annual growth rates were to be 6.9 percent per year between 1960 and 1970 and 8.1 percent per year from 1970 to 1980. A decrease in the rate of increase was predicted for the second ten-year period, with the average annual growth falling from 6.4 percent during the first half of the decade to 5.9 percent per annum for the years 1976 to 1980. The trend line of the forecast as well as historical data through 1972 are shown in Figure 6.

Note that the deviation of actual values from the forecast trend line has swung from negative to
positive since 1965 and has tended to increase, although the cumulative error as of 1972 was still only on the order of 1.7 percent. This error may rise further, however, because the growth rates predicted for the balance of the forecast period may prove conservative. Suggesting an increasing error appears reasonable when the trend line of the 1964 forecast is compared with an extension of the least square trend of the actual values realized to date. Figure 7 makes this comparison.

The initial projection for the 1964 survey was based on regional forecasts prepared by the regional offices of the Federal Power Commission according to guidelines set by the commission. These forecasts then were reviewed by the Power Requirements Special Technical Committee, which also examined the underlying postulates and assumptions. Comparisons were made with similar forecasts developed by the power suppliers themselves, and the opinions of outside experts were solicited. Eventually, through a process of extensive consultation and collaboration, a consensus projection was produced.

Reading the discussion of this forecast contained in the 1964 National Power Survey reveals once again the importance forecasters still attach to judgment. The committee noted that the five year point values were not intended to be precise, but rather "to be broadly indicative of future load growth." It further stated that it "recognized the fact that almost invariably utility long range forecasts are low" and emphasized the "need for reviewing of forecasts in the light of technological and sociological changes as they occur, and at a minimum of once every five years."

The committee's caution regarding the tendency of long-range forecasts to be low did not discourage one of its members from issuing a dissenting opinion which characterized the consensus projection as being too high. The dissector found particular fault with three of the assumptions implicit in the forecast.

The first was the rate of growth of GNP, which at 4 percent per year was above any long-term average ever achieved over any period which he believed to be historically relevant. Although this rate had been scaled down from 4.6 percent used in the initial projection, to him it was still too optimistic. I might note at this point that between 1960 and 1972 the growth of real GNP averaged better than 4.1 percent, but whether the past decade should be considered historically typical or not can be debated.

A second criticism was directed at population estimates. According to the dissector's report, the 265 million figure adopted by the FPC for 1980 was 12 million too high and thus overstated requirements by some 130 billion kwh. Ironically, it would now appear that even such a reduced population estimate will prove exaggerated, although the overall kWh forecast may turn out low.

Finally, the dissenting report took issue with the forecast of residential electric heating installations that had been used in the survey. Originally, these had been predicted to total 25 million in 1980, although the final forecast was premised on some 19 million. Noting that in 1960 the number of electrically heated homes was roughly one million, the question was posed as to how electricity could possibly attain the level of 19 million installations in 1980 without capturing virtually all new construction in the period 1960 to 1980. The implications for competing energy sources, it was stated, were rather astonishing. The number of new gas heating customers added each year would have to
"drop with extreme rapidity," to no more than three or four hundred thousand.

This, of course, was a reasonable viewpoint to adopt in the early 1960s. Today, however, knowing as we do the predicaments of oil and gas, we are more inclined to wonder about the astonishing implications that the shortage of these fuels has for electric heating. As of year-end 1971, nearly 5.6 million electrically heated dwelling units were being served by the nation's power systems. Given that new housing starts are expected to average at least 2 to 2.5 million units per year for the balance of this decade, electric space heating would only need to capture about two-thirds of the residential construction in order to achieve a 1980 total in the neighborhood of 15 million. While I am not predicting that electricity's penetration of the residential space heating market will advance at such a pace, I am suggesting that such an eventuality is now well within the realm of feasibility. In summary, the dissenting report proposed a 1980 requirement figure of 2.3 trillion kWhs compared to the final survey forecast of nearly 2.7 trillion kWhs.

The idea of making a 1970 National Power Survey was in keeping with the suggestions of the 1964 Power Requirements Special Technical Committee which called for reviewing forecasts in the light of technological and sociological changes at least once every five years. Furthermore, the fact that the 1960s were a period of unusually rapid changes, both technological and sociological, made a new look at future power requirements particularly appropriate. Like the 1964 survey, the one made in 1970 relied on a consensus approach to forecasting. The Federal Power Commission staff produced regional projections for 1980 and 1990 which were submitted to the FPC's six Regional Advisory Committees for review and modifications. Some of the committees developed their own independent forecasts, while others merely revised the FPC estimates. These regional projections then were totaled to provide the national forecast.

Underlying the forecast were the usual assumptions to the effect that "during the period to 1990 the Nation would continue to enjoy a high level of economic activity, technological improvements in the electric utility industry would continue, a somewhat smaller proportion of national resources would be channeled to military purposes than during the 1960's, no disruptive epidemic or similar catastrophe would occur, and the Nation would continue to use electricity as an increasing portion of total energy consumption."

Some of the more detailed assumptions implicit in the projection included a real GNP of about 4 percent per year, the same as that adopted by the 1964 survey. Estimates of total households, a key determinant of residential requirements, called for a 1980 figure of 92.2 million as compared to 57.1 million in 1965. It was predicted that at the end of the forecast period these households each would have an average annual consumption of about 15,800 kWhs compared to 4,900 kWhs for the average household in 1965. Population was forecast at about 232 million in 1980, down noticeably from the 1964 projection, and at about 266 million in 1990. Though representing lower growth rates than past population estimates, these projections still could prove too high if the recent decline in the fertility rate continues. Finally, the survey seemed to take the advice of its 1964 dissenter and lowered the 1980 forecast of residential electric heating installations to some 12.5 million, a figure based on the assumption that 40 percent of new dwellings constructed in the 1971-1980 decade would be all-elec-
tric and that there would be half as many conversions as new installations. For 1990 the total was pegged at 24 million, assuming that 50 percent of new construction during the eighties would be all-electric and again that there would be about half as many conversions as new installations.

With regard to the space heating projections, I believe it should be kept in mind that these estimates were developed prior to the emergence of the critical supply situation of oil and gas. More meaningfully, it should be noted that in 1971 some 850,000 electric heating installations, both new and converted, were made. If the rate of additions does no more than hold constant at 850,000 per year for the years 1972 to 1980, there will be more than 13 million electrically heated dwellings by the end of the decade. This assumes, of course, that demolition of existing electrically heated dwellings will be nil, which is not unreasonable.

The net result of the 1970 forecasting exercise can be seen in Figure 8. Here the consensus forecast is set next to the initial PFC staff study estimates. The 1980 figure of 3.08 trillion kWh is some 10.2 percent above the corresponding value projected by the 1964 survey. In terms of growth rates, the 1970 forecast implies an average annual increase of 7.2 percent for the years 1970 to 1980 as compared to an average of 6.1 percent per year for the same period predicted in 1964.

For the years 1980-1990, the 1970 forecasters, like their counterparts in 1964, accepted the concept of a decreasing rate of increase. This is evident from Figure 9. They projected requirements in 1990 at 5.8 trillion kWh, implying an average annual rate of growth of 6.6 percent. However, they did explicitly acknowledge the possibility of continued high rates of growth, as is shown in the following quotation from the survey:

"Recognizing that available energy resources are finite and that the ultimate per capita use of electric energy has an upper limit, it is inevitable that the rate of growth in electric energy consumption eventually will decrease. There are too many imponderables, however, to predict the timing and magnitude of a much slower growth rate. For the period to 1990, the potential for increased use of electric energy appears ample to maintain a growth rate that will result in approximately doubling the use every ten years. If there is substantial realization of this potential, then the projection of electric energy production to 1990 . . . will prove to be too low."

To summarize, the 1970 National Power Survey did a good job of updating the general view of the electric utility industry's future by taking account of the many dramatic changes which were occurring in our national thinking during the 1960s. Some of the updating produced conclusions radically different from those of the 1964 survey, in particular with regard to the trend of electricity costs and prices and the appropriate levels for margins of reserves. Perhaps the only real shortcoming of the survey was that it was completed while many issues critical to the industry's future were still undecided. Although the new survey currently underway may see some of these issues resolved, the probability is great that many still will be unresolved when it is completed, which brings me to my final comments."
Effect of Future Governmental Policies

The general theme of this conference is forecasting under uncertainty. In the field of electric power, uncertainty appears to be increasingly certain, despite such comprehensive efforts as the National Power Surveys.

As electricity becomes an ever greater part of the total energy picture, it is receiving increasing attention from those concerned with the overall role of energy in society. The current preoccupations with the "energy crisis" and environmental protection have resulted in the use of electricity being singled out for special consideration in discussions of future policy options. To the extent that future governmental policies do focus on electricity, the task of the forecaster will become more difficult. He will be obliged to rely on judgment and speculation when trying to take account of the many possible impacts that policy decisions might have on future requirements. While it is not my purpose to comment on the energy debates now taking place, I believe it is worthwhile to cite a few of the major factors raised by these discussions which could affect future growth patterns.

First, there is the environmental question. Some suggestions being offered obviously would tend to inhibit the use of electric energy. Others, put forward by equally ardent advocates of environmental protection, would accelerate electricity use in order to concentrate the general problems of pollution at central station sites where they can be most easily monitored and controlled.

Second, there is the matter of energy resource conservation. Some proponents favor a reduction in the conversion of all fuels to electricity, and others advocate increased electrification as a means of tapping large reserves of energy which can be exploited only in the form of electricity, thereby conserving those fuels which are in short supply.

A third subject being considered, and one which is receiving general support from many quarters, is the possibility of improving the utilization efficiencies of electric equipment and appliances and legislating these higher standards. Although such measures almost certainly would reduce the growth of requirements in the short and medium terms, they ultimately might lead to increased consumption by making the use of electricity more competitive vis-à-vis that of other energy forms.

Finally, the growing reliance on imported energy with its attendant problems of national security and balance-of-payments effects has prompted suggestions to both curtail and increase the consumption of electricity. With regard to the latter alternative, a recent report by the National Petroleum Council described a case in which U.S. imports of petroleum could be reduced to zero by 1985 through a greater dependence on electric power generated from domestic coal and uranium.

These are but a few of the uncertainties which utility forecasters will have to keep in mind when deciding to what extent they can rely on the results of their statistical modeling and regression analyses. Until some consensus is reached as to the role we expect energy to play in our national life, questions like these can only complicate the work of forecasting.

Summary

This has been a very broad-brush treatment of
projections in the electric power industry, and details have been omitted which many would consider of primary importance. Among such details are appliance saturations, the growth of temperature-sensitive loads, and their reaction to cyclical weather patterns, the influence of zero population growth and the consequent "aging" of our society, the use of input-output models, probability forecasting, and the price elasticity of electric energy demand. Although space limitations have necessitated this abbreviated approach, I would hope that I have conveyed what I believe are the major considerations which should guide the forecasting of electricity requirements.

In simple summary, these can be stated as follows: (1) the need for an understanding of the underlying determinants of consumption growth which goes beyond their mere measurement; (2) a realization that electricity is still a minor factor in the total end use market for energy and that, consequently, the potential for high rates of growth may persist for some time to come; (3) the idea that both global and sector approaches to forecasting are valuable and merit being used jointly; (4) a belief that forecasts are best made relying initially on proven, measured relationships between consumption and major economic indices, with adjustments for anticipated additional factors made at a later stage; and (5) an awareness of the possible impacts of future policy decisions by government which could alter substantially the economic parameters affecting energy use.
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Utilities Forecasting Today: 
Some Comments

R. W. Greenleaf

These comments are addressed to certain interesting points raised by Mr. Burbank and Professor Schanz in their articles on forecasting in the electric and gas utilities industries. To round the subject out, the reader will want to refer to the articles on telephone company forecasts by Messrs. Bonsack, Casey, and Kolb.

To begin, let us look at three broad approaches to forecasting, all of which have been used with some success by utilities.

Local Survey

Local surveys are compendia of on-the-spot talks with customers, bankers, chambers of commerce,
local governments, and, of course, one's own local managers, anyone, in fact, in a position to sense intentions, commitments, and trends on the local scene. To the extent that any of my colleagues may understate or even overlook the local survey as a company tool, I think they are incorrect. For if the local survey approach to forecasting has its defects, it also has two great advantages.

First, when properly done, it can provide an extremely accurate volume forecast for the short run. How the short run is defined must be decided from industry to industry and situation to situation. For example, it might be on the order of a year for an electric, longer for a telephone, and perhaps only a few months for a gas utility.

Second, and even more important, it is the local survey that provides the basis for near-term resource allocation. That is, a utility's, or utility industry's, capacity needs and demand may have been pinpointed by other means; but just where within the service area (and in some cases when) the demand will arise becomes a matter for the local survey.

Of course, the great limitation of the local survey type of forecasting is its short-run nature. There are much better ways of looking further ahead, and when one is dealing with lead time requirements of three or five or even eight years for basic capacity planning, one had better use them. In addition, there is no little expertise required in putting local surveys together and making them useful. As one example of the insights needed, does anyone know of a good local manager or chamber of commerce secretary whose own estimates do not tend to err on the optimistic side? This is as it should be, in fact, but a planning group must allow accordingly.

R. W. Greenleaf

Extrapolation

Extrapolation, the mechanical extension of past trend lines into the future, is in no great repute these days. Let me defend it, for it has its uses.

First, let us do away with the idea of straight-line extrapolation based on some such simplistic mechanism as least-squares. I confess to a perhaps overly strong personal aversion to straight-line trending; the whole concept simply goes against nature. (I obviously do not refer to straight lines on logarithmic paper.)

The art of extrapolation, then, is the art of curve fitting, and no mean art it is. It can furnish surprises, too. Back in the fifties and early sixties, Britain's Central Electricity Generating Board had discovered that a family of exponential curves were giving consistently better results for five- to seven-year capacity planning than any other forecasting method. The curves were used with increasing confidence until, in the mid-sixties, it became apparent that, as then forecast, electric power alone was in ten years to exceed the nation's total power forecast—an obvious absurdity.

To me that story illustrates both the power and the dangers of forecasting by extrapolation. If used no other way, extrapolation remains a useful tool for checking or raising questions about forecasts made by other methods.

Econometric/Macroeconomic Models

From the elementary to the most complex and sophisticated, econometric/macroeconomic models are
the basic tools of modern forecasters, and I need say little about them. (For a good example of one such model see D. S. Casey’s paper elsewhere in this volume.) Some, and especially where accurate leading indicators can be employed, give phenomenally precise results. Most have trouble with turning points, and all, I believe, begin to be suspect when carried out to the number of years of capacity lead time required in some instances.

Why Is Forecasting Difficult?

Both Schanz and Burbank conclude that forecasting is becoming more difficult today, and the point I want to address is: Why? All methods except local survey are based on the record of the past (I include leading indicators in the statement because the correlations employed are the correlations which have worked in the past), and all methods perforce must use simplifying assumptions, as excellently noted by Schanz. When the underlying structure changes, when former relationships change or unconsidered factors intrude, the forecasts go awry.

I am convinced that right now—the decade of the seventies will see more basic structural changes, economically, than any recent decade that I am aware of. These will be exciting times, and, as historians tell us, exciting times are rarely comfortable. I am reminded of Charles Dickens’s words in A Tale of Two Cities: “It was the best of times, it was the worst of times.”

We already have seen a number of very fundamental structural changes since 1970, among them the devaluation of the dollar, some side effects of environmental protection measures (fuels shortages for one), and the natural gas supply crisis itself. Their effects continue to ripple through the economy and will continue to do so. Can we hazard, for example, that the dollar devaluations already have unleashed forces that will affect electricity demand two years from now? The natural gas crisis is another example. There scarcely can be anyone who follows these matters who did not foresee what would happen at least three years ago. But how many real forecasters took the actuality sufficiently into account? The fact is, as we increasingly are made aware, our forecasting models are essentially demand models, while today it is supply that has become the more important limiting factor for many industries. That in itself is a wrenching structural change.

For the balance of the decade I think we can expect massive supply situation changes, for good or ill, due to international developments, tax or regulatory shifts, new discovery, and the rest. Furthermore, demand changes and, most excitingly, technological breakthrough. Will ours be the decade of economical coal conversion, of cryogenic electric generation, or the long-awaited nuclear breakthrough? Surely use of the electric vehicle in cities will become more widespread and occasion a heavy additional electricity demand—unless the external combustion vapor engines being developed for the same purpose are even more widely used. Finally, we are in an era of increasing government intervention into the most basic economic matters. If anyone’s sophisticated mathematical forecasting model can predict what the FPC or FCC will do, it is a well-kept secret.

Utilities always have been constrained to look into the future. Their forecasters have developed ever keener ways to help them do this, and they will continue to do so. But I suspect that proven ways of today will be challenged increasingly.
More than ever, those who plan ahead must keep their options open, test their results more critically, be aware of how structural changes can affect the forecast. We all will have to sharpen our cause-and-effect kind of thinking, the sort of thought process by which one might have started last year with the facts of devaluation and a continuing trade deficit with Japan and worked through to the logical conclusion of higher meat prices at home. There is the crux of the matter; for as another panel member has suggested, we have entered an era when the assumptions of a forecast, including the implicit ones, have become more important than the methodology.

Validity of Natural Gas Forecasts: Comment

Donald A. Murry

Since I was asked to discuss primarily the article by Mr. Schantz, I will focus on it, but in many ways at least some of my comments, especially the more general ones seem to apply to Mr. Burbank’s article as well. There is considerable similarity in the thrusts of these two articles: They both are considering different manifestations of the same problem, namely, there are continuing, very sharp changes in the energy industry.

To the forecaster, as they both discuss, these changes are obscenecing many of his simpler tools and bringing about unsettling variations in the data he normally uses. In the simplest form, linear extrapolation or simple growth rates are no longer reassuringly dependable. Of course, the
forecaster's problems are even further complicated by uncertain institutional changes. There appears to be a strong thread of agreement between Schantz and Burbank concerning these problems; and I can only weave support and agreement into theirs.

In focusing on Mr. Schantz's article, in some respects my agreement only becomes more specific. The pervasive uncertainties in the gas industry probably will lead, as Schantz suggests, to conditional forecasts with built-in options. The consumer of such data therefore, will have the privilege of applying his own adjustments, based on his interpretation of events that lie beyond the skill or the willingness of individual forecasters. The trick in developing such forecasts will be in making them sufficiently flexible and still sufficiently precise to be useful.

Although this change in the forecaster's product is likely to be the one that users view, and consequently the one to which users will adjust, I do not believe, as apparently Schantz does, that the turning point of the natural gas industry has so much influence on this type of forecasting behavior. Of course, an industry based solely upon a depleting natural resource cannot produce without some upper bound, but that is not the real problem. The decline of the natural gas industry surely could be predicted with accuracy rivaling that of the predicting of its growth, in both MCF of gas produced and delivered and its price.

The problem of forecasting in the natural gas industry, it seems to me, and as Schantz argues as well, is associated with the general uncertainties in the energy industries. Of course, today these uncertainties are popularized under a broader heading, which is still virtually undefined, very emotionally laden, and labeled "the energy crisis."

Nevertheless, we can perceive the broad range of these uncertainties. They appear to revolve around a conflict among supplies, demand, prices, and environmental costs of the several energy sources. Until the simultaneous interrelationships that reflect producers' costs, supply prices, and consumer and voter attitudes begin taking form, the equations will elude careful econometric specification. We are truly at a state of major readjustment in the energy industries in general and the gas industry, in particular. But what should be more revealing to forecasters, it seems to me, is that now the assumptions are more interesting, and probably more important, than the methodology and even perhaps the results of the actual forecasts.

As a consequence, there may be a better prescription than merely conditional forecasts for the problems of forecasting in this environment. At least there may be a needed strategic refocusing of the options in forecasting, as opposed to the previous concentration on the methodological techniques of producing aggregate figures. These aggregate results may even be less important than previously. In my opinion, forecasters, at least for the short term, should spend more time on their assumptions, and they should carefully delineate the policy alternatives and the prices of competitive fuels.

Not surprisingly, the major uncertainties of forecasting the supply and demand of the attractive natural gas, when measured in terms of environmentally acceptable BTU's, are future governmental policies. Predicting the outcome of only some of these policies is a major undertaking in itself. A few of these policy uncertainties emerge on the demand side. For example: will the proposed secondary environmental standards be enforced by the states? If so, when? The uncertainties probably
are even more confounding on the supply side. For example: What will be the role and prices of the alternative primary fuels such as oil and coal? There is special interest, and associated uncertainties, in policies to expand gas production. Recalling last week's energy message by President Nixon, for example, what is the likelihood and the likely effect of expanding off-shore leasing in both area and depth? What will be the production and price effects of adding the expenses of drilling to the investment tax credit if that is accomplished? Or the deregulating of well-head prices? Or the lifting of oil import quotas? Over the longer range there are more uncertainties. What will be the policy and scientific likelihood of developing near-substitutes such as gasified coal and not-so-near substitutes as nuclear power? If these are developed, what will be their prices?

When the validity of the major underlying assumptions is more interesting than the numbers generated in a forecast, it should suggest, it seems to me, that the forecasters may need to rethink priorities and objectives. The rationale, which indicates something about the likelihood of such events occurring, should be associated with the major policy and scientific economic exigencies. Of course, a more complicated model can account for these "what if" conditions and provide estimates taking various combinations of events into account. That is one alternative solution; it is probably the long-range objective for forecasters. But pragmatism precludes our hoping for such models for much useful exercise at least in the near future, and now is probably when we really need them. There are, however, short-term, more feasible objectives for forecasters.

First, as a minimum, the rationale for the forecaster's assumptions under these present circ-

stances and the details underlying the deviation among forecasters must be clear. An ability to re-
late and piece together many specific forecasts is more important.

Second, there is clearly much room for improving the data used in forecasting. On the demand side, there is a strong likelihood that more detailed data for small geographical areas, such as census tracts, can be used for forecasting peak and off-peak demands. In my opinion, combining data among cities offers new possibilities for understanding residential demand. Forecasters, of course, should use the best data and technology available to them. Furthermore, there is still discontent over the volume data of reserves; but, unfortunately, the National Gas Survey is unlikely to quiet this discontent. In that vein, altering the process of natural gas data collection so that it satisfies a larger constituency may be the single most important policy influencing issue in natural gas forecasting, although it appears beyond the scope of this discussion.

In summary, it seems to me that in the past the forecasting of gas consumption has hinged on the forecasting of gas demand. This forecasting simplification appears very plausible for an attractive fuel that grew from a by-product of oil, with some lifting values in the oil field, into a major industry. But the present forecasting of gas consumption requires insight into very complicated supply, demand, and institutional interrelations, including even politics.

My reading of Schanis's article is enough to convince me; I would hope, however, in addition, forecasters would go beyond the problems that these new uncertainties cause them methodologically. I hope that forecasters, in a reasoned, organized way
attack these uncertainties as well and attempt to explain the ramifications of the policy choices.

Remarks

Reed Reynolds

We certainly have been provided an excellent summary of what has been and is going on in the area of forecasting of energy requirements. I noted that the topic of this conference is "New Challenges to Public Utility Management." Forecasting in the electric utility industry does provide new challenges, and I would like to speak briefly about one particular challenge that I consider to be the most important one presently facing forecasters.

It is true that today we are in a different ballgame, and the past technique of "up the trend line" may or may not be appropriate. I say "may or may not" because all forecasting techniques with which I am familiar lack a dimension that goes
right to the heart of the problem, and that problem is the price elasticity of demand for power. The principles of supply and demand still apply in a general way, and I would like to describe the forecasting problem, as I see it, in those terms.

First, we are all familiar with the problems of supply: If there is to be a supply of electric power, it is going to be considerably more expensive than in the past. I am assuming that the supply will be there one way or another. Those of us who are so inclined are praying quite a lot these days. But it is going to be a more expensive supply: We turned the corner on declining incremental supply costs some time ago, and the outlook is up, up, up. So much for supply.

Second, how will the ultimate consumers of electric power respond to higher power prices? Apparently, no one knows. So long as rates were reasonably stable or even declining, this was not an important question. But with incremental costs running ahead of average costs of delivery, this is a large issue, and I have yet to set my eyes on a study that answered this question in any relevant way.

An associate of mine in Cleveland was asked how far into the future his company's forecasts extend. His response was: "We have a rule that we never go beyond two inches." That is probably not a bad rule to follow, but regardless of how one arrives at the two inches, something, either implicit or explicit, is being assumed about the elasticity of demand.

I have a feeling that coefficients of elasticity are quite low for many classes of service. That is, there is probably not much response from consumers in terms of usage as supply costs are increased. If that is true, the use of extrapolations perhaps still would be in order. As I said before, it is my belief that this problem of elasticity is the most difficult challenge facing forecasters today. Many of you are in positions to tackle this problem, and I am pleased to have this opportunity to encourage inquiry along this line.

The Edison Electric Institute is in a position to encourage this type of inquiry within the industry through its research formula and by other means. I have long had the impression that the EEI's focus has been too engineering oriented and that it is time to change that focus somewhat. The Public Utilities Institute also is in an excellent position to encourage such research, and perhaps it can channel more of its resources into this area. Hopefully, the PUC is working in this field; if not, I hope they will begin.

My final comment on the price elasticity of demand is in the form of a caveat for persons interested in this whole area. There are emerging numerous studies that attempt to measure consumer response to rising power rates, but I reiterate that I have yet to see anything of any relevance along this line. My advice is to use extreme caution when viewing studies of this type. It is an extremely complex, yet absolutely necessary area for exploration, and that is why I consider studies of this type to be the most important challenge facing forecasters today.
PART III

Impact of Competition on Communications Carriers

Chairwoman:
Jean S. Brandli
President
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Marketing Functions in Telecommunications Under Conditions of Growing Competition

Samuel E. Bonsack

This article will discuss competition in the telecommunications industry and its impact on the development of the Bell System's marketing tactics and strategies. Such competition is not new. The Bell System periodically has been confronted with competition in most of its markets and generally has responded with a vigor of intellect and initiative supposedly atypical of monopoly enterprises. The Bell System today is well equipped in terms of its capacity for both technological and marketing innovation to prosper in any genuinely competitive environment.

Nevertheless, the ability of the Bell System to compete is an issue totally peripheral to the effect competition may have on the structure of the common carrier industry and the future of telecom-
Communications services in the United States. The telecommunications industry is being opened to what is purported to be full and intense competition with neither the assurance that the virtues classically attributed to true competition will, in fact, ensure that the forms of competition that will develop will not amount basically to market division or government-sponsored cartelization of specific markets.

Early Competition and the Evolution of Pricing Concepts

Early competition in the telecommunications industry can be briefly, if somewhat summarily, disposed of in two sentences. Between 1876 and 1913, there was fierce competition over the patent rights to the telephone itself and then over territorial rights to operate telephone companies. The acquisitive propensities of the Bell System alarmed the Justice Department, and in 1913 AT&T agreed that the Bell System would not seek to absorb other telephone companies and would interconnect its long distance lines with the local and regional facilities of independent telephone companies.

Since that time, at least until the relatively recent past, the Bell System has been organized, operated, financed, and regulated essentially as a monopoly enterprise. It should be pointed out, however, that the Bell System always has experienced competition in almost every aspect of its business except in specific services and prices. It has had to compete in acquiring labor, in buying supplies, in obtaining a share of disposable personal income, and in attracting the new capital required to expand plant facilities.

Historically and today the Bell System has understood that what has been determined as the public interest is best served when high equality and reliable communications services were universally available to all users at the lowest possible cost consistent with the financial integrity of the business. The pricing of services has been based on an averaging of costs, and the rate structure of the telephone companies reflects a variety of economic and other considerations that are deemed by the regulators of the Bell System to be in the public interest.

In brief, two basic tenets of public policy have shaped the structure and prices of Bell System services. First, of course, was the goal of universal service available to all at the lowest possible price consistent with financial safety, supplied under conditions of government regulation and high barriers which reflected the public interest as determined by the regulators, the avoidance of social discrimination in prices to all customers for particular service offerings.

Both of these tenets of public policy imposed on the industry normative criteria which, by any reasonable measure of effectiveness, have benefited the public. For example, single entity, subject to regulation, has had the responsibility for the operation, repair, and maintenance of facilities used in providing end-to-end service. Each segment of the nationwide communications network has been engineered to achieve, under common control, the optimum end-to-end service and its related costs. Finally, communications services have been offered in many areas at prices that are justified only through the use of averaged costs or through the deliberate support of one area by another. In other words, as a common carrier the Bell System has been obliged to serve unprofitable regions of the nation and less affluent sections of its population; those more favorably situated from a cost viewpoint have compensated for the attendant shortfalls in revenues. Nonetheless, the overall social
An entire service is considered important enough to risk incurring what would be considered by some to be a misallocation of resources.

The newer and more recently discussed concept of avoidance of economic discrimination is not reconcilable with the older public policy that emphasized public interest criterion of avoidance of the social discrimination. This irreconcilability is implicit in the definitions of the two concepts. Social discrimination exists whenever two buyers pay two different prices for what seems to be the same service or product. Economic discrimination exists whenever a seller incurs different costs in offering two different buyers what seems to be the same product or service at an identical price.

In the real world of dynamic technology, there are as many different "actual" costs as there are customers. The only time the two criteria of non-discrimination can converge is in the theoretical case of static costs, uninfluenced by location or volume, with no technological advances allowed. In this theoretical case, economies of scale not only are inoperative but also must be excluded from the analysis. If they are allowed, or if technological advance occurs, the conflict between one or the other type of discrimination must emerge.

Some argue that the existence of many small suppliers amassed in the provision of communications services is a guarantee of efficiency and low cost. They assume that there is no distinction between the most efficient system of producing goods and services in the engineering sense and the system that provides the most immediate competition.

In Adam Smith's world, or in the world of his perfectly competitive "model," no such distinction would have been meaningful. Men, in pursuing their own profit in a competitive market, necessarily maximized the social benefit. Adam Smith's economics are interesting from a theoretical point of view and provide some insights into or at least some standards used by those economists who came after him. But his economics rested on premises that are not always relevant to the world of modern technology. Smith's premises implied a technology relatively efficient in small sizes, so that a firm slightly larger than the average would not have an automatic advantage which would allow it to grow still larger. Smith understandably did not envision a situation in which technological changes occur so frequently that a state of equilibrium never is attained, at least not the static, perfect competition stability postulated by Smith.

It would seem obvious, then, that in assessing the public benefits to be derived from systematized market fragmentation it is of first importance to begin with the fact of technological innovation and ask how the proposed system would deal with it. This is a question more or less scrupulously avoided by those who wish to enter the telecommunications industry on a "protected" basis. If it is answered at all, it is answered with an assumption: Any form of competition automatically accelerates the pace of innovation in all industries, regulated or not.

I recognize, of course, that in these observations I have lapsed into outright advocacy, and I have defined a position that would be more apposite to a competitive environment in which there had been no explicit confrontation in the telecommunications industry between the two norms of avoidance of social discrimination and avoidance of economic discrimination. That confrontation has been suppressed in the past by the conditions of barrier to
they had control over the quality, installation, and maintenance of the individual piece parts that make up the network. The Bell System’s response to the Carterfone decision was to file tariff revisions in 1969 permitting direct interface of terminal equipment with the switched network through a connecting arrangement provided by the telephone companies. A further requirement was that network control signaling functions be performed by equipment furnished, maintained, and installed by the companies. These tariff changes accomplished the goal of opening up the network under conditions which protected the network and employees from harm.

Since 1969 there have been pressures to remove the restrictions regarding connecting arrangements and network control signaling units. A study conducted by the National Academy of Sciences for the FCC concluded that uncontrolled interconnection of customer-provided equipment could cause harm to the network, but that a properly authorized program of standardization and properly enforced certification of customer-provided equipment, installation, and maintenance was technically feasible.

For some time now, the FCC has been exploring the technical feasibility of certification, and the Bell System has been and is participating fully in this inquiry. We have made no secret of our concern about the long-term consequences of the division of responsibility for service that a system of certification would entail. We also are concerned about the consequences in terms of added costs to the average customer, who, sooner or later, would have to meet the revenue requirements that no longer would be met by customers who choose to own their own terminal gear. In other words, would a
certification system benefit a few to the detriment of the larger body of customers?

From a quality of service viewpoint it is difficult to perceive how customer ownership of pieces of the switched network can improve service or reduce costs for the average customer, who relies primarily on end-to-end service provided by the telephone companies. On the contrary, when customer-owned equipment is not maintained at the proper levels of performance, the users of the network are affected adversely. In addition, a division of the responsibility for maintaining end-to-end service must by its very nature increase the expense and time required to locate and repair troubles in the network, and this is disadvantageous to customers who look to the telephone companies for complete communications services.

It also appears clear that the expenses associated with the implementation and enforcement of any standards and certification program cannot be evaluated until the features of the program are determined. These expenses, of course, should be considered in making any decision regarding such a program.

This is not to say that we are ignoring or opposing the concepts embodied in the tariff revisions filed in 1969. We have permitted and will continue to permit the attachment to the network of terminal equipment that is privately beneficial but not harmful to the public. In addition, we will continuously evaluate the design of the network protection and signalling units provided by the telephone companies in order to reduce the costs of these units to the lowest possible level. It is my belief, however, that the choice is between benefitting those who rely on end-to-end service (and that category includes the vast ma-

majority of telephone users, especially single-line residence and business customers) or those who seek to piece out the network, it is in the public interest that attention should be directed primarily to those who rely on common carrier end-to-end service.

Marketing Response: Terminal Market

Naturally, it would be self-defeating not to recognize and respond to both immediate and prospective competition in the terminal equipment market. In this section I will describe the general thrust of our existing and planned response as well as provide specific examples of how that response is being and will be translated into specific service offerings and repricing activities. The areas to be covered include: data communications; flexible payment plans; maintenance payment option plans; usage sensitive pricing; a three-element charge for installing, moving, and changing terminal equipment; the PhoneCenter concept; the "Save and Save" program; and the Denver PBX facility. A few brief observations about the Bell System's overall competitive strategy and tactics will be made first.

The Bell System has begun to move purposefully toward a new vision of its future and, without question, toward a different but no less significant role in the communications market. Fortunately, there is nothing equivocal about our policy with respect to competition: We will compete. Whether we or further competition evolves as a consequence of explicit market segmentation or simply develops into an open entry free-for-all, we do not intend to surrender markets we can serve well and profitably.

We have grown and we have prospered primarily
as a monopoly. We are still largely a monopoly. It is hardly surprising that our traditional management methods have tended to focus chiefly on the obligation of a regulated utility to satisfy the demands of all customers at reasonable rates and to stimulate the demand for better service. We will not default on that obligation. We always have been a service-oriented business, but we are determined that the Bell System will be a marketing-oriented business as well.

In a competitive environment, marketing will become the main spring of those portions of our business that are open to competitors. If genuine competition among carriers and among terminal equipment vendors is to be the future of telecommunications in the United States, then we are prepared to embrace fundamental change because the rules of the game will have been basically altered. We have made several determinations concerning our competitive initiatives. Because we believe there is more than a suggestion of truth to the old adage that he who teaches himself has a fool for a master, we have asked the management consulting firm of McKinsey and Company to evaluate the validity of our determinations.

The determinations we have made for ourselves are simply stated: (1) We are determined to master the art of managing product and service development in a competitive environment. (2) We are determined that we will not permit ourselves to be crippled by capricious or arbitrary political decisions or by monopoly-oriented regulation. (3) We are determined to make explicit distinctions between monopoly services and competitive services. (4) We are determined that the users of our monopoly services will not be burdened by our participation in competitive markets. (5) We are determined to develop a successful marketing strategy, the plans to fulfill it, and the measurements to track it.

As the vice president of market and service plans for AT&T, I am confident that the strengths of the Bell System, properly focused on meeting the marketing requirements of this decade, will form the foundation for outstanding service and profit performance in the new competitive environment. Perhaps I should explain my optimism. Sustaining a competitive position in the communications business or in any other science-based industry demands a systematic and sustained approach to research and development. It is to this kind of approach to technological innovation that the Bell System has been committed virtually from its origin.

Some of our technological advances are very small, such as the cost saving of a few pennies in the manufacture of a telephone, a saving that, multiplied by the millions of phones made every year, can have real significance. Some are large and have implications that are truly astonishing, such as the invention of the transistor at Bell Laboratories only twenty-five years ago. This broad coverage of the advancing front of communications technology combined with our determination to match technological innovation with marketing innovation constitute my reasons for confidence that the Bell System will give a good account of itself in today's increasingly competitive environment. I will not reinforce that remark by describing some of the specific service offerings and repricing activities that are reflective of the Bell System's response to competition.

Data Communications

Several prospective competitors, most notably Datran, have announced plans to establish digital data networks. For more than a dozen years, the
Bell System has used an economical system for distributing voice signals throughout our local exchanges. The system, a short-haul digital carrier called T-1, combines 24 voice-grade channels into one 1.5 megabit stream. It not only has proved to be an efficient vehicle for moving telephone calls but also has served well as the end link for some of our voice-grade and wideband data services. There are 17 million miles of T-1 carrier in place, and new facilities are being installed at the rate of 10,000 channel-miles a day.

We have recognized for some time that this type of digital carrier has great potential for data transmission. What was needed was sufficient demand to provide the proper fill for a 1.5 megabit stream. A digital highway to interconnect local distribution points also was needed, and the essential elements are now available: sufficient demand and sophisticated technology.

A Digital Data System has been developed that will create an entirely new operating environment for system designers. It will offer end-to-end services operating at the synchronous speeds of 2,4, 4.8, 9.6, and 56 kiblits per second. Service over the system should be available in five metropolitan areas in early 1974. The system will be expanded to include 24 cities by the end of 1974, 60 cities by 1975, and almost 100 cities by the end of 1976. Applications to construct facilities to serve the first five cities already have been filed with the Federal Communications Commission.

One of the principal building blocks of the Digital Data System will be a new intercity transmission network developed by Bell Telephone Laboratories. This system is called Data Under Voice because the digital signal rides on frequency bands below those normally used to transmit telephone calls. A field trial of Data Under Voice will be held in late 1973, and will be ready for its initial application in our Digital Data System between New York and Boston by January 1974.

I mentioned that the Digital Data System will mean a new operating environment for data users. What data users want is a communications system that is a relatively error-free, efficient, and economical method of moving information from one place to another, usually between a terminal and a computer or between one computer and another. The Bell System's Digital Data System will provide a highly reliable end-to-end service for applications where voice is not a necessary adjunct to data transmission. By using quality-monitoring techniques and automatic restoration features, we will, in a figurative sense, enclose the system in an envelope of protection extending from one network station to the next. Special testing capabilities will assure quick trouble diagnosis and rapid remedial action.

The objective we have set for ourselves is end-to-end service with no more than one error-second in 200 seconds of transmission at 56,000 bits a second. Performance at lower speeds will be even better. Overall, a throughput efficiency of 99.5 percent is expected, which could mean an error rate of one bit in every 10 million bits transmitted.

In terms of transmission availability, our objective is an average downtime of three to four hours per year. Concerning maintainability our objective is to minimize the probability that a single outage will exceed two hours. This objective recognizes the perishable nature of some data and the increasing impact on a customer's operation as an outage continues.
On the terminal side of the data communications market, we are now in the process of refining the existing product line of 75 different data sets and of applying resources to the development of terminals that offer the greatest potential for customer satisfaction and Bell System profitability. We believe that by focusing attention on the market for high and medium-speed data sets we can develop a limited number of sets — perhaps a baker’s dozen — that will meet the needs of most of our customers most effectively and most economically.

The realignment of product line and redefinition of some priorities for data transmission services require concomitant realignments and redefinitions of corporate support for data planning. In recognition of this, plus the fact that the data market is by far the fastest growing segment of the telecommunications industry, in 1972 a new division at AT&T was created to centralize data planning and support activities for the entire Bell System — the operating telephone companies as well as Bell Laboratories and Western Electric. The responsibilities and functions of this new division, the Computer Communications and Data Services Division, run the gamut from assuring the responsiveness to customer needs and expectations of our research, development, and manufacturing units to preparing market and service plans and rates and tariffs. The digital data services and data terminals. We believe that these well-advanced plans for a digital data system and the decision to bring under one umbrella the functional responsibility for marketing digital services and data terminals will result in better performance for our customers and a stronger competitive position for the Bell System.

Flexible Payment Plans

On the basis of extensive market research and customer preference studies, the Bell System is experimenting with new ways for customers to pay for their telecommunications services. The Flexible Payment Plan has been structured to satisfy customer needs by providing full or partial prepayment options (25 percent minimum); lower monthly charges; sizable discounts (up to 46 percent) from cumulative tariff level billing; variable periods of 5, 7, 10 and 15 years; a rate stability option for 5 years; and terminal equipment applications. This plan, along with modifications introduced by the local telephone companies, will enhance our competitive position in the terminal equipment market and help us retain revenues from the business sector. Retention of these revenues is fundamental to our efforts to maintain at reasonable levels the charges paid by the general body of residence customers for basic exchange service.

The plan also provides customers with the payment options some have requested. One feature of most such plans is the rate of stability clause that insulates customers from rate increases for the first five years of the payment period. During this stability period, customers who discontinue service forego any refund that might accrue through prepayment. The provision protects the telephone companies in a "down" economic cycle since customers will be hesitant to cut back on prepaid equipment and service plans and rates and tariffs. The availability of optional payment periods as long as 15 years also should help the telephone companies achieve longer location lives for terminal equipment without inhibiting desirable design changes; this in turn could limit the inward and outward movement of terminal equipment and facilitate a more efficient utilization of investment. The prepayment options of the plan also provide an incentive for customer money to enter the business more rapidly. In this way the Bell System as a
whole will be able to increase the internal funds available to meet construction budge demands and lessen the current heavy dependence on the debt market for capital requirements. Flexible Payment Plan trial tariffs are effective in three Bell System companies and pending in several others.

Maintenance Payment Option Plan

Over the years the Bell System has included maintenance charges as part of the basic monthly rental fee. With liberalized interconnection policies and the resulting competition for communications services, a change in maintenance pricing clearly was indicated. The Maintenance Payment Option Plan (MPOP) was developed not only as a competitive necessity (private suppliers offer a number of optional plans) but also as a response to stated customer needs. Market studies showed, for example, that although business customers prefer Bell maintenance to that of other suppliers, many of them desire payment alternatives rather than the present all-inclusive arrangement.

With MPOP, new and existing customers may select the payment alternative that most closely matches their current financial situation as well as their projected repair needs. New customers under MPOP initially would receive a one-year, full coverage warranty. The options are the Monthly Plan, nearly identical to the traditional plan; the Contract Plan, by which the customer pays maintenance charges for one year, with reduced billing because of the time value of money, and which includes a rate stability clause; and the Per-Visit Plan, in which billing is based on a per-visit repair visit. The offering of optional maintenance pricing plans by the Bell System will enhance our competitive position by allowing more realistic price comparisons to be made when competitive pre-

posals are encountered. Trial procedures have been developed, implementation is underway, and current plans call for testing the MPOP concept in late 1973.

Usage Sensitive/Value of Service Pricing

The flat or measured methods of charging for local exchange service have been under review for some time at AT&T. A study completed in 1957 concluded that there were "no compelling reasons to be moving in the direction of either flat or message rate service." During 1970 the methods again were reviewed by a study group, and a more definitive position emerged. The study indicated that the Bell System should move toward usage sensitive pricing. Many regulatory commissions have expressed interest in the appropriateness of adopting a "user pays" philosophy in the provision of basic exchange service, particularly since the charges of most other utilities are keyed to usage.

Now the Bell System is moving in this direction, or, perhaps, is seeking the right direction, through the use of cost models, extensive customer usage surveys, studies concerning the effects of rate changes on customer calling habits, and basic market research. In effect, we are attempting to develop a usage-related rate structure that is both equitable and preferable from the customer's point of view.

A classic example of an imbalance that could be corrected through the application of usage sensitive pricing is directory assistance services. It is estimated that about 80 percent of Bell System customers make fewer than five calls to directory assistance each month, and that 3 percent of our customers make more than 50 percent of all calls to directory assistance. Calls to directory assistance
have increased 54 percent over the past 10 years, from 2.5 billion to 4.6 billion annually. In addition, the operator costs involved in providing directory assistance service over the same period have risen from $95 million to $350 million annually. Charging for directory assistance is a means of controlling the rising costs of providing the service, not a vehicle to increase revenues. We believe it would be more equitable and preferable to place the burden of paying for the service directly on those customers who use it most. In other words, charges for directory assistance service should be usage sensitive and should not be applied uniformly, as they are now, to all ratepayers.

The Three Element Plan

The general purpose of the Three Element Plan is to assure that customers who generate the highly labor-intensive costs of installing, moving, or changing telephone equipment actually pay the costs rather than other ratepayers. More specific reasons include the need to reduce or eliminate the revenue shortfall that is directly attributable to station connection activity. This shortfall is aggravated by increasing labor costs and by the "churning" of station equipment. In 1972, for example, the Bell System had to install six telephones to register a net gain of one. It has been estimated that if the telephone companies were to expense rather than capitalize the labor costs associated with establishing or retracting service connections, and if these nonrecurring costs were recovered quickly through compensatory charges, total Bell System capital requirements could be reduced by as much as $1 billion annually.

There is another reason, perhaps less compelling at present than it may become in the future. Prospective competitors in the terminal equipment market will place out the labor costs associated with service-order processing, inside wiring, service connection, and so forth. In a genuinely competitive environment, the Bell System would expect and probably would be required to establish fully compensatory (competitive) station connection charges in fairness to all customers, those who remain at one location for long periods as well as those who move frequently.

The Three Element Plan, which will help the Bell System achieve these and other objectives it has set for itself in the terminal equipment market, includes the following: a service ordering charge, associated with receiving, recording, and processing customer information and, where required, traveling to the customer's premises to obtain that information; a central office access charge, associated with work on the line extending from the serving central office to the customer's home or business; and an on-premise work charge, associated with the installation, movement, or change of terminal equipment and, where necessary, the provision or modification of inside wiring.

What's Now

The PhoneCenter represents an entirely new approach to making service available to residence customers. It allows the telephone companies to provide faster service at lower cost and improves their ability to sell and sell products and services. PhoneCenters may be regarded as supermarkets where the telephone companies display their full line of residential terminal equipment in all colors and all models.

Customers browse among the phones, make their selections, have their orders filled on the spot, take the instruments home, and plug them in for
instant service. The only requirement for PhoneCenter operations is that the customer’s premise be equipped with jacks, and a reasonable number of jacks is furnished without charge. The cost of providing the jacks is offset by subsequent savings: Since customers connect telephone instruments themselves, the telephone companies are able to reduce the labor costs associated with station connection service. This reduces the upward pressure on revenue requirements in general and on service connection charges in particular by eliminating the need for most plant visits to customer premises.

The concept also helps hold down basic service rates by improving vertical service sales. The development of both premium instruments and TOUCH-TONE is greater in a PhoneCenter environment through the use of such improved merchandising techniques as self-selling telephone displays and face-to-face customer contacts. The jacked environment required for PhoneCenter operations gives the companies the opportunity to market a diversified product line without being concerned about the need to fill an enormous hardware pipeline.

Currently there are 17 PhoneCenters serving areas of high customer density, with many new locations in the planning stages. Customer reaction to the conveniences implicit in the concept has been extremely favorable. In addition, company employees develop a greater sense of proprietorship in the business through closer contact with the customer and by virtue of their ability to function in a wider, more enriched job environment.

**Take and Save**

The loss of telephone sets is a serious problem for the Bell System. Some sets are lost on customers’ premises after service is discontinued. To minimize this loss, Bell System policy is to remove 90 percent of the sets within 30 days and retrieve the balance in the next 60 days. A new approach to set recovery—Take and Save—reinforces this policy and, to the extent that customers take advantage of the option, the telephone companies save on station visit costs. More rapid turnaround of instruments results in more efficient inventory utilization and helps lower the upward pressure on revenue requirements. For customers discontinuing service, the plan provides for a credit on their final bill (generally $5) if they cut or unplug the mounting cord on all eligible sets and either take the instruments to their new residence or bring them to a designated collection point. Almost all Bell telephone companies either have introduced Take and Save or are testing the plan in selected cities.

**Denver PBX Facility**

Prior to filing its revised interconnection tariffs in 1969, the Bell System had completed plans for the construction of a large facility that would bring under one roof the Bell Laboratories, Western Electric, and AT&T people responsible for designing, making, and marketing PBX’s. Located in Denver and in operation since 1970, the facility as well as the concept that underlies it already has proved its value in improving the Bell System’s competitive position in the highly competitive markets for PBX units.

Under previous arrangements, the lag between concept and production averaged six years. At Denver, this interval has been shortened to one year or less. In its first year of operation the Denver facility brought three new PBX’s from design to production. One was a modular-design electronic unit that permits growth from 40 to 270 lines. The sec-
and was a 57-line, 12-trunk unit for small and medium sized offices. The third was a compact unit aimed specifically at the hotel-motel market where competition has been particularly marked.

Emerging Competition: InterCity Services

While the Rush-a-Phone and Carterfone decisions dealt with competition in the terminal equipment market, a recent landmark decision has created the potential for intense competition in the market for intercity private line services. In 1971 the FCC decided that a new breed of "specialized common carriers" (SCC's) would be allowed to compete with the Bell System and other common carriers for the private line business.

Before discussing the implications of this decision, one basic fact should be understood. There is an essential difference between the circumstances under which Bell and the SCC's can offer service. The Bell System offers services on a nationwide basis and is bound legally to provide service to anyone in its service area. The SCC's do not have such a broad obligation since they have undertaken to serve only a few customers in certain cities on selected heavy routes.

The SCC's, now in or entering the market have begun offering service or have announced plans to do so, which clearly indicates that they will concentrate their service offerings in those segments of the private line market where high capacity (and low cost) facilities such as coaxial cable and microwave radio can be used. Their rates will be lower than the Bell System's present rates because their's will reflect the lower costs of providing service on high capacity facilities, while Bell's reflect the averaged costs of providing service or both high and low capacity facilities. As already men-

tioned, Bell must provide those services.

The inevitable result would be to leave the low capacity (and high cost) part of the private line business to Bell, which would have a profound effect on the Bell System's overall interstate revenues. It is estimated that by 1976, if Bell's private line rates are not changed, the system will lose to competition more than $200 million in annual revenues. This loss of business, of course, would be accompanied by approximately $100 million in cost reductions in salaries, equipment, maintenance, repair, and so on, but it no longer would be required. The net effect would be the loss annually of a $100 million contribution to the overall earnings of the business. This loss would mean that the revenues derived from other services, principally interstate message telephone service (long distance), would have to be $100 million higher on an annual basis by 1976 than otherwise would be necessary.

The Bell System has proposed to the FCC that it be allowed to change the way in which its rates are set so that they reflect more accurately the costs of providing service. The FCC already has noted the possible need to change the rate structure: "Where services may be in direct competition, departure from uniform nationwide pricing practices may be, in order, and in such circumstances will not be opposed by the Commission."

In planning a new private line rate structure, the Bell System has set as its objectives: The rates for different classifications of private line service should reasonably reflect the cost of the facilities used in providing such services; rates should be reasonably competitive; rates should be fully compensatory; the new private line rate schedule should not tend to increase the present
level of rates for other interstate services or to burden them in any way; and there should be no undue increases to those private line customers whose rates will go up.

To achieve those objectives, the Hi/Lo Plan has been devised. It retains much of the simplicity of nationwide averaging, but also brings rates for voice grade private line services more in line with the cost of providing them. Instead of averaging across the board, rates will be averaged for two categories of service with very different cost characteristics. The first is high density routes on which the unit costs of providing service are relatively low. Telephone plant facilities used here include high capacity coaxial cable and microwave radio. The second category is low density routes on which unit costs are relatively high. In general, the plant used would include low capacity carrier facilities and short-haul radio, although there are some high capacity facilities in place on low density routes. This new rate structure will allow Bell to vie with the specialized carriers in the high density market since costs will permit prices charged to be reasonably competitive. In the low density market, customers will pay charges based on averaged costs of providing facilities needed for the service. Although many of these rates will go up, they will not increase unreasonably.

There is a final important point to be made. While Bell proposes to be competitive, it does not propose to try to run the competition into the ground by introducing loss leaders. The new rates are compensatory in that they will not burden the users of other services. We recognize that under competition we may lose some of this business, but our aim is to limit that loss, not keep all the business. Lessening the effect of competition would ensure that the business retained continues to make a significant contribution to overall earnings, which would avoid a serious impact on the rates of other, and far more numerous, customers.

Conclusion

I trust that the preceding discussion does not in any way imply that the Bell System abhors or fears competition. It does not. The Bell System can and will give a good account of itself in competitive markets. However, if I would suggest, as did Vannevar Bush several years ago, that there traditionally have been two forms of industry in this country: active competition and regulated monopoly. Both are necessary and beneficial. I merely would remark that now that we are mixing the two inextricably, we should pause long enough to provide clear and supportable answers to a variety of questions.

For example: Is competition in the telecommunications industry to be a form of regulated competition, or will equipment manufacturers be given the option of adjusting prices in response to demand while the common carriers—with filled tariffs covering the prices of comparable equipment—are forced to seek regulatory approval of price changes and thus incur the anticompetitive penalties of regulatory lag? Equally as important: Will standards of service reliability, convenience, and safety apply equally to noncommon carriers as well as to regulated common carriers? Finally, while there would appear to be economic advantages inherent in opening certain communications markets to competition—as illustrated by a wider range of products and, perhaps, prices—are advantages that satisfy the norms of economic theory necessarily responsive to societal needs and priorities?

For the sake of argument, let us assume that

Samuel E. Bonack
all aspects of the terminal equipment market, including inside wiring, are declared to be fair game for all competitors. It would follow, then, at least from the standpoint of competitive economics, that the common carriers would be compelled to set a fully compensatory price on providing access to the switched network. Under these circumstances, it is not inconceivable that classes of people, particularly the poor and those living on fixed incomes, who today can afford telephone service would, in effect, be priced out of the market. In short, I would argue that it is necessary to test the validity of any proposed rearrangement of the telecommunications industry against the only criterion that is proof against error of fact rather than theory, namely: "Is this proposal really in the public interest?"

Notes

1. It may appear self-serving to make this statement, but the "response" to Carterfone was in the process of being developed long before the Carterfone case became an issue. In actual practice, the Bell System as early as 1958 had permitted the direct electrical interconnection with private line facilities of customer-provided data terminals and, in 1968, the connection through data access arrangements of customer-provided data terminals with the switched network.

2. I should remark parenthetically that the Bell System is not a newcomer to data communications. For example, in the mid-1950s we filed tariffs that offered a family of private line data services and the included provisions for varying degrees of special channel conditioning required for digital data transmission. Moreover, in 1958, through the introduction of DATA-PHONE Service, we opened up the nationwide switched network for data transmission.
Marketing and Planning Problems
Confronting Independent Telephone Companies

D. R. Casey

Obviously, the problems of marketing and planning in the independent telephone industry have a great deal in common with those faced by the entire communications industry and, for that matter, industry in general. The differences lie only in the intensity of the problems and the importance assigned to them.

As are other utilities, the independent telephone industry is faced with a rising tide of consumerism and ecology, accelerating technological change, and a persistent regulatory lag which demonstrates the reluctance of the public to recognize the critical impact of inflation on a highly capital intensive business. To this list of major concerns, a new element must be added: competition.
A great deal of time could be spent in discussing the actions that we in marketing are taking to become more competitive in the terminal market. And let me assure you we can, we are, and we will continue to compete in every profitable aspect of the communications business. However, a discussion of our overall reaction to competition might be more interesting. In particular, how has it changed our business approach and what are some specific projects which are making this change a reality?

Nonregulated free enterprise in the strictest sense has many similarities to regulated private monopoly. Under both there exists private ownership, private profit, labor unions, and collective bargaining. But only under pure competition is there a consumer choice and a market economy in which competition determines the price, quality, and variety of goods and services provided to the consumer.

In other words, for General Telephone and Electronics Telephone Operations it is a whole new business game, requiring a new management style. Decisions made under monopoly conditions will not hold up in a competitive environment.

Innovation has become more critical, prudent risk is a far more essential part of our business life, and reaction time has diminished. Survival depends upon knowing the customer and satisfying his needs, and better than the competition. This, of course, is the marketing concept! But let us further examine the important elements of innovation, prudent risk, and reaction time.

"Innovation or die" has become the theme for organizations of the 1970s. Innovation, like salvation, once thought to be largely a matter of prayer and inspiration. Today, creativity and innovation can be made to happen. They stem from a conscious and purposeful effort to create an attitude and environment which encourage and expand new ideas. This is our goal in marketing at GTE.

But action and innovation involve risk, and risk is measured by the probability of success. Rewards, in turn, are proportionate to the degree of risk. A company which risks nothing, gains nothing. Today, with time of the essence, prudent risk has become essential. As competitors seek to penetrate our markets, we are responding rapidly and aggressively. Lengthy studies and prolonged testing were permissible in the old environment, but those days are over. We do not deserve to be in business if we cannot manage the risk of change.

Under monopoly, rigidity and inflexibility often controlled the internal environment. We were forced to limit changes which would accommodate special groups in order to provide for the general public. The result was that there was little penalty for indecision or procrastination. In a competitive environment, reaction time is critical. No decision is a bad decision, and to stand still is to lose ground.

This brings us to the concept of planning, that is, the advantages of planning ahead, being first, and making others react to you! Our marketing efforts at GTE follow classical lines: Strategic planning involves the formation of basic concepts or approaches which will move us toward our primary goals, and tactical planning involves how to implement the strategic plan. At this point, let us abandon the theoretical and examine some concrete examples of major plans and programs which were conceived within the framework just outlined.
We further anticipate the offering of a complete new color line and the provision of a varied line of extension services. For example, we now offer only a complete telephone with dial, ringing, and answering capability as an extension. Our studies indicate that most people make their calls from a single location, usually the kitchen. Therefore, we are planning an answer-only phone with the ringer and dial (or touch tone pad) removed, a ring-and-answer phone, and a ring-only location. These changes will give the customer a much wider range of service options, and we also expect to offer both package pricing and optional payment plans wherein installation charges can be spread over the first few months of service.

In summary, Phone Mart will save millions of dollars, and the customer will receive a major improvement in service with discount options. The initial customer reaction has been outstanding, and we also have received a very favorable response from several state commissions. We believe the Phone Mart project goes a long way toward demonstrating that today's marketing effort is geared to improving productivity and customer service. In this respect, it goes a long way toward eliminating our image as strictly a sales organization.

Forecasting

A second planning area of major importance involves the forecasting of telephones, central office, and distribution facilities. Despite the importance of this function in properly allocating resources, it generally has remained a stepchild in the communications industry. The typical situation is usually a fragmentation of responsibility between marketing, engineering, and commercial functions, and the task often becomes a dumping ground for personnel who have little qualification for or interest in the job.

Forecasts are developed on a highly subjective basis with little, if any, concern about cause and effect relationships. Typically, Max the House-counter gets in his car, drives around, returns to the office, and says "50." The obvious result is poor forecasts, not oriented to user needs, and a costly misallocation of capital expenditures. We have attacked this problem at UTE by centralizing the forecasting responsibility in a position under the direction of highly qualified economists. Furthermore, we use an exception forecasting approach based on a sophisticated econometric modeling technique.

Before explaining how the exception principle operates, I would like to mention some interesting points about the pattern of growth. An analysis of historical growth of major U. S. corporations made by a Harvard professor shows that the pattern for most products or services follows a logistic curve, as indicated in Figure 1. For those skeptical of this analysis, a chart describing the rate of growth of telephones in the United States is presented in Figure 2. The result of this growth pattern is utilized very profitably in exception forecasting.

Exception forecasting involves several steps. First, an aggregate forecast for the entire company is prepared through analytical (econometric) techniques. By dealing with large numbers we can be more confident of the accuracy of the forecast. Second, geographical subunits, such as central offices and planning units which display exception growth, are isolated. The causes of abnormality are identified and are used for an analytical forecast for these units. Finally, the state or rate of growth for the balance of the geographical units which display patterned growth are identified. The
ecocurrence, a modern economic model that highlights the importance of understanding the interactions between different ecosystems and their impact on the economy. After the experience gained, the company's financial posture has improved significantly, with a steady increase in profits.

The company's strategy involves focusing on the development of new products and services, with a particular emphasis on sustainability and environmental impact. This approach has been well-received by customers, leading to increased sales and a positive reputation.

In addition to its core business, the company is also involved in community projects, including initiatives to improve local infrastructure and support education programs. These efforts have not only benefited the community but have also contributed to the company's overall success.

The company's success can be attributed to its ability to adapt to changing market conditions, a focus on research and development, and a commitment to ethical business practices. Its leadership has been instrumental in guiding the company through challenging times, and its vision continues to inspire the team as they strive for continued growth and success.
that concern which I am about to prosecute, and I
am the more disposed to proceed as far as
I
so think, in the certain hope of obtainable
redress.

There have been many other instances of
apostasy, and in every one of them I have
seen the same effect produced on the minds of
the obnoxious sect, the same influence on the
inquiry into the facts, and the same
influence on the outcome of the case.

The apostasy of a community or a section of
a community is a serious matter, and it is
important that it should be dealt with in a
manner that will be satisfactory to all parties
concerned.

In this particular instance, I am satisfied
that the evidence produced is sufficient to
prove the charges against the sect, and I
am therefore prepared to proceed with the
case in the manner that I have indicated.

I

The case now before the court is one of
a very serious nature, and I am of the opinion
that it is necessary that it should be
resolved in a manner that will be satisfactory
to all parties concerned.

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Figure 1. Pattern of Growth

Figure 2. Rate of growth of U. S. Telephone

U.S. TELEPHONE INDUSTRIAL \nRESPONDENT IN QUARTERS 1899-1989

D. R. Casey
Figure 3. Rate of Growth Frequency Distribution Curve
Figure 5. Costs: Investment

Figure 6. Costs: Decreased Rate of Return on Equity
Figure 7. Costs: Decreased Rate of Return on Capital
<table>
<thead>
<tr>
<th></th>
<th>Central</th>
<th>Eastern</th>
<th>Northern</th>
<th>Southern</th>
<th>Total Company</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>I. 1971</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eco. Mode Forecast</td>
<td>5,940</td>
<td>13,300</td>
<td>14,600</td>
<td>16,700</td>
<td>50,540</td>
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<tr>
<td>Actual</td>
<td>6,190</td>
<td>14,104</td>
<td>15,178</td>
<td>18,853</td>
<td>54,325</td>
</tr>
<tr>
<td>% Error</td>
<td>4.0</td>
<td>5.7</td>
<td>3.8</td>
<td>11.4</td>
<td>7.0</td>
</tr>
<tr>
<td><strong>II. 1972</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patterned Growth (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. No growth</td>
<td>34.8</td>
<td>44.0</td>
<td>23.6</td>
<td>33.6</td>
<td></td>
</tr>
<tr>
<td>b. Low growth</td>
<td>35.6</td>
<td>27.7</td>
<td>42.6</td>
<td>35.8</td>
<td></td>
</tr>
<tr>
<td>c. Medium growth</td>
<td>13.1</td>
<td>11.2</td>
<td>11.6</td>
<td>12.1</td>
<td></td>
</tr>
<tr>
<td>d. High growth</td>
<td>7.7</td>
<td>7.6</td>
<td>6.7</td>
<td>7.3</td>
<td></td>
</tr>
<tr>
<td>Exception Forecasts (%)</td>
<td>8.8</td>
<td>0.5</td>
<td>15.5</td>
<td>11.2</td>
<td></td>
</tr>
</tbody>
</table>

Figure 11: Budget: Actual and Forecast 1971-1972
I have not planned to discuss the goetheret Tete...

James C. Henderson

Comments
James Hodgson
would like to know if we have a definitive answer for
the control of theft. I
was wondering if the Massachusetts ever took
action to control the control of theft. The
control of theft is an important issue that the
community needs to address. The control of theft
is a major concern for the community.

Discussion

Kylla A. Kelleh

All should pocket from cooperation.
also made one or two changes over the years, and we
to work on this new challenge. Just as we have in
competition.
Mr. Casey described an exception forecasting approach based upon sophisticated econometric models. I would like to know if such models have been developed and utilized in other areas of the Bell System. If so, I would be interested in learning more about their implementation and effectiveness.

The potential for improvements in efficiency and service offerings is significant. However, I believe that we need to consider the long-term implications of such changes. For example, the introduction of new services and technologies may necessitate changes in pricing strategies and regulatory frameworks.

In conclusion, I believe that we should continue to explore and implement innovative approaches to improve our service offerings to customers. This will require careful planning and coordination at all levels of the organization. I look forward to hearing more about the initiatives underway in this regard.
In order to protect the appearance of the paper, the text has been cut off. However, it appears to be discussing the integration of technology in education and the importance of technology in the classroom. The text mentions the need for teachers to be familiar with technology and how it can be used effectively. It also highlights the importance of training and support for educators to ensure they can effectively incorporate technology into their teaching.
Comment

Changes: E. Olson
The market for computer software is growing rapidly.

The rate of growth is accelerating, and the industry is becoming increasingly competitive. This growth is driven by a number of factors, including improved technology, increased demand, and the emergence of new markets.

As the industry continues to evolve, companies are facing new challenges. They must adapt to changing customer needs and preferences, and they must develop new products and services to remain competitive.

In addition, the industry is experiencing significant changes in the way that software is developed and marketed. The traditional model of large-scale, centralized development is giving way to more agile, distributed models that allow for faster and more flexible development.

Overall, the future of the software industry is bright, and companies that are able to adapt to these changes will be well-positioned for success.
I. Report of the Telephone and Telegraph Company

2. Report of the Railroad Commission

Public Utilities
Social Responsibilities of

PART IV
DO WELL WHILE DOING GOOD

Leadership — How To

Social Responsibilities of Public
...other factors of production can also be contractual. When workers are not only paid for the work they actually perform but also for their skills, this can lead to an increase in productivity and overall economic growth. By establishing clear and fair contracts, the needs of both workers and employers can be met, creating a mutually beneficial relationship.

Walter A. Mondale

Assumption of Social Responsibility

A Critical View of Management
In the past, population growth in some areas has been

relatively high, largely due to the lack of proper planning and management. This has led to overpopulation in certain regions, which has

resulted in several negative consequences, including increased pressure on natural resources, pollution, and

social problems such as poverty and inequality. To address this issue, it is crucial to develop and implement effective population control strategies. These strategies should focus on reducing birth rates, improving access to contraception, and promoting family planning. Additionally, policymakers should

promote education and awareness about the importance of controlling population growth. By working together, we can ensure a sustainable future for all.

In conclusion, population control is a critical issue that requires global cooperation and efforts. It is essential to

promote sustainable development and ensure that our planet can support the growing population in a

balanced and equitable manner. By taking proactive steps to control population growth, we can

achieve a more prosperous and sustainable future for all.
What is needed to collect data of type

... the problem, is to adapt the algorithm of the problem.

... the data, in order to

... the data, in order to

... the data, in order to...
the effects of work environment on the
health of workers. Any reduction in injury
rate would translate to substantial savings
for employers and increased productivity for
employees. Therefore, it is imperative that
companies implement effective training
programs to educate workers on proper
workplace practices.

The report also highlighted the importance
of maintaining a healthy and safe work
environment. Companies should prioritize
the welfare of their employees and take
measures to prevent workplace injuries.

In conclusion, the report emphasized
the need for companies to prioritize worker
safety and implement effective training
programs to reduce the incidence of
workplace injuries. By doing so, both
employees and employers can benefit from
a safer and more productive work
environment.

References

[1] National Institute for Occupational Safety
niosh.gov


The text on the page is not legible due to the quality of the image.
The comparatively minor and conceptual issue

To be quite frank, the whole idea of a July 4th program is to

provide a place to celebrate the Fourth, but the Fourth is

merely a backdrop for the real event — the event of July 4th.

The event takes place on the 4th, but the backdrop of

July 4th is the celebration of the event.

The event is a celebration of the people, the country, and the

freedom that we hold dear.

Welcome to the celebration of July 4th.
The business should serve primarily the people. It is the people who have the power to change the world. The power is not in the hands of a few, but in the hands of the masses. We must work together to make the world a better place.

Walter F. Samuel

Responsibilities of Public Officials

Comments on the Social Context and
The concept of Public Interest is a constant challenge in the field of utilities. The concept is often associated with the idea of collective good, where the well-being of the whole community is considered more important than individual interests. Public interest is a broad concept that can be interpreted in various ways, and it is often linked to social responsibility. However, the role of business in this context is often debated, with some arguing that businesses should prioritize profit over social concerns, while others believe that businesses have a responsibility to contribute to the common good.

The argument that businesses should prioritize profit over social responsibility is based on the idea that maximizing profits leads to better outcomes for society as a whole. Proponents of this view argue that businesses have a unique position in society, as they are able to provide goods and services that are essential to the functioning of society. Therefore, it is argued, businesses have a responsibility to pursue profits in order to provide these goods and services.

On the other hand, arguments in favor of social responsibility highlight the role of businesses in promoting social good. Proponents of this view argue that businesses have a moral obligation to contribute to the common good, and that this contribution can be achieved through a variety of means, such as providing fair wages and working conditions, reducing pollution, and supporting community initiatives.

The controversy over social responsibility is ongoing and complex. It involves questions about the nature of business and the role of government in regulating the behavior of businesses. It also involves questions about the nature of social responsibility and the role of businesses in promoting social good. The discussion about social responsibility is important because it touches on fundamental issues about the role of businesses in society and the nature of responsibility in a changing world.

In conclusion, the role of businesses in society is multifaceted and complex. While businesses have a unique position in society, they also have a responsibility to contribute to the common good. The question of how businesses should balance profit and social responsibility is a key challenge for policymakers, business leaders, and society as a whole.
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The effects of this process are both immediate and long-term. In the short term, the exchange of information can lead to increased efficiency and cost savings. However, in the long term, the integration of these systems can lead to a more robust and reliable network. Additionally, the exchange of information can also lead to a better understanding of market trends and consumer behavior.

In conclusion, the exchange of information is crucial for the success of any business. It allows for the sharing of valuable knowledge and expertise, leading to improved decision-making and increased productivity. With the rise of technology, this process has become even more accessible and efficient. As such, it is essential for businesses to embrace this exchange and make the most of the opportunities it presents.
Contributions
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