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ECONOMIC IMPACT OF INCREASING INDUSTRIAL ELECTRIC RATES ABOVE COST OF SERVICE

SUMMARY

Jensen Associates, Inc.

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ELCON

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The full report contains the following Sections:

II.	BACKGROUND
III.	THE IMPACT ON CONSUMER PRICES
IV.	THE IMPACT ON THE UNITED STATES ECONOMY
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I. SUMMARY

Introduction

The price of electricity to all consumers has increased rapidly in the past few years after decades of decline. The growth of all costs, but principally the rapid growth in the costs of oil, natural gas, and coal used as fuel in power generation, has forced up the price of electricity sold to factories, stores and homes. Although the price of industrial electricity has risen faster, the price of residential electricity has generated the most public debate because Americans see the rise in prices in the electricity bill they pay at home.

This public debate has resulted in many proposals intended to moderate price increases for all consumers of electricity or to shift the burden of paying for electricity from one class of consumer to another. One set of these proposals would require industry to pay more for electricity than the costs of delivering it to industry so that the excess revenue would subsidize residential electricity by reducing its price below the cost of serving residential consumers. A uniform electric rate is an example of such a proposal. With a uniform rate, customers would pay the same price for each kilowatt-hour of electricity without regard for the quantity of electricity purchased, the voltage at which it is delivered, the variability of its use, or the extent to which the customer owns substations, transformers, and distribution lines--all factors affecting the cost of supplying electricity.

Typically, the cost per kilowatt-hour of delivering electricity to industry is less than delivery to residential consumers because industry normally buys at higher voltages, uses larger amounts at a more stable rate and more often owns substations

and distribution lines than residential consumers.

The Electricity Consumers Resource Council (ELCON) retained Jensen Associates, Inc., to analyze the economic impact of changes in the rate structure of electric power which would result in industry paying more than cost of service while residential electricity consumers pay less than the costs of serving them. ELCON and Jensen Associates, Inc., agreed that an analysis of the economic impact on segments of American society (e.g., industry or those on fixed incomes) would not provide sufficient evaluation and understanding for public policy judgment. Therefore, the analysis was to address the economic impact on the United States as a whole.

There are five important economic impacts on the United States of requiring industry to pay more for electricity than cost while charging residential consumers less than cost. They are:

- the effect on the costs of all goods and services purchased by the average American household;
- the impact on the overall U.S. economy as measured by gross national product, disposable income, consumption, employment, Federal Government finances, and other economic indicators;
- the long-term impact on the efficiency of the production of goods and services and thus the standard of living in the U.S.;
- the effect on conservation of all forms of energy; and
- the differing effects on regions and industries.

Since modern analytic techniques are not capable of calculating these five impacts together, this analysis focused on the first two. This report presents the methodology and results of the analysis and the conclusions drawn from it.

Method of Analysis

Economic science, both its data and analytic techniques, have improved greatly over the past forty years. However, a

modern industrial economy, especially one as large as the United States, is so complex that no single analytic technique, even when using large computers and extensive amounts of data, can show the complete effects of significant economic changes. Complete economic analysis requires an analytic program which uses different analytic tools to examine different and specific issues of an economic problem. Each analytic tool will provide limited answers, but taken as a whole, the results of the separate analyses will complement one another and provide as full a picture of economic impact as the state of the art of economic science will allow.

The economic impact of raising electricity prices to industries above cost of service is complex. Complete analysis requires an integrated analytic program. This report describes the results of the analysis of the first two of the five economic impacts listed above. Additional analysis, as described in Section V is needed to complete the evaluation of economic impact.

As reported here, an input-output model of the U.S. economy is used first to show the effects upon prices in the economy and the impact upon the budget of the average American household when higher prices for industrial electricity subsidize residential electricity prices. The input-output model is able to show how higher costs for industrial electricity flow through the economy to change prices and the costs of goods purchased by households. The calculation of the change in prices for the entire range of goods and services purchased by consumers, government and foreigners is a necessary input for the second model, but one which the second model is unable to perform by itself. The second model, an econometric model of the U.S. economy, shows that portion of the overall impact upon the U.S. economy caused by changed consumer buying patterns which result from price changes when industry subsidizes electricity purchases by other customer classes.

The analysis using these models was performed by Chase Econometric Associates, Inc., a private economic consulting firm. The input-output model, part of an interindustry model of the U.S. economy, was developed at the University of Maryland.[1/] It is a detailed look at the flows of raw materials and products of 183 producing sectors of the economy as they meet the needs of final consumers.

The second model, one of the better known computer-based econometric models, was developed by Chase Econometric using sophisticated statistical techniques (i.e., econometric techniques) to analyze the historical behavior of the United States economy as a basis for projections. The more than 500 economic variables in the model represent the interaction of forces which create overall economic behavior as measured by gross national product, prices, employment, investment, construction, consumer demand, interest rate, money supply, and government surplus or deficit.

These two models are used extensively by business to forecast economic behavior and by government to evaluate the economic impact of different government tax programs, spending levels, or policies. Sections III and IV of this report detail how these models were used and the calculations that were made in the analysis.

1/ This model is described in 1985: Interindustry Forecasts of the American Economy, Clopper Almon, Jr. et al, Lexington Books, D. C. Heath & Co., Lexington, 1974.

Results and Conclusions

Consumer Price Impact

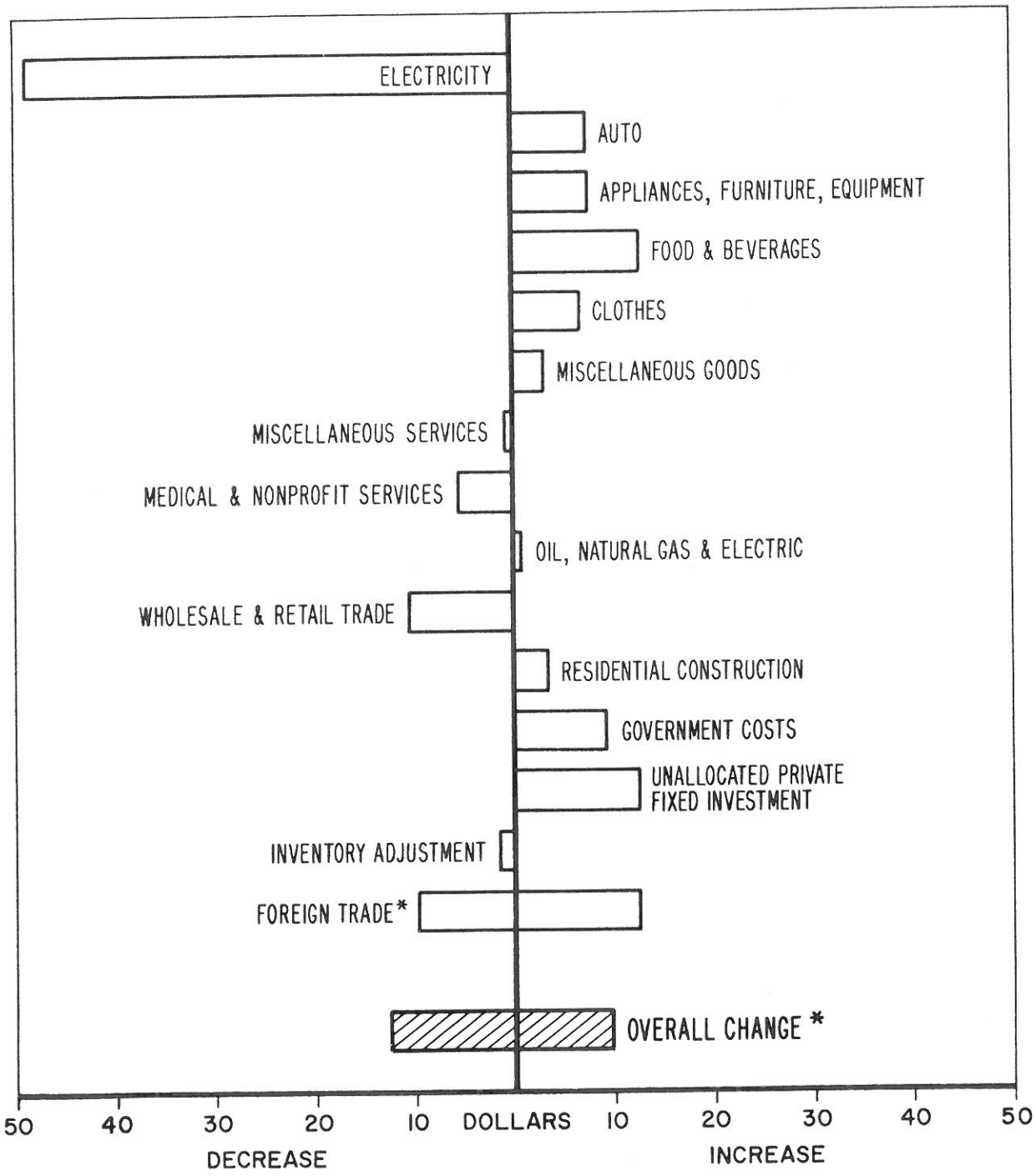
If industry pays a higher price for electricity, it will pass on to consumers this higher cost by increasing its prices which eventually results in higher consumer prices. For example, if uniform electric rates had existed in 1975, electricity prices would have been raised 48.4 percent to industry and reduced 19.3 percent for commerce. This would have provided added revenue to electric utilities to allow an 18.5 percent reduction in average residential electric costs. If the only economic response to these uniform rates were the dollar-for-dollar passthrough of both the greater costs to industry and the savings to commerce, then the impact on the 1975 average American household budget would be as shown in Figure I-1.

By showing only the price effects of changed electricity prices, assuming no other economic changes in this first stage of the analysis, we are able to separate out the price effects from other effects. In so doing, we also follow the precedent of the U.S. Bureau of Labor Statistics in its Consumer Price Index of showing only the price effects upon a set of goods that consumers have purchased in the past.

The price analysis of uniform electric rates shows that the average U.S. household electric bill would have been reduced by $48.88 in 1975. Because industry would have paid more for electricity, the average household would have paid $12.87 more for food, $6.94 more for clothes, and $5.60 more for furniture and appliances, based on their 1975 expenditures. Automobile usage would have cost $7.60 more. Commercial electricity savings would have been passed on in $3.01 reduced medical expenses and $10.30 in reduced prices paid for wholesale and retail trade spread over all of the goods and services people buy in stores and shops. The cost of government would

FIGURE I-1

CHANGE IN THE ANNUAL BUDGET OF THE AVERAGE U.S. HOUSEHOLD WITH UNIFORM ELECTRIC RATES: 1975



* REPRESENTS A RANGE OF POSSIBLE VALUES REFLECTING VARYING ASSUMPTIONS ABOUT PRODUCT PRICING IN INTERNATIONAL TRADE.

SOURCE: JENSEN ASSOCIATES, INC.

have gone up by $9.20 per household, which taxpayers would eventually pay. As described later in Section III, the cost changes are separated into those that affect current expenditures which would be passed on quickly and the cost impact upon investments which would be passed on over a period of years.

What appears to be a savings of $48.88 in lower electric bills is offset by higher prices for goods and services purchased by consumers and government. However, the extent of increase in the average household budget will depend upon the adjustment of the prices of imports and exports in reaction to the electricity induced price changes of domestically produced and consumed goods and services. Domestic pricing will change with electric price changes in different ways with a dollar-for-dollar passthrough being a good representation, but pricing in international trade is more complex and difficult to describe. Factors that make it different from domestic pricing are changes in foreign exchange rates, the differences in the patterns of imports from consumption and exports from production, and the potential for pricing differently in the markets of different countries.

If importers do not change their prices when the prices of domestic goods are changed and if exporters are able to pass on to foreign buyers the full increase in electricity costs, then the average household budget for 1975 would increase by $36.46, which coupled with the $48.88 savings in residential electricity costs means that the average U.S. household would save $12.42, assuming only price changes. If importers were to match the price changes of domestically produced goods and if exporters were able to pass on to their customers the changes in electricity prices, the average U.S. household would pay $46.35 more for goods and services resulting in a net savings of $2.53. If neither importers nor exporters change prices, but all electricity cost changes are passed on

to domestic consumers, price increases resulting from uniform electric rates would fully offset the reduced electricity prices so that the 1975 average household budget would remain the same. Finally, if importers and exporters follow the pricing of competitors in their markets, the following would result. Importers would change prices as the prices of domestically produced goods and services change in response to electricity price changes. On average, the price of imported goods would rise. Exporters would not change their prices, and all price changes for commercial and industrial electricity would be borne by U.S. consumers. In this case, the average U.S. household would pay $58.77 more for goods and services purchased in 1975 which is $9.89 in excess of the $48.88 reduction of residential electric rates.

Because of uncertainties about pricing in international trade, we present a range of price impacts. Thus, if uniform rates were to have been instituted in 1975 resulting in a $48.88 reduction in the electric bill of the average household, the costs of other goods and services due to price effect alone would have increased by $36.46 to $58.77. The net effect upon the average American household budget would range from a $12.42 savings to increased expenditures of $9.89. We believe that the assumptions which underlie each extreme are unrealistic and that a reasonable estimate of the price effect upon the average American household budget lies somewhere in between.

However, the price impact upon any individual family budget will vary from the average depending upon patterns of purchases. The person who lives in a well-furnished home with many electric appliances and whose children are grown and are paying for their own food and clothes, will benefit more from uniform rates. In contrast, young parents with an old car, who are looking forward to buying and furnishing a home, can be worse off as they pay more for goods than they save in lower electric bills.

Even this range of price effect, from a $12.42 net savings to a $9.89 increase in the average household budget, is optimistic because of the assumptions in the analysis and because the input-output model, while it is the best tool to show price effects, is limited. Reduced efficiency in the production of goods and services and thwarted energy conservation brought about by electricity pricing that is not based on cost would further erode the budget of the American household. More immediately, however, the slowing of the U.S. economy (see below) with its loss of jobs will further deteriorate the American household budget.

Impact on the United States Economy

If industrial electricity prices are increased to subsidize residential consumption, the U.S. economy would be slowed. As industry passes on the higher costs of electricity by raising prices, consumers would react by buying fewer manufactured goods. With purchases of manufactured goods moderated, not as many jobs would be needed, and investment and construction would be less. Moreover, the reduction of electricity prices would not stimulate the consumption of electricity enough to offset the loss of manufacturing jobs and investment by the increase of jobs and investment in the electric utility industry. With fewer people employed and investment retarded, gross national product, consumption, and employment would all be reduced, while the government deficit would increase.

Chase Econometric's study of the impact of uniform electric prices on the national economy showed that increasing industrial electricity prices by 48.4 percent, while reducing commercial electricity prices 19.3 percent and residential prices 18.7 percent[1/] on January 1, 1977, would slow the

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1/ Based on 1974 electricity prices and consumption.

economy relative to no change in electricity pricing as shown in Figure I-2.

For the three years, 1977 to 1979, the uniform electric rates would:

- reduce gross national product 9.9 billion 1972 dollars;
- reduce consumption by 7.5 billion 1972 dollars;
- reduce employment by 430,000 man-years;
- reduce disposable income 2.9 billion 1972 dollars; and
- increase the Federal Government deficit by 3.3 billion current dollars.

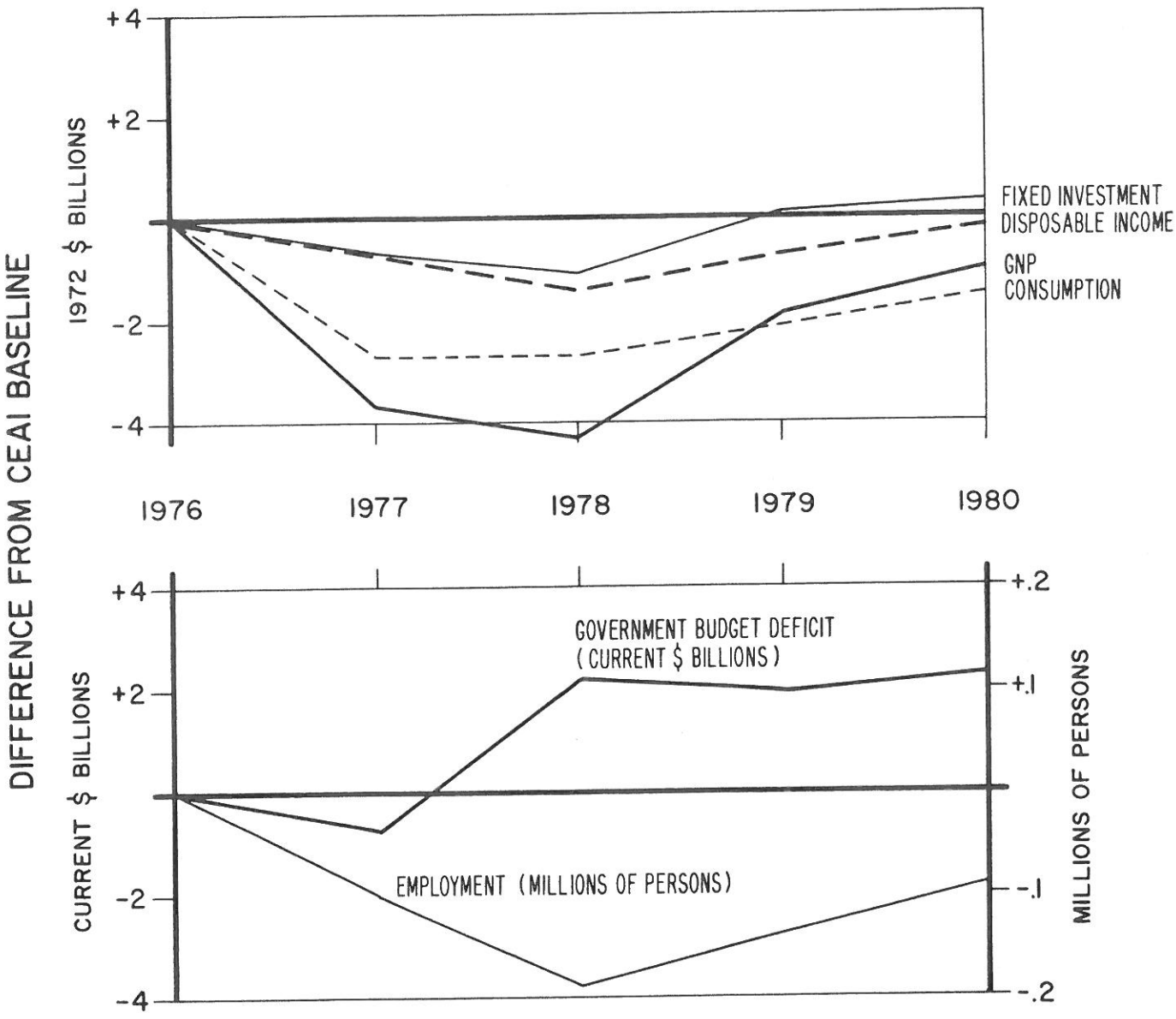
Thus, an average household would probably be worse off from having industry subsidize residential consumption of electricity. In addition, those households that experience unemployment, less overtime, or lower wages will be hard hit by the industrial subsidy of residential electric rates.

Both an examination of the causes of the slower growth plus additional simulations with the Chase Econometric model show that the industrial subsidy of residential electric rates will slow the U.S. economy. The results for the uniform rate structures described here are typical.

However, as we discussed above, each analytic tool of economics is limited. The Chase Econometric model of the U.S. economy shows how the price changes brought about by a changed electric rate structure affect consumers' aggregate demand patterns and the entire U.S. economy. But it does not show how industry will change its purchasing of materials, selection of production process, or use of the existing capital equipment and labor force. These changes by industry and their effect upon the overall economy can be very significant--perhaps even larger than the response of final consumers. Unfortunately, there is no computer model or even an organized set of data which would allow a quick and accurate estimate of

FIGURE I-2

IMPACT ON THE U.S. ECONOMY OF UNIFORM ELECTRIC RATES IMPLEMENTED ON JANUARY 1, 1977



SOURCE: CHASE ECONOMETRIC ASSOCIATES, INC.

how industry would react to significantly higher electricity prices. An industry by industry economic and engineering analysis is needed. However, if electricity is priced above cost, economic theory tells us that the result would be to discourage economic efficiency, as illustrated by the example in Section V of the report. The reason for this is that if the nation sets electricity prices to industry above cost of service, then through millions of decisions industry will adjust in a way that industry believes is efficient, but because the wrong price signal has been given by the nation, the economic efficiency of the nation will be reduced.

Summary of Impacts

Figure I-3 summarizes the five impacts of increasing industrial electric rates above cost of service and the results of the analysis presented in this report. The first three impacts have been discussed above in this summary so the last two are briefly reviewed here.

Energy conservation can be retarded for two reasons. If electricity prices are higher for industry than justified by cost, industry will meet its electrical energy needs by using other fuels or generating their own electricity, which will not take advantage of the efficiencies of large central power generation systems. If, at the same time, residential electricity prices are reduced below cost, then households will be encouraged to use more electricity than if prices reflect cost. Finally, because the production and consumption of electricity varies from region to region and industry to industry, the impact of these new rate structures will vary.

In summary, while Americans are concerned by the increases in the electric bill they pay at home, our economic analysis shows that raising the price of electricity to industry above the cost of service in order to lower residential prices below cost of service will reduce the economic welfare of Americans.

FIGURE I-3

SUMMARY OF ECONOMIC IMPACTS OF

INCREASING INDUSTRIAL ELECTRIC RATES

ABOVE COST OF SERVICE

IMPACT	RESULT OF ANALYSIS
1. Price effect upon the average American household budget for 1975.	Somewhere in the range between $12.42 savings to $9.89 increased costs to the average household budget.
2. Short run demand effects on the U.S. economy.	A slowing economy with $9.84 less disposable income and $51.88 less Gross National Product, measured in 1972 dollars, per household in the first year of uniform rates.
3. Long run productive efficiency.	Detailed analysis not performed, but economic theory predicts discouragement of economic efficiency.
4. Energy conservation.	Detailed analysis not performed, but economics suggests a retardation of conservation.
5. By region and by industry.	Detailed analysis not performed, but economic impacts likely to vary by region and industry.

Source: Jensen Associates, Inc.

A reduced electric bill will be largely, or perhaps more than completely, offset by increases in prices for other goods and services he buys; income will fall in the short run; economic efficiency will be discouraged; energy conservation may well be retarded; and questions of equity will be raised because the impact will vary by region and industry.