# IMPACT OF INDUSTRIAL ELECTRIC RATE STRUCTURE ON ENERGY CONSERVATION - A UTILITY VIEWPOINT

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As the price of energy rises, changes in industrial electric rates will have an impact on energy usage and conservation. Utilities interested in reducing system peak demands may reflect this need in the rate structure as an incentive for the industrial customer to alter their present operation. Utilities recognize that industry offers the greatest potential for peak load reduction.

There are several approaches to energy conservation through rate making which would be analyzed by both the industry and electric utility and these concepts must be understood by both parties to maximize the benefits which may accrue from these rates. An explanation and discussion of the trends in industrial rate making such as interruptible, off peak, seasonal and cost of service point out these opportunities for conservation.

Cooperation between the utility and the industry on these concepts in rate making can reduce electrical energy consumption during peak periods. Industry may have to alter traditional operating patterns and procedures, however, this will result in a reduced cost of service to the utility and substantial savings to the industry.

As the price of energy rises, changes in industrial electric rates will have an impact on energy usage and conservation. Utilities interested in reducing system peak demands may reflect this need in the rate structure as an incentive for the industrial customer to alter their present operation. The purpose of this paper is to give a general overview of utility concepts in rate structure which may motivate their industrial customers to take certain conservation measures.

The needs and problems vary with each utility. Growth rates, generating capacity, fuel availability, type of fuel and load factor are a few of the factors which impact utility rate design. For this reason, my remarks are not intended to represent the utility industry as a whole, nor my own company. These comments are based on my personal contacts with literally hundreds of industries during the past few years and are offered only as suggestions as future considerations for utilities and industry working together to minimize cost and maximize conservation. In this regard, utilities have a vested interest in offering a rate structure that will provide the necessary capital requirements and revenues with the lowest generating capacity requirement. Utilities recognize that industry offers the greatest potential in this area, and there are several approaches to energy conservation through rate structure which should be analyzed by both the industry and the electric utility.

Electric utilities along the Gulf Coast which are primarily oil and gas fired utilities in the process of conversion to other fuels are in a period of increasing incremental cost. For many years this was not so. Big was better. New, larger units had greater efficiency; larger gas contracts continually reduced unit cost and growth was beneficial for all customers. Today the high capital cost of conversion and the rapidly escalating cost of coal and nuclear plants make replacement and new units cost 10 times as much as existing equipment. Incremental fuel for these units cost 10 to 20 times as much, making each new kilowatt hour of industrial energy cost more than the last. The utilities have to plan and provide for that one hot day in August to meet the load responsibility of the system peak. This changing energy situation has already influenced the design of industrial electric rates to reduce this demand and encourage conservation. The utility industry has changed from a load promotion mode to a load management mode. Regulators and conservationists have also used electric rate structures to lower energy consumption. The application of these rates to achieve this objective has often resulted in a rate structure which raises energy cost disproportionately for industry. Some of the new "innovative" rate concepts include:

inverted rates - Rate structures which increase in unit cost based on the amount of energy. The more energy used, the larger the incremental cost. This rate penalizes efficient, high load factor operations.

marginal cost rates - Marginal or incremental rates are based on the cost of the last unit of energy supplied by the utility. This is a concept promoted by DOE as they intervene in utility rate hearings. In theory, new customers pay for the load growth.

mandatory time of day - A rate which establishes a price differential for energy based on the time used. Energy consumed during peak periods would be more costly to the customer.

All of these concepts have one thing in common: If the price is high enough, conservation will occur because of elasticity of demand. When the cost becomes prohibitive, the energy will not be used. These methods may work, however, we may not want to endure the problems that the loss of production and the high cost of the product will do to the economy.

I believe the use of rates for conservation can


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be used in a more positive way. A rate structure which moderates the utility peak has an economic value to the utility and this economic value can be passed on to that class of customer which provides this reduction. In other words, utilities should provide a "carrot" to industrial customers through industrial rates rather than a "stick" in implementing conservation programs.

The basis for this approach is the cost of service concept. My company, among others, files rates on the concept that the cost allocated to each class of service is different; and the revenue requirements from each class of service be compensatory with that cost. I believe that my friends in the industrial sector would support this position. It is within this framework, the basic cost of service concept, that industrial rate structures may be altered so that both the utility and the industry may benefit. So long as the utility revenue requirements from the industrial class of service remain the same, it should give the utility the flexibility within the rate structure to offer customers within that class of service the opportunity to take advantage, or have the option to take advantage, of certain rates that are beneficial to the industry. If the utility can provide a rate which reduces peak demand, and saves money in the process, those industries which can adapt their operations to fit this rate should be allocated these savings. As in any business proposition, there has to be something in it for both parties to make it successful. These concepts should be understood by both parties.

There are a number of rate concepts, some old and some new, which may be applicable to industrial conservation programs. Categorically, the first group which has potential for both the utility and the industry are those rates which reflect the time of operation by the user. None of these are new concepts in electric rates, but from the utility standpoint, the reason behind them is basically new. These rates include the following:

interruptible rates - The original concept of this rate was to provide a utility a chance to sell spinning reserve, to increase revenue and increase a system load factor. It was a chance for the utility to sell something over and above its necessary reserve margin and provide a greater rate of return on the existing equipment. The basic idea behind interruptible has now changed. A great number of utilities do not have any spinning reserve to sell. Modern day interruptible rates are to help utilities during periods of short generation capacity and provide a method to reduce system demands. In some cases the use of interruptible service can provide industry additional power which may not otherwise be available, and because this power is interruptible, it is at a reduced rate. Another change in modern interruptible rates is that the customer can be absolutely certain that the service is going to be interrupted. This is in contrast to some of the older rates in effect 10 years ago.

off peak rates - This rate is basically a time-of-day rate which provides industry the option of scheduling certain plant operations based on price. Off-peak rates, much like interruptible, were originally used by utilities to increase system load factor. These rates are designed with predetermined off-peak periods which are usually designated as all of the winter months, all weekends and holidays, and the hours from 10:00 p.m. to 6:00 a.m. during the summer. This allows the industry some flexibility in plant operations to exceed certain contractual power requirements without penalty and at a reduced cost during these off-peak hours.

seasonal rates - Similar to an off-peak rate except that the differential in cost is basically winter-summer to more accurately reflect the cost of service.

time-of-day - A rate which has a price differential on a daily basis. A form of off-peak rate which offers an economic incentive for industry to change operating procedures on an hourly basis.

Each of these rates are designed in a way which suggest that the industry change its traditional operational procedure to conform with the utility's needs. When an industry does this, there must be an economic incentive to make these changes. If the utility can provide this economic incentive in a rate differential, both parties would benefit.

There are other features in electric rate design which have been given some study recently. One proposal would be a planned maintenance rate by which the industry could plan plant maintenance and major turnarounds on a predetermined schedule worked out with the utility. As an economic incentive to the industry to complete this planning and do maintenance on a utility schedule, probably during the on-peak season, the utility would make some compensation on the rate at the time this maintenance was done.

Another feature some utilities are using is short term or maintenance service; whereby the industry uses power to supplement customer generation for short periods of time, based on the utility company availability. This allows the utility to sell the power on a preplanned, right of refusal basis, but also allows the industry with generation to install more power producing facilities and use purchased power during their generation maintenance period. This differs from emergency standby service but is also much cheaper and is so reflected in the rate.

co-generation is the fad in all utility rate design. The Public Utility Regulatory Policy Act has emphasized this feature in utility rates, and as most of you know, has mandated that the utilities pay qualified cogenerators and small power producers the utility "avoided cost" to the power producer for excess energy. My company has developed such a rate and has worked very closely with the Public Utilities Commission of Texas in adopting a methodology for determining this avoided cost. Gulf States Utilities has been in the cogeneration business in Baton Rouge, Louisiana for over 40 years and we do not have to be convinced of the merits of this concept, not only from its conservation potential but as a sound business proposition for both the utility and the industry. Industries all along the Gulf Coast have been cogenerating for years, long before there was a PURPA or national emphasis on conservation. They also did it because it was good business and will continue to do so based on sound economics. I think you will find that most utilities will want to pursue a cogeneration concept, but as in other rate structures, the cost to the utility should not impact other rate payers to the extent that they may be subsidizing the power producer. Once again,

for a project to be successful, there must be something in it for both the participants.

There are other proposed policies and rates which concern existing and future industrial generation and their interface with utilities. One of these has already been mentioned, standby rates. The PURPA Act stipulates that the rates should be equitable non-discriminatory. I think you would probably find that most utilities say that is a fair definition of their existing rates; however, I think we will see some changes in the future. Bear in mind, back when growth was good and big was better, utilities designed, applied and instituted rate structures which discouraged customer generation and utility/industry interconnections. There are changes taking place daily in the energy business which alter this position. As an example, most utilities have active industrial conservation and load management programs. Some utilities no longer continue to hold an industrial customer to a minimum charge penalty based on a rachet or previous high demand if the industrial customer has undertaken conservation measures which reduce this demand.

There are but a few ideas which industry and utility should share as they address future energy problems. Cooperation between the utility and the industry on these concepts in rate making can reduce the electrical energy consumption during peak periods. Industry may have to alter traditional operating patterns and procedures. However, this will result in a reduced cost of service to the utility and a substantial savings to the industry.