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GAS AND ELECTRIC RATES

HEARING

BEFORE THE

SUBCOMMITTEE ON CONSUMER ECONOMICS

OF THE

JOINT ECONOMIC COMMITTEE

CONGRESS OF THE UNITED STATES

NINETY-THIRD CONGRESS

SECOND SESSION

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THURSDAY, MARCH 28, 1974

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THURSDAY, MARCH 28, 1974

CONGRESS OF THE UNITED STATES,
SUBCOMMITTEE ON CONSUMER ECONOMICS
OF THE JOINT ECONOMIC COMMITTEE,
Washington, D.C.

The subcommittee met, pursuant to notice, at 10:10 a.m., in room 4200, Dirksen Senate Office Building, Hon. Hubert H. Humphrey (chairman of the subcommittee) presiding.

Present: Senators Humphrey and Javits; and Representative Brown.

Also present: Loughlin F. McHugh, senior economist; William A. Cox and Jerry Jasinowski, professional staff members; Michael J. Runde, administrative assistant; Leslie J. Bander, minority economist; and Walter B. Laessig, minority counsel.

OPENING STATEMENT OF CHAIRMAN HUMPHREY

Chairman HUMPHREY. Thank you very much for your patience here. I had 350 students across the street this morning and I said to myself it is maybe more important that I be there with them than be here, because they have got something to say about the future. You too will have something to say about what happens in the future.

I have an opening statement. I shall try to abbreviate it so we can get to our witnesses as quickly as possible.

I want to thank you very much, Mr. Nassikas, for your courtesy in responding to the subcommittee request. I have called today's hearing to examine what I believe may be the next phase of America's energy crisis to hit the consumer—namely, a crisis of the Nation's gas and electric utilities.

Already the consumer has been hit by staggering inflation in all categories—the worst in 25 years: Food prices, up 20 percent from a year ago and still going up; gasoline prices, up 31 percent; heating oil, up nearly 60 percent. The overall consumer price index is up 10 percent and considerably ahead of the average breadwinner's earnings. You may have noticed recent testimony shows that the wage earner today is losing about 4 percent in the race with inflation.

Now, gas and electric bills in parts of our country are going through the roof, and the enormous increases we see, for example, now in New York could spread all across the country.

Let me give you some background on this situation, and I do not say this to you, Mr. Nassikas, but for this record. For the entire decade, 1958 to 1968, the Consumer Price Index for electricity went up by only 3.9 percent, about 4 percent. In some years, no rate increases were reported anywhere in the Nation. The index for residential gas went up somewhat more—by 14 percent—but even it was extremely stable; it was relatively stable after 1960.

In the 5 years from 1968 to 1973, however, gas and electric rates jumped by 24 percent. Beginning in 1969, utilities began seeking increases before regulatory commissions in a steady parade, requesting larger jumps each time they appeared. In the last 6 months alone, electricity rates have gone up by 10 percent and gas rates by 7 percent.

All of these increases, however, have not succeeded in restoring the utilities industry to sound financial health. In many cases the companies have not succeeded in turning high prices into adequate earnings on their investments. Their credit ratings are beginning to suffer, heralding higher interest costs in the future; and the prospect is for a further spiral of bills to consumers. We see a kind of rationing system here. As the price of utility service goes up, there are fewer users and this immediately affects the income of the utility, so they ask for another increase, which in turn produces fewer users. So you have a dangerous spiral here, and there seems to be no place that you can checkmate it, so to speak.

The cruelest blow of all for the consumer is the spate of rate requests now being made to offset revenues lost because of energy conservation. We all recall the forecasts last fall that the winter might bring cold homes and electric blackouts or brownouts because fuel supplies were low. In November, President Nixon went on television and appealed to the people to turn back their thermostats by 6° and to conserve fuel and electricity in other uses so that, collectively, we could avoid those hardships. State governments and Governors, in particular, also promoted conservation, and utilities sponsored advertisements urging it. Most people responded with self-sacrifice, and indeed energy consumption, including natural gas and electricity, went down in an unprecedented way. With the help of warm weather we got through the winter. And I should mention that we have had two of the warmest winters, the last two winters, in the past 50 years. So I do not think we ought to bet on it for renewal, you know, an encore, for another time. But now utilities are saying "thanks" by attempting to raise rates to make up for lost sales.

If these requests are granted, not only will it be an ungrateful response to public-spirited cooperation, but it will undermine the new conservation ethic we are trying to foster in this country. How could we expect the public to cooperate with the future conservation appeals after such action if the conservation means that you have to pay more and more for what you get; this has surely been true of gasoline and every product of the petroleum industry and now of the electrical and gas utilities.

I have been so concerned by this matter that I asked the Library of Congress to find out how many such applications have been filed and how they might be handled. The Library's report, written by Douglas Jones, Deputy Dirctor of the Economics Division of the Congressional Reference Service, is being released at this hearing. Mr. Jones found that 15 applications for so-called "conservation adjustments" have been filed by gas and electric companies in 13 States. Many more, however, are anticipated. Up to now, such requests have been denied in the District of Columbia, Maryland, and New England, and an application in Virginia was withdrawn. The New York Times reports, however, that a 6.7 percent conservation adjustment was granted in New York since the Jones report was completed.

Mr. Jones points out that some of the decline in sales is due to unseasonably warm weather and to the slump in economic activity. I think that is a fair judgment. In fact, some of it no doubt is traceable to earlier price increases themselves. Are new increases to be imposed to offset those declines, too, or have they somehow been factored out?

Mr. Jones also proposes some alternatives to simply socking it to consumers. These might include bolstering the credit ratings of utilities whose earnings suffer due to conservation through temporary State or Fedral guarantees of interest obligations on new borrowing. The utilities' tax rates might be adjusted or, at the very least, the financial consequences of conservation might be divided between the consumer and the utility companies. Mr. Jones points out that another regulated industry—the insurance sector—is benefiting from energy conservation through the decline in automobile accidents, but it has not been very quick to offer lower premiums on that account.

Can we foresee any period of stability for utility rates after the sharp increases of the recent past? A look at the facts indicates that we cannot. To begin with, the adjustment of all U.S. energy prices to the levels set by OPEC for oil may still have a long way to go. The average price of oil supplied to electric companies probably will tend to rise with expansion of imports and new domestic production exempt from price controls. Price controls on oil will expire 11 months from now, permitting a new leap in oil prices unless controls are extended.

The prices of coal, used to generate most electricity in the Midwest, also has not adjusted to the new market conditions. While coal from small producers not under price controls has jumped by about 300 percent to over $30 per ton, the price for coal owned by the utilities or delivered to them by major producers has hardly begun its realinement.

Finally, interstate natural gas prices which are regulated by the Federal Power Commission, also are being permitted to rise. Even if Congress does not approve deregulation of wellhead gas prices as demanded by the administration, the FPC has hinted strongly that gas prices will go up sharply in the future. And liquified natural gas will come in at much higher prices yet.

So make no mistake! The worst is yet to come for utility rates unless we find a way to stem the tide of fuel cost increases that are passed on to customers, and unless utilities get a better grip on their other costs. Unless the outlook changes fundamentally, utility rates throughout the Nation could rise to the frightful levels already reached for electricity in the northeast region. If so, millions of consumers have an ugly shock coming. It could mean home heating bills of $200 a month for all of us. But most of these increases would be paid on to primary fuel producers, and they might not yield returns on investment adequate to keep the utility companies commerically viable.

In closing, therefore, let me pose the question of what will happen if the very large pass-through of primary fuel costs by utilities now taking place should depress sales of gas and electricity significantly. For instance, what if the 50-percent increase in electrical rates in the New York area in the last year causes consumers to cut back on their consumption by, say, 10 percent? Most of the rate increase will flow to foreign oil producers, but the decline in sales will erode the earnings of the utilities. Will we then be asked to swallow more rate increases as a result of earlier ones?

This seems to be what we face unless some reform of rate regulalation is devised. Traditional regulation at this time of soaring costs and primary fuel scarcities appears to be a dead end street. Some new approaches are needed. Today we want to discuss these questions with some of the authorities in the field.

And I want to stop here for a moment just to broaden the spectrum of this hearing. I have the view that not only America and Western Europe, but the whole world has yet to face up to the impact of the rise in the cost of fuel. There are three items that have shaken the economies of many countries and will distort them for years to come and cause great maladjustment—food, fuel, and transportation. The problem around Washington is that we are experts in current events. We can hardly wait to get the morning newspaper. Some of us know a little about history but we do not have a prophet in the crowd. Nobody seems to have any capability of forecast or if they do, they really do not get much attention.

You know, we held hearings the other day on the world food situation. Nobody was interested. We will not be interested until we really get hurt. We have physiological mentalities in this country—empty stomach, full head. full stomach, empty head. Until we are really hurting, until pain becomes unbearable, we refuse—the media, the Government, the public refuses to respond. And it is a tragedy. I do not think anybody comprehends yet what the increase in fuel and food and transportation is going to mean to our economy, a big economy and a healthy one basically; or what it will mean to Western Europe. Of course, it really rocked Japan. The Japanese are going through a major economic reorganization. And 1 billion people in the world today face bankruptcy in their governments because of the increased cost of fuel.

I noted yesterday morning that the increased cost to the less-developed countries will be $15 billion this coming year for fuel and

fertilizer, and that means that they also have inadequate fuel and inadequate fertilizer; and if you add food, it runs to over $22 billion. And they do not have the money to make the adjustment.

We are now at a point where we are facing up to another problem—the electrical utility rates. This hearing is not called to beat on the utilities. We are trying to get information. What does the future hold in store for us? What, if anything, can be done about it?

I have been reading the New York Times stories about some of the complaints in that area and some of the statistical information that has been presented and I shall make available for our record a number of the newspaper articles that we have from the New York Times, the Washington Post, and different other papers.

[The articles referred to follow:]

[From the New York Times, Mar. 14, 1974]

THERE IS NO MERCY IN BILLS FOR ELECTRICITY

In the United States, electricity has been almost as ubiquitous and unnoticed as air. But in the last year, electricity has become expensive and noticed in the New York metropolitan region—for some, so expensive that the cost may literally force them to abandon their homes.

The bill for an all electric home serviced by Con Edison now averages $252.52 (for 5,000 kilowatt hours) a month. Most of the 5.5 million utility customers in the region used electricity only for lighting and normal appliances. And since March, 1973, they have seen enormous increases in their electric bills:

Consolidated Edison, with 2.9 million customers in New York and Westchester, is sending bills for average electrical use (250 kilowatt hours) that are 48.3 per cent higher. The company has asked the Public Service Commission for another 29.3 per cent rate increase and 13.8 per cent of it has already been granted.

The Long Island Lighting Company, with 836,000 customers has had a 49.5 per cent increase on the average bill (500 kilowatt hours). The company is asking the P.S.C. for another 19 per cent.

An average bill (500 kilowatt hours) for Public Service Electric and Gas in New Jersey, serving 1.6 million customers, rose 28.2 per cent. The company is not asking for an increase now; it got one, of 12.2 per cent, last January.

In the one-year period, an average Con Edison bill rose from $14.89 to $22.08. About 29 per cent of the increase is attributable to a rise in the basic rate; 56 per cent, to a rise in the surcharge reffecting the cost of fuel oil and the rest to a rise in taxes.

There is another charge that involves more than a little irony along with the pain. A small part of the increase Con Edison has already received is known as a "conservation adjustment." Since 1971, Con Edison has spent $1.4 million on an advertising campaign urging consumers to "Save A Watt." That expense becomes part of the firm's overall expense, on which it is guaranteed a profitable return. Consumers responded and cut down usage, especially during the energy shortage of recent months. Because that conservation tended to reduce revenues, the company asked for an increase of 6.7 per cent—the "conservation adjustment." Thus, consumers will in effect pay twice for doing what they have been urged by the company, and the government, to do.

For most users of electricity, the percentage of increase is huge, but the absolute amount in dollars remains manageable. That is not the case for the 10,000 who, responding to advertising by Con Edison and builders, have all electric homes, heated, as well as lit, by electricity.

Mrs. Eileen Facciola, an official of a Staten Island-based group called Active Consumers Defy Con Edison (AC-DC), lives in an $80,000 all-electric home, where the thermostat is kept at 50 degrees. Her last electric bill, she said, was $186. She and her husband have notified Con Edison that to save money they are planning to close up their house and move to a trailer camp in the backyard.

NEW YORK CITY RESIDENTIAL ELECTRIC BILL (250 kWh)

(Average residential consumption)

	March 1971	March 1974	Amount of increase	Percent
Basic rate	$9.93	$13.82	$3.89	39
Fuel adjustment	.43	5.63	5.20	1,209
Gross receipt tax charge	.73	1.19	.46	
Sales tax	.67	1.44	.77	
Total	11.76	22.08	10.32	88

NEW YORK CITY RESIDENTIAL ELECTRIC HEAT BILL (5,000 kWh)

(Monthly use, heating season)

	March 1971	March 1974	Amount of increase	Percent
Basic rate	$70.46	$109.73	$39.27	56
Fuel adjustment	8.45	112.70	104.25	1,234
Gross receipt tax charge	5.52	13.57	8.05	
Sales tax	5.07	16.52	11.45	
Total	89.50	252.52	163.02	182

[From the New York Times, Mar. 14, 1974]

MAJOR UTILITIES SEEKING ELECTRIC RISES

(By Peter Kihss)

Every major electric company in New York State, New Jersey and Connecticut is asking or about to ask for an electric rate increase except for two in New Jersey. One of the exceptions is that state's biggest utility, which got its latest rise last January.

A survey yesterday showed the pending and planned bids citing increasing costs in wages, materials, supplies and taxes for operating and for new construction—aside from the rising costs of fuel oil already being largely passed along to consumers automatically without regulatory hearings.

In New York, six of the state's seven major utilities have applications pending before the State Public Service Commission that would increase basic rates from 13 per cent to a peak of 29.3 per cent for the Consolidated Edison Company. (Con Edison having already won a 13.8 per cent interim rise Feb. 28, its bid means 15.5 per cent more still being sought.

The State's other principal utility, the Niagara Mohawk Corporation, was awarded a 7.8 percent rise in basic electric rates last Feb. 5. It said it was preparing a new application to be filed "within a month or so."

Its president, John G. Haehl Jr., predicted "dramatic rises" in electric and gas rates over the next few years. Further, he foresaw a shortage of natural gas "for the next four or five years at least, and allocations of available supplies will be imposed, possibly in 1974."

In New Jersey, the Public Service Electric and Gas Company, with 1.6 million customers, won a 12.2 per cent increase in basic electric rates effective last Jan. 7.

The Jersey Central Power & Light Company, with 600,000 customers, asked for a 23.5 per cent increase March 5, proposing that a 14.8 per cent interim rise take effect April 15. The Atlantic City Electric Company has asked for 11.1 per cent, which last had an increase in February, 1973.

In Connecticut, Northeast Utilities said it would apply within the next three months for "prompt and substantial rate relief" in electric rates. For two

subsidiaries, the Connecticut Light and Power Company, with 534,000 customers, and Hartford Electric Company, with 280,000. Its Western Massachusetts Electric Company has a 15 per cent rate case under way, with more than one third of its bid already granted on an interim basis.

Connecticut's other major electric company, the United Illuminating Company in New Haven and Bridgeport, said a petition for a rate increase "appears inevitable" after the last rise it received for 8.8 per cent in November, 1971, had been its "first in 51 years."

A rundown of the New York State electric rate cases before the Public Service Commission is as follows;

Consolidated Edison (2.9 million customers): Asked Dec. 12 for $426.6-million annual increases, or 29.3 per cent. Received interim increase of $174.7-million Feb. 28, or 13.8 per cent. Last Sept. 6 received $68.2-million increase stop an earlier interim award, for a total rise of $164.5-million, or 13.5 per cent.

Long Island Lighting Company (880,000 customers): Applied Jan. 25 for $57.9-million increase, or 19 per cent, including a bid for an interim $28-million, or 9.5 per cent. Awarded $3,758,000, or 1.2 per cent, last Oct. 10.

Orange & Rockland (130,000 customers): On an application for a $10.8-million or 20 per cent rise, an interim order allowed $4.5-million or 9.9 per cent last Oct. 19. An examiner has now recommended an overall $10.4-million incease, including the interim award. A previous increase of $3.2-million, about 6 per cent, was granted Feb. 26, 1973.

New York State Electric & Gas Corporation (600,000 customers): On a request for $26.1-million, or 14.56 per cent, an examiner last Feb. 5 recommended allowing $16.5-million. The last previous increase was $3.7-million, or 2.16 per cent, Jan. 14, 1973.

Central Hudson Gas & Electric Corporation (160,000 customers): Hearings are under way on an application for $9.7-million, or 13.6 per cent, after the last previous increase in 1972.

Rochester Gas & Electric Corporation (263,000 customers): Applied last Jan. 19 for $15.2-million, or 13 per cent. The last previous rise, Oct. 25, 1972, allowed $10.1-million, or 11.5 per cent.

Niagara Mohawk (1,250,000 customers): Received $34.7-million increase, or 7.8 per cent, last Feb. 5, in a case the company said took 15 months to decide.

[From the New York Times, Mar. 14, 1974]

WHERE THE ELECTRIC BILLS TOP $300

GREENBURGH, N.Y., March 3.—The "all-electric" protest movement against Con Edison began here in late January "on one of those days," Mrs. Tena Jackson recalled today, "when everything goes wrong."

"My daughter's college had been closed because of the energy crisis since mid-December. She was home looking at me and eating like a horse. Then I got a tuition bill for $375—it had gone up again.

"It took $31 that day to have a man fix our electrically operated garage door, my son put something down the toilet and that cost $51, I discovered that my car was out of gas and then I opened the Con Edison bill.

"It was for $226—it's over $300 now—or about twice the 1972 figure when I was using a third more electricity. I asked my neighbor if her bill had come in. 'Don't ask,' she said. Right then we decided to write to Con Ed saying we wouldn't pay until they came around and explained something to us."

RELIEF IS DEMANDED

A Con Edison representative did come around within 24 hours, Mrs. Jackson said, and explained the utility's pass-along dilemma to about 40 neighbors who had gathered in the living room of the six-year-old, $70,000 home on Brookdell Drive in Hartsdale, the heart of all-electric country here in Westchester.

But the utility rates continued to climb and this morning, with other groups in the metropolitan area join-in the protest, the Westchester group filed an application with the Public Service Commission officially seeking relief from

the recent 12 per cent rate increase awarded to the Consolidated Edison Company.

A Con Edison official said that the town of Greenburgh, a sprawling and somewhat formless community enclosing the villages of Tarrytown, Irvington, Dobbs Ferry, Hastings-On-Hudson, Elmsford, Ardsley and such unincorporated areas as Hartsdale, has about 600 all-electric customers, making it possibly the largest such concentration in the metropolitan area.

They include private homes, two-and three-story condominium units such as The Colony, just across the street from Mrs. Jackson, low-income and middle-income apartments as well as soaring, six-story complexes such as The High Point of Hartsdale. In all, there are 4,500 all-electric homes in Westchester and perhaps 10,000 in the metropolitan area and their owners all are hurting.

These people may have had little in common until a few months ago, when rising costs, passed on by Con Edison through rate increases and fuel adjustment sur-charges, began to produce monthly bills that, in some cases, exceeded monthly mortgage payments.

William Finneran, a Greenburgh town councilman and one of the leaders of the "all-electric" protest, says, "We met with some of these residents long before it became a big issue, but they wanted to keep it quiet, afraid the publicity would stigmatize their homes and make them unsalable."

Last week the anger of householders who felt they were misled by the utility and some real-estate developers flared into the open. Shouts swept the Greenburgh Town Hall, unifying into a threat to withhold payment of bills to Con Edison until relief was promised. Nearly $1,000 was collected in a waste-basket passed around the room that night.

Anthony Veteran, the Supervisor of Greenburgh, has aided the protest movement. "Con Ed is a monopoly and has obligations," he said. "It should do something for these people because it has a moral duty, not because it's threatened with nonpayment."

Councilman Finneran argues that the utility can be persuaded to adjust its rates "if enough is at stake." He said the town's own electric bill of about $138,000 for low-income and middle-income apartments was reduced by about $50,000 through negotiation.

"I am sure there will be an adjustment," Councilman Finneran says. Mrs. Jackson commented later that "most people are prepared to share in rising costs, but not with 100 per cent increases. Fifty per cent, perhaps, but not 100."

The protest movement, which says it has gained 4,000 supporters in Westchester alone, has produced demands for a more responsive Public Service Commission—"one that maintains more of an adversary position with regard to Con Edison," Councilman Finneran says. The commission is a regulatory body appointed by the Governor that oversees all public utilities in the state.

Con Edison's position is that it is caught between sharply rising costs and an obligation to provide power, that it is not profiting by recent rate increases and that it must abide by the rate structures established by the Public Service Commission.

DEVELOPERS STILL OPTIMISTIC

Martin S. Berger, president of the Robert Martin Corporation, builders of the Colony, the High Point of Hartsdale and other all-electric developments, insists that he would not hesitate to build another all-electric condominium.

"An apartment is a long-term investment," he says, "and electricity remains the best long-term power source. It's still cleaner and more available than other energy sources and in the long term the costs will come down.

"Look at home heating oil. It has doubled in price—apartment house oil has quadrupled in some cases— and so has gasoline. You don't find people rioting at the pumps, do you?"

Things were not quite so sanguine at the handsomely appointed sales office of High Point, just off Central Avenue, where questions about heating costs were answered guardedly and a propectus was demanded back from a visitor seeking to leave with it.

M. Bernie Frankel, the sales manager, says that the first 50 families of the 500 expected to fill the five-building apartment project and recently moved in, "but none have received their first electric bills."

"We're all concerned about it," he says, "but it hasn't affected our sales adversely so far. "We are telling people about the heavy insulation here and the

fact that, unlike all-electric homes or town house condominiums with one thermostat, you can adjust the temperature in each room here, thus producing a saving."

But Mr. Frankel has some trouble at his home. "I live in all-electric house in Briarcliff Manor, with one thermostate," he explains. "I haven't received a bill in two months but my neighbor has and it came to $300. Since I sold him on the house he wants to know what's the story?"

[From the New York Times, Mar. 19, 1974]

600 CON ED FOES TURN FIRE ON PUBLIC SERVICE COMMISSION

WHITE PLAINS, March 18.—An angry crowd of 600 electric consumers and local political leaders switched their attack today at a hearing on a proposed rate increase from Consolidated Edison to the Public Service Commission.

Neither the P.S.C. chairman, Joseph C. Swidler, nor any of the other commissioners were present at the Westchester County Court House to hear repeated criticism of their performance and allegations that they had "cooperated" with Con Edison at the expense of consumer interests.

The P.S.C. became the target today after Con Edison's weekend announcement, repeated at the hearing, that it proposed to reduce fuel adjustment rates for 10,000 residential electric heating users this April. It would not spread the costs among other customers until a later, but unspecified, date. Today's hearing was on the utility's request for a 22.6 per cent increase over two years.

Edward Meyers, a Democratic Assemblyman, and Richard Ottinger, a former Democratic Congressman, both of whom are seeking Representative Ogden R. Reid's seat, were among those attacking the P.S.C. Mr. Meyers called for the immediate resignation of the present commissioners; Mr. Ottinger called for the replacement of the P.S.C. by a new agency.

DISENCHANTMENT CITED

State Senator Bernard Gordon, a Republican from Peekskill, noted the "widespread public disenchantment" with the P.S.C.'s work. His remarks were greeted with boisterous cheers and applause.

Long before the hearing began at 10:30, protestors stood in the bitter cold outside with placards saying, "Revolt," "Who's in bed with Con Ed?", "Take the Con Out of Ed" and "Misled by Con Ed."

Alexander Funk, a spokesman for 50 senior citizens from Jefferson Village, an all electric development in Yorktown, said that the utility's request for a rate increase because less power is being consumed "is like someone murdering his parents and then pleading for mercy as an orphan." His supporters cheered.

Outside the hearing room, Mrs. Janet Coulston of White Plains, who bought her two young children with her said she spoke for many of the electric heating consumers who are faced with utility bills higher than their mortgage payments.

She said her January electric bill was $250. with her 'thermostat set at 50" and her mortgage $389. "I will have to work 24 hours a day to pay it," she said.

FOR ELECTIVE BODY

Alfred B. Del Bello, the Westchester County Executive, urged the "abolition of the P.S.C. as we currently know it" and suggested it be recreated as "an all-elective body" with more consumer representation.

Before the luncheon recess, John V. Thornton, secretary and treasurer of the Con Edison, admitted that "there was no question of the drastic increase in all customers' bills and especially in residential spaceheating customers." He blamed the Arab oil embargo to loud boos.

[From the New York Times, Mar. 19, 1974]

CON EDISON, SEEKING GAS RISE, REPORTS SHARP DROP IN INCOME

Sharp drops in operating income and net income so far this year were reported yesterday by the Consolidated Edison Company to the state Public

Service Commission. They were attributed in part to reduced sales as a result of conservation efforts and in part to increasing costs.

While power sales were down only 6.5 per cent or less from a year ago, operating income during February was reported as $15,356,000, a decrease of nearly half from $30,505,000 in February, 1973.

Operating income deducts fuel, maintenance and tax costs from gross revenues. The data were introduced at a hearing at 2 World Trade Center on a Con Edison request for increased gas rates; the company is also seeking rises in electric and steam rates.

Net income, after such further deductions as interest payments, was reported as $4,197,000, only about a fifth of the $22,246,000 earned in February, 1973. January net income was reported as $11,343,000 down from $13,241,000 in January, 1973.

The company estimated that energy conservation this year "will have an adverse effect on revenues which will be offset only in part by savings in fuel and operating costs." It reported a current estimate of "the net adverse impact on 1974 operating income as $107-million.

During January, the utility said, it sent out 7.3 per cent less electricity to its New York City and Westchester customers than in January, 1973, and during February 6.5 per cent less than a year before. Gas sendouts were described as down 5.6 per cent and 2.8 per cent for the two months, and stream down 8.2 per cent and 5.4 per cent.

The company's revenue have been going up, with eight electric rate increases since September, 1970; four gas increases since November, 1971, and five steam increases since January, 1971.

Costs offsetting the revenues left last year's net income at $207,707,000, according to the report. The company said this month's operating results "should be favorably affected" by the temporary electric rate increase that took effect March 8—$174.7-million on an annual basis.

Fuel oil costs, a major factor in the declines in income over the last few months, have been indicated separately to be easing off this month.

The commission has granted a 13.8 per cent interim increase in electric rates, on the company's bid for a permanent 22.6 per cent rise over the next two years. Interim increases have also been granted for gas rates, 4.6 per cent, and steam, 7.8, effective last Jan. 28, on the company's bid for permanent rises of 17 and 19.4 per cent.

Con Edison has been seeking the latest rate increases on the plea that it must increase the ratio of net earnings to interest charges, so as to be able to float at least $150-million in bonds next October to help pay for construction programs.

Yesterday's hearing on gas rates was the 10th in a current proceeding before Examiner Thomas P. Barkey, Renee G. Schwartz, counsel for the City Housing Authority along with members of the commission staff and city lawyers, has been disputing the company on effects of conservation, gas-supply curtailment and savings from a billion-cubic-foot natural-gas storage and liquefaction facility scheduled to go into service in Astoria, Queens, this year.

[From the Washington Post, Mar. 24, 1974]

Consumers React Angrily to Higher Electric Bills

Soaring electric rates have prompted consumer complaints in several areas of the country, and some people are refusing to pay all or part of their bills.

An Associated Press survey showed the increases have hit every area of the country. The utilities say most of the rate hikes are due to rising fuel costs, both for coal and imported crude oil.

Other boosts in electric rates are caused by increases in operating costs and declining usage. The power companies say they need higher rates to make up for lower revenues caused by energy conservation programs.

In Jacksonville, Fla., the city-owned utility said the average homeowner's monthly bill this year is $27.70, compared to $17.90 last year, an increase of more than 50 per cent. A spokesman said the increase would have been higher, but customers reduced electricity usage because of the energy shortage.

Louise Winnard, manager director of the utility, said the increase is due solely to the rising cost of imported fuel. "There is definitely a tremendous consumer reaction," he said.

"We get a lot of petitions opposed to high electric bills with 4,000 to 5,000 signatures. We've sent them to Washington to show why we need a domestic fuel allocation."

Some customers are taking stronger action. "The increase in delinquent accounts is not astronomical, but it is up to about 5 per cent of our customers," Winnard said.

Consumer protests range from speeches at public hearings on proposed rate increases to refusal to pay bills. The strongest public outcry has come in the Northeast, which is more dependent than other areas on imported crude oil and has been hardest hit by the rising price of Arab exports.

The Connecticut Public Utilities Commission ordered power companies on Tuesday to itemize customers' bills to show what part of the charge is going for fuel adjustment.

One Connecticut company, United Illuminating, said the average homeowner, who used 500 kilowatt hours of electricity, will pay a monthly bill of $19.32 in March, up 26 per cent from last year. Fuel cost increases are the only reason for the boost, a spokesman said.

UI regularly itemizes the fuel adjustment charge on customers' bills.

Owners of all-electric and electrically heated homes have been particularly hard hit. Consumers in Westchester County, a New York City suburb, have threatened not to pay their bills.

Consolidated Edison Co., which supplies the electricity, recently received a 13.8 per cent interim rate boost and is seeking a permanent 22.1 per cent rise over the next two years. The company says operating income has declined sharply—from $30.5 million in February, 1973, to $15.4 million in February, 1974—partly because of a cutback in electricity usage due to conservation measures.

Angry consumers took over the platform recently at a Public Service Commission hearing on the rate increase. They accused the commissioners of war crimes against the public and said Con Ed executives were "greedy animals."

For the owner of an all-electric home served by New York's Orange and Rockland Utilities, Inc., and using 5,000 kilowatt hours a month, the basic rate in March 1973 would have been $93.02 plus a fuel adjustment of $8.65. That's a total of $101.67, excluding tax.

This year the same home owner would pay a basic rate of $102.90. But the fuel adjustment would be $102.70 and the total bill, a whopping $205.60.

Prices are highest in the East: 7 cents a kilowatt hour for residential customers of Con Edison, compared to 1.5 cents a kilowatt hour for people served by the Southern Nevada utility.

The higher prices elsewhere are little consolation to Nevada residents, however. The 1.5-cent figure is 25 per cent higher than it was a year ago and a consumers group in Las Vegas is circulating a petition urging Gov. Mike O'Callghan to prohibit the Public Service Commission from approving any further rate hikes.

[From the Washington Post, Mar. 26, 1974]

WGL To Seek $23 Million

The Washington Gas Light Co. plans to ask this week for permanent rate increases in Washington, Maryland and Virginia that would bring in more than $23 million in annual revenues, company president Paul E. Reichardt said yesterday.

In January, the company failed in its bid for emergency rate increases that would have raised an additional $11.6 million, money the utility said it needed in part to offset a conservation-related decline in sales. At a time when the utility had been urging customers to use less gas, the region was also experiencing what Reichardt said yesterday would probably be the warmest winter recorded in a century.

Reichardt, who was speaking at WGL's annual stockholders meeting, would not be more specific about rate increase requests to be filed with public service commissions in the three jurisdictions.

Two years ago, when the company last asked for permission to earn more money, the utility commissions said it could earn a maximum profit on its investment of about 8.25 per cent. But Reichardt said in January that the actual rate had fallen below 6.5 per cent in 1973, while the amount of gas sold fell by 3 per cent, the first annual drop in more than 50 years.

Operating revenues during the year increased by $8 million to $171 million as a result of the rate increase which was the first sought by the company in 14 years. But since March, 1972, gas shortages have prevented the company from taking on new customers.

One upshot of the drop in gas usage here is that Washington Gas Light will have between 6 and 7 billion cubic feet of extra gas to sell this year, stockholders were told. Reichardt and his corporate planning vice president Donald J. Heim said that in recent weeks the company has begun offering the excess gas for sale to short-term users, such as industries and other utilities.

Stockholders were told that the extra gas couldn't be channeled to new customers because surpluses in future years could not be guaranteed.

The company also will promote—on a minor scale—the use of gas air conditioning as it has in the past, Reichardt said.

Asked by a stockholder how a House Banking and Currency Committee proposal to exclude advertising expenses from utility rate requests might affect WGL, Reichardt said the company feels "very keenly the need to communicate to the general public and to our customers in particular."

In other business yesterday, Dr. Philip H. Abelson, president of the Carnegie Institution of Washington and editor of Science magazine, was elected to the WGL board of directors.

[From the United Electrical Workers News, Mar. 11, 1974]

Hearing Hits Utility Rise in Response to UE Drive

BRIDGEPORT, CONN.—Monday night, February 25, was a good night to take refuge in a cozy chair in front of the television in this seacoast town. Outside a mixture of snow and sleet put a glaze on windshields and made the going treacherous under foot and wheel. Almost 200 angry citizens, nevertheless, left their homes to go to City Hall to protest a "fuel adjustment" charge tacked on to their electric bills.

The local utility company, United Illuminating (UI), is passing on the increased cost of crude oil to its customers and it runs as high as 40 to 50 percent of their electric bills. One outraged customer told the state subcommittee, holding the hearing on the charge, "I almost had a cardiac arrest when I saw the fuel adustment charge on my last bill."

The public hearing, held by the subcommittee of the Bank and Regulated Activities committee of the Connecticut Assembly, came as a direct result of an intensive campaign on all aspects of the contrived fuel shortage conducted by UE Local 209, which represents the workers at the Bryant Electric division of Westinghouse here.

Announcement of the hearing came less than two weeks after Local 209 Pres. Albert Cioffari announced to the press that the union was calling on its members and to all consumers to withhold payment of the fuel adjustment charge until a full investigation of the costs is made by the Public Utilities Committee.

Response to the union's proposal was immediate and overwhelming. Other unions, consumer groups and all sorts of "concerned citizens" joined in. Some 12,000 signatures to a petition calling for non-payment and investigation were gathered in a brief time. The reaction was felt in the state capital at Hartford. The Bridgeport hearing was scheduled, and Connecticut Gov. Meskill has announced that the subcommittee will hold statewide hearings.

SUFFERING CONSUMERS

So on that cold Monday night the long-suffering consumers had the opportunity to air their complaints and press their legislators for action. They were joined by state representatives and senators from their districts.

In his testimony before the committee, Local 209 Pres. Cioffari cited expert opinion showing that due to the fuel adjustment charge, which allows the utility company to pass on increased costs to its customers, the UI wastes fuel

wantonly and "soaks us for this waste." He charged that the fuel adjustment gives UI carte blanche to spend as they wish and charge what they please.

Cioffari demanded that UI officials be subpoenaed and made to testify under oath as to the accuracy of their figures on costs and charges. Until this is done, he said, customers should continue to withhold payment of the fuel adjustment charge. (The union has made it clear that as long as that customer pays the basic service charge, exclusive of the adjustment, the company cannot shut off service.)

The UE leader exhorted the committee to "stop this robbery", and reminded the legislators that this is an election year and the people will remember in November what they do or fail to do to protect them from price gouging.

Brother Cioffari was joined in presenting the consumer's plight by speakers representing various community organizations including Michael Sorrentino, president of the Bridgeport Labor Council; representatives of taxpayer's, consumers' and senior citizens' groups, and a number of just plain "frustrated" citizens.

Their frustration was pretty well summed up by one speaker who declared: "They've got us by the you-know-what! Everybody's passing on the high costs, but we've got no place to pass it. The buck stops with us. Pretty soon we'll just hand over our paychecks."

Several speakers lashed out against the monopoly control of the utilities. "It's bad enough at the super-markets," said one, "but we still have some choice there, to shop around and maybe find one store with a few cents less on an item or two."

Not so with the utilities. No shopping around for cheaper electric service, and the speakers called up the Public Utilities Commission to live up to its responsibility to protect the consumer's interest and hold public hearings.

P.U.C. NO HELP

They got little comfort from the representatives of the P.U.C. whose testimony was basically a defense of their own actions and the position of the utility company. The remarks of the P.U.C. speakers were often greeted with howls of derision, and the citizens pointed out that the burden of proof rests on the utilities and again demanded public hearings.

A speaker for retired people asked that the commission "look into the ease with which these large increases seem to be gotten."

The particularly distressing plight of people on fixed incomes was stressed by many, and the commission was reminded of the old couple in Schenectady, N.Y., who froze to death when the utility company shut off their service.

State Sen. Gerald S. Gunther, a longtime opponent of the fuel adjustment concept who played a leading role in arranging the hearing, also pointed out that the fuel adjustment, as presently conceived and policed, gives the utilities a "blank check" with no sort of regulation which would compel them to shop for cheaper fuel.

Gunther submitted a six-point program which included proposals for the P.U.C. to eliminate the present fuel adustment authority and replace it with bi or trimonthly hearings on fuel adjustment costs, and to increase the staff of the P.U.C. and give them expertise to properly regulate the utilities.

NEED VOTER PRESSURE

As the hearings progressed, it became clear that the people are going to have to apply greater voter pressure on their representatives. The president of the utility company (UI) was greeted by numbers of customers, waving their electric bills and demanding explanations, but the state politicians on the commission, holding the hearings, were not exactly sharp in their inquiry. Their questions, in fact, served more as a platform for the UI official to plead his case.

The rebuttal was left to the harried citizens, and one was greeted with cheers when he proposed that all utility executives making over $20,000 take a 10 percent wage cut and pass the savings on to the customers. Another wanted to know how much the utilities spend in lobbying to remain monopolies.

The action of Local 209 had given the citizens their first opportunity to air their grievances, but action remained the key. The withholding of payment of

the adjustment charge will need to continue and the unions and community groups throughout the state will have to make their political strength felt at future hearings.

Unions throughout the country can take the cue from the Bridgeport action, for the fuel adjustment charge is gouging consumers in communities across the nation.

Chairman HUMPHREY. One little headline I thought was kind of interesting. It said, "There Is No Mercy in Bills of Electricity." The bill for an all-electric home serviced by Con Edison now averages $252.52 a month, and they go on to show what has been the difference between the new rates as compared to the old rates.

Might I say as a homeowner, you ought to try propane. What happened to propane prices in the Midwest should not happen to anything. It made Jesse James look like a social worker.

Go ahead, Mr. Nassikas.

STATEMENT OF HON. JOHN N. NASSIKAS, CHAIRMAN, FEDERAL POWER COMMISSION, ACCOMPANIED BY EMMETT J. GAVIN, ASSISTANT TO THE CHAIRMAN; WILLIAM W. LINDSAY, CHIEF, DIVISION OF RATES AND CORPORATE REGULATION, BUREAU OF POWER; WARREN MORRISON, ASSISTANT TO THE CHIEF, OFFICE OF ECONOMICS; DANIEL GOLDSTEIN, ASSISTANT GENERAL COUNSEL; AND HASKELL WALD, CHIEF, OFFICE OF ECONOMICS

Mr. NASSIKAS. Thank you, Mr. Chairman. I would like to introduce, if I may, some of the staff who are accompanying me here at this hearing.

On my right is William W. Lindsay, who is our Chief of the Division of Rates and Corporate Regulation, Bureau of Power. He is a doctor of economics. Emmett Gavin, my chief administrative assistant. And to my left is Haskell Wald, who is the Chief of our Office of Economics. Mr. Wald also has a Ph. D. in economics. I felt since this is the Joint Economic Committee that perhaps the economists could make a contribution. I will see what I can do as a lawyer.

I have a summary statement which I would like to read. I will perhaps paraphrase parts of it and refer to my prepared statement as I go along. I will be very brief in presenting my summary.

Chairman HUMPHREY. We shall include your summary and prepared statements as prepared in the record at the end of your oral statement.

Mr. NASSIKAS. Thank you.

Chairman HUMPHREY. You have a very brief summary statement. Do not hesitate to read it, Mr. Nassikas.

Mr. NASSIKAS. I do appreciate the opportunity, Mr. Chairman, to appear before your subcommittee and present testimony concerning the outlook for gas and electric rates. The availability and prices of gas and electric service have become matters of widespread public concern during recent months as the public has listened to persistent appeals, as you stated in your opening statement, to conserve energy and has seen the prices of gas and electric energy rise more rapidly

than ever before. In other words, the reward for patriotism seems to be a higher price.

In my prepared statement, I describe the extent of the increases in gas and electric prices that have occurred, the causes of the current situation, some of the causes, energy conservation and its relationship to the revenue requirements to the utilities, the role of rate design in energy conservation, and the outlook for the future. In my prepared statement, I summarize our jurisdicition and I think it may be important as a background of my testimony to point out that the Federal Power Commission regulates about 25 percent of the energy in the United States, two-thirds of the natural gas which in turn is about 36 percent of total energy supply, and then hydroelectric power which is approximately 6 percent of overall energy supply, although it is 15 percent or upwards of our electric power supply.

Also, the Federal Power Commission in the electric area regulates the rates of about 7 percent by dollar value of the revenues of utilities, about 15 percent of the kilowatt hours. The remainder of the regulation, which is by far the substantial part of the regulation, is by State regulatory agencies.

One other fact which I will refer to later on. The electric utility industry currently consumes about 25 percent of our primary fuel resources. Based on forecasts through the year 2000 under various assumption of growth, under various assumptions of effectiveness of conservation or demand restriction or more efficient utilization of resources, we anticipate that by the year 2000, about 50 percent of our primary energy resources will be consumed by the electric utility industry.

This is important because we must find a way to avoid the escalating prices of fuels that will be consumed by the electric utility industry and other sectors of our energy economy. We must be sure that they are clean and acceptable environmentally. And we have to find a way to rely on our own self-sufficiency and independence as a nation to the extent that we can without relying on imports from abroad.

Chairman HUMPHREY. Is there not another factor here, too, about what we call the efficiency of the utilization?

Mr. NASSIKAS. Yes.

Chairman HUMPHREY. Of the primary fuel?

Mr. NASSIKAS. It is about——

Chairman HUMPHREY. The electrical utility has a rather low rate.

Mr. NASSIKAS. It is only 32 to 34 percent and I am certain that this can be improved since we are an outstanding engineering society in America.

Chairman HUMPHREY. Yes.

Mr. NASSIKAS. We seem to be able to do things if there are policies that enable the doers to do it in effect. Now, the engineers and the scientists, I am sure, can improve the conversion efficiency from 32 upwards of 40, at least. In fact, improvements were made with the fuel cell which was a point development of the combination gas and

electric utilities along with Pratt and Whitney Division of United Aircraft working on the initial breakthrough by NASA in the Apollo program. The individual fuel cell has a potential conversion efficiency in the order of 60 to 70 percent right now. So that we are on the threshold of conservation in the real sense of the word.

Chairman HUMPHREY. Right. The same thing is true in the automobile. I have been studying this. It gets about a 45 percent converse rate from the primary fuel.

Mr. NASSIKAS. Yes. I am sure that can be improved.

Now, turning again to my prepared statement, my conclusions are in general that we have a long way to go to achieve the President's goal of energy independence for the United States by the 1980's and I should say this is not necessarily only the President's goal. I think it is also the congressional goal at least of the various committees that I have appeared before and from my knowledge of the views of various Congressmen and Senators, I believe the goal of most of the Congress is to achieve energy independence as soon as possible.

We can expect substantial further increases in the prices of gas and electricity in 1974 and beyond. I regret to say this. I believe it is true, that prices will go up, and I will detail that in a moment.

The 1960's was a decade of relatively stable rates for electricity with a slightly downward trend reversing in about 1967 and increasing at an increasing rate since that time. We may note parenthetically that the 1964 National Power Survey prepared by some of my predecessors at the Commission, and an excellent survey by the way, had some basic assumptions that were wrong. They estimated that the average cost to the consumer would decline from 1.68 center per kilowatt hour in 1962 to 1.23 cents in 1980, a decline of approximately 27 percent. Of course, the prophecy went in the wrong direction, but so did Cassandra, Senator Humphrey.

Chairman HUMPHREY. Yes.

Mr. NASSIKAS. I predict in my prepared statement that if an average rate of inflation of 5 percent is assumed, that the rates to the consumers by 1990 or even a decade earlier may triple. In other words, I will repeat that, it is conceivable that by 1980, at the rate we are going, that the rates paid on average by all consumers of electric power may triple by that time.

My forecast goes through 1990; it is always easier if we are dealing with a longer range.

Chairman HUMPHREY. Now, you do not make any assumptions of major technological breakthroughs on that rate increase, do you?

Mr. NASSIKAS. I make no such assumptions. Yes, that is right. I include in that forecast the breeder reaction coming on line by the year 1982 but not in any great quantities until the 1990's, and the light water reactor developing into about 35 percent of our power generation by the year 1985; with a fossil fueled and hydropowered electricity economy for the remainder of our electric power generation.

I include in this again, not in a very sophisticated way, some measure of success in conservation efforts not only in using less but making the energy available to us go further, utilized more efficiently rather than wastefully.

Your point of production efficiency is well taken. We can do a great deal to conserve at the point of consumption, particularly with large users of energy. Whether it is electricity or whether it is natural gas or oil, there are industries which can affect dramatic savings. Our chief engineer, Mr. Charles Berg, spends 100 percent of his time with his staff on conservation measures which industry may be able to implement without retarding their economic productivity but using less energy.

Chairman HUMPHREY. Yes. Now, we have seen some of that already this year in the conservation.

Mr. NASSIKAS. Yes, we have.

Chairman HUMPHREY. And I noted in a study that I read that in Western Europe, for example, they used about an average of 10 percent less energy to produce an identical product. They were more conservation conscious.

Mr. NASSIKAS. Yes, they are, and, of course, their prices rather induce them in that direction and I think that prices will perhaps exercise that kind of constraint in the United States.

Chairman HUMPHREY. I notice DuPont set up a subdivision to——

Mr. NASSIKAS. Yes.

Chairman HUMPHREY [continuing]. More or less train American industry how to conserve on energy, saying there was as much as 20 to 25 percent waste in many of the industries.

Mr. NASSIKAS. That is very true. I have urged and the Commission has also urged the electrice utility and the natural gas industries as major suppliers of energy to adopt conservation programs to assit their consumes in effective conservation methods.

In a national rulemaking which we issued about 5 months ago, we requested the utilities to strive for an objective of 10 percent reduction in the use of electric power on a national basis, and as high as 15 to 20 percent in some regions of the country like New England, which was particularly hard hit by the Arab embargo and the residual fuel cutoff.

As you said earlier, Mr. Chairman, Divine Providence did assist us with weather. At the same time, in addition to that the conservation measures by consumers, I think, also contributed to the reduction in the use of electric power.

Chairman HUMPHREY. Yes. Do you see any merit in a rate incentive for conservation of fuel? Today we have a rate incentive for the use of fuel. I mean the maximum use. Is there any way that is applicable, practicable?

Mr. NASSIKAS. Certainly rates should be designed with the objective of conserving fuel. I will get into the inverted rate structure as a possibility and also peak load costing as a method of perhaps allocating our resources more closely to the cost of supplying the service thus obtaining the objective of conservation.

By the end of 1972, residential rates had increased 15 to 19 percent above the 1967-68 level. Commercial rates increased 18 to 13 percent. Industrial rates 25 to 28 percent over the same period of time. During 1973 these rates continued to increase. The residential increase for that year was more than 7 percent. This is equivalent to at least a doubling of rates every 10 years. The increases have been larger in some sections of the country, particularly in California and in the Northeast, oil is an important fuel for electricity generation. In the northeast 80 percent of our power generation is oil-based and of that oil, 90 percent is imported and has been imported in a free import market since 1968. For example, the increase in Los Angeles was nearly 28 percent while rates in New York City increased by nearly 50 percent.

The prinipal cause of these rate increases over the past year seems to have been increases in prices paid for fuels—this is the principal cause—used for electric generation, especially oil prices, although I would like to qualify this a little further. I am concentrating on oil prices but coal prices have also tripled. In fact, there are some New England utilities which are importing coal from Poland at a price equivalent to about a $15 to $18 a ton basis. When we think that only 2 short years ago in the Duke Power, Carolina, TVA region of the United States coal was being purchased at $5 and $6 a ton, we see what the impact has been on coal prices also.

I do not want to say that other fuel prices have not gone up. They have.

For example, during the year ended January 1974, the price of oil purchased by Consolidated Edison Co., serving the city of New York, approximately tripled, while in New England and in California oil prices doubled. This is again residual fuel oil largely, No. 6, although No. 2 fuel also virtually doubled in New England this past winter.

Chairman HUMPHREY. Now, is it not fair to say too. Mr. Nassikas, that what you have seen here in the New England States, in the east, is just a pattern of things yet to come in other parts of the country?

Mr. NASSIKAS. Absolutely.

Chairman HUMPHREY. I emphasized that some in my opening statement because you sort of see it kind of creep across the country really from two coastlines, so to speak.

Mr. NASSIKAS. That is right.

Chairman HUMPHREY. And it is just beginning to work its way through the Alleghenies and the Rockies.

Mr. NASSIKAS. Yes, sir. As a result of the widespread existence of fuel cost adjustment clauses under which electric utilities are able to automatically and almost immediately pass on to customers changes in the price of fuel used for generation, the escalating fuel costs have been rapidly reflected in the bills paid by consumers of electricity. For example, table 6 in my prepared statement is where that is detailed. I will not go through the whole table, but 75 percent of the increase in the price of residential electricity in New

York during the year ended February 15, 1974, was attributable to fuel adjustment clauses as compared with about 38 percent in Los Angeles and about 67 percent in Boston.

These unprecedented increases in fuel costs occurred during a time when the electric utility industry was already experiencing substantial cost increases springing from a variety of other sources besides fuels. These include: One, the increasing cost of providing facilities for the purpose of controlling air and water pollution; two, increases in capital costs, particularly interest rates; and three, increases in the cost of construction and equipment. In addition to these specific causes of cost increases to electric utilities, we have, of course, been in a period of general price inflation affecting all of the various kinds of labor and material costs experienced by electric utilities. From 1960-1967, while the general price level crept upward the price of electricity remained relatively constant or, in constant dollars, may be said to have gradually declined, which is true, by the way, also of natural gas prices at the wellhead. In constant dollars between 1962 and presently, the price of natural gas has declined pretty close to 10 percent rather than going up. This is at the wellhead.

From 1967 to the present, although the price of electricity has risen sharply it has not increased as rapidly as has the general price level; we may, therefore, say that from 1967 on, the average cost of electricity in constant dollars has continued to decline but at a much lesser rate of decline than during the first part of the 1960's. These, of course, are national averages. In certain areas, such as New York and Los Angeles, electricity prices have been increasing more rapidly than the cost of living, so that the price of electricity may be said to have increased in constant dollars in those areas also.

As a result of fuel shortages and the conservation efforts resulting therefrom during the latter part of 1973 and continuing into 1974, many utilities have been experiencing customer demands substantially less than have been projected: a substantial number of utilities experienced load requirements less than a year earlier. It is ironic that the very success of these conservation programs, as you pointed out, Mr. Chairman, has created a new problem in the form of sharply reduced revenues. As a result, utilities are claiming that without higher rates they will be unable to raise capital for the purpose of constructing facilities to meet their customers' needs or indeed, to continue to operate at all. These are their claims. Efforts by the utilities to obtain increased rates on this basis have created a wave of public indignation and protect.

Chairman HUMPHREY. You know, I have also wondered, without defending the utilities, why people did not get as mad at bankers. After all, I know a little bit about their industry because I used to serve on the commission back in my home State when I was mayor of the city that looked into things like this and the cost of money is a very serious matter for these big industries, particularly in the utilities.

Mr. NASSIKAS. Yes.

Chairman HUMPHREY. Of course, I have always been antihigh interest rates. My father taught me that early when they practically drove him out of business. No amount of education is going to get that out of my system. I will go to my grave with antagonism for high interest rates but the public does not seem to understand that this is one of the major factors even in the Federal Government's deficit today. The cost of money— the cost of money on a home—this is what is hurting young people today as they try to buy a home. We get indignant, and hightly so, about the price of beef and electricity but on money they just raise those interest rates and they say, you know, that is the way it is. There is something mystical about this business and only bankers understand interest rates.

Mr. NASSIKAS. Well, I am in agreement with you. I know how important interest rates are to the financing of several billion dollars in the electric utility industry or natural gas industry. For instance—this is not in here, in my prepared statement—over the course of the next 20 years we estimate that about $300 billion will have to be committed to investment in exploration and development for gas and oil. We estimate that perhaps $450 billion—I do not understand these number, they are too large for me—will be invested in new electric facilities. So that if interest rates stay where they are, the prime rate being over 9 percent today, we are dealing in terms, in round figures, of billions of dollars of financing costs for plant.

One other example. It takes up to 10 years before 1,000 megawatt nuclear facility costing $500 million can be built and in service; $500 million is about the investment forecast for the next 4 or 5 years. Let us assume that $500 million cost. Let us assume that that plant will be on line in 10 years but you have half your investment in place in 5 years, so that you have to carry half of your investment on the average for the full period. The interest costs on that at 10 percent run $25 million a year without amortizing any part of the mortgage. Someone has to pay that cost.

Chairman. HUMPHREY. And without getting any use of the plant.

Mr. NASSIKAS. Without getting any use of the plant.

Now, then, those ratepayers who have been most cooperative in helping to conserve electicity find that they are the very ones being asked to pay higher rates as a direct result of this cooperation. This appears, to the average citizen, to be an exceedingly inequitable situation, especially coming as it does at a time when for other reasons electric rates were already going up at an unprecedented rate. Ratepayers not only argue that they should not have to finance the conservation program but also that the failure of utilities to anticipate the current situation should assign the burden of increased costs to the utilities. The distribution of the burden of increased costs as the result of conservation between ratepayers and investors must be equitably resolved to serve the public interest on a case-by-case basis. This is what I submit. The issue of whether or not utilities can or should recover the impact of conservation upon reduced revenues and, therefore, their increased unit costs, or whether the consumer should bear part of that burden or all of it, is pending before our Commission. We are studying the issue. We denied a request for emergency rates by a New England utility system and have

set the matter for hearing and we hope that we will be able to decide the issue. This is not necessarily a test case. There will be others. Other utilities are applying for the same kind of treatment both before our Commission and as you said, before the many State commissions.

Chairman HUMPHREY. Yes.

Mr. NASSIKAS. And we hope that we can resolve that issue fairly when we receive all the evidence.

The energy problems that have become apparent in recent months, including shortages of fuel and escalating costs, have focused attention to a greater extent than heretofore on the design of electric rates. In my prepared statement, I discuss two rate design issues: One, the proposal for an "inverted rate design"; and two, peakload pricing. Although I believe that both of these concepts deserve further consideration and research, I believe that cost related peakload pricing probably holds more promise immediately for efficient resource allocation and fair treatment of consumers than does the inverted rate proposal which does not necessarily reflect the pattern of costs in relation to providing the service.

Chairman HUMPHREY. Just for the novices around here, when you talk about peakload pricing, would you be kind enough to put that out in consumer language?

Mr. NASSIKAS. Yes. Peakload pricing in its simplest terms would be to assign the costs of providing service at peak to those consumers for whom the peak capacity was provided.

Chairman HUMPHREY. I see.

Mr. NASSIKAS. In other words, if there is provision for additional plant, additional transmission, additional distribution systems, to provide service to meet a very large peak that might occur—it might occur at 4 in the afternoon, it might occur at 6 or 7 p.m.—then, the cost of providing that service continuously to all users where that plant, over the course of perhaps another 22 hours, might not be fully utilized should be assigned on a cost basis to those consumers using the service.

The inverted rate concept is different. Inverted rates in simplest terms are rates where the rate increases as usage increases. The current structure in the electric utility industry is basically the reverse.

Chairman HUMPHREY. Yes.

Mr. NASSIKAS. They are promotional rate designs which are designed to promote the use use of electric power by charging less as you use more.

I believe that the tilt should go in the direction of flattening out the curve. I am not saying that inverted rates should not be tried. I am saying that the evidence is not yet sufficient for me to say that this should be adopted before we get into an evidentiary proceeding before our Commission to determine its validity as a matter of public policy. In fact, I state in my prepared statement, and perhaps in my summary statement, too, that I think on an experimental basis that inverted rates should be tried in different market areas of the country in addition to the peakload concept actually being adopted by State commissions and by our Commission as we go along.

Chairman HUMPHREY. Peakload, in other words, refers even to change in the rate structure at certain hours of the day, does it not?

Mr. NASSIKAS. Yes. I should have said that. You have a peakload over a 24-hour cycle. There also are diversity exchanges as to seasonal peakloads between utility systems. And, of course, some day we may be able to follow the sun and perhaps transmit load from east to west or vice versa, depending upon where the peakloads fall, where the coincident loads or divergent loads may fall.

Now, for the balance of 1974 and for the next few years the electric utility prices will probably continue to increase. I believe that the price of electricity is going to continue to go up regardless of whether inflation is brought under control. If inflation is not brought under control, I think we will see a tripling of electric utility rates long before 1990 for the following reasons: One, costs for environmental protection, which should not be underestimated; two, increases in the cost of coal and oil prices; three, increase in the overall cost of installing nuclear generation; and four, increased demand for capital and inflationary impact resulting in higher cost of capital.

Chairman HUMPHREY. By the way, on that nuclear generation do you think you should have emphasized also, Mr. Nassikas, the time factor—I guess you did—is about 10 years?

Mr. NASSIKAS. Yes, sir.

Chairman HUMPHREY. In Japan they do it in 5 years.

Mr. NASSIKAS. That is right. Same technology.

Chairman HUMPHREY. Same equipment.

Mr. NASSIKAS. Same equipment. So that something must be wrong with our own energy policy structure which prohibits this.

Chairman HUMPHREY. In Japan a citizen does not go into court to say I do not like where it is placed. In the United States you have a little trouble even getting a croquet court located now.

Mr. NASSIKAS. I agree with you. That is part of it, Senator Humphrey. Another point which I think is major as to why it takes us longer to do things in the United States is our State Federal system which we have to protect.

Chairman HUMPHREY. Yes.

Mr. NASSIKAS. But where you have State-Federal dichotomy we get into delays, inevitable delays, and we can carry this through to counties——

Chairman HUMPHREY. You have your regional planning commission, you have your city and I think it ought to also be emphasized for the purpose of objectivity in this record, if you have a timespan of 10 years, let us say, for a nuclear installation in the United States as compared to 5 years in Japan, this affects rates structure.

Mr. NASSIKAS. It does.

Chairman HUMPHREY. Because during that period of time you have to pay for money borrowed over a longer period of time in which you have little or no production.

Mr. NASSIKAS. Right.

Chairman HUMPHREY. So that the Japanese are actually able to take exactly the same facility, put it in in 5 years, thereby cutting back on their interest cost on the nonproductive period.

Mr. NASSIKAS. Yes. Well, even hydroelectric projects, of course, have been involved in enormous waste. For example, the High Mountain Sheep case has been pending for years; Ithink I was a young man when this thing started 22 years ago.

Chairman HUMPHREY. I have one just as good. There is a Cedar Avenue bridge over the Minnesota River we have been arguing about for 22 years. Wait a minute. Longer that that. I started as Mayor—1946. We have still got the same old bridge. It was put in there by Ichabod Crane. It is unbelievable, unbelievable. You would not believe that this could happen, the same people, but still going on, same old bridge, but the Lord will take care of us. It is going to fall down in a couple of years and then only the pure people will be able to walk across the river. The rest of us will just stay on the other side.

Mr. NASSIKAS. It is just a question of time.

Chairman HUMPHREY. Yes. Go ahead.

Mr. NASSIKAS. The Storm King Project in another example. The application for this facility was filed with te FPC for a pumped storage project in New York State back in 1962. The Commission in 1964, a predecessor Commission, certified the project. It was appealed to the courts. The case was reversed, remanded to the Commission. More evidence was taken.

When I became chairman I wrote a unanimous decision for the Commission in 1970. This went all the way to the U.S. Supreme Court where certiorari was denied and the project has been certified except that there are now other proceedings that have been initiated before the Commission and further appeals have been taken to the courts. The project still is not extant.

Chairman HUMPHREY. I know when my son became a lawyer—I am a pharmacist. I was able to dispense pills that cured the ills. Lawyers find no cures.

Mr. NASSIKAS. In a way. Senator Humphrey, I do not know why I ever made this choice. But anyway, our best hope for resolving problems of electricity supply and rates in the long run seems to me to be dependent upon these factors I have set forth here, inflation control. eliminate delay, development of environmentally acceptable domestic fossil fuel resources, and research and development.

With respect to research and development, there has been increased recognition on the part of the electric power industry of the need for expanded R.&D. programs. Industry expenditures doubled and redoubled over the period 1970 through 1972. In addition, a major step was taken in 1972 when the electric utilities formed the Electric Power Research Institute to direct and conduct an industry program of electric power R.&D. The Institute is now in full operation, well that is going a little too far. It really is not in full operation. The organization is there, the management has been organized, but it is far from being in full operation with the kind of expenditures that should be invested by the utilities.

One of the problems is, of course, that the method of funding the program has to be approved by State commissions and to the extent we are involved, by the Federal Power Commission, and this takes time.

I do not state this here, but I think I should—the R.&D. programs by the Federal Government, both various bills that were presented by the Congress and by Senators and various committees as well as the present administration's accelerated R.&D. programs, are very important factors in the overall development of increased, more efficient utilization of energy, and the development of new forms of energy. They may offer promise for a major breakthrough some time; $10 billion, for instance, over the course of the next 5 years is the proposal of the administration; $20 billion over the course of the next 10 years is another major proposal in Congress. And there are other energy R.&D. proposals pending too.

Chairman HUMPHREY. And then there is a number of bills that are being reported now on the Joint Committee on Atomic Energy, geothermal, solar energy, and other forms of energy development.

Mr. NASSIKAS. Yes, sir. Now, the concluding portion of my prepared statement provides an overview of FPC rate regulatory policy with respect to the natural gas industry. I should state that our jurisdiction is far more pervasive as to natural gas regulation than electric power regulation. We do determine the rates for producers at the wellhead and determine the rates from the wellhead as by interstate pipelines and we also grant transportation certificates and sales certificates. Our jurisdiction is extensive except for the retailing of gas which is controlled by the State commissions.

We also have exclusive jurisdiction over LNG imports as to both feasibility and public interest considerations; that is, liquified natural gas imports as well as imports from Canada and Mexico.

The Canadian aspect is an extremely important aspect of our future natural gas supply. We currently import about 5 percent of our natural gas requirements from Canada, a little over 1 trillion cubic feet.

I have appended to my prepared statement a summary statement on the natural gas producer rate policy which I presented on February 19, 1974, at an oversight hearing before the Senate Commerce Committee. That statement reflects the Commission's efforts to regulate wellhead prices for natural gas so as to promote the consumers' interest in reliable and adequate gas service at reasonable rates. I believe that the summary statement which I have appended is relevant to the purpose of this hearing and I would request your indulgence that I include that in the hearing record.

Chairman HUMPHREY. Indeed, we welcome it. Thank you very much. We will see that it is included.

Mr. NASSIKAS. Curently natural gas is sold at the wellhead to interstate pipeline companies representing 70 percent of the national market at an average price of 25 cents per thousand cubic feet. Let me translate that figure for a second here. That would be equivalent to oil at a $1.50 a barrel on a Btu basis: 25 cents times 6, $1.50. That would be equivalent to 1 ton of coal, 26 times, my computer would tell me about $6.50 there.

Chairman HUMPHREY. About half the price of coal.

Mr. NASSIKAS. Right.

Chairman HUMPHREY. And about a fourth of the price of oil.

Mr. NASSIKAS. Yes. On a Btu basis.

A staff study prepared at my request shows that natural gas committed to the interstate market under all pricing procedures for the years 1971 to 1973, the two most recent years, totaled 3.1 trillion cubic feet at an average price of a little less than 33 cents per million cubic feet. The price of new gas commitments to the interstate market ranged on average from 28.41 cents in 1971, 29.67 cents in 1972, to 39.35 cents per thousand cubic feet in 1973. The reason that these figures are higher is that these are new gas dedications to the interstate market at a higher price through our Commission policies where we have allowed the price to rise for new gas commitments. The flowing gas price is a 5 cents which is 85 to 90 percent of all gas in any event. We have about 16 trillion cubic feet that flows in the interstate market and another 8 trillion that flows in the intrastate market. The flowing gas price is still 25 cents, as I said earlier.

During the same period long-range dedications under area rates declined from 52 percent of new commitments in 1971 to 44 percent in 1972 and down to 25 percent in 1973.

Chairman HUMPHREY. You mean, in other words, is this a trend of usage?

Mr. NASSIKAS. This is a trend of long-range commitments. The long-range commitments on a percentage basis are going down.

Chairman HUMPHREY. Yes.

Mr. NASSIKAS. We would rather have the long-range commitments go up and the short-range commitments go down.

Chairman HUMPHREY. Are these commitments by producers that you are talking about?

Mr. NASSIKAS. Yes. Producer sales to interstate pipeline companies, yes, sir, exactly. That is what they are.

Chairman HUMPHREY. So what you are really seeing is the shift to the intrastate where it is unregulated or regulated if at all by the State?

Mr. NASSIKAS. We are seeing some shift to the intrastate market but it is curious in a way that the relative percentage of gas flowing to the interstate market have not discernibly changed in the course of the past 3 years.

Chairman HUMPHREY. What we are seeing is a kind of a holding back on commitments, pressuring price?

Mr. NASSIKAS. It is entirely possible; part of this can be a holdback, although our studies show that so far the holdback is not substantial. We have conducted four major studies of national markets on uncommitted gas reserves. We have found so far that withholding of gas is insubstantial. We just sent staff over to a hearing earlier this week where I was not requested to testify—which is most unusual; I usually testify at these hearings rather than my staff—but anyway, at that particular hearing we presented a report for a special staff study of gas reserves in the Outer Continental Shelf, indicating that there are some additional gas reserves, 1.7 trillion cubic feet of gas reserves in the Federal domain south of Louisiana, over and

above the estimate of reserves as reported by the American Gas Association. So there is a holdback.

Chairman HUMPHREY. That is a rather substantial quantity, is it not?

Mr. NASSIKAS. Yes, 1.7 trillion cubic feet. I will tell you what that is equivalent to. That is just short of England's, Wales' and Scotland's entire gas supply.

Chairman HUMPHREY. And that was the miscalculation they made in terms of ascertaining reserves, right?

Mr. NASSIKAS. It may be a difference in reporting. We are not sure yet.

Chairman HUMPHREY. I want to tell you, if I were the arithmetic teacher, you would flunk.

Mr. NASSIKAS. It is being carefully examined to determine whether the reporting procedures are different and, therefore, that the lag is explainable. We have not passed judgment on it. Our staff is continuing to investigate it.

Also, I think this is an important point, Senator Humphrey, because it affects potential supplies of gas to consumers.

We also are conducting a study, we are trying to secure the assistance of the Department of the Interior, and so far they have cooperated with us, for shut-in gas wells. Also, a study of producible gas leases where a lease has been committed for purchase by a producer. It is a producible lease because a well has been bored. There is gas. The lease, nevertheless, is not being developed or produced. We want to find out what the basis is and what the approximate amount of reserves is that may be held under producible leases that are not being produced.

Interior has a rule applicable to what I am talking about, that in the course of 5 years a lease should be developed. Some of the leases that we are examining are ancient, beyond 5 years. We want to know why they have not been developed and we trust that this study may also produce some additional gas. At the same time, whether it does or does not, we feel responsible. We want to know the answer.

Chairman HUMPHREY. Right. I noticed here that the qualifying words on the dedications decline, are "area rates" and when I look over your summary statement I see the area rate ceiling, average price, is 24.36 Mcf and, of course, all the other rates for the different other kinds of pricing structure are substantially higher.

Mr. NASSIKAS. They are.

Chairman HUMPHREY. Now, is it fair to assume or am I correct in assuming that possibly the gas companies are refusing these long-range dedications because there are other rate structures under which they can deliver gas that are substantially higher?

Mr. NASSIKAS. There is no question about it, part of the reason for the switch from long-range dedications to short-range dedications is a question of price. As I said earlier, we are currently reviewing under a national rulemaking proceeding a pricing structure to prescribe a uniform national rate by all areas for the United States. We noticed this in April of 1973. Our decision should be out some time

in the course of the next few months. I cannot predict when. The only reason I cannot is that we noticed just last week not only this discrepancy of 1.7 trillion cubic feet that I mentioned earlier, and we want commentary on this and we want analysis on this before we make our determination of where price levels should be to elicit new supplies, but we also noticed for comment some other questions that relate to the economics of producer ratemaking.

In the course of the next 60 days we should have all the commentaries received on that and then in the next few months hopefully issue a national rate. If we can prescribe national rates by rulemaking, and two courts have told us we can, which is very salutary—I started this kind of concept, by the way, 2 months after I became Chairman of this Commission in 1969. But regrettably, the first test case was appealed to the courts and then the appeal was withdrawn. I wanted a test case to see if we could legally prescribe rates by rulemaking instead of an adjudicatory proceeding.

Chairman HUMPHREY. Yes.

Mr. NASSIKAS. The court finally, the 10th Circuit, said yes. Certiorari was denied by the U.S. Supreme Court. One other court has given us dictum to the effect that we can prescribe rates by the use of rulemaking.

Chairman HUMPHREY. By the way, on the matter of reserves, I think I should note last evening on WMAL-TV, here in Washington——

Mr. NASSIKAS. I wish I had seen that.

Chairman HUMPHREY [continuing]. We had quite a go-around for 2 hours, a wide number of participants in the gas and petroleum business, Members of Congress, trucking industries, aviation, automobile, many users of petroleum, plus the citizen call-in, when the matter of the Louisiana reserve figure was brought up, the representatives of the petroleum industry said, yes, that is true on the basis of Louisiana, but that the estimates of the FPC on total reserves was actually lower than the estimates that had been projected by the industry.

Mr. NASSIKAS. That is true as to December 31, 1970.

Chairman HUMPHREY. Yes.

Mr. NASSIKAS. Our study was a statistical study and incorporated about 55 percent of the known fields and reservoirs in the United States. On that sampling basis, extrapolated for the Nation, a study that consumed about a year and a half and 22 full-time geologists, petroleum experts and engineers, employed by the Federal Power Commission—by the way, not an industry study, but a Federal Power Commission study—we found that there were about 10 percent less reserves according to our staff than reported by the industry for that year.

Now, what it would be for 1971 and 1972, is another question.

Chairman HUMPHREY. So really you have to put it in a time frame is what you are saying.

Mr. NASSIKAS. We must. And the time series is extremely important, I believe, in pricing gas and also in determining where trends

are going. You cannot use a spot test year and come out with a definitive result. It is better to use a longer series because of the nature of the particular business.

According to our staff review—I will not read all the figures in the table of my summary statement[1] but you can see that the prices in 1973 average 39.35 cents. Under our 180 day emergency sales about 230 million Mcf were committed to the interstate market through March 15. The average price for these sales I believe as of 8 days ago—I get daily reports on this but I have not looked at this now for about 8 days—was 54.1 cents.

Chairman HUMPHREY. So we are seeing under these procedures, then, a substantial increase in price?

Mr. NASSIKAS. We are seeing a substantial increase in price. That was an emergency procedure. It has now been terminated by order of the Commission. The idea of it was to be sure that we survived the winter and with the aid of weather and some policies—I happen to think this is a very salutary policy—we succeeded in getting through the winter.

Chairman HUMPHREY. What bothers me about this area rate and the long-range dedications is that this pattern of the variables in price is also applied to fuel oil and other petroleum products. For example, school districts that would want to make a full-year contract, for example, under fuel oil, were unable to get it, or aviation services that wanted to purchase jet fuel over a year on a year's contract or 2 years' contract were unable to get it. Now, they were able to get the oil on a 30-day basis but they got it at a much higher price.

Mr. NASSIKAS. Yes.

Chairman HUMPHREY. And what has bothered me as a Senator, here to try to be fair about this, is that you are seeing a pattern in the petroleum industry and related products of getting away from long-term contracts that give some price stability and moving into the short-term arrangements which permit wide increase—very substantial increases in prices. And you find the same thing, for example, while this is way out of your jurisdiction, in what we call the filling station operation. I mean, I know dozens of filling station operators that are only getting—well, really, they do not get any guarantee of delivery even for 30 days. They just buy it on a current market basis and this is driving people out of business, increasing the profits and raising the prices.

Mr. NASSIKAS. No question about it. There is a relationship or correlation between one-third of our energy supply which is natural gas and the price of other fuels. Historically natural gas prices have kept down the price of coal, for instance. Take the present situation. As a regulator, I would like nothing better than to reduce the price to the consumers if this is consistent with providing service. The trouble is that the forces are all in the other direction today. To provide the service, the forces seem to be in the direction of higher prices.

[1] See table, p. 40.

Now, even at 50 cents a thousand cubic feet or a million Btu for natural gas, this is still $3 oil and the regulated price of oil for old oil in the United States today is at $4.25.

Chairman HUMPHREY. $5.25.

Mr. NASSIKAS. $5.25. It went up a $1. to $5.25 and with so-called new oil from stripper wells or new oil that increases production beyond the base year of 1972, we are dealing in $9 oil. So that actually, our natural gas prices, even with some of our procedures here—innovative procedures, still seem to be at least comparable on a Btu basis. However, it is very unfair, I believe, for those who advocate a theory that natural gas should be priced on an exactly equivalent Btu basis at the wellhead with crude oil. There are vast differences between the economics of a crude oil reservoir and a natural gas reservoir as to what the ultimate production will be, its ultimate end use, and its ultimate profit. So a fairer comparison which I have always tried to use in testimony before committees or elsewhere is to see where the price of gas might be in various market areas. What does the consumer pay for gas at his burner in comparison to the price of No. 2 fuel, for instance, in a comparable consumer purpose? Well, table 8-A and table 8-B in my prepared statement summarize in various market areas of the United States and by selected cities the comparable Btu price of electricity, the Btu price for gas and for heating and nonheating purposes, and the price of No. 2 fuel oil. Without going through all of the detail, it is apparent that the price of No. 2 fuel oil has escalated far higher than the price of natural gas because the price of natural gas has been restrained by the Federal Power Commission largely at the wellhead.

If a consumer pays $2. in New York City for a thousand cubic feet of gas, and he uses 100,000 cubic feet, then he is going to have a $200 bill.

Now, if the price of gas at the wellhead would have doubled from 25 cents to 50 cents, that consumer's price would approximate $2.25 or about a 10- to 12-percent increase. This is not to say that this justifies any kind of an increase in price but a fair comparison would indicate that consumers are getting their biggest energy bargain in the United States today in natural gas prices.

Chairman HUMPHREY. Yes. I understand that. I think this is very helpful for our record because all these fuels are competitive and they surely are particularly for all users, home users, industrial users, or utilities.

Mr. NASSIKAS. Let me state here just to complete this, without going through the remanider of my summary statement, simply asking that you incorporate it——

Chairman HUMPHREY. We are going to incorporate the whole summary statement as written along with your prepared statement.

Mr. NASSIKAS. Let me just back away a second here and mention incremental pricing, which I have not mentioned yet.

In the so-called El Paso-Algeria import case there were three importing pipeline companies, Consolidated Gas, Southern Natural Gas, or Southern Energy Co., a wholly owned subsidiary of Southern Natural Gas, and Columbia Gas. We decided by a rather split vote

of the Commission that we should have incremental pricing. That is, if the gas is delivered dockside United States, or into a liquefaction plant, and then is vaporized as gas at about a dollar a million Btu, that is a round figure, that is the approximate price of that particular import, then the purchasing pipeline company in selling to a distributor for resale must charge that incremental price of $1 rather than rolling it into his average cost of purchased gas which might be at 45 cents, in round figures, at that same point of delivery, in the northeastern part of the United States.

We did not, however, impose incremental pricing in our final order to the point of consumption. That is, we did not say as a condition of the purchase by the distributor that the distributor must charge the incremental price rather than rolling it into his customers. The impact of incremental pricing would be—insofar as allocating a resource is concerned—more effective if incremental pricing were to be imposed down the line to the point of consumption. There is a question, and this has not been resolved by the courts, the courts are currently grappling with this issue in the fifth circuit as to whether we were right or wrong legally in imposing incremental pricing to the point of purchase by the distribution company. The legal point that is unresolved is whether we can impose as a condition of sale to a distribution company that they must charge in their tariff to their ultimate consumer the same price. I cannot pass judgment on that because it is likely to come up before us.

[The following information was subsequently supplied for the record by Mr. Nassikas in the context of the above colloquy:]

The litigation concerning the incremental pricing of LNG imports, *Columbia LNG Corp.* v. *FPC*, No. 72-3122 *et al.* 5th Cir. On March 25, 1974, the Court of Appeals remanded Opinion No. 622 in the *Columbia LNG* case holding that there was a lack of substantial evidence in the record to support our decision requiring the incremental pricing of LNG. This issue is again, therefore, before the Commission for review. The court's decision is enclosed for your information.

INDEXED

COLUMBIA LNG CORPORATION and Consolidated System LNG Company, Petitioners,

v.

FEDERAL POWER COMMISSION, Respondent.

SOUTHERN NATURAL GAS COMPANY and Southern Energy Company, Petitioners,

v.

FEDERAL POWER COMMISSION, Respondent.

Nos. 72-3122, 72-3251.

United States Court of Appeals. Fifth Circuit.

March 25, 1974.

By certificates of convenience and necessity issued by the Federal Power Commission, public utilities were allowed to import liquefied natural gas from a supplemental source of supply, but they were required to use incremental pricing in the sale of such gas to pipeline and wholesale customers. The utilities sought review. The Court of Appeals, Coleman, Circuit Judge, held that evidence was insufficient to sustain the Commission's order, entered after oral arguments without adequate presentation and sifting of evidence with appropriate findings, particularly in view of the fact that, under long-standing commission practice, rolled-in pricing had been approved for existing supply sources.

Vacated and remanded for evidentiary hearing.

1. Gas ⇐2

Under Natural Gas Act, order of Federal Power Commission was to be tested by "substantial evidence" requirement; more than mere scintilla and more than creation of suspicion of existence of fact to be established was required to sustain the order. Natural Gas Act, § 19(b), 15 U.S.C.A. § 717r(b).

2. Gas ⇐2

Evidence was insufficient to sustain Federal Power Commission's order, entered after oral arguments without adequate presentation and sifting of evidence with appropriate findings, requiring public utilities, which had contracted to purchase liquefied natural gas from Algeria as alternative source of fuel, to use incremental pricing in lieu of rolled-in pricing which had, pursuant to long-standing Commission practice, been approved for existing supply sources. Natural Gas Act, §§ 3, 7, 19(b), 15 U.S.C.A. §§ 717b, 717f, 717r(b).

Petitions for Review of an Order of the Federal Power Commission.

Before GEWIN, THORNBERRY and COLEMAN, Circuit Judges.

COLEMAN, Circuit Judge:

On June 28, 1972, the Federal Power Commission promulgated its Order No. 622, whereby Columbia LNG Corporation, Consolidated System LNG Company, and Southern Energy Company were granted Certificates of Convenience and Necessity under Sections 3 and 7 of the Natural Gas Act, 15 U.S.C. §§ 717b and 717f. By these certificates, the petitioners were allowed to import approximately 1,000,000 Mcf [1] of liquefied natural gas per day and to construct the necessary transportation and gasification facilities. This appeal asserts that the Commission's decision to require "incremental" pricing in sales of the liquefied natural gas was not based upon

1. 1,000 cubic feet.

substantial evidence as required by Section 19(b) of the Act, 15 U.S.C. § 717r(b). We vacate the Commission order and remand for further proceedings.

Early in 1970, anticipating a short fall in domestic supplies of natural gas to meet current demand, the petitioners and their parent companies, Columbia Gas System, Inc., Consolidated Natural Gas Company, and Southern Natural Gas Company, all registered public utilities, began searching for alternative sources of fuel. After considering a variety of supplements,[2] petitioners contracted with El Paso Algeria Corporation, a subsidiary of El Paso Natural Gas Company, to purchase what they considered to be the most economically feasible alternative. Under the terms of the various agreements, El Paso Algeria was to purchase the required amount of liquefied natural gas from Societe Nationale Sontarch, an Algerian state-owned company, and transport it to the petitioners' facilities on the East Coast of the United States. In total, the three petitioners contracted to purchase 1,000,000 Mcf of liquefied natural gas per day for a twenty-five year period beginning in 1976.

Upon reaching the United States this liquefied natural gas would be re-gasified and injected into the petitioners' transportation facilities. According to the evidence of record, this gas would be used only to service existing customers for the purpose of preventing curtailments of service.

In this time of the energy shortage and the quest for relief supplies, this case marks two rather important reference points in the effort to ease the domestic fuel problem. First, by granting the requested certificates the Commission has approved the largest importation scheme of liquefied natural

2. According to the findings of fact of the Administrative Law Judge, Algerian liquefied natural gas was a more desirable supplement than natural gas from Canada, Alaska, Mexico, Nigeria, Trinidad, Venezuela, or other Domestic Sources, gasified coal, reformed Naptha or other feedstocks such as Methanol or Oil Shale, or nuclear stimulated gas for a number of reasons—cost, supply, availability, etc.

gas, at the highest price, heretofore of record, $.80 per MMBtu.[3] Second, by its decision to require incremental pricing of imported fuels and the announcement that it will seriously and scrupulously review each case involving such, the Commission has, in effect, assumed an attitude of discouraging the use of imported supplements.

The controversy here arises over the Commission's requirement that the imported liquefied natural gas be sold on an incremental basis. Although something of a misnomer, the incremental marketing system ordered by the Commission provides for the sale of the imported gas by separate contracts and rate schedules. Originally, by Order No. 622, the petitioners were required to institute the following three-step program: (1) the filing of an incremental rate schedule for the separate sale of the liquefied natural gas, reflecting the commodity and transportation costs; (2) during curtailments the gas must be made available to customers who had not contracted for it; and (3) the gas could be sold only to wholesale customers who had established their own incremental schedules for separate sales to retail customers.

Immediately upon rendition of the Order, the Commission was inundated with petitions for rehearing, all alleging hardship and impossibility of performance and requesting an evidentiary hearing on these factors. The Commission responded only to the extent of hearing oral arguments.

The oral arguments consisted of two major points: (1) the administrative impossibility of implementing the incremental pricing system and (2) the advantages of the rolled-in pricing system. After argument, the Commission modified its original order[4] by eliminating the requirement of incremental pricing at the retail level as well as the requirement that liquefied natural gas be distributed to non-subscribers for that product during times of curtailment, thereby leaving only the

3. 1,000,000 British thermal units.

4. See, Federal Power Commission Order No. 622–A.

incremental sales to pipeline and wholesale customers. Unfortunately, both Orders No. 622 and 622–A were decided by only four members of the Commission. This is particularly troublesome because in Order No. 622–A the Commission was evenly divided, two–two, *on the merits* of whether to retain incremental sales as to pipeline and wholesale customers.

The record supports the petitioners' position that virtually all of the evidence presented below went to show how much the price would rise, using the Commission's time-honored tradition of rolling the new prices in with the old ones while letting all customers pay their pro rata share of the costs of the supplement.[5] Petitioners contend that since all of their customers will benefit from the added liquefied natural gas they should all bear the burden. The Commission, on the other hand, contends that in the absence of incremental pricing high priority users as decreed by Commission Order No. 431[6] would have to bear part of the cost of maintaining a supply for the low priority users, thereby placing an undue burden upon them. Under the incremental method, the high priority users—households, etc.—would not bear a higher price burden, and those whose services would be curtailed under Order No. 431 [dated April 15, 1971] would have an incentive due to higher fuel prices to seek alternative sources of energy.

The only real evidence supporting incremental pricing comes from testimony involving a special agreement between Southern and its largest subscriber, Atlanta Gas Light Company, in which Southern would offer its customers the option of

5. See Trunkline Gas Supply Company, 1949, 8 F.P.C. 250; Pandandle Eastern Pipe Line Company, 1951, 10 F.P.C. 185; American La. Pipeline Company, 1954, 13 F.P.C. 380; Trunkline Gas Company, 1959, 21 F.P.C. 704; El Paso Natural Gas Company, 1959, 22 F.P.C. 260; Kansas-Nebraska Natural Gas Company, Inc., 1961, 25 F.P.C. 448; Nucces Industrial Gas Company, 1971, 45 F.P.C. 1224.

6. The Commission in Opinion No. 622 stated:
"We may note that under our Order No. 431, issued April 15, 1971, jurisdictional pipelines are required to file curtailment plans where curtailment is necessary; and Columbia Gas Transmission, Consolidated Gas Supply & Southern Natural have all done so."

either having the price of the liquefied natural gas rolled in with the domestic or contracting separately for the service under a different rate schedule. In substance, this testimony was only an afterthought and dealt with the theoretical economic feasibility of such a program. No testimony was taken as to the administrative problems which might arise, what the cost of implementation might be, or how the public interest could best be served.

[1] The result is that we must determine whether the Commission has met the "substantial evidence" requirement of Section 19(b), 15 U.S.C. § 717r(b); for if it has not, this Court may not affirm its action, S. E. C. v. Chenery Corporation, 1947, 332 U.S. 194, 67 S.Ct. 1575, 91 L.Ed. 1995.

Substantial evidence, as defined by the Supreme Court, means more than a mere scintilla and must do more than create a suspicion of the existence of the fact to be established, N. L. R. B. v. Columbian Enameling and Stamping Company, 1939, 306 U.S. 292, 59 S.Ct. 501, 83 L.Ed. 660. "It means such relevant evidence as a reasonable mind might accept as adequate to support a conclusion", Consolidated Edison Company v. N. L. R. B., 1938, 305 U.S. 197, 229, 59 S.Ct. 206, 217, 83 L.Ed. 126. "It must be enough to justify, if the trial were to a jury, a refusal to direct a verdict when the conclusion sought to be drawn from it is one of fact for the jury", N. L. R. B. v. Columbian Enameling and Stamping Company, 306 U.S. at 300.

[2] It seems clear to us that the record, as compiled, fails to sustain the proposition that incremental pricing is more desirable. Certainly, ten pages of testimony out of a total record of 14,500 pages of testimony, affidavits, briefs, opinions, etc. cannot suffice to justify departing from the long-standing Commission practice of approving rolled-in pricing.

The Commission argues that the petitioners had ample opportunity to present their case, pointing specifically to the granting of oral arguments on the petitions for rehearing. In the context of this case, oral argument, lacking an adequate

presentation and sifting of the evidence, with appropriate findings, is, we believe, not enough. The evidentiary hearing conducted below did not produce substantial evidence to support the Federal Power Commission's decision to use incremental pricing, and it did not explore the problems that incremental pricing would create. Therefore, we must remand for an evidentiary hearing that will examine the advantages and disadvantages of incremental pricing.

Vacated and remanded.

Mr. NASSIKAS. One second point on incremental pricing. We have no jurisdiction, Chairman Humphrey and Congressman Brown, over direct industrial sales at the Federal Power Commission. Over all, residential gas is about 25 percent of total consumption. Industrial sales and commercial sales and electric generation are the rest of it.

If a pipeline company sells gas directly to a utility, for instance, not for resale but to burn in the boilers, or as feedstock, for instance, or for an industrial use, for the—let us say in processed gas, in the manufacture of anhydrous ammonia fertilizer, in that kind of situation we have no jurisdiction.

I have advocated to the Congress and there is a bill before some of the committees, that our jurisdiction should be extended over direct industrial sales. I think that to allocate this resource effectively through pricing policies and rate design, that we should be privileged to determine the rate design apart from the initial rate charged under section 7(c) for a certificate of public convenience and necessity. We should have broad jurisdiction over the rate charged for direct industrial sales by pipeline companies throughout the term of the sale.

Chairman HUMPHREY. What you are really saying is about 65 percent of it escapes your jurisdiction today.

Mr. NASSIKAS. I am saying that——

Chairman HUMPHREY. Or 60 percent or something.

Mr. NASSIKAS. Well, it is not quite that. We still control the price of 60 to 70 percent of gas that flows, but a large part of the gas that is sold through direct industrial sales we do not control. The reason I say this, the reason there is a difference—your observation is well taken—is that many industrial sales are made by distribution companies for resale to industry.

Chairman HUMPHREY. Yes.

Mr. NASSIKAS. So that is the reason for the difference in the statistic. No, we still control 60 to 70 percent of all gas. We do not control the unregulated intrastate market. I have long advocated that our jurisdiction not be extended to that market. That is another controversy. I think that there are good arguments in favor of it. I think there are sounder arguments against extension.

This completes my statement and I will respond to further questions as we go along.

Chairman HUMPHREY. Very good. We are most grateful to you for a very enlightening and helpful discussion, Mr. Nassikas.

[The summary statement and prepared statement of Mr. Nassikas follow:]

SUMMARY STATEMENT OF HON. JOHN N. NASSIKAS

Mr. Chairman and members of the Subcommittee on Consumer Economics, I appreciate the opportunity to appear before your Subcommittee and present testimony concerning the outlook for gas and electric rates, in accordance with the request of Chairman Humphrey. The availability and prices of gas and electric service have become matters of widespread public concern during recent months as the public has listened to persistent appeals to conserve energy and has seen the prices of gas and electric energy rise more rapidly than ever before. In my testimony, I describe the extent of the increases in gas and electric prices that have occurred, the causes of the current situation, energy conservation and its relationship to the revenue requirements to the utilities, the role of rate design in energy conservation, and the outlook for the future. In general, my conclusions are that we have a long way to go to achieve the President's goal of energy independence for the United States by the 1980's and that we can expect substantial further increases in the prices of gas and electricity in 1974 and beyond.

The 1960's was a decade of relatively stable rates for electricity with a slightly downward trend reversing in about 1967 and increasing at an increasing rate since that time. By the end of 1972 residential rates had increased 15–19 percent above the 1967-68 level, while commercial rates had increased 18–23 percent and industrial rates 25–28 percent over the same period of time. During 1973 these rates continued to increase; the residential rate increase for that year was more than 7%. This is equivalent to at least a doubling of rates every 10 years. In some sections of the country, particularly in California and in the Northeast, where oil is an important fuel for electricity generation, the rates of increase over the past year have been much greater. For example, the increase in Los Angeles was nearly 28% while rates in New York City increased by nearly 50%.

The principal cause of these rate increases over the past year seems to have been increases in prices paid for fuels used for electricity generation, especially oil prices. For example, during the year ended January 1974, the price of oil purchased by Consolidated Edison Company, serving the City of New York, approximately tripled, while in New England and in California oil prices doubled. As a result of the widespread existence of fuel cost adjustment clauses under which electric utilities are able to automatically and almost immediately pass on to customers changes in the price of fuel used for generation, the escalating fuel costs have been rapidly reflected in the bills paid by consumers of electricity. For example, about 75 percent of the increase in the price of residential electricity in New York during the year ended February 15, 1974, was attributable to fuel adjustment clauses as compared with about 38 percent in Los Angeles and about 67 percent in Boston.

These unprecedented increases in fuel costs occurred during a time when the electric utility industry was already experiencing substantial cost increases springing from a variety of other sources. These include: (1) the increasing cost of providing facilities for the purpose of controlling air and water pollution; (2) increases in capital costs, particularly interest rates; and (3) increases in the cost of construction and equipment. In addition to these specific causes of cost increases to electric utilities, we have, of course, been in a period of general price inflation affecting all of the various kinds of labor and material costs experienced by electric utilities. From 1960-1967, while the general price level crept upward the price of electricity remained relatively constant or, in constant dollars, may be said to have gradually declined. From 1967 to the present, although the price of electricity has risen sharply it has not increased as rapidly as has the general price level: we may, therefore, say that from 1967 on, the average cost of electricity in constant dollars has continued to decline but at a much lesser rate of decline than during the first part of the 1960's. These, of course, are National averages. In certain areas, such as New

York and Los Angeles, electricity prices have been increasing more rapidly than the cost of living so that the price of electricity may be said to have increased in constant dollars in those areas.

As a result of fuel shortages and the conservation efforts resulting therefrom during the latter part of 1973 and continuing into 1974, many utilities have been experiencing customer demands substantially less than have been projected; a substantial number experienced load requirements less than a year earlier. It is ironic that the very success of these conservation programs has created a new problem in the form of sharply reduced revenues. As a result, utilities are claiming that without higher rates they will be unable to raise capital for the purpose of constructing facilities to meet their customers' needs or indeed to continue to operate at all. Efforts by the utilities to obtain increased rates on this basis have created a wave of public indignation and protest. Those groups of ratepayers that have been most cooperative in helping to conserve electricity find that they are the very ones being asked to pay higher rates as a direct result of this cooperation. This appears, to the average citizen, to be an exceedingly inequitable situation especially coming as it does at a time when for other reasons electric rates were already going up at an unprecented rate. Ratepayers not only argue that they should not have to finance the conservation program but also that the failure of utilities to anticipate the current situation should assign the burden of increased costs to the utilities. The distribution of the burden of increased costs as the result of conservation between ratepayers and investors must be equitably resolved to serve the public interest on a case-by-case basis. The issue is pending before several State commissions and the FPC.

The energy problems that have become apparent in recent months including shortages of fuel and escalating costs have focused attention to a greater extent than heretofore on the design of electric rates. In my prepared statement, I discussed two rate design issues: (1) the proposal for an "inverted rate design", and (2) peak load pricing. Although I believe that both of these deserve further consideration and research, I believe that cost related peak load pricing holds more promise for efficient resource allocation and fair treatment of consumers than does the inverted rate proposal which does not necessarily reflect the pattern of costs to provide the service.

For the balance of 1974 and for the next few years the electric utility prices will probably continue to increase. I believe that the price of electricity is going to continue to go up regardless of whether inflation is brought under control. If it is not brought under control, I think we will see a tripling of electric utility rates long before 1990 for the following reasons: (1) costs for environmental protection, (2) increases in the cost of coal and oil prices, (3) increase in the overall cost of installing nuclear generation, and (4) increased demand for capital and inflationary impact resulting in higher cost of capital.

Our best hope for resolving problems of electricity supply and rates in the long run seems to me to be dependent upon (1) our ability to control inflation; (2) our ability to bring new facilities, particularly nuclear facilities, on the line with substantially less delay than is occurring at the present; (3) development of environmentally acceptable domestic fossil fuel resources; and (4) a greatly expanded program of research and development. With respect to the latter, there has been increased recognition on the part of the electric power industry of the need for expanded R & D programs. Industry expenditures doubled and re-doubled over the period 1970 through 1972. In addition, a major step was taken in 1972 when the electric utilities formed the Electric Power Research Institute to direct and conduct an industry program of electric power R & D. The Institute is now in full operation, with key staffing complete. While an expanded program of electric power R & D represents an immediate modest increase in the electric power cost to the consumer, it is an investment which will tend to hold down electric power costs in the future and help insure that sufficient electric energy is available for the Nation's needs.

The concluding portion of my prepared statement provides an overview of FPC rate regulatory policy with respect to the natural gas industry. I have appended to my formal statement the summary statement on natural gas producer rate policy that I presented at an oversight hearing before the Senate Commerce Committee on February 19, 1974, That statement reflects the Commission's efforts to regulate wellhead prices for natural gas so as to promote the consumers' interest in reliable and adequate gas service at reasonable rates.

I believe that summary statement is relevant to the purpose of this hearing and I request that it be included in the hearing record.

Currently natural gas is sold at the wellhead to interstate pipeline companies representing 70 percent of the national market at an average price of 25 cents per Mcf. A staff study prepared at my request shows that natural gas committed to the interstate market under all pricing procedures during 1971 to 1973 totaled 3.1 Tcf at an average price of 32.85 cents per Mcf. The price of new gas commitments to the interstate market ranged on average from 28.41 cents in 1971, to 29.67 cents in 1972, to 39.35 cents per Mcf in 1973. During the same period long-range dedications under area rates declined from 52 percent of new commitments in 1971 to 44 percent in 1972 and down to 25 percent in 1973. As a result of our releasing small producers from area ceilings in 1971, there were additional long-range dedications of small producer sales to the interstate market in 1972 approximating 19 percent of new commitments (231 Bcf, of 1,206 Bcf), and in 1973 to almost 10 percent of new commitments (107 Bcf out of 1,116 Bcf).

According to the staff review, in 1973 the breakdown of volumes and prices of all new natural gas sales committed to the interstate market under various pricing procedures was as follows:

	Deliveries (1,000 ft³)	Average price (cents per 1,000 ft³)
Area rate ceilings	265,000,000	24.63
Optional procedure	87,006,000	39.93
Limited term sales	340,000,000	40.85
Small producer sales	107,000,000	42.43
60-day emergency sales	116,000,000	46.11
180-day emergency sales	201,000,000	50.41
Total	1,116,000,000	39.35

With respect to our regulation of the transportation and sale for resale of natural gas in interstate commerce, I have summarized major recent developments in natural gas pipeline rate cases at in my prepared statement. The most significant development in this area of our jurisdiction is our adoption of Opinion No. 671 on October 31, 1973 (*United Gas Pipeline*) in which we departed from the traditional *Atlantic Seaboard* rate design used by most pipelines since 1952, in favor of a design giving less weight to large volume users. This and other recent actions of the Commission reflect our efforts to minimize and equalize the effects of the natural gas shortage. For example, in light of the present demand for natural gas (as well as all other energy supplies for that matter) and our limited supply of this valuable resource the Commission has undertaken a review in individual cases of the pricing mechanisms of interstate pipelines with the objective of establishing pricing policies to ensure the conservation and fairest allocation of existing supplies.

In addition, we have adopted incremental pricing for pipeline sales of LNG and synthetic gas (SNG) supplements. The incremental approach assesses the costs of the project to those who receive the benefit of the new forms of gas. Thus those who do not benefit do not subsidize those who do. On the other hand, some of the advantages of rolled-in pricing are (1) there is displacement of conventional gas to enable service to meet existing contract demands, (2) load factors are markedly improved, (3) there is a beneficial cash flow enabling the pipelines to provide better facilities and service to all customers, (4) there are reduced capital costs to the extent pipelines have improved overall financial conditions upon which investment risk is measured, and (5) the LNG supplement to gas supply will reduce the reliance on other fuels which are less advantageous in meeting our environmental objectives.

I have also included in my prepared statement, a discussion of purchased gas adjustment clauses (PGA) by which pipelines are able to pass along to their customers producer increases. Any rate change under the PGA must be at least one mill per Mcf of annual jurisdictional sales and the company must present at least 45 days' notice of the change, together with appropriate verifying calculations. As a general rule, but subject to stated exceptions, only two PGA rate changes are permitted each year. A deferred purchased gas cost

account is permitted wherein over and under charges are maintained in order to assure recovery of only those expenditures actually made, and to assure recovery of all purchased gas costs. Supplier refunds must be passed on to consumers and company rates are subject to complete review every 3 years.

The Commission will face many important gas pipeline rate questions in the future. Besides addressing the continuing questions of appropriate fixed cost allocations, the FPC will be faced with questions pertaining to the further development and application of its incremental approach, the determination of who should pay for idle pipeline capacity in periods of curtailment, and the desirability of various automatic adjustment clauses which would depart from our normal test year approach for setting rates. The resolution of these issues will depend upon the applicability of the Commission's regulatory standards and objectives and in part on the specifics of each case as it comes before us.

This concludes my statement; I will be pleased to respond to any questions you may have.

PREPARED STATEMENT OF HON. JOHN N. NASSIKAS

Mr. Chairman and members of the Subcommitte on Consumer Economics, I appreciate the opportunity to appear before your subcommittee and present testimony concerning the outlook for gas and electric rates, in accordance with the request of Chairman Humphrey. The availability and prices of gas and electric service have become matters of widespread public concern during recent months as the public has listened to persistent appeals to conserve energy and has seen the prices of natural gas and electric energy rise more rapidly than ever before. In my testimony I shall describe the extent of the increases in gas and electric prices that have occurred, the causes of the current situation, energy conservation and its relationship to the revenue requirements of the utilities, the role of rate design in energy conservation, and the outlook for the future. In general, my conclusions are that we have a long way to go to achieve the President's goal of energy independence for the United States by the 1980's and that we can expect substantial further increases in the prices of natural gas and electricity in 1974 and beyond.

At the outset, I would like to summarize briefly the major jurisdictional responsibilities of the Federal Power Commission in order to place our agency's role with respect to utility rates in perspective.

THE ROLE OF THE FEDERAL POWER COMMISSION

The jurisdiction of the Federal Power Commission extends to approximately 25 percent of domestic primary energy consumption (natural gas and hydropower) which includes more than two-thirds of the annual production of natural gas which was approximately 23 Tcf in 1973. We also regulate natural gas imports and exports, including liquefied natural gas (LNG). Under the Natural Gas Act we have jurisdiction over (1) the transportation of natural gas in interstate commerce (whether ultimately sold retail or wholesale), (2) its sale in interstate commerce for resale, and (3) natural gas companies engaged in such transportation or sale. Excluded from our jurisdiction are the local distribution of natural gas as well as the production and gathering of natural gas. We can neither compel producers to explore for or develop gas reserves nor dedicate such reserves to the interstate market. Since our ratemaking powers are limited to sales for resale in interstate commerce and do not extend to direct sales, we do not occupy the entire interstate field. Nor do we have authority either to compel producers to explore for or develop gas reserves or dedicate or commit gas to the interstate market.

Our jurisdiction over the production of electric energy is limited to the licensing and regulation of non-federal hydroelectric power projects. Our rate jurisdiction in the electric power area is considerably more circumscribed than our corresponding jurisdiction over the rates for the sale and transmission of natural gas in interstate commerce. Under the Federal Power Act we regulate about 15 percent of the kilowatt hours sold annually by jurisdictional electric companies (excluding interchanges) which represents less than 7 percent of the annual dollar volume of their sales. We have, however, been charged by the Congress with the responsibility of monitoring natural power supplies and "of assuring an abundant supply of electric energy throughout the United States with

greatest possible economy and with regard to the proper utilization and conservation of natural resources. . . "[1]

The most critical issues confronting the Commission in its regulation of the natural gas industry are the formulation of policies to correct our supply deficit, to allocate existing supplies for optimum utilization and to regulate the level and structure of rates to serve the interest of consumers in an adequate and reasonably priced gas supply. Similarly, our chief concerns in regualting the electric power industry are the formulation of policies and voluntary programs that will assure the availability of needed generation on a timely basis—including fuels to drive the turbines of thermal electric generating plants.[2] In addition, we are directly concerned with the encouragement of research and development to provide new and improved power sources, as well as the protection of the public interest in just and reasonable wholesale rate levels and adequate environmental protection in the construction and operation of jurisdictional power facilities.

EXTENT OF ELECTRIC RATE INCREASES

In the 1964 National Power Survey, the Commission estimated that the average cost of power to the consumer could decline 1.68 cents per kWh in 1962 to about 1.23 cents in 1980, a decline of approximately 27 percent. It must be emphasized that this estimate was on the basis of 1962 equivalent dollars and thus made no allowance for inflation. It was based upon the proposition that the unit cost of electricity would fall principally as a result of economies of scale to be obtained from the installation of generation and transmission of facilities of larger size by way of expanded interconnection and coordination of bulk power systems.

By 1968 the average cost of electricity had declined to 1.54 cents/kWh. However, in our 1970 Survey the Commission projected that that figure would rise by 1990 to 1.83 cents.[3] In terms of 1968 equivalent dollars this would constitute an increase over the 22-year period of a little less than 20 percent. The Commission noted that various average rates of inflation over that 22-year period would produce substantial increases in costs to the consumer. For example, at an average rate of inflation of 5 percent the price to the consumer over that period would more than triple to a figure of 5.35 cents/kWh. In order to put this in perspective it should be noted that the 1.54 cents/kWh is an overall average revenue figure. The comparable figure in 1968 for residential revenue was in the order of 2.3 cents/kWh or about 50 percent higher than the average. If we apply that ratio to the projection of 5.35 cents for 1990 we get a figure of about 8 cents/kWh. For a typical residential consumer using about 7,000 kWhs per year in 1990 this might mean an annual electric bill of about $560 as compared with $161 in 1968.

Table 1 shows the trends in average residential rates per kWh in cities with populations of 2,500 and more for various levels of usage. Tables 2 and 3 provide similar data for commercial and industrial service.[4] It will be noted that the 1960's was a decade of relatively stable rates for electricity with a slight downward trend reversing in about 1967 and increasing at a seemingly increasing rate since that time. By the end of 1972 the average bills in each of the categories of residential service set forth in Table 1 had increased 15–19 percent above the 1967–68 level. Commercial service increased 18–23 percent and industrial service increased 25–28 percent over the same period of time.

[1] Federal Power Act, §202(a), 16 U.S.C. 824a(a).

[2] In an August 1970 statement to the National Press Club I stated: "I believe that the basic fossil fuel shortage is the most acute phase of our developing energy crisis, dwarfing the formidable problem of installing adequate generation and transmission facilities to meet short-term demand."

[3] The 1970 Power Survey forecast underestimated the impact on higher fuel costs on electric rates.

[4] Data for commercial and industrial service is limited to cities having populations of 50,000 or more.

TABLE 1.—NATIONAL WEIGHTED AVERAGE BILLS FOR RESIDENTIAL SERVICE, 1935–73.

[Cities of 2,500 population and more]

Date	Average bill					Average charge per kilowatthour (amts.)					Index of average bill (1967=100)				
	100 kWh	250 kWh	500 kWh	750 kWh	1,000 kWh	100 kWh	250 kWh	500 kWh	750 kWh	1,000 kWh	100 kWh	250 kWh	500 kWh	750 kWh	1,000 kWh
Jan. 1:															
1973	$4.65	$8.67	$12.56	$16.96	$21.85	4.65	3.47	2.51	2.26	2.19	115.4	117.6	121.1	119.4	119.3
1972	4.51	8.35	11.99	16.14	20.70	4.51	3.34	2.40	2.15	2.07	111.9	113.3	115.6	113.6	113.0
1971	4.25	7.84	11.13	14.99	19.24	4.25	3.14	2.23	2.00	1.92	105.5	106.4	107.3	105.5	105.0
1970	4.09	7.51	10.51	14.22	18.31	4.09	3.00	2.10	1.90	1.83	101.5	101.9	101.4	101.1	99.9
1969	4.05	7.40	10.32	13.97	18.03	4.05	2.96	2.06	1.86	1.80	100.5	100.4	99.5	98.3	98.4
1968	4.03	7.38	10.37	14.16	18.27	4.03	2.95	2.07	1.89	1.83	100.0	100.1	100.0	99.6	99.7
1967	4.03	7.37	10.37	14.21	18.32	4.03	2.95	2.07	1.89	1.83	100.0	100.0	100.0	100.0	100.0
1966	4.00	7.34	10.34	14.19	18.32	4.00	2.94	2.07	1.89	1.83	99.3	99.6	99.7	99.9	100.0
1965	4.02	7.38	10.41	14.34	18.59	4.02	2.95	2.08	1.91	1.86	99.8	100.1	100.4	100.9	101.5
1964	4.03	7.43	10.61	14.51	18.86	4.03	2.97	2.12	1.93	1.89	100.0	100.8	102.3	102.1	102.9
1963	4.06	7.48	10.64	14.65	----	4.06	2.99	2.13	1.95	----	100.7	101.5	102.6	103.1	----
1962	4.06	7.48	10.66	----	----	4.06	2.99	2.13	----	----	100.7	101.5	102.8	----	----
1961	4.05	7.45	10.64	----	----	4.05	2.98	2.13	----	----	100.5	101.1	102.6	----	----
1960	4.04	7.44	10.62	----	----	4.04	2.98	2.12	----	----	100.2	100.9	102.4	----	----
1959	3.98	7.36	10.51	----	----	3.98	2.94	2.10	----	----	98.8	99.9	101.4	----	----
1958	3.93	7.30	10.47	----	----	3.93	2.92	2.09	----	----	97.5	99.1	101.0	----	----
1957	3.89	7.23	10.39	----	----	3.89	2.89	2.08	----	----	96.5	98.1	100.2	----	----
1956	3.86	7.21	10.36	----	----	3.88	2.88	2.07	----	----	96.3	97.8	99.9	----	----
1955	3.82	7.18	10.30	----	----	3.86	2.87	2.06	----	----	95.8	97.4	99.3	----	----
1954	3.88	7.10	10.23	----	----	3.82	2.84	2.05	----	----	94.8	96.3	98.6	----	----
1953	3.81	7.08	10.20	----	----	3.81	2.83	2.04	----	----	94.5	96.1	98.4	----	----
1952	3.76	6.97	10.08	----	----	3.76	2.79	2.02	----	----	93.3	94.6	97.2	----	----
1951	3.74	6.95	10.02	----	----	3.74	2.78	2.00	----	----	92.8	94.3	96.6	----	----
1950	3.76	6.98	10.11	----	----	3.76	2.79	2.02	----	----	93.3	94.7	97.5	----	----
1945	3.89	7.09	10.19	----	----	3.89	2.84	2.04	----	----	96.5	96.2	98.3	----	----
1940	4.06	7.37	10.55	----	----	4.06	2.95	2.11	----	----	100.7	100.0	101.7	----	----
1935	4.67	8.91	13.87	----	----	4.67	3.56	2.77	----	----	115.9	120.9	133.8	----	----

Source: Federal Power Commission, "Typical Electric Bills," 1973, p. x.

TABLE 2.—NATIONAL WEIGHTED AVERAGE BILLS FOR COMMERCIAL SERVICE—1935-73

[Large cities only]

Date	Average bill				Average charge per kWh (cents)				Index of average bill (1967=100)			
	6 kW, 750 kWh	12 kW, 1,500 kWh	30 kW, 6,000 kWh	40 kW, 10,000 kWh	6 kW, 750 kWh	12 kW, 1,500 kWh	30 kW, 6,000 kWh	40 kW, 10,000 kWh	6 kW, 750 kWh	12 kW, 1,500 kWh	30 kW, 6,000 kWh	40 kW, 10,000 kWh
Jan. 1:												
1973	$31.80	$62.53	$193.67	$285.97	4.24	4.17	3.23	2.86	118.7	123.4	121.0	121.8
1972	30.40	59.65	184.76	272.50	4.05	3.98	3.08	2.73	113.5	117.7	115.4	116.0
1971	23.45	55.88	171.92	252.43	3.79	3.73	2.87	2.52	106.2	110.2	107.4	107.5
1970	27.09	51.64	162.91	239.37	3.61	3.44	2.72	2.39	101.2	101.9	101.7	101.9
1969	26.82	50.91	160.85	236.51	3.58	3.39	2.68	2.37	100.1	100.4	100.5	100.7
1968	26.72	50.75	160.39	235.71	3.56	3.38	2.67	2.36	99.8	100.1	100.2	100.4
1967	26.78	50.69	160.11	234.84	3.57	3.38	2.67	2.35	100.0	100.0	100.0	100.0
1966	26.72	50.56	159.67	234.29	3.56	3.37	2.66	2.34	99.8	99.7	99.7	99.8
1965	26.99	50.98	161.01	236.02	3.60	3.40	2.68	2.36	100.8	100.6	100.6	100.5
1964	27.35	51.59	163.00	237.37	3.65	3.44	2.72	2.37	102.1	101.8	101.8	101.1
1963	27.56	51.95	164.41	239.44	3.67	3.46	2.74	2.39	102.9	102.5	102.7	102.0
1962	28.04	53.13	164.67	241.17	3.74	3.54	2.74	2.41	104.7	104.8	102.8	102.7
1961	27.98	52.98	164.11	240.36	3.73	3.53	2.74	2.40	104.5	104.5	102.5	102.4
1960	28.15	53.51	165.12	241.81	3.75	3.57	2.75	2.42	105.1	105.6	103.1	103.0
1959	27.87	52.98	163.47	239.68	3.72	3.53	2.72	2.40	104.1	104.5	102.1	102.1
1958	27.70	52.54	162.88	----------	3.69	3.50	2.71	----------	103.4	103.6	101.7	----------
1957	27.44	52.00	160.71	----------	3.66	3.47	2.68	----------	102.5	102.6	100.4	----------
1956	27.33	51.95	160.05	----------	3.65	3.46	2.67	----------	102.2	102.5	100.0	----------
1955	27.20	51.65	159.16	----------	3.63	3.44	2.65	----------	101.6	101.9	99.4	----------
1954	27.06	51.34	158.16	----------	3.61	3.42	2.64	----------	101.0	101.3	98.8	----------
1953	27.00	51.25	158.03	----------	3.60	3.42	3.63	----------	100.8	101.1	98.7	----------
1952	27.48	53.02	159.40	----------	3.66	3.53	2.66	----------	102.6	104.6	99.6	----------
1951	27.35	52.71	158.06	----------	3.65	3.51	2.63	----------	102.1	104.0	98.0	----------
1950	27.64	53.52	160.75	----------	3.69	3.57	2.68	----------	103.2	105.6	100.4	
1945	29.96	55.41	166.21	----------	3.99	3.69	2.77	----------	111.9	109.3	103.8	----------
1940	31.76	57.04	170.96	----------	4.23	3.80	2.85	----------	118.6	112.5	106.8	----------
1935	37.09	61.16	182.23	----------	4.95	4.08	3.04	----------	138.5	120.7	113.8	----------

Source: Federal Power Commission, "Typical Electric Bills," 1973, p. xxi.

TABLE 3.—NATIONAL WEIGHTED AVERAGE BILLS FOR INDUSTRIAL SERVICE—1935–73

[Large cities only]

Date	Average bill			Average charge per kilowatthour (cents)			Index of average bill (1967=100)		
	150 kW, 30,000 kWh	300 kW, 60,000 kWh	1,000 kW, 200,000 kWh	150 kW, 30,000 kWh	300 kW, 60,000 kWh	1,000 kW, 200,000 kWh	150 kW, 30,000 kWh	300 kW, 60,000 kWh	1,000 kW 200,000 kWh
Jan. 1:									
1973	$790	$1,457	$4,402	2.63	2.43	2.20	124.8	125.7	128.6
1972	749	1,377	4,137	2.50	2.30	2.07	118.3	118.8	120.9
1971	692	1,269	3,774	2.31	2.12	1.89	109.3	109.5	110.3
1970	648	1,183	3,492	2.16	1.97	1.75	102.4	102.1	102.0
1969	636	1,163	3,436	2.12	1.94	1.72	100.5	100.3	100.4
1968	634	1,160	3,428	2.11	1.93	1.71	100.2	100.1	100.2
1967	633	1,159	3,422	2.11	1.93	1.71	100.0	100.0	100.0
1966	631	1,154	3,407	2.10	1.92	1.70	99.7	99.6	99.6
1965	634	1,160	3,423	2.11	1.93	1.71	100.2	100.1	100.0
1964	634	1,159	3,414	2.11	1.93	1.71	100.2	100.0	99.8
1963	638	1,167	3,442	2.13	1.95	1.72	100.8	100.7	100.6
1962	628	1,140	3,351	2.09	1.90	1.68	99.2	98.4	97.9
1961	624	1,136	3,337	2.08	1.89	1.67	98.6	98.0	97.5
1960	627	1,134	3,309	2.09	1.89	1.65	99.1	97.8	96.7
1959	622	1,124	3,283	2.07	1.87	1.64	98.3	97.0	95.9
1958	621	1,123	3,279	2.07	1.87	1.64	98.1	96.9	95.8
1957	616	1,111	3,235	2.05	1.85	1.62	97.3	95.9	94.5
1956	612	1,103	3,204	2.04	1.84	1.60	96.7	95.2	93.6
1955	606	1,091	3,168	2.02	1.82	1.58	95.7	94.1	92.6
1954	605	1,089	3,162	2.02	1.82	1.58	95.6	94.0	92.4
1953	601	1,086	3,154	2.00	.81	1.58	94.9	93.7	92.2
1952	583	1,046	3,042	1.94	1.74	1.52	92.1	90.3	88.9
1951	578	1,036	3,011	1.93	1.73	1.51	91.3	89.4	88.0
1950	580	1,043	3,024	1.93	1.74	1.51	91.6	90.0	88.4
1945	565	1,002	2,863	1.88	1.67	1.43	89.3	86.5	83.7
1940	565	995	2,828	1.88	1.66	1.41	89.3	85.3	82.6
1935	612	1,085	3,081	2.04	1.81	1.54	96.7	93.6	90.0

Source: Federal Power Commission, "Typical Electric Bills," 1973, p. xxvi.

Unfortunately, it appears that if the current trends in rates persist, rate levels will triple long before 1990. In fact, as the result of escalating fuel costs, electricity consumers in some parts of the country are paying as high as 50 percent more than last year. Table 4 shows the rates of increase in average bills for two different levels of residential monthly usage for annual periods from 1969 through 1973.

TABLE 4.—PERCENTAGE INCREASES IN MONTHLY RESIDENTIAL BILLS FOR 250 KWH AND 500 KWH FOR ANNUAL PERIODS 1969 THROUGH 1974

As of Jan. 1—	Percentage increase in monthly bills	
	250 kWh	500 kWh
1969–70	1.5	2.0
1970–71	4.5	5.9
1971–72	6.5	7.7
1972–73	3.7	4.8
1973–74	7.9	7.2

Source: Calculation from table 1, and from U.S. Department of Labor, Bureau of Labor Statistics, "Retail Prices and Indexes of Fuels and Utilities," December 1973.

It will be noted that the rate at which residential rates have been increased since 1969 has itself been increasing [5] although the rate of increase in 1973 appears to have been about the same as 1971. Nevertheless, the rate of increase for both 250 and 500 kWh during calendar year 1973 was more than 7 percent. This is especially significant when we bear in mind that an increase at a compound rate of 7 percent means a doubling of electricity consumption every 10 years. These figures, of course, only cover the period through December 1973 and there are

[5] The sharp drop-off in the rate of increase between June 1, 1972 and January 1, 1973, appears to have resulted, at least in part, from the price control program.

indications that the situation has worsened since then as rapidly escalating fuel costs have been passed through to consumers primarily by way of fuel costs adjustment clauses. It should also be noted that the figures in Table 4 are averages covering 56 metropolitan areas and smaller cities. In certain parts of the country, particularly Coastal areas where oil-fired generation is a significant proportion of the total, the increases have been substantially in excess of the 7–8 percent averages listed above. Table 5 provides data on monthly residential bills for 500 kWh of electricity in 10 selected cities as of February 15, 1974 as compared with February 15, 1973.

TABLE 5.—MONTHLY BILLS FOR 500 KWH OF RESIDENTIAL ELECTRICITY IN 10 U.S. CITIES, FEB. 15, 1973 AND FEB. 15, 1974

City	Bill		Percent increase
	Feb. 15, 1973	Feb. 15, 1974	
Boston	$17.56	$21.93	24.9
New York	25.13	37.08	47.5
Philadelphia	17.24	19.50	13.1
Washington, D.C.	15.01	17.43	16.2
Atlanta	11.02	12.89	17.0
Chicago	15.60	16.43	5.3
Houston	12.18	13.00	6.7
San Francisco	11.08	12.90	16.4
Los Angeles	12.85	16.41	27.7
Long Beach	14.35	19.56	36.3

Source: Special survey.

It will be seen from that table that increases have varied from 5.3 percent in Chicago to more than 47 percent in New York City. It will also be noted that increases in the State of California have been among the most severe in the Nation.

CAUSES OF ELECTRIC RATE INCREASES

The increased cost of electric power to the consumer can be attributed for the most part to four primary factors: (A) a marked escalation in the cost of fuel to the utilities, (B) environmental protection devices and procedures, (C) increased cost of capital and (D) effects of inflation on the cost to utilities of construction and equipment.

(A) *Fuel Costs.*—The principal cause of the increase in rates for electricity over the past year appears to have been increases in prices paid by electric utilities for fuels used in the generation of electricity. Of most importance has been the recent increases in oil prices, although prices of natural gas and coal have been rising also. In January 1974 utilities on the East Coast of the U. S. paid $1.58 per MMBtu for residual oil (or over $9.00 a barrel) used for electric power generation compared to a national average price per MMBtu in January 1973 of 65.3 cents (or less than $4.00 a barrel). Table 6 provides data on the average prices paid for fuels by seven selected electric utilities in January 1973 and January 1974. The severe increases in oil prices are evident from this table. Of the seven selected utilities. Consolidated Edison Company, serving the City of New York, appears to have been the most affected as the price of oil per million Btu approximately tripled. In New England, the figures for the Connecticut Light and Power Company show an approximate doubling in oil prices, while in the State of California the Pacific Gas and Electric Company figures indicate an increase in oil prices somewhat more than double the figure as of 1973.

TABLE 6.—AVERAGE PRICES FOR FUELS PAID BY SEVEN SELECTED ELECTRIC UTILITIES, JANUARY 1973 AND JANUARY 1974, IN CENTS PER MILLION BTU

	Distillate oil (No. 2)	Residual oil (No. 6)	Coal	Natural gas
Connecticut Light & Power Co.:				
January 1973		72.6		
January 1974		150.2	105.8	
Wisconsin Electric Power Co.:				
January 1973	85.6		40.9	46.7
January 1974	259.6		46.0	77.0
Commonwealth Edison Co.:				
January 1973		58.7	44.1	58.3
January 1974		67.4	52.1	80.1
Northern States Power Co.:				
January 1973	124.0	78.0	38.5	35.6
January 1974	190.6	115.0	39.2	37.4
Consolidated Edison Co. of New York:				
January 1973		71.4		46.3
January 1974		212.9		57.9
Pacific Gas & Electric Co.:				
January 1973		75.7		43.0
January 1974		160.2		49.2

Source: Special FPC staff survey.

For most utilities, increases in fuel costs are the only ones that can be immediately and automatically passed on to customers in the form of higher charges for service. This results from the fact that the rate schedules of many electric utilities contain so-called "fuel cost adustment" clauses which provide for the automatic pass-through of changes in fuel costs to customers served under the rate schedule. In the past, fuel cost adustment clauses of this sort were fairly common in wholesale electric rate schedules and in rate schedules covering sales to large industrial customers, primarily because under circumstances of relatively stable fuel costs the inclusion of a fuel adjustment clause in residential and commercial schedules was not worth the cost of administering the clause. More recently as fuel costs have become more volatile to avoid regulatory lag and assure cash flow there has been a trend in the direction of the inclusion of fuel adjustment clauses in electric rate schedules of all kinds. Table 7 presents data comparing the extent to which the use of fuel clauses were incorporated in rate schedules as regulated by state commissions in 1970 as compared with the present time. As shown in Table 7, the number of utilities having fuel cost adjustment clauses in their residential rate schedules increased from 69 companies as of January 1, 1970 to 127 companies as of January 1, 1973. The table further indicates that there have been substantial increases in the number of companies incorporating such clauses in their commercial and industrial rate schedules. For example, the percentage of total companies having fuel adjustment clauses in industrial rate schedules increased from 72 percent in 1970 to 83 percent in 1973.

As a result of the widespread existence of fuel adjustment clauses, the burden of escalating fuel costs on utilities has been rapidly shifted to consumers. For example, a substantial part of the increases in bills for 500 kWh of residential electricity in 10 U. S. cities shown in Table 5 represent the operation of fuel cost adjustment clauses. Table 8 shows the proportions of the increases in bills for 500 kWh of residential electric service attributable to the operation of fuel cost adjustment clauses in those 10 cities during the year ended February 15, 1974. It will be noted that in 8 of the 10 cities more than 40 percent of the increases during that period were attributable to fuel cost clauses; in 4 cities fuel costs account for more than two-thirds of the total increases in the bills.

TABLE 7.—NUMBERS AND PERCENTAGES OF ELECTRIC UTILITIES HAVING FUEL COST ADJUSTMENT CLAUSES IN RETAIL RATE SCHEDULES, JAN. 1, 1970, AND JAN. 1, 1973

	Jan. 1, 1970		Jan. 1, 1973	
	Number	Percent	Number	Percent
Residential rate schedules:				
Utilities canvassed	197	100	196	100
Utilities with fuel adjustment clauses	69	35	127	65
Commercial and industrial:				
Utilities canvassed	130	100	135	100
Utilities with fuel adjustment clauses:				
Commercial	76	58	104	77
Industrial	94	72	112	83

Source: Special FPC staff study.

TABLE 8.—PERCENTAGES OF INCREASE IN BILLS FOR 500 kWh OF RESIDENTIAL SERVICE ATTRIBUTABLE TO OPERATION OF FUEL ADJUSTMENT CLAUSES IN 10 SELECTED CITIES, FEB. 15, 1973 TO FEB. 15, 1974

	Percentage increase in bill	Percentage of increase attributable to fuel adjustment clause
Boston	24.9	67.5
New York	47.5	74.6
Philadelphia	13.1	49.1
Washington	16.1	68.2
Atlanta	17.0	32.1
Chicago	5.3	40.9
Houston	6.7	40.2
San Francisco	16.4	95.6
Los Angeles	27.7	38.5
Long Beach	36.3	46.6

Source: Staff study.

In Opinion No. 633, issued October 30, 1972, in the New England Power Company case, Docket E–7541, the Commission affirmed the proposition that appropriately designed fuel adjustment clauses are acceptable provisions to be included in wholesale electric rate schedules. Some have argued that the inclusion of a fuel adjustment clause in rate schedules eliminates or at least reduces the incentive of a utility to minimize its costs of fuel. I am inclined to think, however, that the principal problem of electric utilities in 1974 and over the next decade is obtaining an adequate supply of environmentally acceptable fuel to provide reliable service to its customers. If a utility makes an improvident purchase of fuels at a higher price than necessary, the excess cost is subject to being disallowed in the utility's cost of service upon which rates to the consumer are based.

Base on 1973 fuel purchase information supplied to the FPC (Form 423), it

appears that more than 80 percent of the coal burned under electric utility boilers could not meet 1975 State Implementation Plans as they apply to sulfur oxide emissions. Even with variances about 45 percent of the coal would fail to meet minimal air quality standards. These percentages when applied to the projected electric utility coal demand for 1974 of 410 million tons translate into a potential quality-coal deficit of from 185 to 330 million tons. The supply of low-sulfur oil for power plant use is superior to that of coal. Still there are considerable quantities of oil being burned today which are difficult to desulfurize and which also would not meet 1975 standards.

The Commission currently has pending a proposed rule-making in Docket R-479 to amend its regulations by prescribing a standard form of fuel adjustment clause in wholesale electric rate schedules which includes the issue of the need for incentives to minimize costs and alternative methods for achieving those results. The appropriate design of fuel cost adjustment clauses is a highly complex and controversial matter, and we have received extensive comments from over 50 utility groups, associations and individual systems concerning our proposed rulemaking. We are hopeful of completing our analysis of this matter in the near future and to issue an appropriate order in this rulemaking.

TRENDS OF PRICES FOR DISTILLATE OIL AND ELECTRICITY

Relative comparison of trends of retail prices for gas, distillate fuel (no. 2 fuel) and electricity charged to residential and commercial users in certain parts of the country can be made from statistical series on retail prices of fuels and electricity in representative cities prepared monthly by the Bureau of Labor Statistics. In Table 8a these price series have been converted to standard energy equivalents expressed as dollars per million British Thermal Units (Btu), thereby permitting a regional comparison of price trends among the key energy fuels and electricity and their relationships to each other.

Examination of the trends of retail prices in representative cities for the period 1961 through 1973 in Table 8b reveals a relatively stable and competitive relationship between gas and No. 2 fuel oil prevailing from 1961 through 1970, especially along the Eastern Seaboard. Since 1971, however, the retail prices of No. 2 fuel have escalated rapidly and are also disproportionately higher than increases in the retail prices of gas and electricity in almost all of the cities indicated in the table. Table 8b shows monthly retail prices for these key energy sources for the latest period available, July–December 1973. Price data for the 6-month period indicates substantial increases in the prices of gas, fuel oil and electricity throughout the country, but with the increases in the retail prices of No. 2 fuel oil continuing to outdistance increases in other energy sources. During the last 6 months of 1973, the price of No. 2 fuel oil increased 47 percent in New York and 15 percent in St. Louis, the latter city having the lowest increase of all of the cities represented. Increases in the retail prices of gas for heating during the 6-month period were highest in Houston, 53.7 percent, and Detroit, 14.9 percent. Six other cities had increases of over 5 percent in gas retail prices during the period. Electric power retail price increases of over 10 percent during July–December 1973 occurred in New York, Pittsburgh and Boston.

TABLE 8A.—ENERGY PRICES AT POINT CONSUMPTION IN 10 REPRESENTATIVE CITIES, 1961–73[1]

[Dollars per million Btu[2]]

December—	Baltimore, Md.				Boston, Mass.				Chicago, Ill.				Detroit, Mich.				New York, N.Y.			
	Gas		Oil (No. 2 fuel)	Electricity	Gas		Oil (No. 2 fuel)	Electricity	Gas		Oil (No. 2 fuel)	Electricity	Gas		Oil (No. 2 fuel)	Electricity	Gas		Oil (No. 2 fuel)	Electricity
	Heating	Non-heating			Heating	Non-heating			Heating	Non-heating			Heating	Non-heating			Heating	Non-heating		
1973	1.54	1.94	1.91	10.19	2.05	3.42	2.18	10.36	1.18	1.78	1.94	9.50	1.16	1.73	1.80	9.19	1.89	3.02	2.40	15.20
1972	1.55	1.95	1.39	9.78	1.89	3.21	1.46	8.92	1.10	1.67	1.34	9.03	.99	1.63	1.34	9.00	1.66	2.66	1.46	12.07
1971	1.51	1.91	1.38	9.21	1.80	3.07	1.48	8.97	1.05	1.62	1.33	8.89	.95	1.58	1.34	8.11	1.60	2.60	1.47	10.87
1970	1.31	1.71	1.37	7.89	1.57	2.74	1.42	8.49	.98	1.55	1.31	8.20	.87	1.44	1.34	8.27	1.38	2.38	1.37	10.14
1969	1.33	1.73	1.27	7.71	1.50	2.59	1.34	7.85	.94	1.51	1.23	7.52	.87	1.44	1.27	7.08	1.32	2.32	1.30	9.05
1968	1.25	1.64	1.25	7.57	1.44	2.51	1.27	7.85	.87	1.42	1.18	7.47	.85	1.32	1.22	7.08	1.30	2.28	1.26	8.92
1967	1.28	1.66	1.22	7.54	1.43	2.50	1.27	7.95	.94	1.49	1.18	7.44	.85	1.32	1.18	7.08	1.29	2.28	1.23	8.92
1966	1.28	1.67	1.19	7.48	1.42	2.49	1.25	7.95	.93	1.47	1.14	7.38	.85	1.32	1.17	7.08	1.30	2.29	1.21	8.84
1965	1.17	1.55	1.15	7.48	1.45	2.52	1.22	8.21	.93	1.45	1.14	7.28	.85	1.32	1.12	7.08	1.36	2.31	1.18	8.51
1964	1.34	1.73	1.11	7.54	1.42	2.50	1.14	8.25	.94	1.45	1.13	7.34	.86	1.32	1.12	7.08	1.36	2.26	1.14	8.42
1963		1.20	1.13			1.84	1.14			1.04	1.13		.84	.94	1.13			1.62	1.17	
1962		1.19	1.12			1.83	1.14			1.05	1.13		.83	.93	1.13			1.62	1.17	
1961		1.19	1.13			1.85	1.17			1.06	1.06		.83	.95	1.13			1.63	1.15	

	St. Louis, Mo.				Philadelphia, Pa.				Washington, D.C.				St. Paul, Minn.				Seattle, Wash.			
	Gas		Oil (No. 2 fuel)	Electricity	Gas		Oil (No. 2 fuel)	Electricity	Gas		Oil (No. 2 fuel)	Electricity	Gas		Oil (No. 2 fuel)	Electricity	Gas		Oil (No. 2 fuel)	Electricity
	Heating	Non-heating			Heating	Non-heating			Heating	Non-heating			Heating	Non-heating			Heating	Non-heating		
1973	1.18	2.02	1.90	8.77	1.71	2.37	1.89	10.41	1.60	2.17	2.15	9.59	1.12	1.97	1.90	8.26	1.34	2.13	1.96	3.90
1972	1.08	1.92	1.40	8.73	1.53	2.12	1.38	9.58	1.57	2.14	1.42	8.87	1.05	1.86	1.30	8.11	1.27	2.02	1.59	3.90
1971	1.09	1.92	1.39	8.26	1.37	1.92	1.36	9.22	1.50	1.87	1.42	7.86	1.25	1.83	1.30	7.86	1.25	2.01	1.60	3.81
1970	.98	1.80	1.34	7.75	1.43	2.01	1.37	7.88	1.35	1.72	1.38	7.85	.90	1.62	1.28	7.13	1.16	2.04	1.57	3.56
1969	.91	1.73	1.25	7.68	1.38	1.95	1.27	7.27	1.36	1.72	1.27	7.03	.88	1.58	1.23	7.15	1.16	1.99	1.46	3.56
1968	.84	1.59	1.20	7.27	1.38	1.95	1.27	6.78	1.32	1.68	1.26	6.99	.84	1.45	1.20	7.07	1.15	1.98	1.39	3.56
1967	.84	1.59	1.18	7.27	1.37	1.93	1.22	6.72	1.29	1.66	1.22	6.86	.81	1.46	1.26	6.84	1.15	1.98	1.38	3.56
1966	.84	1.59	1.15	7.25	1.37	1.93	1.19	6.72	1.35	1.72	1.18	6.86	.83	1.42	1.10	6.64	1.16	1.97	1.33	3.56
1965	.82	1.57	1.14	7.25	1.37	1.93	1.17	6.72	1.14	1.50	1.14	7.05					.97	1.96	1.32	3.58
1964	.84	1.59	1.14	7.25	1.37	1.93	1.11	6.72	1.41	1.76	1.12	7.06					.97	1.96	1.34	3.58
1963	.85	-------	1.13	-------	-------	-------	1.13	-------	1.35	-------	1.15	-------	.98	-------	1.10	-------	-------	-------	1.32	-------
1962	.85	-------	1.12	-------	-------	-------	1.13	-------	1.34	-------	1.15	-------	.97	-------	1.10	-------	-------	-------	1.32	-------
1961	.85	-------	1.09	-------	-------	-------	1.14	-------	1.31	-------	1.15	-------	1.01	-------	1.10	-------	-------	-------	1.24	-------

[1] Prices include all applicable taxes. Gas price is based on average per therm above 40 therms per month. Fuel oil price is based on price paid per 100 gallons of No. 2 fuel oil.
[2] The calorific value of gas is converted at 1,031 Btu per CF; No. 2 fue loil at 138,000 Btu per gal; and electricity at 3,412 Btu per Kwh.

Source. Gas oil and electricity: Retail prices and indexes of Fuel and Electricity, U.S. Department of Labor, Bureau of Labor Statistics, December 1962-73. Prepared by Office of Economics, Federal Power Commission (Mar. 21, 1972).

TABLE 8B.—AVERAGE RETAIL PRICES OF GAS, NO. 2 FUEL OIL, AND ELECTRICITY IN REPRESENTATIVE CITIES, JULY-DECEMBER 1973 AND PERCENTAGE PRICE CHANGE

[Dollars per million Btu]

	July				December				Percentage change July-December			
	Gas				Gas				Gas			
	Heating	Non-heating	No. 2 fuel oil	Electricity	Heating	Non-heating	No. 2 fuel oil	Electricity	Heating	Non-heating	No. 2 fuel oil	Electricity
Atlanta	1.12	1.64	—	6.40	1.12	1.64	—	6.81	0	0	—	6.4
Baltimore	1.48	1.88	1.53	10.04	1.54	1.94	1.91	10.19	4.1	3.2	24.8	1.5
Boston	1.92	3.25	1.72	9.34	2.05	3.42	2.18	10.36	6.8	5.2	26.7	10.9
Buffalo	1.25	1.74	1.67	8.99	1.28	1.77	2.15	9.10	2.4	1.7	28.7	1.2
Chicago—Northwest Indiana	1.12	1.72	1.47	9.47	1.18	1.78	1.94	9.50	5.4	3.5	32.0	.3
Cincinnati	.96	1.11	----------	8.33	.95	1.10	----------	8.33	−1.0	−.9	----------	0
Cleveland	.95	1.41	----------	7.88	.92	1.39	----------	8.03	−3.2	−1.4	----------	1.9
Dallas	.89	1.06	----------	7.67	.89	1.07	----------	7.91	0	.9	----------	3.1
Detroit	1.10	1.68	1.47	9.00	1.16	1.73	1.80	9.19	14.9	3.0	22.4	2.1
Houston	.67	1.66	----------	7.14	1.03	1.67	----------	7.49	53.7	.6	----------	4.9
Kansas City	.72	1.22	----------	8.00	.78	1.29	----------	8.05	8.3	5.7	----------	.6
Milwaukee	1.40	1.92	1.59	8.66	1.45	1.96	2.00	8.69	3.6	2.1	25.8	.3
Minneapolis—St. Paul	1.13	1.97	1.47	8.15	1.12	1.97	1.90	8.26	−.9	0	29.3	1.3
New York—Northeast New Jersey	1.79	2.89	1.63	13.37	1.89	3.02	2.40	15.20	5.6	4.5	47.2	13.7
Philadelphia	1.66	2.32	1.57	9.76	1.71	2.37	1.89	10.41	3.0	2.2	20.4	6.7
Pittsburg	1.06	1.60	----------	8.36	1.12	1.66	----------	9.35	5.7	3.8	----------	11.8
St. Louis	1.10	1.98	1.65	8.77	1.18	2.02	1.90	8.77	7.3	2.0	15.2	0
San Francisco—Oakland	.85	1.20	----------	7.14	.92	1.28	----------	7.48	8.2	6.7	----------	4.8
Seattle	1.29	2.04	1.70	3.90	1.34	2.13	1.96	3.90	3.9	4.4	15.3	0
Washington, D.C	1.56	2.12	1.58	9.15	1.60	2.17	2.15	9.59	2.6	2.4	36.1	4.8

Note: A dash, "—", represents no report.

Source: Reatil and Indexes of Fuels and Electricity 1973 (Bureau of Labor Statistics).

(B) *Environmental Costs.*—These unprecedented increases in fuel costs described above were superimposed upon increased costs arising from a variety of sources including delays in construction and completion of generation and transmission facilities, higher costs of capital, and increased environmental costs.

Compliance with environmental standards directly contributes to the overall cost of elecrticity through increased capital and operating expenditures. Among the significant environmental costs associated with electric generating facilities are: (1) Water cooling systems for nuclear and non-nuclear thermal generation; (2) Stack gas cleaning systems for non-nuclear thermal generation.

A factor of increasing importance in the siting and operation of steam electric plants is the disposal of large quantities of waste heat. The amount of heat to be disposed of depends upon the type and efficiency of the plant. Although the most efficient plants achieve efficiencies of about 40 percent, the average for all steam electric plants in 1972 was about 32.88 percent (heat rate of 10,379 Btu). In the operation of a plant, some heat is lost within the plant and through the stack. On the average, however, more than one-half of the heat input is discharged to the cooling water in the condensing process. The heat added to the water must then be dissipated by some cooling method.

Nuclear units are less thermally efficient than non-nuclear units and the estimated cost of the cooling systems for nuclear plants ($10/kW to $20/kW) are thus correspondingly higher than for non-nuclear ($7.50/kW to $15/kW). To backfit presently constructed units to comply with new standards requires relatively more investment than if such a cooling system were installed originally as part of the plant and thus the backfitting of presently constructed units must also be considered in determining the effect on capital expenditures.

The total reported capital cost of cooling water facilities for 1971 is $1,206 million, an increase of $233 million over the 1969 reported cost. These expenditures have a relatively small effect on the overall cost of electricity, equivalent to less than 0.15 mills per kWh in 1970, assuming fixed charges of 15 percent, but will become increasingly significant as the use of cooling towers becomes more widespread for new installations as well as being added to existing plants.[6]

The capital expenditures for stack gas cleaning systems are primarily for particulate removal and for removal of sulfur oxides. Although the total ash content of all the coal burned by steam electric plants increased to 48.6 million tons in 1971 from 38.1 million tons in 1969, estimated particulate emissions decreased, respectively, to 4.15 million tons from 4.29 million tons, a drop of 3.0 percent. Compared with 1969, electric utilities spent 50 percent more money to collect 20 percent more ash. This was accomplished through upgrading the performance of existing precipitators and through the installation of new equipment. During the two-year period the installed cost of all precipitators increased by $121.5 million—an increase of 31 percent. Most of the new capital expenditures were in the electrostatic precipitator category.

Three general methods of meeting emission standards are (1) to burn fuel with lower sulfur content (this has a direct effect on the fuel expense), (2) to remove the sulfur from the fuel prior to combustion (this is still in the experimental stage and will ultimately affect the fuel expense when commercially feasible), and (3) to utilize flue gas desulfurization. The latter method will require capital expenditures now estimated to be in the range of $40/kW to $60/kW for new instalaltions. This would amount to a cost in the general order of magnitude of 1.0–1.25 mills/kWh.

Due to the wide variety of generation mixes (hydro, steam, nuclear), types of boiler fuels (coal, gas and oil), and environmental standards for different localities, the effects of environmental requirements on rate levels is difficult to quantify. Certainly the most important short run effect of the higher air quality standards has been on fuel expense. In the longer run the increased capital expenditures for sulfur removal systems will become of growing importance.

(C) *Cost of Capital.*—A third source of increases in costs to electric utilities over the past few years has been the increase in the cost of capital. Electric

[6] The Federal Water Pollution Control Act Amendments of 1972 set a deadline of July 1, 1977 by which pollutants discharged into United States waters covered by the amendment must be controlled to the level of "the best practicable control technology currently available."

utilities typically obtain 50–60 percent of their total capital requirements in the open market in the form of debt capital and another 10 percent in the form of preferred stock capital. Interest and preferred stock dividend requirements are, therefore, an important element of the total cost of service of an electric utility.

Table 9 shows yields to maturity of public utility bonds rated Aaa, Aa, A and Baa and yields of high grade public utility preferred stocks from 1950 through June of 1973. It will be noted that the decade of the 1960's witnessed a gradual increase in these yields rising to a peak in 1970 followed by a gradual decline and leveling out of yields at levels only slightly below the peak yields of 1970. These yields, of course, constitute merely an index of the level of interest paid by electric utilities for new capital raised in the market. The average rate paid on all long-term debt outstanding is somewhat below the current yield rates. For example, as of the end of 1971 the average embedded rate of interest being paid by electric utilities was approximately 5½ percent. But as more and more debt capital is raised at the higher current rates the overall average embedded debt cost will continue to rise gradually until it reaches the current rate. That process has continued so that at the present time the average embedded debt rate has reached a level of 6–6½ percent. It will continue to rise.

TABLE 9.—AVERAGE YIELDS TO MATURITY OF VARIOUSLY RATED PUBLIC UTILITY BONDS AND YIELDS OF HIGHGRADE PUBLIC UTILITY PREFERRED STOCKS, 1950 THROUGH JUNE 1973

	Public utility bonds				
	Aaa	Aa	A	Baa	Preferred stock
June 1973	7.51	7.59	7.71	7.94	7.53
1972	7.46	7.60	7.72	8.17	7.23
1971	7.72	8.00	8.16	8.63	7.10
1970	8.31	8.52	8.69	9.18	7.56
1969	7.12	7.34	7.54	7.93	6.76
1968	6.22	6.35	6.51	6.87	6.07
1967	5.58	5.66	5.87	6.15	5.54
1966	5.19	5.25	5.39	5.60	5.19
1965	4.50	4.52	4.58	4.78	4.53
1964	4.42	4.44	4.52	4.74	4.49
1963	4.27	4.32	4.39	4.67	4.38
1962	4.35	4.41	4.54	4.75	4.52
1961	4.37	4.46	4.62	4.83	4.71
1960	4.47	4.53	4.78	4.97	4.85
1959	4.49	4.56	4.78	4.96	4.79
1958	3.87	3.92	4.20	4.43	4.51
1957	3.96	4.03	4.24	4.46	4.72
1956	3.39	3.43	3.56	3.78	4.18
1955	3.09	3.13	3.22	3.43	3.94
1954	2.93	3.00	3.16	3.51	3.94
1953	3.24	3.32	3.49	3.73	4.22
1952	2.99	3.05	3.24	3.53	4.03
1951	2.88	2.95	3.11	3.39	4.02
1950	2.62	2.68	2.79	3.18	3.75

Source: "Moody's Public Utility Manual," 1973, pp. a5–a8.

A further reflection of rising embedded debt costs in relation to overall earnings of electric utilities is to be found in the trend in interest coverage ratios. This is the ratio of the overall earnings of the utility (including interest) either before or after income taxes to the interest paid during the year. Table 9A presents the interest coverage ratios of 10 selected electric utilities for the period 1968–1972 both on a before-tax basis and an after-tax basis. The unweighted average of the after-tax coverage ratio of these utilities declined from 3.63 in 1968 to 2.47 in 1972. This is especially significant in view of the fact that the mortgage bond indentures of most electric utilities do not permit the issuance of additional long-term debt if it will cause the after-tax interest coverage ratio to fall below 2.0.

TABLE 9A.—INTEREST COVERAGE RATIOS OF 10 SELECTED PRIVATELY OWNED ELECTRIC UTILITIES, 1968–72

[Times interest earned]

Company	1972		1971		1970		1969		1968	
	Before taxes	After taxes	Before taxes	After taxes	Before taxes	After taxes	Before taxes	After taxes	Before taxes	After taxes
Alabama Power Co	2.18	2.17	2.66	2.35	3.52	2.64	4.20	2.99	3.80	2.70
Pacific Gas & Electric Co	3.22	2.67	3.39	2.67	3.34	2.67	4.07	3.03	4.33	3.24
Southern California Edison Co	3.04	2.51	3.02	2.55	3.14	2.67	3.16	2.59	3.38	2.71
Florida Power Corp	3.19	2.57	3.35	2.69	3.58	2.81	4.56	3.23	4.81	3.29
Commonwealth Edison Co	2.86	2.53	2.60	2.40	3.19	2.55	4.22	3.07	5.41	3.68
Kentucky Utilities Co	3.04	2.41	3.38	2.66	4.30	3.04	7.30	4.34	9.67	5.44
Boston Edison Co	1.72	2.06	2.09	2.09	2.34	2.25	3.51	2.71	4.49	3.20
Detroit Edison Co	2.37	2.30	2.29	2.23	2.73	2.38	3.89	2.94	4.75	3.46
Atlantic City Electric Co	2.70	2.51	2.39	2.37	2.83	2.57	3.95	3.27	3.85	3.03
Ohio Edison Co	3.51	2.93	3.80	3.01	5.69	3.96	8.56	5.46	8.84	5.59
Unweighted Averages	2.78	2.47	2.90	2.50	3.47	2.75	4.74	3.36	5.33	3.63

In view of the increases in embedded interest costs that have continued for a considerable period of time, higher rates of return earned by electric utilities are to be anticipated reflecting increased costs of money. Data available for the period 1969–71, however, indicate that this has not been occurring.

TABLE 10.—NUMBERS OF COMPANIES EARNING MORE THAN SPECIFIED RATES OF RETURN ON ELECTRIC UTILITY RATE BASE, 1969–71

Rate of return in percent	1971		1970		1969	
	Number	Percent	Number	Percent	Number	Percent
Total	194	100.0	194	100.0	192	100.0
More than 5.00	180	92.8	184	94.8	180	93.7
More than 6.00	163	84.0	168	86.6	169	88.0
More than 7.00	122	62.9	113	58.2	122	63.6
More than 8.00	49	25.3	46	23.7	61	31.9
More than 9.00	13	6.7	13	6.7	16	8.5
More than 10.00	3	1.5	1	.5	4	2.1

Source: Federal Power Commission, "Statistics of Privately Owned Electric Utilities in the United States," 1969 issue p. 651, 1971 issue p. 731.

Table 10 shows the number and percentage of total electric utilities earning more than the various specified rates of return. As indicated by Table 10 the number of utilities earning more than a 7 percent rate of return has remained rather constant over the three year period. The number of utilities earning more than 8 percent has tended to decline slightly and the same is true at higher rate of return levels. Since embedded interest costs have tended to increase this would lead one to anticipate a decline of the rates of return earned on common stock equity. Table 11 presents data reflecting rates of return earned on common stock equity for the period 1969–71. As shown by that table there has been a general tendency for the number of companies earning rates of return on common equity at higher levels to decline. For example, the number of companies earning 11 percent or more declined from 112 to 101. It should be noted that this was occurring at a time when the common stock equity ratios of electric utilities on the average was also declining, a factor which tends to increase the risk of the common equity and, therefore, would in and of itself have led to an expectation of higher rates of return on common stock equity.

TABLE 11.—NUMBERS OF COMPANIES EARNING MORE THAN SPECIFIED RATES OF RETURN ON COMMON STOCK EQUITY, 1969-71

Rate of return in percent	1971		1970		1969	
	Number	Percent	Number	Percent	Number	Percent
Total	209	100.0	207	100.0	207	100.0
More than 5.00	198	94.7	202	97.6	197	95.2
More than 6.00	187	89.4	190	91.8	189	91.3
More than 7.00	181	86.5	179	86.5	180	87.0
More than 8.00	165	78.8	165	79.7	168	81.2
More than 9.00	151	72.1	151	72.9	148	71.5
More than 10.00	120	57.3	130	62.8	132	63.8
More than 11.00	101	48.2	108	52.2	112	54.1
More than 12.00	82	39.1	84	40.6	93	44.9
More than 13.00	50	23.8	62	30.0	63	30.4
More than 14.00	35	16.6	41	19.9	42	20.3
More than 15.00	18	8.5	24	11.7	26	12.6
More than 16.00	9	4.2	14	6.8	12	5.8
More than 17.00	4	1.8	7	3.4	5	2.4
More than 18.00	2	.9	1	.5	1	.5

Source: Federal Power Commission, "Statistics of Privately Owned Electric Utilities in the United States," 1970 issue, p. 755, 1971 issue, p. 735.

(D) *Construction and Equipment Costs.*—A fourth important source of cost increases to electric utilities has been steady increases in the cost of construction and equipment. A substantial part of the total cost of rendering electric service is related to the cost of the plant utilized in rendering that service. These costs include depreciation, interest, return on equiy investment, and some taxes. Table 12 shows electric light and power construction cost indexes for the various parts of the country from 1949 to the present. It will be noted that during the decade of the 1960's an increase in construction costs of approximately 25 percent or about 2½ percent per year occurred. During the period from the end of 1969 through the end of 1972 an additional increase of about 45 percent occurred, or, in other words, an average increase of over 10 percent per year.

TABLE 12.—ELECTRIC LIGHT AND POWER CONSTRUCTION COST INDEXES, 1949 THROUGH 1972

[1949=100]

	North atlantic division	South atlantic division	North central division	South central division	Plateau division	Pacific division
1972	245	247	248	237	242	244
1971	229	230	238	227	231	229
1970	212	213	221	213	211	215
1969	195	199	203	196	196	201
1968	184	184	187	185	186	189
1967	179	179	183	178	182	185
1966	172	173	175	171	173	177
1965	167	167	170	166	170	172
1964	162	163	165	161	165	166
1963	157	159	160	157	160	162
1962	157	159	161	157	162	161
1961	155	157	159	156	160	160
1660	158	160	163	160	163	164
1959	159	161	164	161	163	163
1958	156	158	161	158	160	160
1957	152	154	157	154	157	155
1956	143	145	148	145	146	146
1955	132	133	136	133	134	134
1954	128	129	132	129	130	130
1953	125	125	129	126	126	126
1952	119	118	121	119	120	120
1951	116	115	118	116	117	118
1950	104	104	105	105	105	105
1949	100	100	100	100	100	100

Source: "Moody's Public Utiity Manual," 1973, p. a25.

Table 12A presents data reflecting recent increases in construction costs of nuclear coal-fired generating plants.

TABLE 12A.—AVERAGE COST PER KILOWATT OF NUCLEAR AND COAL-FIRED GENERATION GOING INTO SERVICE 1968–70 AND 1971–73

	Cost per kilowatt	
	Nuclear	Coal fired
1968 to 1970	$175	$138
1971 to 1973	211	159
Increase (percent)	20.6	15.2

Table 12A shows, for example, that the cost of nuclear-fired generation going on the line between 1971 and 1973 had increased more than 20 percent above the average cost of nuclear generation going on the line between 1968 and 1970. It also shows that for the same period the average cost of construction of coal-fired generation had increased by about 15 percent. Projections for nuclear and fossil fired generation for the balance of the 1970's indicate that even greater rates of increase in costs per kilowatt are anticipated.

In considering the causes of the rise in electric rates over the past several years, we must keep in mind that it occurred during a period of general price inflation. As a matter of fact, during the decade of the 1960's prior to 1967 while the general price level crept gradually upward the price of electricity remained practically constant. Consequently, in terms of constant dollars the price of electricity gradually declined during those years. From 1967 to the present, although the price of electricity has risen sharply, it has still been at a rate of increase less than the increase in the general price level. Thus, 1967 onward the cost of electricity in constant dollars continued to decline but at a much lesser rate of decline than during the period 1960–67. Table 13 compares the Index of Residential Electricity Prices with the Consumer Price Index and Wholesale Price Index as of December 1972 and December 1973. All of these figures are on the basis of 1967 equals 100.

TABLE 13.—INDEX OF ELECTRICITY PRICES COMPOUNDED WITH CONSUMERS PRICE INDEX AND WHOLESALE PRICE INDEX AS OF DECEMBER 1972, AND DECEMBER 1973

	December 1972	December 1973
Electricity index	120.2	129.0
Consumer price index	127.3	138.5
Wholesale price index (all commodities)	122.9	145.3

Source: U.S. Department of Labor, Bureau of Labor Statistics, "Retail Prices and Indexes of Fuels and Utilities," December 1973; Economic Report to the President, 1974.

It will be noted that the price of electricity as of both points in time had risen by lesser amounts over the 1967 levels than had either the Consumer Price Index or the Wholesale Price Index. I must re-emphasize, however, that there are national average figures. I have no doubt that in certain parts of the country, particularly coastal areas, the price of electricity, primarily as the result of increased fuel costs, has risen sharply as shown in Table 13A.

CONSERVATION AND RATES

The winter of 1973–74 was a relatively mild one and the figures contained in Table 14 are not adjusted for weather conditions. It is evident, nevertheless, that under circumstances in which projected growth from January 1973 to January 1974 would have been in the order of 6–8 percent, it was substantially less than this for all companies and pools listed in the table. In most instances, particularly in areas of greatest shortage on the Pacific Coast and in the Northeast, energy for load in January 1974 was materially less than it had been a year earlier. Table 15 presents additional material supporting this conclusion on the basis of a comparison of projected and actual generation for 11 selected companies and power pools for December 1973 and January 1974.

TABLE 13A.—INDEXES OF RETAIL PRICES OF GAS AND ELECTRICITY COMBINED, GAS, ELECTRICITY, BY AREA, DECEMBER 1973

[1967=100]

Standard metropolitan statistical areas	Gas and electricity		Gas		Electricity	
	Nov. 1973	Dec. 1973	Nov. 1973	Dec. 1973	Nov. 1973	Dec. 1973
Atlanta	134.0	133.7	136.0	135.5	130.6	130.6
Baltimore	122.2	123.0	116.0	117.9	127.3	127.3
Boston	132.6	134.7	143.9	142.9	121.6	126.7
Buffalo	145.9	146.9	149.4	150.4	138.2	139.2
Chicago—Northwest Indiana	[1] 122.2	123.0	[1] 121.3	122.7	123.4	123.4
Cincinnati	119.7	119.8	124.6	124.6	113.1	113.3
Cleveland	124.1	124.4	128.9	128.9	114.7	115.7
Dallas	117.6	117.6	120.8	120.9	114.2	114.0
Detroit	129.4	129.3	137.8	137.5	116.4	116.4
Honolulu	107.7	107.8	99.3	99.7	109.9	109.9
Houston	129.7	129.6	142.2	142.1	121.5	121.5
Kansas City	120.4	123.6	130.2	136.1	109.8	110.3
Los Angeles-Long Beach	149.7	150.4	142.7	143.7	158.9	159.1
Milwaukee	137.6	139.5	132.8	136.3	143.4	143.4
Minneapolis-St. Paul	130.6	131.0	136.4	136.8	122.2	122.7
New York—Northeast New Jersey	139.9	142.4	139.6	139.3	140.1	144.3
Philadelphia	137.0	137.2	123.4	124.0	153.5	153.3
Pittsburgh	132.3	133.8	133.3	135.5	129.9	130.1
St. Louis	126.5	126.4	135.5	135.1	115.9	116.0
San Diego	125.5	125.5	127.0	127.0	123.8	123.8
San Francisco-Oakland	132.2	134.5	139.5	143.5	122.7	122.7
Seattle	109.9	110.4	117.9	120.6	108.1	108.1
Washington, D.C	130.4	132.6	126.2	126.4	136.3	141.5

[1] Revised Indexes.

TABLE 14.—ELECTRIC ENERGY FOR LOAD OF SELECTED ELECTRIC UTILITIES, JANUARY 1973, AND JANUARY 1974

	Energy for load		Percent increase (decrease)
	Jan. 1973 (1,000 kWh)	Jan. 1974 (1,000 kWh)	
New England Power Pool	6,956,575	6,693,482	(3.78)
Minnesota Power	494,516	505,200	2.16
Wisconsin Electric Power Co	1,332,205	1,350,720	1.39
Commonwealth Edison Co	5,104,010	5,134,664	.60
Northern States Power Co	1,567,380	1,551,223	(1.03)
New York Power Pool [1]	9,364,702	9,205,744	(1.70)
Pacific Gas & Electric Co	4,969,145	4,710,797	(5.20)

[1] Data are for December 1972, and December 1973.

Note: Data are not adjusted for weather conditions.

TABLE 15.—REDUCTION IN ACTUAL ENERGY GENERATION BELOW PROJECTIONS IN PERCENTAGE FOR DECEMBER 1973, AND JANUARY 1974, FOR SELECTED UTILITIES AND POOLS

Name of utility	Percentage reductions	
	December 1973	January 1974
Wisconsin Public Service	10.0	5.9
Wisconsin Power & Light	9.4	11.7
Wisconsin Electric Power	2.6	3.3
Northern States Power	22.2	NA
New York Power Pool	.9	NA
Minnesota Power & Light	9.2	9.5
Commonwealth Edison	8.9	12.9
New England Power Pool	20.6	17.6
Southern California Edison	29.5	NA
Los Angeles Department of Water & Power	37.9	39.2
Pacific Gas & Electric	31.8	37.4

It is ironic that the very success of the conservation programs initiated by the utilities and encouraged by agencies of government, have created a new revenue problem for the utilities. Consumers pay more for less electricity use. To the extent that a utility's customers reduced the amout of energy taken from the utility, the result has been in a reduction in the revenue of the utility. Obviously, it resulted also in some reduction in the utilities' costs to the extent that such costs are directly related to energy output. The most significant of these is the cost of fuel which varies directly with the amount of energy sold. More than half of the costs of a typical electric utility, however, are fixed, i.e., do not vary with the amount of energy produced. These include such elements of cost as interest expense, taxes of various kinds, depreciation of plant and property as well as some administrative and general costs and operating and maintenance expenses. Such costs continue to be incurred at an equivalent or slightly reduced level even though there has been a substantial diminution in the rate of energy production.

As a result of revenue declines far in excess of the decline in costs, those utilities in whose service areas conservation programs have been most successful are claiming that without revenue relief in the form of higher rates they will be unable to raise capital for the purpose of financing facilities to meet the needs of their customers or, indeed, to continue to operate at all. These utilities have been seeking increases in rates to cover revenue deficiencies arising from conservation programs in proceedings before a number of state commissions and the Federal Power Commission.

Efforts on the part of utilities to obtain increased rates on this basis have created a wave of public indignation and protest. The typical ratepayer having been admonished to cooperate by participating in a program of conservation whereby he reduces his electric energy requirements and having turned off some of his lights and turned down his thermostat, now finds that he is being asked to pay even higher rates for service as a direct result of this cooperation. Paradoxically, where the conservation program has not been successful as a result of lack of effort on the part of the utility involved or lack of cooperation on the part of its customers, there is no need for rate increases to offset revenue reductions. This appears, to the average citizen, to be an exceedingly inequitable situation, especially coming, as it does, at a time when for other reasons electric rates were already going up at an unprecedented rate. Ratepayers not only argue that they are being treated shabbily in being asked to finance the conservation program but also the failure of utilities to anticipate the current situation should assign the burden of increased costs to the utilities. The distribution of the burden of increased costs as the result of conservation between ratepayers and investors must be equitably resolved to serve the public interest on a case-by-case basis. The issue is pending before several state commissions and the FPC.

Our information indicates that utilities have filed proposed increases related to energy conservation requirements with more than a dozen State utility commissions. Where such commissions have acted, it appears that they have denied the proposed increases, but in most cases the proposals remain pending.

The first wholesale electric case to come before the Federal Power Commission in this context was a January 1974 filing by the New England Power Company seeking the establishment of an "automatic cost adjustment clause." The purpose of this clause was to assure the company of wholesale revenue upon the basis of projected kilowatts of demand and kilowatt-hours of energy. To the extent that the killowatts and killowatt-hours actually taken fall below projections as a result of conservation measures or weather or other factors, charges to customers would be automatically increased sufficiently to enable the company to continue to collect almost all of its projected revenue needs. In an Order issued February 7, 1974, the Commission declined to allow the proposed clause to go into effect and instead initiated an investigation to determine whether or not the clause was just and reasonable in accordance with the provisions of the Federal Power Act.

Following the issuance of this order, the New England Power Company filed a "Petition of New England Power Company for Emergency Relief by Way of Waiver of Commission Rules and Regulations; Acceptance of R–8 Rate Increase Filing; and Establishment of April 1, 1974, as the Effective

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Date Thereof and Motion for Consolidation with Other Dockets." This petition, filed late in February, seeks emergency relief partly because ". . . NEPCO's current predicament is aggravated by the voluntary fuel conservation measures initiated last fall." According to the petition the propsed increase amounts to about $39 million or approximately 10 percent. Our Commission has not yet acted on this petition.

RATE DESIGN

Most of the efforts of the electric utility industry and the various governmental agencies that regulate that industry to deal with the shortage of electric power have been in the direction of efforts to improve and increase the facilities and fuels necessary to produce electric energy. Recently, however, more and more public attention has been focused upon the demand side of the equation. Questions have been raised concerning the desirability of a projected rate of growth of the industry of a general order of magnitude equivalent to a doubling every 10 years. Some have taken the position that the construction of facilities necessary to supply a rate of growth of this magnitude will be unduly harmful to the environment. Others are of the view that conservation of our natural resources requires a dampening in the rate of growth of our usage of electricity. Spokesmen for both of these groups as well as others have expressed the notion that electric rates should be redesigned in such a way as to achieve this result. Rate design is a function of just and reasonable nondiscriminatory rates. Accordingly, the level of rates charged to different classes of consumers must be based on an evidentiary record in proceedings before the Commission.

INVERTED RATES

The most extreme form of rate design to reduce demand is the so-called "inverted rate" which means a rate schedule designed in such a way that as the usage of electricity increases the cost per kWh increases also. This compares with a typical design of residential rates and, to some extent, other types of rates also, in which the average cost per kWh declines as usage increases.

In evaluating this proposal we must take into account its potential effectiveness as well as the extent to which it may result in a misallocation of resources. The question of whether a redesign of electric rates may have the desired effect depends upon the elasticity of demand for electricity, i.e., the extent to which the amount of electricity customers demand is a function of the price of electricity. Textbook economics teaches that as the price of a product increases the amount taken will decline. But the extent of the reduction in the amount taken when the price goes up depends upon the elasticity of demand. Such statistical studies as exist of the elasticity of demand for electricity indicate that the amount of electricity taken will be affected by the prices charged over the long run. But such studies provide little data concerning the magnitude of the effect of price changes of various degrees by types and classes of service or the period of time required for these impacts on usages to become effective. We simply don't know very much about the elasticity of demand for electricity so that the impacts of various forms of inverted rate schedules are largely unknown. This is particularly the case in view of the fact that we operate under the constraint that the total revenue of an electric utility should exaxctly cover its total cost of rendering service. Consequently, if we are to increase the rates charged at higher levels of usage, we must necessarily reduce the rates charged at lower levels. Without fairly precise information concerning elasticities at these various usage levels we may not only miss the mark of equating revenue to cost by a wide margin, but conceivably may bring about an increase in the demand for electricity.

While the effectiveness of the inverted rate is a problem of elasticity of demand, the wisdom of such a proposal seems to me to depend primarily on the pattern of electric utility costs. If it costs more to serve a high usage customer than a low usage customer, the rate design should reflect that pattern, otherwise not. To the extent that rate design departs from the pattern of cost, one group of customers subsidizes another group of customers and resources are misallocated. Such information as is available on cost patterns tends to support the proposition that the design of rates should be such that the average charge declines with increased usage. It follows that a rate design such as

the inverted rate does not necessarily reflect the pattern of cost and, therefore, may result in resource misallocation. In the absence of substantial evidence of cost related demand elasticities, we should not adopt the inverted rate concept as a matter of public policy of general application to all utilities. Before adopting an untested concept, it is desirable that empirical evidence demonstrating the economics of alternate rate designs be tested in selected market areas. It may well be that a careful analysis of the pattern of costs would warrant at least some flattening or perhaps a complete flattening of electric rates. It is entirely possible, for example, that where the form of the rate is a two-part rate, i.e., with separate charges per kW and per kWh, that neither of these should be blocked (i.e. reduced as assumption increases). This is an area in which considerably more painstaking research would be useful as a guide to public policy.

PEAK LOAD PRICING

Another rate design issue in which there appears to have been some revival of interest since the energy shortage became apparent is what has been characterized as "peak load pricing." Broadly conceived, peak load pricing constitutes recognition in the design of rates that electricity produced at times when the load on the electric system reaches maximum values is more costly than electricity produced and sold during low load periods of time. It is common knowledge that in general electric systems or the load on a typical electric system reaches a peak during the day and falls to a minimum during the early hours of the morning. Saturdays, Sundays and holidays generally are low load periods. In addition, utilities peak on a seasonal basis. In most cases the seasonal peak period is during the Summer because of air conditioning demand, although there are some systems whose peaks occur during the Winter because of space heating requirements or for other reasons. In other cases the summer and winter peak periods are approximately equal. In still other cases the winter peak exceeds the preceding summer peak but is itself exceeded by the following summer peak so that the load on the utility continues to reach new maximums each summer and winter. Electricity is generally more costly during peak periods because the system bulk power supply facilities are designed in such a way as to meet these peaks and consequently are partly idle during off-peak periods. In addition, the generation that is operating during peak periods is less efficient generally than the generation that is operating during off-peak periods so that fuel costs per kWh are higher during on-peak periods.

There are those who argue that if rates are to reflect costs, there should be higher rates charged for electricity during the peak season of the year than during other seasons of the year. A few utilities have rate schedules with a seasonal differential, i.e., a higher charge for service rendered during the peak season. Others have gone further, and have argued that rates should be designed in such a way as to establish a differential in the price charged during the peak hours in the day as opposed to the off-peak hours. Insofar as I am aware, no major utility in the United States has rate schedules which provide for a differential of this sort, partly because of metering problems, although they do exist in Europe. Those who advocate peak load pricing argue first, that it is neecssary for the proper allocation of resources since it provides a closer approximation of rates to costs. Second, they argue that by charging more for electricity sold at peak times, there will be a tendency to flatten the load curve so that the need for facilities will be reduced and the efficiency of use of those facilities improved with obvious beneficial effects with respect to problems of environmental impact and cost minimization.

The extent to which peak load pricing may affect the pattern of use of electricity and thereby achieve beneficial results with respect to environment and costs is, again, a question of demand elasticity. As indicated above, we have limited knowledge of demand elasticities. It should also be recognized that peak load pricing requirements in most instances require the incurring of additional costs, particularly metering costs. The extent to which the benefits from peak load pricing in one form or another may exceed the additional costs necessary to its utilization is not clear. I believe that peak load pricing carries important potential for improvement in electric rate designs,

particularly as metering devices are improved and the cost of such metering is reduced. It is a further area of rate design which deserves further research and further consideration both by utilities and by regulatory agencies.

THE OUTLOOK FOR 1974 AND BEYOND

For the balance of 1974 and for the next few years the outlook for electric utility prices depends in part on the extent to which we are successful in controlling inflation. As discussed earlier in my testimony, one can predict various levels of increase in price for electricity depending upon the inflation level that is assumed. So far as I can judge, the next few years will see a continuing increase in the price level, although hopefully at rates of increase less than we have been experiencing in recent months. It follows that we are going to continue to experience substantial increases in the price of electricity. Furthermore, I think it important to point out that the price of electricity is going to go up regardless of whether we succeed in bringing inflation under control in 1974.

One of the reasons for this, I believe, is the fact that we can anticipate continued pressure on the part of the public to protect and improve the natural environment. This means not only that new facilities being constructed will have to incorporate equipment for environmental pollution control but also that a certain amount of retrofitting of existing equipment will be necessary. If processes for stack-gas removal prove successful, they will undoubtedly be required for installation for all new plants plus certain existing plants at installation costs which will have a material affect on electric rates. If, on the other hand, such processes do not prove successful, the pressure on low-sulfur fuel supplies and costs will continue to grow. I recognize that here are elements within the federal government that take the position that the commercial feasibility of these processes has already been demonstrated. Unfortunately, there appears to be a certain amount of doubt on the part of coal mine operators so that they are reluctant to open new mines containing high sulfur content coal on the ground that when the present oil situation eases, environmental requirements will preclude further use of coal from such mines. On the other hand, the Environmental Protection Agency seems reluctant to relax air quality standards on the ground that stack-gas removal has been demonstrated to be commercially feasible. There should be provision for variances from inflexible standards where the technology is, in fact, not available and where human health and safety are not threatened.

In any event, I see no reason to expect any material decline in coal prices over the next few years unless some sort of measure of the type I have been suggesting is taken. The future of oil prices, particularly foreign oil, is exceedingly difficult to predict at this time because it has become a highly political matter. Gas for boiler fuel is being phased out; to the extent that it continues to be used, it will be at continually rising prices over the next few years. It is only in the case of nuclear fuel that we can anticipate relative stability with respect to prices although even here the tendency will be upward if only as a result of the increased costs of processing.

As mentioned earlier in my testimony the impact of money costs on electric rates will continue to be in an upward direction for at least several more years until embedded costs catch up with current costs. Prognostication with respect to the direction of current interest rates over the next few years would be highly speculative on my part. I have no reason to believe, however, that the level of current interest rates will decline to any material extent over that period of time.

Construction costs constitute another element of the total cost of rendering electric utility service that will necessarily exert an upward pressure on prices for the next few years regardless of whether inflation is brought under control. The reason is that the construction costs per kilowatt of generating plants now going on the line are far in excess of the average cost of facilities presently operating. This is partly because of the fact that the proportion of new plants that are nuclear is in excess of the proportion of existing plants that are nuclear. But, it is also because the current costs of construction of all types of plants are far in excess of the average cost of currently operating plants.

For example, although the cost of nuclear plants going on the line between 1968 and 1970 averaged about $175 and the cost of plants going on the line

during the period 1971-73 averaged about $210, the Atomic Energy Commission estimates the average cost of nuclear plants projected to go on the line in 1981 is in the range of $411 to $472.[7] It must be emphasized that these are average numbers and that the costs are substantially higher in the case of specific generating plants. For example, the current estimate of the cost for the two units of the Susquehanna Nuclear Plant estimated to go on the line in 1979 and 1981 average $660 per kilowatt. Projected cost escalation with respect to fossil fuel plants exceed $300 per kW in 1981.

Considering the elements in the cost of service of electric utilities described above, it is clear that the outlook for electric utility prices over the next few years is exceedingly bleak. Whether these trends continue beyond that period of time depends on several factors over which we still exercise some degree of control. Among these is the nuclear power program and the research and development program.

Our success in dealing with our energy supply problems and in arresting the rapid increases in the rates for electricity will depend in part upon our ability to bring new nuclear generation rapidly on the line. Nuclear power is one of the major sources of electric energy for which fuel stocks are currently adequate and fuel costs relatively low. In addition, although problems of thermal pollution control are at least as great for nuclear as for fossil generation and although the problem of safety is a matter of continuing public concern, there is, to all intents and purposes no problem of air pollution control.

NUCLEAR SLIPPAGE

At the end of 1973, there was a total of nearly 430,000 MW of installed generating capacity in service throughout the contiguous United States, including 45 nuclear units with a total capacity of about 27,000 MW or 6.4 percent of the total. Nuclear generation, although presently a relatively small percentage of our total generating capacity, is a substantial part of our new generation additions but recent experience has shown substantial delays in the construction of nuclear units. For example, of the 83 units delayed for 1974–78 projected in-service period, 42 are nuclear units and 41 are fossil units. Although the number of nuclear and fossil units delayed is almost equal, the installed capacities are not. Nuclear delayed capacity and fossil delayed capacity are 42,347 MW and 22,816 MW, respectively. Delays in the construction of units has a substantial effect on both energy supply and the ultimate cost of power, since the new units generally are more efficient than the average of the units already operating or to be retired. Significant progress can be made in solving our energy problems, both supply and cost, by getting our nuclear power program back on track and shortening the lead time for nuclear additions.

Of the above cited dealys 11 units are delayed for construction or technical problems, 25 units delayed for regulatory or environmental reasons, 5 units have combinations of these two types of reasons, and 42 units have been delayed for other reasons. Nuclear plant load times are now in excess of six years and any reduction in this lead time will reduce the gap caused by fossil fuel shortages and reduce the alternative costs to the consumer.

Some of the problems aggravating the lead times are lack of standardization in plant design, lack of definitive environmental acceptance criteria or site acceptability criteria and anti-trust clearance as a prerequisite to the issuance of construction permits.

Since nuclear plant construction is predicated on the economic tradeoff of relatively high per unit capital costs in favor of very low fuel costs, the success in reducing the lead time will also reduce the capital costs (e.g., interest on construction funds or capitalized labor costs) and thus make the nuclear plants even more desirable on an economic basis.

RESEARCH AND DEVELOPMENT

In the long run the principal source of solutions to our problems of rising costs of electric energy and adequate power supply must be found in a further expansion of our programs of research and development. In organizing the

[7] U. S. Atomic Energy Commission, *The Nuclear Industry 1973*, p. 12

new National Power Survey in September of 1971, the Commission appointed a Technical Advisory Committee on Research and Development under the Chairmanship of Dr. Guyford Stever, Director of the National Science Foundation.[8] In so doing, we recognized that one of the major imperatives of the electric power industry was the development of a far reaching program of research and development to deal with both long run and short run problems of environmental protection and energy supply. That Committee has been at work for about a year and a half and we anticipate that its report will be forthcoming soon.

There has been increased recognition on the part of the electric power industry of the need for expanded programs of research and development. Table 16 summarizes the expenditures of the privately owned sector of the industry for the period 1970 through 1972. It will be noted that industry expenditures for R&D approximately doubled from 1970–71 and nearly redoubled again in 1972 to a total of over $175 million in the latter year. Over the course of that same three year period R. & D. expenditures increased from about one-fourth of one percent of electric utility operating revenue in 1970 to nearly seven-tenths of one percent of electric utility operating revenue in 1972. Although this rate of expansion is indeed commendable, the fact that only about seven-tenths of one percent of electric utility operating revenue was spent for research and development in 1972 indicates that there is plenty of room for further improvement.

A major step in this direction was taken in 1972 when the electric utilities formed a new organization, the Electric Power Research Institute, to conduct and direct an industry program of electric power research and development. The Institute is now in full operation, with key staffing complete and its headquarters established at Palo Alto, California.

EPRI receives financial support from the investor owned electric utilities, the publicly owned utilities and Federal power entities such as the Bureau of Reclamation and the Tennessee Valley Authority. It has taken over support of programs previously funded by the Edison Electric Institute and the Electric Research Council and is initiating new programs based on its assessment of priorities for the industry. In 1973 the EPRI funding totalled about $75 million; its 1974 budget is in the neighborhood of $100 million and steady increases are scheduled for subsequent years. Contributions from investor owned utilities in 1974 will be approximately equivalent to 1/10 mill per kilowatthour, which of course is ultimately provided by the rate payer.

Because the EPRI funding now and in the future is expected to be below Federal electric energy R&D expenditures it plans to select its areas of support carefully, emphasizing those projects where the operating requirements of electric utilities are key factors in obtaining effective research results. The Federal and EPRI research programs will be complimentary, not competitive, and EPRI personnel are involved in a number of the major governmental examinations of energy R&D now going on, including the FPC's National Power Survey.

An expanded program of electric power R&D has been regarded as essential by most authorities, including this Commission. While it represents an immediate modest increase in electric power costs for the consumer, the growing R&D program is an investment which will hold down the costs of electric power in the future and help insure that sufficient electric energy is available for the nation's needs.

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[8] In addition to the Technical Advisory Committee (TAC) on Research and Development, the current National Power Survey is composed of an Executive Advisory Committee as well as a TAC on Conservation of Energy, TAC on Power Supply, TAC on Finance, a TAC on Fuels, and a TAC on the Impact of Inadequate Electric Power Supply, which was created to conduct an intensive investigation of problems which may arise from insufficient development over the next decade of resources and technology to meet projected growth in electric energy requirements.

TABLE 16.— RESEARCH AND DEVELOPMENT EXPENDITURES BY PRIVATELY OWNED ELECTRIC UTILITIES, 1970–72

	1972		1971		1970	
	Amount	Percent	Amount	Percent	Amount	Percent
Within the companies						
Powerplants:						
Hydro	$5,303,405	3.0	$2,654,608	2.8	$862,526	1.9
Fossil fuel	70,019,290	39.9	37,330,521	39.5	6,522,763	14.2
Internal combustion	282,385	.2	569,785	.6	545,166	1.2
Nuclear	14,675,975	8.3	6,226,028	6.6	7,383,251	16.0
Direct conversion	93,324		120,956	.1	26,142	.1
System planning, engineering, and operation	4,037,016	2.3	3,318,972	3.5	2,157,945	4.7
Transmission	7,341,738	4.2	3,384,992	3.6	2,835,129	6.1
Distribution	2,058,164	1.2	1,503,421	1.6	1,754,135	3.8
Other	6,796,669	4.0	6,068,215	6.5	3,449,189	7.5
Total	110,607,966	63.1	61,177,498	64.8	25,536,246	55.5
Outside the companies						
Research support to:						
Electric Research Council	$333,114	0.2	$5,817,467	6.2		
Edison Electric Institute	17,889,460	10.2	7,059,826	7.5	$4,789,303	10.4
Nuclear power groups	12,539,175	7.2	5,878,536	6.2	7,046,286	15.3
Others	11,615,657	6.6	3,982,913	4.2	8,665,144	18.8
Other	22,357,142	12.7	10,473,644	11.1		
Total	64,734,548	36.9	33,212,386	35.2	20,500,733	44.5
Grand total	175,342,514	100.0	94,389,884	100.0	46,036,979	100.0

Source: Federal Power Commission, "Statistics of Privately Owned Electric Utilities in the United States."

Rate regulatory policy in the natural gas industry is also, of course, a primary responsibility of the FPC. I would like to conclude this statement with an overview of major rate considerations which influence our regulation of the gas industry in this period of diminishing supply and growing demand.

NATURAL GAS RATES

Federal Power Commission producer rate policy is outlined in the attached Summary Statement I presented at oversight hearings before the Senate Commerce Committee on February 19, 1974. I request that this material be incorporated in this hearing record as relevant to your request for a discussion of gas utility rates.

In addition to producer pricing policy, however, the FPC has jurisdiction over the rates for the transportation and sale for resale of natural gas sold in interstate commerce. The following material summarizes currently significant concerns in natural gas pipeline rate cases and reflects upon the areas of inquiry specified in your invitation to participate in this hearing.

Since the early 1950's interstate natural gas pipelines have sold gas under a two part rate structure which results in a continually lower unit price to the buyer as his purchases increase. This rate structure enabled pipelines in the 1950's and early 1960's to meet competitive fuel prices thus allowing pipelines and their distributor customers to retain and acquire industrial loads. Over 90 percent of the natural gas in interstate commerce is marketed under the two part rate structure.

In light of the present demand for natural gas (as well as all other energy supplies for that matter) and our limited supply of this valuable resource this

Commission has undertaken a review in individual cases of the pricing mechanisms of interstate pipelines with the objective of establishing pricing policies to ensure the conservation and fairest allocation of existing supplies.

We stated in our Opinion No. 600–A issued May 8, 1972, in a case involving El Paso Natural Gas Company that "our purpose will be arrive at a method of cost classification and allocation and rate design which will produce a strong economic pressure towards a more efficient allocation of our fuel reserves. This will be directed particularly to conserving gas for residential, commercial and other uses for which this clean fuel is greatly needed and discouraging the use of gas for large volume industrial and boiler fuel purposes." Since that Opinion this Commission has taken a series of actions to reduce the amount of the volume discount available under pipeline rates structures. Five pipelines filing rate increases after the issuance of Opinion No. 600-A were notified that a review of the promotional features of their rate would be undertaken.[9] In response to that notice three of the five pipelines involved filed revised rates which reduced the impact of their promotional design.[10]

The Commission conditioned its acceptance of a rate settlement involving East Tennessee Natural Gas Company upon the company removing a promotional block type rate form from its rate schedule (order issued September 25, 1972). In Opinion No. 611–A issued January 19, 1973, the Commission rejected a Staff proposal for a two part promotional rate design on the Florida Gas Transmission Company system.

Our most recent findings on the subject of pipeline rate making are found in Opinion No. 671 issued October 31, 1973, involving the rate design of United Gas Pipeline Company. In that case the Commission departed from what is known as the *Seaboard* rate design, a promotional design used by most pipelines and in existence since 1952, in favor of a design giving less weight to large volume purchases. The effect of our action was to shift about $2 million of costs to United's direct industrial customers and another $3 million to the large volume purchasers of United that purchase gas for resale (i.e. distributors and other pipelines). While favorably impressed with the presentation of evidence by our Staff as to the merits of a one-part rate (i.e. the same price or rate for all purchases irrespective of volume) we found that a sudden abrupt change to a one part rate could be "disruptive to United's system and that at this time a more moderate shift would be in the public interest."

Recent events, however, have convinced the Commission that pricing innovations, beyond the adjustment of the *Seaboard* formula, are going to be required if rates to the customers are to reflect the economics of gas. In the past few years pipeline companies have been embarking on several supplemental

[9] See the following table:

Appplicant	Docket No.	Date of order
Southern Natural Gas Co	RP70–38 et al	July 7, 1972
Texas Eastern Transmission Corp	RP72–98	Aug. 9, 1972
Sea Robin Pipeline Co	RP73–47	Nov. 13, 1972
El Paso Natural Gas Co	RP72–151	Nov. 7, 1972
Transcontinental Gas Pipe Line	RP73–69	Jan. 31, 1973

[10] See the following table:

Applicant	Docket No.	Date of order accepting Seaboard design
Southern Natural Gas Co	RP70–38 et al	Sept. 9, 1972*
El Paso Natural Gas Co	RP72–151	Dec. 29, 1972*
Sea Robin Pipeline Co	RP73–47	Pending.

supply projects. These projects include the importation of LNG, the production of synthetic gas from naphtha and other petroleum products and the gasification of coal. These projects will produce supplementary supplies in a period of gas shortages, but at prices greatly in excess of natural gas prices from traditional supply sources. Prices of the supplemental supplies have ranged up to $2.99/Mcf, but generally in the range of $1.40 to $1.60/Mcf. Traditional pipeline pricing policies have "rolled-in" the costs of gas supplies so that higher costs for new natural gas attachments are averaged over all customers. For the LNG and synthetic supplements the Commission has decided that rolling-in would meet neither the economic efficiency nor the equity standards (*Columbia LNG Corp.*) Opinion 622, 47 FPC 1624 and Opinion 622–A 48 FPC 723). Rather the Commission determined that these supplemental supplies should be sold on an incremental basis. Selling under an incremental schedule allows a market test for the gas projects since the price of these new supplies will not be artificially lowered due to averaging. The incremental approach assesses the costs of the project to those who receive the benefit of the new forms of gas. Thus those who do not benefit do not subsidize these who do. Some of the advantages of rolled-in pricing are (1) there is displacement of conventional gas to enable service to meet existing contract demands, (2) load factors are markedly improved, (3) there is a beneficial cash flow enabling the pipelines to provide better facilities and service to all customers, (4) there are reduced capital costs to the extent pipelines have improved overall financial conditions upon which investment risk is measured, and (5) the LNG supplement to gas supply will reduce the reliance on other fuels which are less advantageous in meeting our environmental objectives.

PURCHASED GAS ADJUSTMENT CLAUSES

The cost of purchased gas for the majority of natural gas pipeline companies is by far the largest single component of their total cost of service. By series of court affirmed decisions,[11] The Commission made it clear that the responsibility for protecting pipelines against gas supplier rate increases lay with the pipelines themselves. On October 22, 1970, the Commission initiated proceedings to provide an administratively feasible procedure for passing on to consumers increases in purchased gas costs, thereby providing a viable means whereby the pipeline could minimize its adverse financial effects resulting from increases in gas costs. The Commission stated that the proposal should result in a much smaller volume of general rate increase applications, charges collected subject to refund and shifts in consumer charges should be greatly reduced, and the proposal should also help prevent a backlog of "pancaked" rate filings which cause prolonged delays in the final determination of proper rate levels, and frustrate the administrative process.

The proposal as modified was ultimately adopted on April 14, 1972 (Order No. 452, Docket No. 406), and as subsequently amended, permits a pipeline company to include in its rates the currently effective average cost of purchased gas paid by the pipeline, subject to specific filing conditions and subject to Commission approval of the specific purchased gas cost adjustment provision and subject to Commission review and approval of each rate change.

Any rate change under the PGA must be at least one mill per Mcf of annual jurisdictional sales and the company must present at least 45 days' notice of the change, together with appropriate verifying calculations. As a general rule, but subject to stated exceptions, only two PGA rate changes are permitted each year. A deferred purchased gas cost account is permitted wherein over and under charges are maintained in order to assure recovery of only those expenditures actually made, and to assure recovery of all purchased gas costs. Supplier refunds must be passed on to consumers and company rates are subject to complete review every three years.

The Commission will face many important gas pipeline rate questions in the future. Besides addressing the continuing questions of appropriate fixed cost allocations, the FPC will be faced with questions pertaining to the further development and application of its incremental approach, the determination of

[11] *Texas Eastern Transmission Corporation*, 39 FPC 630 (1968), affirmed *Texas Eastern Transmission Corporation* v. *F.P.C.*, 414 F.2d (CA5 1969), *cert. denied* 398 U.S. 928 (1970).

who should pay for idle pipeline capacity in periods of curtailment, and the desirability of various automatic adjustment clauses which would depart from our normal test year approach for setting rates. The resolution of these issues will depend upon the applicability of the Commission's regulatory standards and objectives and in part on the specifics of each case as it comes before us.

This concludes my formal statement; I will be pleased to respond to any questions you may have.

APPENDIX

SUMMARY STATEMENT OF HON. JOHN N. NASSIKAS, CHAIRMAN, FEDERAL POWER COMMISSION, BEFORE THE SENATE COMMERCE COMMITTEE, FEBRUARY 19, 1974

I believe the FPC's pricing policies for the production of natural gas for the interstate market established over the past 4 years have been rational and articulated within the regulatory powers granted to us by the Natural Gas Act and the Administrative Procedure Act. We have been confronted with a pervasive natural gas shortage identified shortly after I became Chairman in August of 1969 and discussed in detail at a comprehensive hearing before the Senate Interior Committee in November 1969, and in January 1970 at an oversight hearing concerning Federal Power Commission regulatory policies held before the Senate Commerce Committee, and at numerous hearings since.

Natural gas reserves committed to the interstate market reported by jurisdictional pipelines have declined from 198.1 Tcf in 1967 to 148.6 Tcf in 1972—a decline of 50 Tcf. During the same 6-year period we have consumed—by depleting our proved reserve inventory—twice as much gas as we have found. Increasing curtailments of delivery to meet firm demand of pipeline customers has escalated to 10 percent of projected national demand for interstate gas during this winter and the 12-month period ending August 1974.

The impact of the natural gas shortage on the national economy is compounded by the shortage of other fuels—such as propane, middle distillate, and No. 6 residual fuel oil, as well as the lack of deliverable coal. The Nation is confronted with a national energy emergency as we found in various emergency orders to produce and commit more natural gas to the interstate market.

Currently natural gas is sold at the wellhead to interstate pipeline companies representing 70 percent of the national market at an average price of 25 cents per Mcf. A staff study prepared at my request shows that natural gas committed to the interstate market under all pricing procedures during 1971 to 1973 totaled 3.1 Tcf at an average price of 32.85 cents per Mcf. The price of new gas commitments to the interstate market ranged on average from 28.41 cents in 1971, 29.67 cents in 1972, to 39.35 cents per Mcf in 1973. During the same period long-range dedications under area rates declined from 52 percent of new commitments in 1971 to 44 percent in 1972 and down to 25 percent in 1973. As a result of our releasing small producers from area ceilings in 1971, there were additional long-range dedications of small producer sales to the interstate market in 1972 approximating 19 percent of new commitments (231 Bcf of 1,206 Bcf), and in 1973 to almost 10 percent of new commitments (107 Bcf out of 1,116 Bcf).

According to the staff review, in 1973 the breakdown of volumes and prices of all new natural gas sales committed to the interstate market under various pricing procedures was as follows:

	Deliveries (1,000 ft³)	Average price (cents per 1,000 ft³)
Area rate ceilings	265,000,000	24.63
Optional procedure	87,000,000	39.93
Limited term sales	340,000,000	40.85
Small producer sales	107,000,000	42.43
60-day emergency sales	116,000,000	46.11
180-day emergency sales	201,000,000	50.41
Total	1,116,000,000	39.35

It should be observed that another major program of the Commission to stimulate investment by pipeline companies in exploration and development for gas to be committed to the interstate market is the advance payments program. The

advance payments concept allows recovery of non-reimbursed advances in the rate base of the pipeline company so that a company can recover non-reimbursed losses in exploration and development. This program has succeeded in finding about 10.3 Tcf of proved reserves and has doubled the total of potential reserves in the lower 48 states from 4.75 Tcf to 9.5 Tcf.

Our policies, as well as greatly expanded lease sales in the federal domain, have resulted in a substantial turn-around in exploration and developmental drilling for gas in the lower 48 states in contrast to the oil exploration and development program as shown by the following preliminary data:

	1973	Percentage change 1973–72	Percentage change 1973–61
Footage drilled (thousands):			
Gas:			
Exploratory	6,127	+33.4	+16.7
Developmental	29,428	+32.7	+23.0
Total	35,555	+32.8	+21.9
Oil:			
Exploratory	3,747	−6.4	−36.5
Developmental	40,835	−8.3	−48.7
Total	44,582	−8.1	−47.9
Dry holes	56,195	−5.2	−25.0
Total	136,332	+1.3	−28.1
Wells completed:			
Gas	6,373	+29.3	+16.7
Oil	9,892	−12.5	−53.8
Dry holes	10,314	−6.7	−40.7
Total	26,579	−2.9	−39.9

To add over 30 trillion cubic feet of natural gas annually over the next 12 years in contrast to the average of 10 trillion cubic feet added over the past six, the turnaround for gas must intensify, and our domestic oil exploration and development program which historically has accounted for 25-35 percent of new gas discoveries, must be greatly expanded.

Probably the major regulatory program of the Commission to reduce regulatory lag and establish systematic reviews of just and reasonable price levels is our pending decision in R-389-B relating to a uniform national rate for new gas supplies committed to the interstate market. Pending the issuance of this decision, it is important that the Commission does not establish precedents which will exert pressure for or create expectations of higher prices than may be warranted for increased production of natural gas. Even though there is a shortage of natural gas, we should not allow our pricing policies in setting just and reasonable rates to be controlled by producers in a seller's market. We must remember that the determination of incremental cost of producing natural gas is dependent upon speculative elasticities and cross-elasticities of supply and demand. Even at an assumed 50 percent supply elasticity, if the price doubles, supply increases by 50 percent. If a price of 25 cents produces 10 Tcf, a double price to 50 cents shall produce 15 Tcf, resulting in a marginal cost for the additional 5 Tcf of $1.00. Another example: Assuming that 10 Tcf of new additions will be committed at 35 cents per Mcf, a price increase to 45.5 cents (30 percent) per Mcf with an elasticity of .5 would result in an incremental cost of $1.15 per Mcf. If an elasticity of .1 is assumed, the incremental cost increases to $3.95.

We are charged by the Congress and the Natural Gas Act to regulate. We are not regulating if we are compelled to accept a price offered by a producer in competition with the intrastate market—which cannot be sustained by evidence of costs approved by the Commission, or in the absence of a rational basis for acceptance including unit costs of the project in addition to relevant economic factors.

If the unregulated intrastate market or producer-stimulated prices in excess of a workably competitive market control the price level to consumers in the interstate market above the level reasonably justified by costs, including a reasonable return, producers will receive windfall profits sanctified by orders of

this Commission. I cannot endorse this kind of nonregulation and I am certain that my colleagues cannot either. It is not our mission to enable producers to be unjustly enriched at the expense of interstate consumers—even if our failure to certificate a sale may result in less gas for the interstate market. It is Congress that has imposed upon our Commission the duty to provide a permanent bond of consumer protection under the Natural Gas Act. If we are unable to prescribe prices under the Natural Gas Act to serve the interstate market, Congressional change in the Act is necessary—not Commission actions beyond delegated powers.

I believe we have generally succeeded in holding prices for natural gas in line in the face of an irrational energy economy where the prices of other fossil fuels and products have spiraled beyond the zone of reasonableness. During the present national energy emergency ordinary prudence and common sense would indicate that we should control the price of natural gas within reasonable limits consistent with the powers delegated to us by the Natural Gas Act rather than to engage in a losing price battle with the intrastate market. We serve neither intrastate nor interstate consumers—if unrestrained price competition between intrastate and interstate buyers for natural gas in a sellers market is permitted without critical review of the impact of our policies upon ultimate rates to be charged to consumers. It should be emphasized that Federal domain gas is not subject to intrastate price competition (except in relation to the attraction of capital to either domain), since its price and deliverability in interstate commerce is controlled by the Federal Power Commission.

If a producer through contract with a pipeline offers a block of natural gas to the interstate market at a price of 75 cents on the basis that the same block of gas will be sold to the intrastate market at 80 cents if the offer is not accepted, the approval of a certificate of sale by the Commission will grant a dramatic windfall profit to the producer if our past cost studies and current evaluations are applied. Also, the approval of a certificate of sale by the Commission under these circumstances will not increase overall gas supply since the same block of gas is in effect being offered at auction to the highest bidder. If there is no intrastate market bidding for gas—as in the case of Federal domain gas, or where the block of gas is surplus to intrastate requirements—the prescription of a just and reasonable rate by the Commission which will induce the sale of that block of gas on terms established by the Commission, *not* by the producer, will increase the supply of natural gas available to interstate consumers without creating windfall profits. The delivery of gas to the interstate market should not be contingent on the contract price between the producer and the pipeline company unless the price is confirmed by substantial evidence on a hearing record. I have advocated legislation before this Committee to enable the Commission to prescribe prices by commodity value and economic and market factors in addition to cost evidence. (Senate Committee on Commerce, March 22, 1972, S. 2467, S. 2505). On October 11, 1973, Commissioners Brooke, Moody and I testified before this Committee in support of deregulation of natural gas—in differing degrees. I testified in support of a revision of the Natural Gas Act to provide for the monitored deregulation of new gas dedications to the interstate market. Deregulation under the close surveillance of the Federal Power Commission, the Federal Trade Commission and the Justice Department to assure that prices are established in a workably competitive market is a superior public policy to the present structure where 70 percent of natural gas is regulated and 30 percent is unregulated. The unregulated market should not be the tail that wags the dog. The entire marketplace should be the price determinant.

If the Congress deregulates natural gas then to avoid windfall profits and escalating prices beyond the realm of reasonableness, the Federal Power Commission should be granted authority to reimpose controls or establish an absolute ceiling on natural gas prices. At the same time, tax policy should be used to limit excess profits or to tax prices on a graduated basis over a prescribed standard until we can attain as a Nation the energy balance which will enable our free enterprise system to operate effectively.

Chairman HUMPHREY. Congressman Brown joined us here and since I have already asked you, Mr. Nassikas, a number of questions, I want to yield to the Congressman.

Representative BROWN. Thank you, Mr. Chairman, and thank you, Mr. Nassikas. It is nice to see you again. I see you frequently on the other side of the Capitol——

Mr. NASSIKAS. That is right.

Representative BROWN [continuing]. In the Interstate and Foreign Commerce Committee, Communication and Power Subcommittee.

It looks to me as if you have been some place keeping warm.

Mr. NASSIKAS. Yes. I was in Utah. It just happened that I lectured out there and then I did a little skiing.

Representative BROWN. Keeping cold, then, I beg your pardon. I thought you had been in the south.

Mr. NASSIKAS. We had electric power to convey us up.

Representative BROWN. Let me follow up on what you were just saying to the chairman of the subcommittee about the amount of the cost of gas to the consumer which the Federal Power Commission has under its control. Can you give me some idea what that percentage is?

Mr. NASSIKAS. Yes.

Representative BROWN. In other words, you regulate the cost of the gas itself?

Mr. NASSIKAS. Yes, sir, at the wellhead.

Representative BROWN. And what percentage of the total cost to the consumer on average does that amount to?

Mr. NASSIKAS. I will do it in stages. In round figures, total gas consumption in the United States is 24 trillion cubic feet, round figures; 16 trillion cubic feet is under the jurisdiction of the Federal Power Commission; 8 trillion cubic feet—it is a little less than that—is unregulated intrastate.

Now, the average price of the 16 trillion cubic feet flowing from the wellhead is 25 cents. That is the average price flowing as of last month, the closest statistic that we have.

If we take a consumer in the northeastern part of the United States——

Chairman HUMPHREY. Could you get one in Ohio?

Representative BROWN. Any place that is average and obviously Ohio and Minnesota are not average but we will take whatever is.

Mr. NASSIKAS. Let us take Cleveland, Ohio, just as an example. In Cleveland, Ohio, the delivered price of gas to the consumers there would be about a $1.75 an Mcf. It would be somewhat less than New York. About a $1.75 an Mcf. Of that $1.75 cost, the cost of gas in that $1.75 price per Mcf is 25 cents. So that it would be 14 percent of the $1.75? I have not computed it. So that that is the percentage of the cost of gas. Probably 100 percent of the cost of gas virtually would be controlled by us in Ohio because your indigenous sources of natural gas are quite limited. In Massachusetts, I can say 100 percent would be controlled and in New York, about 99.9 percent.

Representative BROWN. And in Texas?

Mr. NASSIKAS. Texas, take the reverse.

Representative BROWN. Much lower.

Mr. NASSIKAS. Reverse in Texas. Their gas as well as Louisiana's—that they consume in their industrial complexes and to heat their

homes—is almost exclusively unregulated intrastate gas. It is not exclusive. There is some interstate gas that flows there also.

Representative BROWN. Now, could you do the same thing for the gas in Texas; that is, this 8 million cubic feet? I suppose it is not all—well, Texas is probably very far off the average. Could you give me the average of intrastate gas costs?

Mr. NASSIKAS. Yes, to the extent that we know it. In our national rulemaking that I mentioned earlier, we noticed intrastate prices as of 1971 or 1972. I will get up to the present in a moment. It is either 1971 or 1972. Some place in the range of 31 to 33 cents. I will give you the exact figures. This is close. Staff studies that we have conducted in various proceedings before the Federal Power Commission would indicate that the intrastate price level currently in selected market areas of Texas and Louisiana may range from 35 cents for flowing gas—no, I am too high. Sorry. I take that back. For flowing gas, it ranges slightly under the national average which is 25 cents. For new gas commitments the intrastate market is somewhere in the neighborhood of 35 cents and as high as 70 cents. We can even find $1 and $2 purchases in the spot market for natural gas. But on average, new gas prices in the intrastate market from studies that we have conducted, and we have another national study where we are trying to get the true array of prices, would seem to be somewhere between 35 to 60 cents. That is the best that I can give you at this time.

Representative BROWN. That is the price of the gas itself. What about the price to the consumer?

Mr. NASSIKAS. Well, the price to the consumer because of transportation charges which range about 20 cents from south Louisiana or from Louisiana to the Northeast, 20 to 25 cents, so you would have to take off about 25 cents for that price. The unregulated intrastate price that they are paying, as I said earlier, was on average about 23 cents. So that it is somewhere under—perhaps 20 to 30 cents less than you might be paying in the Northeast and I have give it to you exactly.

Representative BROWN. Related to the Cleveland price you are telling me it is a buck and a half?

Mr. NASSIKAS. A $1.75 in Cleveland, is what I said, per Mcf.

Representative BROWN. Yes.

Mr. NASSIKAS. So that just in round figures here, I would say on a comparable figure to the $1.75, that the price would be in Dallas for the residential consumers, in December 1973, somewhere in the area of $1.07. I am not too far off. That is Texas.

In Cleveland, Ohio—table 8–B, of my prepared statement—for nonheating purposes, the comparable price as of December 1973 was $1.39 and for heating purposes 92 cents. It was a little high on Cleveland there. That is December 1973. But that price has gone up.

Representative BROWN. What was it, then?

Mr. NASSIKAS. About a dollar—in Cleveland, a $1.39 for nonheating purposes and for heating purposes, in round figures, 92 cents.

Representative BROWN. Well, now, the impression I am drawing from this, without pressing you to the precise figures or what they

were yesterday as opposed to the apparently comparable figures you have there, is that the cost of the gas itself is higher in the intrastate areas than the cost of the gas at the spigot, so to speak—is that not correct?

Mr. NASSIKAS. Congressman Brown, no, it is not correct.

Representative BROWN. Well, I was using——

Mr. NASSIKAS. The flowing gas price intrastate, which is the predominant part of your gas supply intrastate, is slightly less than the flowing gas price interstate. In other words, if we are dealing with 25 cents in round figures for 16 trillion cubic feet of gas, the 8 trillion cubic feet of gas on average is flowing for a little under 25 cents.

Representative BROWN. Why would it be cheaper than the regulated price of natural gas?

Mr. NASSIKAS. Well, I think the fundamental reason for this is that long-term contracts are still in effect which were executed many years ago when gas was a surplus kind of commodity. We had energy affluence in the country when these contracts were entered into.

Representative BROWN. So this is not unlike the $3.80 per barrel oil where that well came in extensively and the price—the profit margin, if that is a fair term, the price at least was held down because there were an awful lot of wells being drilled and there was a big supply available.

Mr. NASSIKAS. That is true.

Representative BROWN. And you had more supply in effect, than you had consumption.

Mr. NASSIKAS. That is true. I do not want in anyway, however, to leave the impression that the intrastate market for new gas is as low as the price that we have authorized for new gas in the interstate market. There is no question about it in my mind, based on my total judgment and experience here in the last 5 years, that the intrastate price for new gas in the Southwest, which is our gas producing area, is substantially higher than the price that we have allowed gas to rise on the interstate market.

Representative BROWN. That is the 35 to 70 percent and sometimes over a dollar.

Mr. NASSIKAS. That is right.

Representative BROWN. Now, the intrastate new gas price that you permitted is how much?

Mr. NASSIKAS. Interstate new gas, I have this in my summary statement. Perhaps I could summarize it for you. I think a rather dramatic illustration of what I am trying to say here is in the table [1] of my summary statement.

Now, these are new gas commitments under our various pricing procedures. Optional pricing procedure, we still do not have much gas flowing under that procedure. It is being tested in the courts and has not been operating more than a year and a half now; 39.93 cents is the average price there. Limited term sales is a big block of gas, more than committed under our long-range commitments. Limited term sales, the price during 1973, on average was almost 41

[1] See table, p. 40.

cents. Small producers sales, another big block of gas, 107 billion cubic feet. We released small producers, by the way, from area ceilings in 1971 and that case is pending before the U.S. Supreme Court. As a result of that policy, small producers can charge an unregulated price to the pipeline companies, unrestricted by area ceilings. Well, that gas was committed by small producers on average at 42½ cents; 60-day sales which are sales again where we allow the sale to be made by producer to a pipeline without price restriction. Those sales were at 46 cents on average.

Our latest experience, which is the 180-day emergency sales may coincide to some degree with where the market is, both intrastate and interstate. It may coincide, it may not, but at least it is evidence. On 180-day emergency sales which were terminated as of March 15, 1974, the everage price was 54.1 I think I told Chairman Humphrey just before you came that that figure now is about 54 to 55 cents on average with dedications of about 230 million rather than the 200 million thousand cubic feet shown in the table of my summary statement.

Chairman HUMPHREY. Mr. Nassikas, I have got to go down and cast a vote, but I will be back. Congressman Brown will take over the Chair.

I have two questions. Do you expect the fuel cost adjustments we have seen in the Northeast may well be repeated throughout the country?

Mr. NASSIKAS. Yes, sir.

Chairman HUMPHREY. You state the doleful prospect that electric rates may triple in the next decade or so but this includes purely monetary extension. To what extent would you modify this estimate if inflation is taken out? In other words, what do you estimate the increase in real resources cost would be?

Mr. NASSIKAS. I do not want to be either a Cassandra or a Pollyanna. I am sure I am a poor prophet but I will say double.

Chairman HUMPHREY. All right. Are the gas utilities in the same perilous financial condition that seems to be characterized by many of our electrical utilities?

Mr. NASSIKAS. Well, I——

Chairman HUMPHREY. Capital-short?

Mr. NASSIKAS. I would say I do not believe, frankly, that either the electric utilities or the gas utilities are in perilous financial condition. While the electric utilities, as I showed in one section of my prepared statement, are getting down to 2½ times interest earned, and many of their indentures limit them to two times interest earned, we still are not below the indenture limit and through rate applications and rate increases and other efficiency factors, I think that they are going to survive. The fuel clause adjustment in itself is a means of creating cash flow, eliminating regulatory lag, and giving the electric utilities survival characteristics. As to the gas industry, their most vulnerable Achilles heel, I would say, is the lack of an adequate gas supply. I am encouraged by a turn around in exploration and drilling statistics in the gas industry where the year

1973 was the highest year for exploratory footage and developmental footage drilled in the history of the gas industry. This will have the result of improving gas supply.

The new leasing policies of the Federal Government, apart from whether it should be 10 million or 3 million acres, will make available prolific resources for gas supply. At the same time, the gas industry goes not by any standard have an adequate gas supply to meet forecasted demands over the course of the next decade, no matter what we do.

Chairman HUMPHREY. There was an article in the New York Times of March 21 that carried a story headlined, "FPC Hints at Higher Gas Prices." The article said that the FPC had:

> Invited comment on a new range of estimates of natural gas costs. The estimates are higher than those published 11 months ago when the Commission began a proceeding to establish a single national wellhead price for gas. * * * Energy analysts consider it certain that if the Commission sets such a price it will be higher than all prices now authorized under the Agency's nine area rate ceilings.

The cost estimates range as high as 60 cents per thousand cubic feet. You note in your summary statement, however, that the average price of new gas commitments to interstate commerce in 1973 was 30 cents per thousand cubic feet and this was much more than in 1972 or prior years. Can you give us any information on this matter about the projected new price?

Mr. NASSIKAS. Yes. The report of the New York Times refers to a notice that we issued in Docket No. 389-B in which there were columns A to H, and in which various productivity assumptions of the new gas supply added, according to the footage drilled, were used. Also, various investment lives were used. Nine to then and a half years was another basic assumption.

Chairman HUMPHREY. Yes.

Mr. NASSIKAS. If you apply productivity factors to the costing of new gas, that is, determine how much gas—how many feet of gas are added per foot drilled, compute the investment per foot drilled which is the exercise that we go through, and then apply these very productivity factors by different time series and on these two basic assumptions, the price can vary from 30 to 60 cents.

Chairman HUMPHREY. Would you just continue this with Congressman Brown? I hate to walk out on you but I must cast a vote here. You take the next witness, will you?

Mr. NASSIKAS. Nice to see you, Mr. Chairman.

Chairman HUMPHREY. Thank you. We are grateful to you.

Mr. NASSIKAS. The 60 cent price, Congressman Brown, is based on the 4-year time series, the last 4 years until 1972. The lowest assumption, around 32 cents cost factor there, is based on a 9-year investment life and a time series of average of 10, 15, and 25 years.

Representative BROWN [presiding]. Let me pursue this to ask what the cost, then, would be in terms of the Btu equivalent with oil and coal?

What is the economy for the average consumer in even 60-cent gas as opposed to what might be the price of oil or the price of coal to

heat with? Because obviously when the price of gas was held down and we apparently reduced the activity in terms of exploration and supply, we stimulated the consumption of gas because a lot of people switched from coal to gas or from oil to gas as the prices of those two commodities went higher.

Mr. NASSIKAS. At a 60-cent level, on a Btu basis, it would be equivalent to about $3.50 a barrel oil. The controlled price of old oil, so-called, is $5.25 and in the world market today oil is selling for over $9 a barrel. So that $9 a barrel oil working backwards would be $1.50 gas, 1 million British thermal units.

There are about 24 or 25 million British thermal units in a ton of good quality coal. So that if we multiply 60 by 25, we arrive at $15 a ton of coal. Coal on the spot market for below 1 percent sulfur is selling for more than $15 a ton, even a high-sulfur coal in the spot market is selling for $12 to $15 a ton today. So that here again on 60-cent gas, while it is far higher than the average price of gas and far higher than the average price of coal, nevertheless it translates to these Btu equivalents on the price basis.

Representative BROWN. Can you do this in a different way because I would like to make it as simple as possible. For the heat coming out of the furnace in the home what would be the price that you would pay in your gas bill, the price that you would pay in your oil bill or the price you would pay, I guess—it has been so long since I have ordered coal—for a ton of coal in your basement? Now, is that a fair question? Do you understand? I am trying to get it down to what the consumer price would be for these equivalent products.

Mr. NASSIKAS. I do not have coal here, regrettably. I do not have coal in my tables 8A and 8B of my prepared statement. I have gas, oil, and electricity. I can supply it to you for coal.

[The following information was subsequently supplied for the record:]

The price of coal is not included in tables 8A and 8B of my prepared statement, and I indicated I would supply coal prices for the record. I am advised by staff that these data are not available for the geographic areas and time frames covered in those tables. My staff has, however, obtained the delivered price of coal per short ton in the Washington, D.C., area from the only local retailer, Colonial Fuel Co. Currently, the delivered price of bituminous coal (soft coal) in Washington is $44.35 per ton plus tax, which is equivalent to $1.70 per million Btu. Anthracite coal (hard coal) is delivered in this area at $44.10 per ton plus tax, which is equal to $1.69 per million Btu.

Mr. NASSIKAS. Let me give it to you as I have it here. On No. 2 fuel oil, which is used as we know, to heat our homes with, in Baltimore, $1.53 was the price a million Btu. Gas was about the same for heating purposes, $1.48 a million Btu. Nonheating, $1.88 a million Btu.

What I can do, Congressman Brown, if it is all right with you, I could supply to you average household bills for a certain level of consumption of No. 2 fuel oil and for natural gas.[1] I can also give you for coal our latest figures that we collect from all electric utilities, coal, oil, and gas, on a Btu basis, by plant locations as to what the relative prices are. I can tell you off the top of my head that the

[1] These data are included in tables 8A and 8B, pp. 50–51 and 52.

price of natural gas currently as used for boiler fuel by the electric utility industry is less than either coal, in most markets, or oil. Substantially less.

Representative BROWN. Would that be true for gas at 60 cents a thousand cubic feet.

Mr. NASSIKAS. I do not think so but I will check. I do not believe so.

[The following information was subsequently supplied for the record:]

BUREAU OF POWER STAFF ANALYSIS OF THE MOST RECENT DATA ON AVAILABLE PRICES PAID BY THE ELECTRIC POWER INDUSTRY

In June 1973, the total heat content of the fossil fuels delivered to steam-electric plants was 1.3 quadrillion Btu's. Fuel deliveries reported for June 1973 are summarized below:

	Quantity delivered	Percent of total British thermal units	Average price (cents per million British thermal units)
Coal	31.11 million tons	53.5	40.0
Oil	41.67 million barrels	19.6	71.0
Gas	340.45 billion ft³	26.9	33.8

Attached is a Staff report showing similar data for May 1973 in summary and by geographic areas.

FEDERAL POWER COMMISSION, BUREAU OF POWER, MONTHLY STAFF REPORT ON COST AND QUALITY OF FUELS FOR STEAM-ELECTRIC PLANT FOR MAY 1973

(FPC Form No. 423)

ABSTRACT

Summary

In May, the total heat content of all fossil fuel deliveries reported on FPC Form 423 was 1.3 quadrillion BTU's, up 13.2 percent from April. The following statistics summarize the fuel deliveries to steam-electric plants in May.

	Quantity delivered	Percent of total British thermal units	Average price (cents per million British thermal units)
Coal	34.12 million tons	58.5	39.5
Oil	38.90 million barrels	18.3	71.1
Gas	295.69 billion ft³	23.2	33.7

DELIVERIES

Deliveries of *coal* increased 13.5 percent from April to 34.1 million tons in May. Contract deliveries of coal accounted for 82.8 percent of the total deliveries. Surface mined coal represented 58.9 percent of the coal deliveries with the rest coming from underground mines.

Total *oil* deliveries to steam plants increased 8.4 percent from April. Leading the increase were No. 4 and No. 5 blends. Deliveries of these blends rose to 757 thousand barrels from 342 thousand barrels in April. Crude oil deliveries of 1.8 million barrels in May were up from 1.0 million barrels in April. Distillate oil (No. 2) deliveries also rose to 1.4 million barrels, up from 1.1 million barrels in April. Total No. 6 residual oil deliveries were 34.97 million barrels of which 97.2 percent was delivered under contract.

Total *gas* deliveries in May of 295.7 billion cubic feet were 18.2 percent higher than in April. Interruptible deliveries amounted to 132.2 billion cubic feet in May, or 44.7 percent of the total. This was up from 41.7 percent of the April total and is a seasonal occurrence as more interruptible gas is available to electric utilities as the summer season approaches.

QUALITY

In May, coal deliveries to steam electric plants increased substantially in all six sulfur categories compared to April. While the national average delivered price of coal in all sulfur categories remained at the April level of $8.80 per ton, the price of coal containing .5 percent sulfur or less rose 10.3 percent.

Deliveries of oil containing .51 to 1.0 percent sulfur decreased by about 2 million barrels from April while deliveries of the 1.01 to 2.0 percent oil increased by approximately the same amount. Deliveries of oil containing .5 or less sulfur and more than 2.01 percent sulfur increased moderately. Price gains occurred in all six sulfur categories of oil.

PRICE

In May, the Industrial Commodities Wholesale Price Index rose 1.1 percent from April. While all of the fuels increased in price from April, coal registered a moderate increase of 0.2 percent. The price of gas continued its rapid toward trend and rose 1.2 percent in May. Since December of 1972, the delivered price of gas to steam electric utility plants has increased 13.5 percent.

In May, the price of heavy oil increased 2.2 percent. Contributing to the rapid increase in the average price was the 41 percent climb in the spot price of No. 6 residual oil. The May national average spot price of $5.85 per barrel was a remarkable $1.70 per barrel higher than in April. During the same month the price of distillate oil increased by 0.3 percent.

EXPLANATION TO TABLES

1. *The number of reporting companies and plants* in Tables 1, 5, 9 include those which had at least one delivery of a particular fuel during the month. Because either a company or a plant may have certain months where no deliveries are made, the number of reporting companies and plants varies from month to month.

2. The *price* as reported on Form 423 is in cents per million BTU. The monthly averages for the three fossil fuels, by state and region, appear in Tables 2, 3, 6, 7, and 10. However, also included are average prices in dollars per ton of coal in Tables 2 and 3, dollars per barrel of oil in Tables 6 and 7, and dollars per Mcf of gas in Table 10. These prices were computed for each state and region as follows:

Coal: (Average $ per ton) = Average BTU per lb. x Average price (¢ per million BTU) x 2000 (lbs. per ton) x 10^{-8}.

Oil: (Average $ per barrel) = Average BTU per gal. x Average price (¢ per million BTU) x 42 (gal. per barrel) x 10^{-8}.

Gas: (Average $ per Mcf) = Average BTU per cu. ft. x Average price (¢ per million BTU) x 10^{-8}.

3. Therefore, the *average BTU* of a fuel can be calculated as follows:

$$\textit{Coal:}\ \text{Average BTU per lb.} = \frac{\text{Average price (\$ per ton)} \times 10^{8}}{\text{Average price (¢ per million BTU)} \times 2000}$$

$$\textit{Oil:}\ \text{Average BTU per gal.} = \frac{\text{Average price (\$ per bbl.)} \times 10^{8}}{\text{Average price (¢ per million BTU)} \times 42}$$

$$\textit{Gas:}\ \text{Average BTU per cu. ft.} = \frac{\text{Average price (\$ per Mcf)} \times 10^{8}}{\text{Average price (¢ per million BTU)}}$$

4. *Variations in the average price* per million BTU in relation to the average price in dollars per ton of coal and dollars per Mcf of gas occur because of the wide ranges in average BTU content of some of the fuel types. For instance, the heat content of bituminous coal can be above 13000 BTU's per pound while lignite rarely contains more than 7500 BTU's per pound. Also, the heat content of refinery gas can be upwards to 1200 BTU's per cubic foot while blast furnace gas contains approximately 90 BTU's per cubic foot.

5. The *total gas* reported on Table 11 does not include off peak gas. Off peak gas accounts for less than one-half of one percent of the total gas deliveries.

TABLE 1.—COAL DELIVERIES

Geographic region and State	Number of reporting		Quantity and type of coal received (in thousands of tons)				
	Companies	Plants	Anthracite	Bituminous	Sub-bituminous	Lignite	Total
New England:							
Connecticut	0	0	0	0	0	0	0
Maine	0	0	0	0	0	0	0
Massachusetts	0	0	0	0	0	0	0
New Hampshire	1	1	0	24.2	0	0	24.2
Rhode Island	0	0	0	0	0	0	0
Vermont	0	0	0	0	0	0	0
Total	1	1	0	24.2	0	0	24.2
Middle Atlantic:							
New Jersey	1	2	0	218.0	0	0	218.0
New York	4	10	0	555.4	0	0	555.4
Pennsylvania	8	29	129.7	3,008.2	0	0	3,137.8
Total	13	41	129.7	3,781.5	0	0	3,911.2
East North Central:							
Illinois	8	25	0	2,198.7	510.0	0	2,708.7
Indiana	13	26	0	2,330.6	101.0	0	2,431.6
Michigan	9	22	0	2,088.0	0	0	2,088.0
Ohio	15	34	0	3,772.4	20.7	0	3,793.1
Wisconsin	9	16	0	966.4	0	0	966.4
Total	54	123	0	11,356.1	631.7	0	11,987.7
West North Central:							
Iowa	10	17	0	423.3	37.0	0	460.3
Kansas	3	6	0	108.4	0	0	108.4
Minnesota	6	14	.8	63.4	416.2	65.4	545.8
Missouri	8	13	0	1,223.2	0	0	1,223.2
Nebraska	3	3	0	107.3	0	0	107.3
North Dakota	5	5	0	0	0	374.7	374.7
South Dakota	1	1	0	0	9.6	0	9.6
Total	36	59	.8	1,925.7	462.8	440.1	2,829.3

TABLE 1.—COAL DELIVERIES—Continued

Geographic region and State	Number of reporting		Quantity and type of coal received (in thousands of tons)				
	Companies	Plants	Anthracite	Bituminous	Sub-bituminous	Lignite	Total
South Atlantic:							
Delaware	1	1	0	97.0	0	0	97.0
District of Columbia	1	1	0	26.0	0	0	26.0
Florida	2	5	0	543.0	0	0	543.0
Georgia	1	7	0	1,057.0	0	0	1,059.7
Maryland	3	5	0	303.7	0	0	303.7
North Carolina	2	11	0	1,764.7	0	0	1,764.7
South Carolina	3	7	0	408.9	0	0	408.9
Virginia	4	6	0	372.6	0	0	372.6
West Virginia	6	13	0	1,966.7	0	0	1,966.7
Total	23	56	0	6,539.6	0	0	6,539.6
East South Central:							
Alabama	4	9	0	1,985.6	0	0	1,985.6
Kentucky	8	16	0	1,938.4	0	0	1,938.4
Mississippi	1	1	0	67.0	0	0	67.0
Tennessee	1	8	0	2,033.6	0	0	2,033.6
Total	14	34	0	6,024.7	0	0	6,024.7
West South Central:							
Arkansas	0	0	0	0	0	0	0
Louisana	0	0	0	0	0	0	0
Oklahoma	0	0	0	0	0	0	0
Texas	1	1	0	0	0	504.0	504.0
Total	1	1	0	0	0	504.0	504.0
Mountain:							
Arizona	1	1	0	0	42.4	0	42.4
Colorado	4	8	0	101.1	271.7	0	372.8
Idaho	0	0	0	0	0	0	0.0
Montana	2	2	0	0	58.0	29.3	89.3
Nevada	2	2	0	0	298.2	0	298.2
New Mexico	1	1	0	0	726.6	0	726.6
Utah	1	3	0	33.0	58.0	0	91.0
Wyoming	3	3	0	0	385.9	0	385.9
Total	14	20	0	134.1	1,840.8	29.3	2,004.1
Pacific:							
California	0	0	0	0	0	0	0
Oregon	0	0	0	0	0	0	0
Washington	1	1	0	0	300.0	0	300.0
Total	1	1	0	0	300.0	0	300.0
U.S. total	157	336	130.4	29,785.8	3,235.3	973.4	34,124.8

TABLE 2.—AVERAGE COAL PRICES, F.O.B. PLANT

Geographic region and State	Purchase price by type of purchase						Purchase price by type of mining method					
							Strip and auger			Underground		
	Contract purchases (1,000 tons)	Average contract price		Spot purchases (1,000 tons)	Average spot price		Quantity (1,000 tons)	Average price		Quantity (1,000 tons)	Average price	
		Cents per 10^6 Btu	Dollars per ton		Cents per 10^6 Btu	Dollars per ton		Cents per 10^6 Btu	Dollars per ton		Cents per 10^6 Btu	Dollars per ton
New England:												
Connecticut	0	0	0	0	0	0	0	0	0	0	0	0
Maine	0	0	0	0	0	0	0	0	0	0	0	0
Massachusetts	0	0	0	0	0	0	0	0	0	0	0	0
New Hampshire	24.2	48.2	13.08	0	0	0	0	0	0	24.2	48.2	13.08
Rhode Island	0	0	0	0	0	0	0	0	0	0	0	0
Vermont	0	0	0	0	0	0	0	0	0	0	0	0
Total	24.2	48.2	13.08	0	0	0	0	0	0	24.2	48.2	13.08
Middle Atlantic:												
New Jersey	218.0	61.2	16.06	0	0	0	81.0	59.2	15.40	137.0	62.4	16.46
New York	258.7	47.6	12.21	304.7	48.9	11.98	272.8	46.7	11.15	282.6	49.7	12.99
Pennsylvania	2,343.8	43.3	10.51	794.1	38.9	9.16	1,180.2	38.6	9.18	1,957.6	44.3	10.76
Total	2,812.5	45.2	11.09	1,098.7	41.8	9.94	1,534.0	41.3	9.86	2,377.2	46.1	11.36
East North Central:												
Illinois	2,501.3	40.0	8.27	207.4	46.2	10.38	1,703.5	40.5	8.38	1,005.2	40.6	8.53
Indiana	2,012.4	31.3	6.82	419.2	36.1	7.93	2,372.2	31.9	6.97	59.4	38.8	8.64
Michigan	1,657.1	45.3	10.89	430.9	51.1	12.51	1,209.6	44.3	10.48	878.4	49.4	12.25
Ohio	2,565.1	40.5	9.21	1,228.0	42.5	9.79	2,036.9	41.3	9.19	1,756.1	41.0	9.64
Wisconsin	941.0	48.0	11.12	25.4	55.9	10.83	952.7	49.2	11.22	373.6	46.6	10.93
Total	9,676.8	40.2	8.95	2,310.9	43.5	10.02	7,915.0	39.4	8.70	4,072.7	43.3	10.03
West North Central:												
Iowa	352.6	41.6	8.61	107.7	46.8	12.48	390.1	46.3	9.84	70.2	39.3	7.73
Kansas	103.6	29.6	6.15	4.8	36.4	9.12	108.4	29.9	6.28	0	0	0
Minnesota	456.2	37.6	6.51	89.6	48.4	.37	519.7	39.3	6.83	26.1	44.3	10.07
Missouri	1,072.6	32.0	6.92	150.6	39.1	8.72	1,068.5	31.7	6.81	154.7	40.5	9.44
Nebraska	107.3	46.7	10.57	0	0	0	103.6	46.3	10.50	3.7	59.2	12.51
North Dakota	370.4	14.8	1.98	4.3	22.4	3.00	374.7	14.9	1.99	0	0	0
South Dakota	9.6	32.5	5.37	0	0	0	9.6	32.5	5.37	0	0	0
Total	2,472.3	33.2	6.47	357.1	46.5	9.96	2,547.6	34.4	6.69	254.7	40.9	9.08

TABLE 2.—AVERAGE COAL PRICES, F.O.B. PLANT—Continued

Geographic region and State	Purchase price by type of purchase						Purchase price by type of mining method					
							Strip and auger			Underground		
	Contract purchases (1,000 tons)	Average contract price		Spot purchases (1,000 tons)	Average spot price		Quantity (1,000 tons)	Average price		Quantity (1,000 tons)	Average price	
		Cents per 10^6 Btu	Dollars per ton		Cents per 10^6 Btu	Dollars per ton		Cents per 10^6 Btu	Dollars per ton		Cents per 10^6 Btu	Dollars per ton
South Atlantic:												
Delaware	27.0	56.6	14.77	70.0	52.3	12.85	80.0	52.4	12.98	17.0	58.8	15.31
District of Columbia	14.0	62.8	16.63	12.0	55.0	14.24	0	0	0	26.0	59.3	15.52
Florida	511.0	44.0	9.98	32.0	49.6	12.10	397.8	41.6	9.31	145.2	51.4	12.29
Georgia	941.0	43.5	10.39	116.0	43.0	10.56	897.2	43.3	10.27	159.8	44.3	11.20
Maryland	108.7	57.0	14.91	195.0	50.2	12.75	175.6	48.4	12.19	128.1	58.2	15.35
North Carolina	1,384.0	45.7	11.09	380.7	48.2	11.85	602.3	46.5	11.22	1,162.3	46.1	11.27
South Carolina	272.4	50.4	12.23	136.5	47.8	11.68	129.6	48.1	11.56	279.3	50.2	12.28
Virginia	226.3	40.7	9.94	146.3	49.5	12.18	63.3	54.7	13.49	309.3	42.0	10.27
West Virginia	1,481.7	34.0	8.09	458.0	41.7	9.84	550.5	37.4	8.60	1,416.2	35.4	8.49
Total	4,966.1	42.1	10.08	1,573.8	46.5	11.33	2,896.4	43.7	10.34	3,643.2	42.7	10.41
East South Central:												
Alabama	1,739.7	43.0	9.61	245.9	37.1	8.95	638.1	39.2	9.15	1,347.5	43.7	9.71
Kentucky	1,767 9	29.6	6.35	170.5	37.4	9.01	1,270.3	28.2	6.06	668.1	34.4	7.58
Mississippi	67.0	37.1	8.96	0	0	0	0	0	0	67.0	37.1	8.96
Tennessee	1,926.1	38.6	8.49	107.5	34.5	7.94	688.6	34.6	7.69	1,345.1	30.3	8.85
Total	5,500.7	37.2	8.16	524.0	36.7	8.76	2,597.0	32.8	7.25	3,427.7	40.4	8.94

West South Central:												
Arkansas	0	0	0	0	0	0	0	0	0	0	0	0
Louisiana	0	0	0	0	0	0	0	0	0	0	0	0
Oklahoma	0	0	0	0	0	0	0	0	0	0	0	0
Texas	504.0	12.8	1.79	0	0	0	504.0	12.8	1.79	0	0	0
Total	504.0	12.8	1.79	0	0	0	504.0	12.8	1.79	0	0	0
Mountain:												
Arizona	42.4	31.5	6.58	0	0	0	42.4	31.5	6.58	0	0	0
Colorado	363.8	28.1	6.05	9.0	31.9	7.50	294.6	27.1	5.90	78.1	32.8	6.79
Idaho	0	0	0	0	0	0	0	0	0	0	0	0
Montana	87.3	21.4	3.35	0	0	0	87.3	21.4	3.35	0	0	0
Nevada	298.2	29.0	6.61	0	0	0	233.0	26.4	5.87	65.2	37.3	9.26
New Mexico	726.6	15.0	2.69	0	0	0	726.6	15.0	2.69	0	0	0
Utah	91.0	32.6	7.99	0	0	0	0	0	0	91.0	32.6	7.99
Wyoming	385.9	17.9	2.95	0	0	0	385.9	17.9	2.95	0	0	0
Total	1,995.1	22.2	4.29	9.0	31.9	7.50	1,769.8	20.4	3.82	234.3	34.0	7.94
Pacific:												
California	0	0	0	0	0	0	0	0	0	0	0	0
Oregon	0	0	0	0	0	0	0	0	0	0	0	0
Washington	300.0	37.8	6.12	0	0	0	300.0	37.8	6.12	0	0	0
Total	300.0	37.8	6.12	0	0	0	300.0	37.8	6.12	0	0	0
U.S. total	28,251.7	38.5	8.51	5,873.1	43.5	10.24	20,090.8	36.9	7.94	14,034.0	42.8	10.04

TABLE 3.—COAL DELIVERIES AND PRICES BY SULFUR CONTENT

Geographic region and State	0.5 percent sulfur or less			0.51 to 1.0 percent sulfur			1.01 to 1.5 percent sulfur		
		Average price			Average price			Average price	
	Quantity (1,000 tons)	Cents per 10⁶ Btu	Dollars per ton	Quantity (1,000 tons)	Cents per 10⁶ Btu	Dollars per ton	Quantity (1,000 tons)	Cents per 10⁶ Btu	Dollars per ton
New England:									
Connecticut	0	0	0	0	0	0	0	0	0
Maine	0	0	0	0	0	0	0	0	0
Massachusetts	0	0	0	0	0	0	0	0	0
New Hampshire	0	0	0	0	0	0	0	0	0
Rhode Island	0	0	0	0	0	0	0	0	0
Vermont	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0
Middle Atlantic:									
New Jersey	0	0	0	65.0	62.1	16.46	105.0	62.7	16.48
New York	0	0	0	37.1	55.9	13.30	66.4	40.4	9.76
Pennsylvania	47.1	32.5	6.55	190.3	44.3	9.59	345.4	44.1	10.75
Total	47.1	32.5	6.55	292.4	50.4	11.59	516.8	47.6	11.79
East North Central:									
Illinois	448.0	64.1	12.43	66.3	63.6	11.20	84.4	49.0	11.47
Indiana	60.0	60.6	11.73	62.2	53.9	10.12	43.8	39.7	8.84
Michigan	13.4	60.4	14.62	289.9	63.0	15.66	33.8	61.4	14.28
Ohio	9.4	60.6	14.94	408.6	46.8	10.79	92.8	50.2	12.33
Wisconsin	31.2	54.1	10.52	11.3	60.0	14.79	114.2	44.8	10.59
Total	562.0	63.0	12.34	838.4	54.5	12.51	369.0	48.1	11.36
West North Central:									
Iowa	101.7	38.8	7.66	41.5	45.4	9.37	3.3	61.8	14.90
Kansas	0	0	0	0	0	0	0	0	0
Minnesota	0	0	0	147.4	48.6	8.06	344.5	34.7	6.02
Missouri	81.0	37.4	7.10	39.0	53.0	13.65	21.0	47.7	11.17
Nebraska	0	0	0	55.1	47.7	10.10	0	0	0
North Dakota	4.3	22.4	3.00	370.4	14.8	1.98	0	0	0
South Dakota	9.6	32.5	5.37	0	0	0	0	0	0
Total	196.6	37.7	7.21	653.4	32.6	5.20	368.8	36.0	6.39

South Atlantic:									
Delaware	0	0	0	8.0	54.3	12.76	23.0	55.5	13.95
District of Columbia	12.0	55.0	14.24	2.0	60.7	16.03	12.0	63.2	16.73
Florida	0	0	0	11.0	52.1	13.06	11.0	59.1	14.40
Georgia	3.0	43.0	10.76	284.0	42.6	10.45	247.0	40.4	10.06
Maryland	1.1	44.0	10.61	104.6	57.5	15.09	40.0	49.5	12.46
North Carolina	17.2	47.1	11.62	1,192.8	47.6	11.49	426.5	43.8	10.88
South Carolina	0	0	0	83.7	48.5	11.74	250.2	49.9	12.06
Virginia	.4	38.8	9.52	332.8	43.4	10.60	29.0	49.1	12.18
West Virginia	0	0	0	600.0	43.0	10.27	196.7	38.3	8.99
Total	33.7	49.4	12.42	2,618.9	46.0	11.15	1,235.4	44.4	10.88
East South Central:									
Alabama	30.0	32.9	7.46	467.8	44.3	10.14	188.8	42.1	10.02
Kentucky	0	0	0	172.3	38.3	9.04	152.7	35.6	7.80
Mississippi	0	0	0	0	0	0	0	0	0
Tennessee	5.6	36.7	8.44	42.7	32.0	7.50	398.4	38.4	8.59
Total	35.6	33.5	7.62	682.9	42.1	9.70	739.9	38.8	8.79
West South Central:									
Arkansas	0	0	0	0	0	0	0	0	0
Louisiana	0	0	0	0	0	0	0	0	0
Oklahoma	0	0	0	0	0	0	0	0	0
Texas	0	0	0	504.0	12.8	1.79	0	0	0
Total	0	0	0	504.0	12.8	1.79	0	0	0
Mountain:									
Arizona	42.4	31.5	6.58	0	0	0	0	0	0
Colorado	213.9	27.1	5.86	158.9	29.7	6.38	0	0	0
Idaho	0	0	0	0	0	0	0	0	0
Montana	29.3	27.1	3.55	58.0	19.2	3.25	0	0	0
Nevada	298.2	29.0	6.61	0	0	0	0	0	0
New Mexico	0	0	0	726.6	15.0	2.69	0	0	0
Utah	91.0	32.6	7.99	0	0	0	0	0	0
Wyoming	155.4	25.6	4.83	230.5	11.3	1.68	0	0	0
Total	830.2	28.5	6.13	1,174.0	17.0	3.02	0	0	0
Pacific:									
California	0	0	0	0	0	0	0	0	0
Oregon	0	0	0	0	0	0	0	0	0
Washington	300.0	37.8	6.12	0	0	0	0	0	0
Total	300.0	37.8	6.12	0	0	0	0	0	0
U. S. total	2,005.1	40.6	8.12	6,764.0	40.1	8.51	3,229.9	43.4	10.09

TABLE 3.—COAL DELIVERIES AND PRICES BY SULFUR CONTENT—Continued

Geographic region and State	1.51 to 2.0 percent sulfur			2.01 to 3.0 percent sulfur			3.01 percent or more sulfur			Average price for all purchases	
		Average price			Average price			Average price			
	Quantity (1,000 tons)	Cents per 10^6 Btu	Dollars per ton	Quantity (1,000 tons)	Cents per 10^6 Btu	Dollars per ton	Quantity (1,000 tons)	Cents per 10^6 Btu	Dollars per ton	Cents per 10^6 Btu	Dollars per ton
New England:											
Connecticut	0	0	0	0	0	0	0	0	0	0	0
Maine	0	0	0	0	0	0	0	0	0	0	0
Massachusetts	0	0	0	0	0	0	0	0	0	0	0
New Hampshire	24.2	48.2	13.08	0	0	0	0	0	0	48.2	13.08
Rhode Island	0	0	0	0	0	0	0	0	0	0	0
Vermont	0	0	0	0	0	0	0	0	0	0	0
Total	24.2	48.2	13.08	0	0	0	0	0	0	48.2	13.08
Middle Atlantic:											
New Jersey	48.0	56.9	14.62	0	0	0	0	0	0	61.2	16.06
New York	162.0	48.3	11.67	274.9	49.2	12.70	15.0	48.2	12.63	48.3	12.08
Pennsylvania	468.2	40.4	9.70	1,956.8	42.4	10.32	130.1	40.8	10.15	42.2	10.17
Total	678.2	43.6	10.51	2,231.6	43.3	10.61	145.1	41.6	10.40	44.2	10.77
East North Central:											
Illinois	129.0	40.1	9.47	376.7	42.1	9.00	1,604.3	32.8	6.83	40.5	8.43
Indiana	90.9	31.7	6.82	621.8	29.8	6.47	1,552.9	31.1	6.88	32.1	7.01
Michigan	18.2	55.0	13.62	823.4	42.4	10.37	909.2	43.9	10.37	46.5	11.23
Ohio	101.9	45.1	10.26	931.7	40.2	9.36	2,248.7	39.8	8.98	41.1	9.40
Wisconsin	225.5	44.9	10.14	250.8	50.7	12.12	333.3	48.7	11.11	48.2	11.11
Total	565.5	42.2	9.59	3,004.5	40.0	9.22	6,648.3	37.2	8.27	40.8	9.15
West North Central:											
Iowa	8.0	40.4	8.96	213.8	46.4	9.95	92.0	49.1	10.48	45.3	9.51
Kansas	0	0	0	0	0	0	108.4	29.9	6.28	29.9	6.28
Minnesota	0.8	60.7	15.18	14.9	56.7	14.04	38.2	40.0	8.62	39.6	6.98
Missouri	5.0	68.6	16.65	265.0	28.1	6.29	812.3	32.3	6.95	32.9	7.15
Nebraska	0	0	0	15.2	46.7	10.89	37.0	45.4	11.14	46.7	10.57
North Dakota	0	0	0	0	0	0	0	0	0	14.9	1.99
South Dakota	0	0	0	0	0	0	0	0	0	32.5	5.37
Total	13.7	52.3	12.09	509.0	37.1	8.19	1,087.8	34.3	7.39	35.1	6.91

South Atlantic:											
Delaware	58.0	53.0	13.35	8.0	51.2	12.62	0	0	0	53.6	13.39
District of Columbia	0	0	0	0	0	0	0	0	0	59.3	15.52
Florida	34.1	49.5	12.21	102.1	50.3	11.86	384.8	41.5	9.25	44.4	10.11
Georgia	143.0	50.0	11.33	269.0	41.5	9.82	111.0	50.0	11.35	43.5	10.41
Maryland	132.0	50.5	12.83	26.0	48.7	12.46	0	0	0	52.7	13.52
North Carolina	110.6	41.5	10.21	17.6	41.9	10.31	0	0	0	46.2	11.25
South Carolina	50.1	49.4	12.34	24.9	50.4	12.35	0	0	0	49.6	12.05
Virginia	10.4	56.2	13.90	0	0	0	0	0	0	44.2	10.82
West Virginia	197.0	39.2	9.23	464.0	33.2	7.82	509.0	27.9	6.65	35.9	8.52
Total	735.2	46.2	11.17	911.6	38.8	9.21	1,004.8	35.3	8.16	43.2	10.38
East South Central:											
Alabama	170.8	36.2	8.88	80.3	40.3	9.87	1,067.9	42.7	9.32	42.2	9.53
Kentucky	64.4	36.1	8.70	320.3	32.3	7.08	1,228.7	27.5	5.84	30.4	6.58
Mississippi	0	0	0	67.0	37.1	8.96	0	0	0	37.1	8.96
Tennessee	78.2	38.6	9.06	128.0	39.5	9.27	1,380.7	38.5	8.34	38.4	8.46
Total	313.4	36.8	8.89	575.5	35.5	8.08	3,677.3	36.1	7.79	37.1	8.21
West South Central:											
Arkansas	0	0	0	0	0	0	0	0	0	0	0
Louisiana	0	0	0	0	0	0	0	0	0	0	0
Oklahoma	0	0	0	0	0	0	0	0	0	0	0
Texas	0	0	0	0	0	0	0	0	0	12.8	1.79
Total	0	0	0	0	0	0	0	0	0	12.8	1.79
Mountain:											
Arizona	0	0	0	0	0	0	0	0	0	31.5	6.58
Colorado	0	0	0	0	0	0	0	0	0	28.2	6.08
Idaho	0	0	0	0	0	0	0	0	0	0	0
Montana	0	0	0	0	0	0	0	0	0	21.4	3.35
Nevada	0	0	0	0	0	0	0	0	0	29.0	6.61
New Mexico	0	0	0	0	0	0	0	0	0	15.0	2.69
Utah	0	0	0	0	0	0	0	0	0	32.6	7.99
Wyoming	0	0	0	0	0	0	0	0	0	17.9	2.95
Total	0	0	0	0	0	0	0	0	0	22.3	4.31
Pacific:											
California	0	0	0	0	0	0	0	0	0	0	0
Oregon	0	0	0	0	0	0	0	0	0	0	0
Washington	0	0	0	0	0	0	0	0	0	37.8	6.12
Total	0	0	0	0	0	0	0	0	0	37.8	6.12
U.S. Total	2,330.3	43.3	10.32	7,232.2	40.4	9.49	12,563.3	36.6	8.07	39.5	8.80

TABLE 4.—BASIC COAL STATISTICS FOR THE PAST 12 MONTHS

	Monthly summaries of coal purchases												
	April 1973	May 1973	June 1973	July 1973	August 1973	September 1973	October 1973	November 1973	December 1973	January 1974	February 1974	March 1974	Total
Quantity purchased, 1,000 tons	30,062.9	34,124.8	0	0	0	0	0	0	0	0	0	0	64,187.7
Total heating value, billion Btu	671,165.8	761,542.4	0	0	0	0	0	0	0	0	0	0	1,432,709.2
Average sulfur content, percent by weight	2.3	2.3	0	0	0	0	0	0	0	0	0	0	2.3
Average price, cents per million Btu	39.4	39.5	0	0	0	0	0	0	0	0	0	0	39.4
Total estimated coal bill, $1,000	264,561.9	300,428.5	0	0	0	0	0	0	0	0	0	0	564,990.3
National data													
Regional data													
New England:													
Quantity purchased, 1,000 tons	59.2	24.2	0	0	0	0	0	0	0	0	0	0	83.4
Total heating value, billion Btu	1,594.2	656.9	0	0	0	0	0	0	0	0	0	0	2,251.1
Average sulfur content, percent by weight	2.1	2.0	0	0	0	0	0	0	0	0	0	0	2.1
Average price, cents per million Btu	48.7	48.2	0	0	0	0	0	0	0	0	0	0	48.5
Total estimated coal bill, $1,000	776.0	316.4	0	0	0	0	0	0	0	0	0	0	1,092.5
Middle Atlantic:													
Quantity purchased, 1,000 tons	3,668.1	3,911.2	0	0	0	0	0	0	0	0	0	0	7,579.3
Total heating value, billion Btu	88,883.0	95,180.8	0	0	0	0	0	0	0	0	0	0	184,063.8
Average sulfur content, percent by weight	2.1	2.1	0	0	0	0	0	0	0	0	0	0	2.1
Average price, cents per million Btu	45.7	44.2	0	0	0	0	0	0	0	0	0	0	45.0
Total estimated coal bill, $1,000	40,650.5	42,114.6	0	0	0	0	0	0	0	0	0	0	82,765.0
East North Central:													
Quantity purchased, 1,000 tons	10,673.2	11,987.7	0	0	0	0	0	0	0	0	0	0	22,660.9
Total heating value, billion Btu	238,140.5	268,817.9	0	0	0	0	0	0	0	0	0	0	506,958.4
Average sulfur content, percent by weight	2.9	2.9	0	0	0	0	0	0	0	0	0	0	2.9
Average price, cents per million Btu	40.4	40.8	0	0	0	0	0	0	0	0	0	0	40.6
Total estimated coal bill, $1,000	96,240.2	109,729.3	0	0	0	0	0	0	0	0	0	0	205,969.6
West North Central:													
Quantity purchased, 1,000 tons	2,383.3	2,829.3	0	0	0	0	0	0	0	0	0	0	5,212.7
Total heating value, billion Btu	46,352.9	55,738.3	0	0	0	0	0	0	0	0	0	0	102,091.3
Average sulfur content, percent by weight	2.2	2.4	0	0	0	0	0	0	0	0	0	0	2.3
Average price, cents per million Btu	35.5	35.1	0	0	0	0	0	0	0	0	0	0	35.3
Total estimated coal bill, $1,000	16,454.6	19,545.3	0	0	0	0	0	0	0	0	0	0	35,999.8

South Atlantic:													
Quantity purchased, 1,000 tons	5,667.3	6,539.6	0	0	0	0	0	0	0	0	0	0	12,206.9
Total heating value, billion Btu	136,232.4	157,272.2	0	0	0	0	0	0	0	0	0	0	293,504.5
Average sulfur content, percent by weight	1.8	1.7	0	0	0	0	0	0	0	0	0	0	1.8
Average price, cents per million Btu	42.9	43.2	0	0	0	0	0	0	0	0	0	0	43.0
Total estimated coal bill, $1,000	58,421.3	67,874.7	0	0	0	0	0	0	0	0	0	0	126,295.9
East South Central:													
Quantity purchased, 1,000 tons	5,175.2	6,024.7	0	0	0	0	0	0	0	0	0	0	11,199.9
Total heating value, billion Btu	115,088.6	133,261.0	0	0	0	0	0	0	0	0	0	0	248,349.6
Average sulfur content, percent by weight	2.8	2.9	0	0	0	0	0	0	0	0	0	0	2.9
Average price, cents per million Btu	36.0	37.1	0	0	0	0	0	0	0	0	0	0	36.6
Total estimated coal bill, $1,000	41,431.1	49,478.5	0	0	0	0	0	0	0	0	0	0	90,909.6
West South Central:													
Quantity purchased, 1,000 tons	294.0	504.0	0	0	0	0	0	0	0	0	0	0	798.0
Total heating value, billion Btu	4,116.0	7,056.0	0	0	0	0	0	0	0	0	0	0	11,172.0
Average sulfur content, percent by weight	.6	.6	0	0	0	0	0	0	0	0	0	0	.6
Average price, cents per million Btu	12.8	12.8	0	0	0	0	0	0	0	0	0	0	12.8
Total estimated coal bill, $1,000	526.8	903.2	0	0	0	0	0	0	0	0	0	0	1,430.0
Mountain:													
Quantity purchased, 1,000 tons	1,942.5	2,004.1	0	0	0	0	0	0	0	0	0	0	3,946.6
Total heating value, billion Btu	37,519.1	38,699.4	0	0	0	0	0	0	0	0	0	0	76,218.5
Average sulfur content, percent by weight	.5	.6	0	0	0	0	0	0	0	0	0	0	.6
Average price, cents per million Btu	22.7	22.3	0	0	0	0	0	0	0	0	0	0	22.5
Total estimated coal bill, $1,000	8,522.3	8,629.9	0	0	0	0	0	0	0	0	0	0	17,152.2
Pacific:													
Quantity purchased, 1,000 tons	200.0	300.0	0	0	0	0	0	0	0	0	0	0	500.0
Total heating value, billion Btu	3,240.0	4,860.0	0	0	0	0	0	0	0	0	0	0	8,100.0
Average sulfur content, percent by weight	.5	.5	0	0	0	0	0	0	0	0	0	0	.5
Average price, cents per million Btu	47.5	37.8	0	0	0	0	0	0	0	0	0	0	41.7
Total estimated coal bill, $1,000	1,539.0	1,837.1	0	0	0	0	0	0	0	0	0	0	3,376.1

TABLE 5.—FUEL OIL DELIVERIES

Geographic region and State	Number of reporting		Quantity and type of oil received (in thousands of barrels)						
	Companies	Plants	Fuel oil No. 2	Fuel oil No. 4 [1]	Fuel oil No. 5 [1]	Fuel oil No. 6	Crude Oil [2]	Kerosene [3]	Total
New England:									
Connecticut	3	7	0	0	0	1,935.0	0	0	1,935.0
Maine	2	3	0	0	0	289.9	0	0	289.9
Massachusetts	11	17	4.0	0	0	2,642.0	0	0	2,646.0
New Hampshire	1	1	0	0	0	101.4	0	0	101.4
Rhode Island	1	2	0	0	0	201.0	0	0	201.0
Vermont	0	0	0	0	0	0	0	0	0
Total	18	30	4.0	0	0	5,169.2	0	0	5,173.2
Middle Atlantic:									
New Jersey	6	14	0	0	0	2,770.1	813.1	0	3,583.2
New York	6	20	4.0	0	0	7,558.1	0	0	7,562.1
Pennsylvania	3	13	17.1	0	0	995.5	313.0	0	1,325.6
Total	15	47	21.1	0	0	11,323.7	1,126.1	0	12,470.9
East North Central:									
Illinois	6	8	96.2	0	0	325.6	0	0	421.8
Indiana	3	10	23.5	0	0	0	3.3	0	26.8
Michigan	2	11	54.0	0	0	447.3	129.1	0	630.4
Ohio	4	5	45.0	0	0	138.4	0	0	183.4
Wisconsin	3	3	18.7	0	0	14.7	0	0	33.4
Total	18	37	237.4	0	0	926.0	132.4	0	1,295.8
West North Central:									
Iowa	4	5	1.9	0	0	0	0	0	1.9
Kansas	3	4	30.0	0	0	34.7	0	0	64.7
Minnesota	4	5	4.3	0	0	46.1	0	0	50.4
Missouri	5	5	2.8	0	0	43.5	0	0	46.3
Nebraska	1	1	6.0	0	0	0	0	0	6.0
North Dakota	2	2	1.3	0	0	0	0	0	1.3
South Dakota	1	1	0	0	0	8.0	0	0	0
Total	20	23	46.3	0	0	132.3	0	0	178.6
South Atlantic:									
Delaware	2	3	0	0	0	62.0	303.0	0	365.0
District of Columbia	1	2	0	0	0	385.0	0	0	385.0
Florida	12	35	44.3	0	0	5,330.7	0	0	5,375.0

Georgia	2	7	14.1	0	0	233.0	0	0	247.1
Maryland	4	8	0	0	0	2,139.1	0	0	2,139.1
North Carolina	2	2	33.4	0	0	489.3	0	0	522.7
South Carolina	2	2	2.1	0	0	12.6	0	0	14.7
Virginia	1	5	0.2	0	0	1,860.0	207.0	0	2,067.2
West Virginia	0	0	0	0	0	0	0	0	0
Total	26	64	94.1	0	0	10,511.7	510.0	0	11,115.8
East South Central:									
Alabama	0	0	0	0	0	0	0	0	0
Kentucky	1	1	0.3	0	0	0	0	0	.3
Mississippi	3	5	414.4	59.8	0	18.0	0	0	492.2
Tennessee	0	0	0	0	0	0	0	0	0
Total	4	6	414.7	59.8	0	18.0	0	0	492.5
West South Central:									
Arkansas	3	8	6.0	0	2.4	301.6	0	0	310.0
Louisiana	3	5	42.0	0	192.4	1.0	0	0	235.4
Oklahoma	2	2	0.9	0	1.0	0	0	0	1.9
Texas	15	37	282.8	71.9	318.1	62.5	0	0	735.3
Total	23	52	331.8	71.9	513.9	365.1	0	0	1,282.6
Mountain:									
Arizona	4	9	237.4	0	0	126.2	0	0	363.6
Colorado	3	4	0.8	0	0	30.8	0	0	31.6
Idaho	0	0	0	0	0	0	0	0	0
Montana	1	1	0	0	23.0	0	0	0	23.0
Nevada	2	2	0.1	0	0	2.0	0	0	2.0
New Mexico	2	2	0	6.7	5.9	16.4	0	0	29.0
Utah	1	1	0	0	0	14.0	0	0	14.0
Wyoming	0	0	0	0	0	0	0	0	0
Total	13	19	238.3	6.7	28.9	189.4	0	0	463.3
Pacific:									
California	8	22	12.5	0	75.5	6,259.3	0	0	6,347.3
Oregon	1	1	10.2	0	0	0	0	0	10.2
Washington	2	2	0	0	0	70.9	0	0	70.9
Total	11	25	22.7	0	75.5	6,330.2	0	0	6,428.4
U.S. Total	148	303	1,410.4	138.4	618.3	34,965.6	1,768.5	0	38,901.1

[1] Blend of No. 2 and No. 6 Fuel Oil.
[2] Includes small quantities of Topped Crude.
[3] Includes small quantities of Jet-Fuel.

TABLE 6.—AVERAGE FUEL OIL PRICES, F.O.B. PLANT

Geographic region and State	Price of residual oil (No. 6) by type of purchase						Average prices of other products							
	Contract purchases	Average contract price		Spot purchases	Average spot price		Fuel oil No. 2		Fuel oil No. 4 and No. 5		Crude oil		Kerosene	
	(1,000 barrels)	Cents per 10^6 Btu	Dollars per barrel	(1,000 barrels)	Cents per 10^6 Btu	Dollars per barrel	Cents per 10^6 Btu	Dollars per barrel	Cents per 10^6 Btu	Dollars per barrel	Cents per 10^6 Btu	Dollars per barrel	Cents per 10^6 Btu	Dollars per barrel
New England:														
Connecticut	1,935.0	78.5	4.75	0	0	0	0	0	0	0	0	0	0	0
Maine	249.3	28.9	1.82	40.6	50.8	3.14	0	0	0	0	0	0	0	0
Massachusetts	2,642.0	63.9	3.91	0	0	0	88.1	5.21	0	0	0	0	0	0
New Hampshire	101.4	47.6	2.97	0	0	0	0	0	0	0	0	0	0	0
Rhode Island	201.0	62.2	3.80	0	0	0	0	0	0	0	0	0	0	0
Vermont	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	5,128.6	67.2	4.10	40.6	50.8	3.14	88.1	5.21	0	0	0	0	0	0
Middle Atlantic:														
New Jersey	2,770.1	82.1	4.94	0	0	0	0	0	0	0	81.5	4.77	0	0
New York	7,558.1	66.6	4.08	0	0	0	89.3	5.14	0	0	0	0	0	0
Pennsylvania	995.5	78.9	4.78	0	0	0	103.7	6.00	0	0	73.8	4.26	0	0
Total	11,323.7	71.4	4.35	0	0	0	101.0	5.84	0	0	79.4	4.63	0	0
East North Central:														
Illinois	325.6	75.4	4.76	0	0	0	88.0	5.09	0	0	0	0	0	0
Indiana	0	0	0	0	0	0	98.1	5.57	0	0	84.2	4.88	0	0
Michigan	359.0	65.8	4.14	88.3	85.8	5.41	93.5	5.40	0	0	72.4	4.10	0	0
Ohio	138.4	87.0	5.48	0	0	0	98.4	5.69	0	0	0	0	0	0
Wisconsin	14.7	59.0	3.75	0	0	0	118.3	6.83	0	0	0	0	0	0
Total	837.7	72.9	4.60	88.3	85.8	5.41	94.6	5.46	0	0	72.7	4.12	0	0
West North Central:														
Iowa	0	0	0	0	0	0	94.9	5.48	0	0	0	0	0	0
Kansas	0	0	0	34.7	68.6	4.48	128.6	7.46	0	0	0	0	0	0
Minnesota	46.1	80.1	5.09	0	0	6	104.9	6.10	0	0	0	0	0	0
Missouri	43.5	63.5	4.01	0	0	0	111.8	6.49	0	0	0	0	0	0
Nebraska	0	0	0	0	0	0	111.3	6.42	0	0	0	0	0	0
North Dakota	0	0	0	0	0	0	94.4	5.55	0	0	0	0	0	0
South Dakota	0	0	0	8.0	77.0	4.92	0	0	0	0	0	0	0	0
Total	89.6	72.1	4.57	42.7	70.2	4.56	120.8	7.00	0	0	0	0	0	0

South Atlantic:														
Delaware	62.0	79.1	4.93	0	0	0	0	0	0	0	80.2	4.64	0	0
District of Columbia	385.0	71.9	4.42	0	0	0	0	0	0	0	0	0	0	0
Florida	5,330.7	58.3	3.60	0	0	0	90.0	5.18	0	0	0	0	0	0
Georgia	233.0	50.2	3.12	0	0	0	98.4	5.79	0	0	0	0	0	0
Maryland	2,139.0	64.5	3.97	0.1	81.0	5.00	0	0	0	0	0	0	0	0
North Carolina	489.3	50.1	3.11	0	0	0	83.5	4.85	0	0	0	0	0	0
South Carolina	12.6	50.3	3.16	0	0	0	90.8	5.27	0	0	0	0	0	0
Virginia	1,860.0	48.0	2.99	0	0	0	79.3	4.66	0	0	66.6	4.01	0	0
West Virginia	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	10,511.6	57.7	3.57	0.1	81.0	5.00	89.0	5.16	0	0	74.5	4.38	0	0
East South Central:														
Alabama	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kentucky	0	0	0	0	0	0	79.7	4.68	0	0	0	0	0	0
Mississippi	0	0	0	18.0	74.9	4.81	81.4	4.81	70.1	4.24	0	0	0	0
Tennessee	0	0	0	0	0	0.00	0	0	0	0	0	0	0	0
Total	0	0	0	18.0	74.9	4.81	81.4	4.81	70.1	0.24	0	0	0	0.00
West South Central:														
Arkansas	301.6	68.2	4.34	0	0	0	86.4	5.08	81.4	4.96	0	0	0	0
Louisiana	0	0	0	1.0	69.1	4.28	113.4	6.51	71.5	4.46	0	0	0	0
Oklahoma	0	0	0	0	0	0	79.8	4.86	53.9	3.34	0	0	0	0
Texas	0	0	0	62.5	54.4	3.48	100.9	5.86	94.4	5.78	0	0	0	0
Total	301.6	68.2	4.34	63.5	54.7	3.49	102.1	5.92	86.6	5.34	0	0	0.0	0
Mountain:														
Arizona	126.2	91.5	5.78	0	0	0	97.5	5.71	0	0	0	0	0	0
Colorado	23.6	72.5	4.56	7.2	86.5	5.42	121.3	7.76	0	0	0	0	0	0
Idaho	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Montana	0	0	0	0	0	0	0	0	93.6	5.76	0	0	0	0
Nevada	2.0	84.2	5.45	0	0	0	143.2	8.26	0	0	0	0	0	0
New Mexico	5.2	58.0	3.80	11.2	68.8	4.42	0	0	77.5	4.74	0	0	0	0
Utah	14.0	39.2	2.45	0	0	0	0	0	0	0	0	0	0	0
Wyoming	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	171.0	83.5	5.28	18.4	75.6	4.81	97.6	5.72	87.9	5.40	0	0	0	0
Pacific:														
California	5,613.3	85.1	5.24	646.0	111.1	6.62	108.4	6.36	88.0	5.47	0	0	0	0
Oregon	0	0	0	0	0	0	75.6	4.52	0	0	0	0	0	0
Washington	0	0	0	70.9	68.5	4.34	0	0	0	0	0	0	0	0
Total	5,613.3	85.1	5.24	716.9	106.7	6.39	93.5	5.53	88.0	5.47	0	0	0	0
U.S. total	33,977.1	68.9	4.23	988.5	96.0	5.85	93.5	5.46	85.6	5.27	77.5	4.52	0	0

TABLE 7.—FUEL OIL DELIVERIES AND PRICES BY SULFUR CONTENT

Geographic region and State	0.3 percent sulfur or less			0.31 to 0.5 percent sulfur			0.51 to 1.0 percent sulfur		
		Average price			Average price			Average price	
	Quantity (1,000 barrels)	cent per 10^6 Btu	Dollar per barrel	Quantity (1,000 barrels)	Cent per 10^6 Btu	Dollar per barrels	Quantity (1,000 barrels)	Cent per 10^6 Btu	Dollar per barrel
New England:									
Connecticut	0	0	0	1,935.0	78.5	4.75	0	0	0
Maine	0	0	0	0	0	0	0	0	0
Massachusetts	118.0	67.9	4.13	882.4	75.5	4.58	1,637.5	57.4	3.53
New Hampshire	0	0	0	0	0	0	0	0	0
Rhode Island	0	0	0	0	0	0	201.0	62.2	3.80
Vermont	0	0	0	0	0	0	0	0	0
Total	118.0	67.9	4.13	2,817.4	77.6	4.70	1,838.5	58.0	3.56
Middle Atlantic:									
New Jersey	2,587.5	82.2	4.94	37.0	77.7	4.44	958.7	81.5	4.82
New York	4,644.4	76.5	4.63	0	0	0	1,238.7	51.2	3.15
Pennsylvania	320.0	80.8	4.85	949.0	76.3	4.56	39.5	86.4	5.32
Total	7,551.9	78.6	4.75	986.0	76.3	4.55	2,236.9	64.5	3.90
East North Central:									
Illinois	0	0	0	0	0	0	70.0	59.5	3.68
Indiana	0	0	0	0	0	0	3.3	84.2	4.88
Michigan	0	0	0	129.1	72.4	4.10	148.0	76.6	4.80
Ohio	0	0	0	0	0	0	60.8	86.2	5.43
Wisconsin	0	0	0	0	0	0	0	0	0
Total	0	0	0	129.1	72.4	4.10	282.1	74.6	4.66
West North Central:									
Iowa	0	0	0	0	0	0	0	0	0
Kansas	0	0	0	0	0	0	0	0	0
Minnesota	0	0	0	0	0	0	0	0	0
Missouri	0	0	0	0	0	0	0	0	0
Nebraska	0	0	0	0	0	0	0	0	0
North Dakota	0	0	0	0	0	0	0	0	0
South Dakota	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0

South Atlantic:									
Delaware	0	0	0	303.0	80.2	4.64	31.0	73.8	4.64
District of Columbia	0	0	0	0	0	0	385.0	71.9	4.42
Florida	0	0	0	0	0	0	1,980.5	68.2	4.15
Georgia	0	0	0	0	0	0	0	0	0
Maryland	0	0	0	311.0	79.7	4.82	1,144.1	73.1	4.50
North Carolina	0	0	0	0	0	0	0	0	0
South Carolina	0	0	0	0	0	0	0	0	0
Virginia	0	0	0	0	0	0	207.0	66.6	4.01
West Virginia	0	0	0	0	0	0	0	0	0
Total	0	0	0	614.0	79.9	4.73	3,747.7	70.1	4.28
East South Central:									
Alabama	0	0	0	0	0	0	0	0	0
Kentucky	0	0	0	0	0	0	0	0	0
Mississippi	0	0	0	0	0	0	2.2	75.3	4.62
Tennessee	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	2.2	75.3	4.62
West South Central:									
Arkansas	0	0	0	0	0	0	288.5	68.0	4.33
Louisiana	1.0	69.1	4.28	0	0	0	49.5	71.0	4.45
Oklahoma	0	0	0	1.0	53.9	3.34	0	0	0
Texas	33.0	103.3	6.20	60.1	98.3	6.00	296.9	92.6	5.69
Total	34.0	102.3	6.14	61.1	97.6	5.95	634.8	79.6	4.98
Mountain:									
Arizona	0	0	0	74.1	100.3	6.30	0	0	0
Colorado	0	0	0	1.3	107.4	6.76	29.5	74.4	4.68
Idaho	0	0	0	0	0	0	0	0	0
Montana	0	0	0	0	0	0	0	0	0
Nevada	0	0	0	0	0	0	2.0	84.2	5.45
New Mexico	5.9	77.2	4.58	5.2	58.0	3.80	0	0	0
Utah	14.0	39.2	2.45	0	0	0	0	0	0
Wyoming	0	0	0	0	0	0	0	0	0
Total	19.9	50.0	3.08	80.6	97.5	6.15	31.5	75.0	4.72
Pacific:									
California	536.5	91.5	5.63	5,731.9	87.6	5.37	0	0	0
Oregon	0	0	0	0	0	0	0	0	0
Washington	0	0	0	0	0	0	0	0	0
Total	536.5	91.5	5.63	5,731.9	87.6	5.37	0	0	0
U.S. total	8,260.3	79.3	4.80	10,420.1	83.4	5.07	8,773.7	67.0	4.10

Note: No. 2 Fuel Oil is omitted from this table.

TABLE 7.—FUEL OIL DELIVERIES AND PRICES BY SULFUR CONTENT—Continued

Geographic region and State	1.01 to 2.0 percent sulfur			2.01 to 3.0 percent sulfur			.01 percent or more sulfur			Average price for all purchases	
		Average price			Average price			Average price			
	Quantity (1,000 barrels)	Cents per 10^6 Btu	Dollars per barrel	Quantity (1,000 barrels)	Cents per 10^6 Btu	Dollars per barrel	Quantity (1,000 barrels)	Cents per 10^6 Btu	Dollars per barrel	Cents per 10^6 Btu	Dollars per barrel
New England:											
Connecticut	0	0	0	0	0	0	0	0	0	78.5	4.75
Maine	40.6	50.8	3.14	249.3	28.9	1.82	0	0	0	32.0	2.01
Massachusetts	0	0	0	4.1	44.1	2.73	0	0	0	63.9	3.91
New Hampshire	0	0	0	101.4	47.6	2.97	0	0	0	47.6	2.97
Rhode Island	0	0	0	0	0	0	0	0	0	62.2	3.80
Vermont	0	0	0	0	0	0	0	0	0	0	0
Total	40.6	50.8	3.14	354.7	34.4	2.16	0	0	0	67.1	4.09
Middle Atlantic:											
New Jersey	0	0	0	0	0	0	0	0	0	82.0	4.90
New York	71.0	88.2	5.48	1,604.0	49.9	3.14	0	0	0	66.6	4.08
Pennsylvania	0	0	0	0	0	0	0	0	0	77.7	4.65
Total	71.0	88.2	5.48	1,604.0	49.9	3.14	0	0	0	72.1	4.38
East North Central:											
Illinois	174.0	86.4	5.50	81.6	65.2	4.11	0	0	0	75.4	4.76
Indiana	0	0	0	0	0	0	0	0	0	84.2	4.88
Michigan	217.3	67.7	4.26	82.0	63.0	3.99	0	0	0	70.3	4.33
Ohio	77.6	87.7	5.52	0	0	0	0	0	0	87.0	5.48
Wisconsin	14.7	59.0	3.75	0	0	0	0	0	0	59.0	3.75
Total	463.6	77.4	4.89	163.6	64.1	4.05	0	0	0	74.0	4.60
West North Central:											
Iowa	0	0	0	0	0	0	0	0	0	0	0
Kansas	15.5	77.4	5.02	19.2	61.6	4.03	0	0	0	68.6	4.48
Minnesota	15.5	68.4	4.32	30.6	85.9	5.48	0	0	0	80.1	5.09
Missouri	36.8	63.0	3.98	0	0	0	6.7	66.0	4.21	63.5	4.01
Nebraska	0	0	0	0	0	0	0	0	0	0	0
North Dakota	0	0	0	0	0	0	0	0	0	0	0
South Dakota	8.0	77.0	4.92	0	0	0	0	0	0	77.0	4.92
Total	75.8	68.6	4.36	49.8	76.4	4.92	6.7	66.0	4.21	71.4	4.56

South Atlantic:											
Delaware	0	0	0	31.0	84.5	5.21	0	0	0	80.0	4.69
District of Columbia	0	0	0	0	0	0	0	0	0	71.9	4.42
Florida	2,255.8	54.9	3.41	1,094.3	47.7	2.99	0	0	0	58.3	3.60
Georgia	0	0	0	233.0	50.2	3.12	0	0	0	50.2	3.12
Maryland	664.0	43.5	2.70	0	0	0	0	0	0	64.5	3.97
North Carolina	0	0	0	489.3	50.1	3.11	0	0	0	50.1	3.11
South Carolina	12.6	50.3	3.16	0	0	0	0	0	0	50.3	3.16
Virginia	0	0	0	1,860.0	48.0	2.99	0	0	0	49.8	3.09
West Virginia	0	0	0	0	0	0	0	0	0	0	0
Total	2,952.4	52.2	3.25	3,707.6	48.6	3.03	0	0	0	58.5	3.61
East South Central:											
Alabama	0	0	0	0	0	0	0	0	0	0	0
Kentucky	0	0	0	0	0	0	0	0	0	0	0
Mississippi	57.6	69.9	4.23	18.0	74.9	4.81	0	0	0	71.3	4.37
Tennessee	0	0	0	0	0	0	0	0	0	0	0
Total	57.6	69.9	4.23	18.0	74.9	4.81	0	0	0	71.3	4.37
West South Central:											
Arkansas	15.5	73.8	4.61	0	0	0	0	0	0	68.3	4.35
Louisiana	142.9	71.5	4.46	0	0	0	0	0	0	71.5	4.56
Oklahoma	0	0	0	0	0	0	0	0	0	53.9	3.34
Texas	0	0	0	62.5	54.4	3.48	0	0	0	88.6	5.46
Total	158.4	71.7	4.48	62.5	54.4	3.48	0	0	0	78.5	4.90
Mountain:											
Arizona	52.1	79.2	5.04	0	0	0	0	0	0	91.5	5.78
Colorado	0	0	0	0	0	0	0	0	0	75.8	4.76
Idaho	0	0	0	0	0	0	0	0	0	0	0
Montana	23.0	93.6	5.76	0	0	0	0	0	0	93.6	5.76
Nevada	0	0	0	0	0	0	0	0	0	84.2	5.45
New Mexico	6.7	77.8	4.88	11.2	68.8	4.42	0	0	0	70.4	4.45
Utah	0	0	0	0	0	0	0	0	0	39.2	2.45
Wyoming	0	0	0	0	0	0	0	0	0	0	0
Total	61.8	83.1	5.23	11.2	68.8	4.42	0	0	0	83.5	5.26
Pacific:											
California	66.4	65.0	4.14	0	0	0	0	0	0	87.7	5.38
Oregon	0	0	0	0	0	0	0	0	0	0	0
Washington	70.9	68.5	4.34	0	0	0	0	0	0	68.5	4.34
Total	137.3	66.8	4.24	0	0	0	0	0	0	87.5	5.37
U.S. total	4,058.5	58.3	3.64	5,971.4	49.0	3.07	6.7	66.0	4.21	70.3	4.31

TABLE 8.—BASIC FUEL OIL STATISTICS FOR THE PAST 12 MONTHS

	Monthly summaries of oil purchases												
	April 1973	May 1973	June 1973	July 1973	August 1973	September 1973	October 1973	November 1973	December 1973	January 1974	February 1974	March 1974	Total
NATIONAL DATA													
Quantity purchased, 1,000 barrels	35,880.7	38,901.1	0	0	0	0	0	0	0	0	0	0	74,788.8
Total heating value, billion Btu	219,834.4	237,923.5	0	0	0	0	0	0	0	0	0	0	457,798.5
Average sulfur content, percent by weight	0.9	0.9	0	0	0	0	0	0	0	0	0	0	0.9
Average price, cents per million Btu	69.5	71.1	0	0	0	0	0	0	0	0	0	0	70.4
Total estimated oil bill, $1,000	152,880.1	169,168.3	0	0	0	0	0	0	0	0	0	0	322,093.3
REGIONAL DATA													
New England:													
Quantity purchased, 1,000 barrels	7,534.8	5,173.2	0	0	0	0	0	0	0	0	0	0	12,708.0
Total heating value, billion Btu	46,196.0	31,578.8	0	0	0	0	0	0	0	0	0	0	77,774.8
Average sulfur content, percent by weight	.8	.7	0	0	0	0	0	0	0	0	0	0	.8
Average price, cents per million Btu	63.6	67.1	0	0	0	0	0	0	0	0	0	0	65.0
Total estimated oil bill, $1,000	29,398.6	21,183.7	0	0	0	0	0	0	0	0	0	0	50,582.2
Middle Atlantic:													
Quantity purchased, 1,000 barrels	10,766.4	12,470.9	0	0	0	0	0	0	0	0	0	0	23,237.3
Total heating value, billion Btu	65,403.4	75,663.9	0	0	0	0	0	0	0	0	0	0	141,067.3
Average sulfur content, percent by weight	.7	.7	0	0	0	0	0	0	0	0	0	0	.7
Average price, cents per million Btu	72.7	72.2	0	0	0	0	0	0	0	0	0	0	72.4
Total estimated oil bill, $1,000	47,564.6	54,602.4	0	0	0	0	0	0	0	0	0	0	102,167.0
East North Central:													
Quantity purchased, 1,000 barrels	1,344.6	1,295.8	0	0	0	0	0	0	0	0	0	0	2,647.4
Total heating value, billion Btu	8,235.7	7,956.7	0	0	0	0	0	0	0	0	0	0	16,233.0
Average sulfur content, percent by weight	1.1	1.2	0	0	0	0	0	0	0	0	0	0	1.1
Average price, cents per million Btu	73.3	77.5	0	0	0	0	0	0	0	0	0	0	75.5
Total estimated oil bill, $1,000	6,040.0	6,169.8	0	0	0	0	0	0	0	0	0	0	12,254.4
West North Central:													
Quantity purchased, 1,000 barrels	354.0	178.6	0	0	0	0	0	0	0	0	0	0	532.6
Total heating value, billion Btu	2,235.5	1,113.7	0	0	0	0	0	0	0	0	0	0	3,349.1
Average sulfur content, percent by weight	1.5	1.6	0	0	0	0	0	0	0	0	0	0	1.6
Average price, cents per million Btu	76.7	83.3	0	0	0	0	0	0	0	0	0	0	78.9
Total estimated oil bill, $1,000	1,713.9	928.1	0	0	0	0	0	0	0	0	0	0	2,642.0

South Atlantic:													
Quantity purchased, 1,000 barrels	8,771.7	11,115.8	0	0	0	0	0	0	0	0	0	0	19,887.5
Total heating value, billion Btu	54,033.9	68,569.9	0	0	0	0	0	0	0	0	0	0	122,003.9
Average sulfur content, percent by weight	1.5	1.5	0	0	0	0	0	0	0	0	0	0	1.5
Average price, cents per million Btu	60.4	58.7	0	0	0	0	0	0	0	0	0	0	59.5
Total estimated oil bill, $1,000	32,637.9	40,269.1	0	0	0	0	0	0	0	0	0	0	72,907.0
East South Central:													
Quantity purchased, 1,000 bbl	322.3	492.5	0	0	0	0	0	0	0	0	0	0	814.8
Total heating value, billion Btu	1,927.9	2,928.1	0	0	0	0	0	0	0	0	0	0	4,856.0
Average sulfur content, percent by weight	.5	.4	0	0	0	0	0	0	0	0	0	0	.4
Average price, cents per million Btu	79.1	79.8	0	0	0	0	0	0	0	0	0	0	79.5
Total estimated oil bill, $1,000	1,524.6	2,335.6	0	0	0	0	0	0	0	0	0	0	3,860.3
West South Central:													
Quantity purchased, 1,000 bbl	1,079.5	1,282.6	0	0	0	0	0	0	0	0	0	0	2,362.0
Total heating value, billion Btu	6,686.4	7,859.9	0	0	0	0	0	0	0	0	0	0	14,546.2
Average sulfur content, percent by weight	.7	.8	0	0	0	0	0	0	0	0	0	0	.8
Average price, cents per million Btu	73.9	84.3	0	0	0	0	0	0	0	0	0	0	79.5
Total estimated oil bill, $1,000	4,944.4	6,624.8	0	0	0	0	0	0	0	0	0	0	11,569.2
Mountain:													
Quantity purchased, 1,000 bbl	782.9	463.3	0	0	0	0	0	0	0	0	0	0	1,246.2
Total heating value, billion Btu	4,803.8	2,811.9	0	0	0	0	0	0	0	0	0	0	7,615.7
Average sulfur content, percent by weight	.7	.7	0	0	0	0	0	0	0	0	0	0	.7
Average price, cents per million Btu	87.9	90.5	0	0	0	0	0	0	0	0	0	0	88.9
Total estimated oil bill, $1,000	4,222.7	2,545.5	0	0	0	0	0	0	0	0	0	0	6,768.2
Pacific:													
Quantity purchased, 1,000 bbl	4,924.5	6,428.4	0	0	0	0	0	0	0	0	0	0	11,352.9
Total heating value, billion Btu	30,311.9	39,440.5	0	0	0	0	0	0	0	0	0	0	69,752.4
Average sulfur content, percent by weight	.5	.5	0	0	0	0	0	0	0	0	0	0	.5
Average price, cents per million Btu	81.9	87.5	0	0	0	0	0	0	0	0	0	0	85.1
Total estimated oil bill, $1,000	24,833.4	34,509.5	0	0	0	0	0	0	0	0	0	0	59,342.9

TABLE 9.—GAS DELIVERIES

Geographic region and State	Number of reporting		Quantity and type of gas received (in millions of cubic feet)				
	Companies	Plants	Natural gas	LNG [1]	SNG [2]	Other [3]	Total
New England:							
Connecticut	0	0	0	0	0	0	0
Maine	0	0	0	0	0	0	0
Massachusetts	3	3	474.7				474.7
New Hampshire	0	0	0	0	0	0	0
Rhode Island	1	1	5.6	0	0	0	5.6
Vermont	1	1	7.4	0	0	0	7.4
Total	5	5	487.7	0	0	0	487.7
Middle Atlantic:							
New Jersey	3	6	1,877.3	0	0	0	1,877.3
New York	3	6	4,929.8	0	0	0	4,929.8
Pennsylvania	0	0	0	0	0	0	0
Total	6	12	6,807.1	0	0	0	4,807.1
East North Central:							
Illinois	6	12	2,270.0	0	0	0	2,270.0
Indiana	2	4	292.9	0	0	0	292.9
Michigan	4	10	3,608.9	0	0	2,049.0	5,657.9
Ohio	4	4	543.5	0	0	91.3	634.8
Wisconsin	7	9	2,494.5	0	0	0	2,494.5
Total	23	39	9,209.8	0	0	2,140.3	11,350.1
West North Central:							
Iowa	10	19	5,818.5	0	0	0	5,818.5
Kansas	10	20	12,105.6	0	0	0	12,105.6
Minnesota	7	13	5,669.0	0	0	62.0	5,731.0
Missouri	8	11	4,337.5	0	0	0	4,337.5
Nebraska	7	10	4,501.3	0	0	0	4,501.3
North Dakota	0	0	0	0	0	0	0
South Dakota	1	2	388.0	0	0	0	388.0
Total	43	75	32,819.9	0	0	62.0	32,881.9
South Atlantic:							
Delaware	2	3	6.0	0	0	1.0	7.0
District of Columbia	0	0	0	0	0	0	0
Florida	10	26	12,427.1	0	0	0	12,427.1
Georgia	2	5	2,679.0	0	0	0	2,679.0
Maryland	0	0	0	0	0	0	0
North Carolina	1	1	93.8	0	0	0	93.8
South Carolina	2	2	558.4	0	0	0	558.4
Virginia	2	2	97.8	0	0	15.0	112.8
West Virginia	1	1	0	0	0	27.9	27.9
Total	20	40	15,862.2	0	0	43.9	15,906.0

See footnotes at end of table.

TABLE 9.—GAS DELIVERIES—Continued

Geographic region and State	Number of reporting		Quantity and type of gas received (in millions of cubic feet)				
	Companies	Plants	Natural gas	LNG [1]	SNG [2]	Other [3]	Total
East South Central:							
Alabama	2	3	63.5	0	0	0	63.5
Kentucky	1	2	624.4	0	0	0	63.5
Mississippi	3	7	3,997.9	0	0	0	3,997.9
Tennessee	1	1	936.0	0	0	0	936.0
Total	7	13	5,621.8	0	0	0	5,621.8
West South Central:							
Arkansas	3	8	5,499.4	0	0	0	5,499.4
Louisiana	11	21	28,287.5	0	0	1,241.0	29,528.5
Oklahoma	4	14	17,726.9	0	0	0	17,726.9
Texas	20	75	104,203.8	0	0	0	104,203.8
Total	38	118	155,717.7	0	0	1,241.0	156,958.7
Mountain:							
Arizona	4	9	6,141.5	0	0	0	6,141.5
Colorado	3	9	6,142.6	0	0	0	6,142.6
Idaho	0	0	0	0	0	0	0
Montana	2	3	75.7	0	0	0	75.7
Nevada	3	5	3,916.4	0	0	0	3,916.4
New Mexico	8	12	4,413.0	0	0	0	4,413.0
Utah	1	2	449.0	0	0	0	449.0
Wyoming	0	0	0	0	0	0	0
Total	21	40	21,138.3	0	0	0	21,138.3
Pacific:							
California	8	35	44,007.2	0	0	429.2	44,436.4
Oregon	1	1	100.6	0	0	0	100.6
Washington	0	0	0	0	0	0	0
Total	9	36	44,107.8	0	0	429.2	44,537.0
U.S. total	172	378	291,772.3	0	0	3,916.3	295,688.6

[1] Liquefied natural gas.
[2] Synthetic natural gas.
[3] Includes small quantities of coke oven gas, refinery gas and blast furnace gas.

TABLE 10.—AVERAGE GAS PRICES

Geographic Region and State	Quantity and price by type of purchase											
	Interruptible gas			Firm gas			Offpeak gas			Total gas purchases		
		Average price			Average price			Average price			Average price	
	Quantity (1,000 M ft³)	Cents per 10⁶ Btu	Dollars per M ft³	Quantity (1,000 M ft³)	Cents per 10⁶ Btu	Dollars per M ft³	Quantity (1,000 M ft³)	Cents per 10⁶ Btu	Dollars per M ft³	Quantity (1,000 M ft³)	Cents per 10⁶ Btu	Dollars per M ft
New England:												
Connecticut	0	0	0	0	0	0	0	0	0	0	0	0
Maine	0	0	0	0	0	0	0	0	0	0	0	0
Massachusetts	474.7	51.0	.51	0	0	0	0	0	0	474.7	51.0	.51
New Hampshire	0	0	0	0	0	0	0	0	0	0	0	0
Rhode Island	5.6	50.0	.52	0	0	0	0	0	0	5.6	50.0	.52
Vermont	7.4	42.6	.43	0	0	0	0	0	0	7.4	42.6	.43
Total	487.7	50.9	.51	0	0	0	0	0	0	487.7	50.9	.51
Middle Atlantic:												
New Jersey	331.3	43.6	.45	1,546.0	50.0	.52	0	0	0	1,877.3	48.9	.50
New York	687.8	38.5	.40	3,979.0	49.8	.51	263.0	53.6	0.55	4,929.8	48.4	.50
Pennsylvania	0	0	0	0	0	0	0	0	0	0	0	0
Total	1,019.1	40.2	.41	5,525.0	49.9	.51	263.0	53.6	0.55	6,807.1	48.6	.50
East North Central:												
Illinois	568.6	53.2	.55	1,695.0	62.2	.64	6.4	37.3	0.39	2,270.0	59.8	.62
Indiana	279.7	44.0	.44	13.2	51.5	.52	0	0		292.9	44.3	.45
Michigan	2,136.7	61.1	.43	3,519.1	68.2	.45	0	0	0	5,657.9	65.5	.44
Ohio	147.1	44.1	0.44	487.7	60.6	0.56	0	0	0	634.8	56.5	0.53
Wisconsin	2,494.5	45.1	0.46	0	0	0	0	0	0	2,494.5	45.1	0.46
Total	5,628.7	50.7	.46	5,715.1	65.1	.52	6.4	37.3	0.39	11,350.1	57.5	.49
West North Central:												
Iowa	5,818.5	40.6	.41	0	0	0	0	0	0	5,818.5	40.6	.41
Kansas	11,581.1	28.8	.29	524.	36.7	.36	0	0	0	12,105.5	29.1	.29
Minnesota	5,707.4	39.5	.39	23.6	52.7	.53	0	0	0	5,731.0	39.5	.39
Missouri	3,133.5	32.8	.32	1,204.0	37.2	.36	0	0	0	4,337.5	34.0	.33
Nebraska	4,501.3	41.3	.41	0	0	0	0	0	0	4,501.3	41.3	.41
North Dakota	0	0	0	0	0	0	0	0	0	0	0	0
South Dakota	388.0	40.0	.40	0	0	0	0	0	0	388.0	40.0	0
Total	31,129.8	35.3	.35	1,752.0	37.3	.36	0	0	0	32,881.9	35.4	.35

South Atlantic:												
Delaware	7.0	74.3	.73	0	0	0	0	0	0	7.0	74.3	.73
District of Columbia	0	0	0	0	0	0	0	0	0	0	0	0
Florida	3,346.7	51.6	.54	9,080.4	41.1	.42	0	0	0	12,427.1	44.0	.45
Georgia	2,679.0	44.1	.45	0	0	0	0	0	0	2,679.0	44.1	.45
Maryland	0	0	0	0	0	0	0	0	0	0	0	0
North Carolina	93.8	49.1	.51	0	0	0	0	0	0	93.8	49.1	.51
South Carolina	558.4	50.3	.52	0	0	0	0	0	0	558.4	50.3	.52
Virginia	112.8	39.8	.41	0	0	0	0	0	0	112.8	39.8	.41
West Virginia	0	0	0	27.9	31.0	.16	0	0	0	27.9	31.0	.16
Total	6,797.8	48.4	0.50	9,108.3	41.1	0.42	0	0	0	15,906.0	44.3	.45
East South Central:												
Alabama	34.7	34.6	.36	28.8	39.2	.40	0	0	0	63.5	36.7	.38
Kentuck	0	0		0	0	0	624.4	32.1	.33	624.4	32.1	.33
Mississippi	2,576.1	33.1	.34	1,421.8	49.1	.52	0	0	0	3,997.9	38.8	.40
Tennessee	936.0	30.0	.32	0	0	0	0	0	0	936.0	30.0	.32
Total	3,546.9	32.3	.34	1,450.6	48.9	.51	624.4	32.1	0.33	5,621.8	36.6	.38
West South Central:												
Arkansas	5,499.4	33.5	.34	0	0	0	0	0	0	5,499.4	33.5	.34
Louisiana	6,700.5	46.9	.50	22,828.0	28.5	.30	0	0	0	29,528.5	32.7	.35
Oklahoma	763.6	37.5	.39	16,963.4	26.9	.28	0	0	0	17,726.9	27.4	.29
Texas	12,366.7	25.5	.25	91,700.6	25.4	.26	136.5	42.0	.42	104,203.8	25.4	.26
Total	25,330.2	33.5	.34	131,491.9	26.2	.27	136.5	42.0	.42	156,958.7	27.3	.28
Mountain:												
Arizona	3,610.2	40.7	.43	2,531.3	41.4	.44	0	0	0	6,141.5	41.0	.44
Colorado	4,713.3	31.5	.27	1,429.3	35.3	.31	0	0	0	6,142.6	32.4	.28
Idaho	0	0	0	0	0.0	0	0	0	0	0	0	.00
Montana	.7	33.4	.35	75.0	14.9	.18	0	0	0	75.7	15.1	.18
Nevada	916.0	44.3	.47	3,000.4	48.7	.52	0	0	0	3,916.4	47.6	.51
New Mexico	4,068.0	32.6	.34	345.0	35.6	.39	0	0	0	4,413.0	32.9	.35
Utah	449.0	31.5	.29	0	0	0	0	0	0	449.0	31.5	.29
Wyoming	0	0		0	0	0	0	0	0	0	0	0
Total	13,757.3	35.4	.35	7,381.1	42.9	.44	0	0	0	21,138.3	38.1	0.38
Pacific:												
California	44,436.4	41.3	.44	0	0	0	0	0	0	44,436.4	41.3	.44
Oregon	100.6	49.4	.51	0	0	0	0	0	0	100.6	49.4	.51
Washington	0	0		0	0	0	0	0	0	0	0	0
Total	44,537.0	41.3	.44	0	0	0	0	0	0	44,537.0	41.3	.44
U.S. total	132,234.5	38.3	.39	162,423.9	30.0	.31	1,030.2	38.9	.40	295,688.6	33.7	.34

TABLE 11.—BASIC GAS STATISTICS FOR THE PAST 12 MONTHS

	Monthly summaries of gas purchases												
	April 1973	May 1973	June 1973	July 1973	August 1973	September 1973	October 1973	November 1973	December 1973	January 1974	February 1974	March 1974	Total
NATIONAL DATA													
Quantity purchased: firm 1,000 M ft³	145,192.8	162,423.9	0	0	0	0	0	0	0	0	0	0	307,616.7
Interruptible 1,000 M ft³	104,236.3	132,234.5	0	0	0	0	0	0	0	0	0	0	236,470.3
Total 1,000 M ft³	249,429.1	294,658.4	0	0	0	0	0	0	0	0	0	0	544,087.5
Total heating value, billion Btu	255,635.1	302,189.3	0	0	0	0	0	0	0	0	0	0	557,824.3
Average price, cents per million Btu	33.3	33.7	0	0	0	0	0	0	0	0	0	0	33.5
Total estimated gas bill, $1,000	85,190.1	101,947.5	0	0	0	0	0	0	0	0	0	0	187,137.8
REGIONAL DATA													
New England:													
Quantity purchased: firm 1,000 M ft³	0	0	0	0	0	0	0	0	0	0	0	0	0
Interruptible 1,000 M ft³	135.5	487.7	0	0	0	0	0	0	0	0	0	0	623.2
Total 1,000 M ft³	135.5	487.7	0	0	0	0	0	0	0	0			623.2
Total heating value, billion Btu	135.8	488.1	0	0	0	0	0	0	0	0	0	0	623.9
Average price, cents per million Btu	47.9	50.9	0	0	0	0	0	0	0	0	0	0	50.2
Total estimated gas bill, $1,000	65.1	248.3	0	0	0	0	0	0	0	0	0	0	313.4
Middle Atlantic:													
Quantity purchased: firm 1,000 M ft³	4,014.0	5,525.0	0	0	0	0	0	0	0	0	0	0	9,539.0
Interruptible 1,000 M ft³	1,155.7	1,019.1	0	0	0	0	0	0	0	0	0	0	2,174.8
Total 1,000 Btu	5,169.7	6,544.1	0	0	0	0	0	0	0	0		0	11,713.8
Total heating value, billion Btu	5,859.6	7,005.3	0	0	0	0	0	0	0	0	0	0	12,864.8
Average price, cents per million Btu	47.0	48.6	0	0	0	0	0	0	0	0	0	0	47.8
Total estimated gas bill, $1,000	2,751.7	3,401.4	0	0	0	0	0	0	0	0	0	0	6,153.1
East North Central:													
Quantity purchased: firm 1,000 M ft³	4,955.5	5,715.1	0	0	0	0	0	0	0	0	0	0	10,670.4
Interruptible 1,000 M ft³	4,733.6	5,628.7	0	0	0	0	0	0	0	0	0	0	10,362.3
Total 1,000 M ft³	9,688.9	11,343.8	0	0	0	0	0	0	0	0	0	0	21,032.7
Total heating value, billion Btu	8,027.9	9,598.9	0	0	0	0	0	0	0	0	0	0	17,626.9
Average price, cents per million Btu	55.6	57.5	0	0	0	0	0	0	0	0	0	0	56.6
Total estimated gas bill, $1,000	4,465.7	5,519.3	0	0	0	0	0	0	0	0	0	0	9,985.0
West North Central:													
Quantity purchased: firm 1,000 M ft³	1,491.7	1,752.0	0	0	0	0	0	0	0	0	0	0	3,243.8
Interruptible 1,000 M ft³	23,713.5	31,129.8	0	0	0	0	0	0	0	0	0	0	54,843.4
Total 1,000 M ft³	25,205.2	32,881.9	0	0	0	0	0	0	0	0	0	0	58,087.1
Total heating value, billion Btu	25,065.2	32,738.9	0	0	0	0	0	0	0	0	0	0	57,804.1
Average price, cents per million Btu	34.6	35.4	0	0	0	0	0	0	0	0	0	0	35.1
Total estimated gas bill, $1,000	8,679.9	11,595.1	0	0	0	0	0	0	0	0	0	0	20,275.0

South Atlantic:													
Quantity purchased: firm 1,000 M ft³	10,172.0	9,108.3	0	0	0	0	0	0	0	0	0	0	19,280.2
Interruptible 1,000 M ft³	5,318.2	6,797.8	0	0	0	0	0	0	0	0	0	0	12,116.0
Total 1,000 M ft³	15,490.2	15,906.0	0	0	0	0	0	0	0	0	0	0	31,396.2
Total heating value, billion Btu	15,851.0	16,321.3	0	0	0	0	0	0	0	0	0	0	32,172.3
Average price, cents per million Btu	43.5	44.3	0	0	0	0	0	0	0	0	0	0	43.9
Total estimated gas bill, $1,000	6,889.3	7,222.3	0	0	0	0	0	0	0	0	0	0	14,111.6
East South Central:													
Quantity purchased: firm 1,000 M ft³	1,352.4	1,450.6	0	0	0	0	0	0	0	0	0	0	2,803.0
Interruptible 1,000 M ft³	2,588.5	3,456.9	0	0	0	0	0	0	0	0	0	0	6,135.3
Total 1,000 M ft³	3,940.9	4,997.4	0	0	0	0	0	0	0	0	0	0	8,938.4
Total heating value, billion Btu	4,079.4	5,850.9	0	0	0	0	0	0	0	0	0	0	9,930.3
Average price, cents per million Btu	37.7	36.6	0	0	0	0	0	0	0	0	0	0	37.0
Total estimated gas bill, $1,000	1,538.6	2,139.7	0	0	0	0	0	0	0	0	0	0	3,678.2
West South Central:													
Quantity purchased: firm 1,000 M ft³	117,386.9	131,491.9	0	0	0	0	0	0	0	0	0	0	248,878.8
Interruptible 1,000 M ft³	20,390.1	25,330.2	0	0	0	0	0	0	0	0	0	0	45,720.3
Total 1,000 M ft³	137,777.0	156,822.2	0	0	0	0	0	0	0	0	0	0	294,599.1
Total heating value, billion Btu	142,072.5	161,639.1	0	0	0	0	0	0	0	0	0	0	303,711.6
Average price, cents per million Btu	27.3	27.3	0	0	0	0	0	0	0	0	0	0	27.3
Total estimated gas bill, $1,000	38,802.4	44,198.9	0	0	0	0	0	0	0	0	0	0	83,001.3
Mountain:													
Quantity purchased: firm 1,000 M ft³	5,820.5	7,381.1	0	0	0	0	0	0	0	0	0	0	13,201.5
Interruptible 1,000 M ft³	8,045.8	13,757.3	0	0	0	0	0	0	0	0	0	0	21,803.1
Total 1,000 M ft³	13,866.3	21,138.3	0	0	0	0	0	0	0	0	0	0	35,004.6
Total heating value, billion Btu	14,158.0	21,248.4	0	0	0	0	0	0	0	0	0	0	35,406.4
Average price, cents per million Btu	38.1	38.1	0	0	0	0	0	0	0	0	0	0	
Total estimated gas bill, $1,000	5,398.9	8,085.3	0	0	0	0	0	0	0	0	0	0	13,484.2
Pacific:													
Quantity purchased: firm 1,000 M ft³	0	0	0	0		0	0	0	0	0	0	0	38.1
Interruptible 1,000 M ft³	38,155.4	44,537.0	0	0	0	0	0	0	0	0	0	0	82,692.4
Total 1,000 M ft³	38,155.4	44,537.0	0	0	0	0	0	0	0	0	0	0	82,692.4
Total heating value, billion Btu	40,385.7	47,298.5	0	0	0	0	0	0	0	0	0	0	87,684.2
Average price, cents per million Btu	41.1	41.3	0	0	0	0	0	0	0	0	0	0	41.2
Total estimated gas bill, $1,000	16,598.6	19,537.1	0	0	0	0	0	0	0	0	0	0	36,135.7

Note: Off peak gas is omitted from this table.

TABLE 12.—PRIMARY ENERGY PURCHASE DATA FOR THE PAST TWELVE MONTHS [1]

Geographic region and state	Total Btu (billions)				Percent of total Btu			Average price, cents per 10^6 Btu		
	Coal	Oil	Gas	Total	Coal	Oil	Gas	Coal	Oil	Gas
New England:										
Connecticut	0	25,400.5	0	25,400.5	0	100.0	0	0	78.4	0
Maine	0	4,948.0	0	4,948.0	0	100.0	0	0	30.9	0
Massachusetts	0	44,079.9	586.6	44,666.5	0	98.7	1.3	0	61.8	50.5
New Hampshire	2,245.8	1,202.8	0	3,448.6	65.1	34.9	0	48.5	47.6	0
Rhode Island	0	2,143.5	11.4	2,154.9	0	99.5	0.5	0	62.1	51.4
Vermont	5.3	0	25.9	31.2	17.1	0	82.9	71.9	0	42.6
Total	2,251.1	77,774.8	623.9	80,649.7	2.8	96.4	.8	48.5	65.0	50.2
Middle Atlantic:										
New Jersey	11,106.0	37,242.0	2,618.4	50,966.5	21.8	73.1	5.1	62.4	82.4	49.0
New York	28,048.2	87,752.9	10,246.4	126,047.5	22.3	69.6	8.1	48.6	67.2	47.5
Pennsylvania	144,909.6	16,072.4	0	160,982.0	90.0	10.0	0	42.9	77.8	0
Total	184,063.8	141,067.3	12,864.8	337,995.9	54.5	41.7	3.8	45.0	72.4	47.8
East North Central:										
Illinois	107,677.3	4,917.0	4,181.7	116,776.0	92.2	4.2	3.6	40.4	74.5	57.3
Indiana	102,659.9	243.9	1,029.7	103,933.5	98.8	.2	1.0	32.3	94.0	44.5
Michigan	93,637.6	8,531.4	6,701.2	108,870.2	86.0	7.8	6.2	45.9	71.9	65.9
Ohio	165,142.2	2,226.6	1,261.5	168,630.4	97.9	1.3	.7	41.2	88.3	56.4
Wisconsin	37,841.4	314.1	4,452.8	42,608.3	88.8	.7	10.5	48.3	83.9	44.9
Total	506,958.4	16,233.0	17,626.9	540,818.3	93.7	3.0	3.3	40.6	75.5	56.6
West North Central:										
Iowa	19,017.8	28.2	9,977.3	29,023.2	65.5	.1	34.4	46.1	100.3	40.5
Kansas	4,435.3	735.4	22,862.0	28,032.7	15.8	2.6	81.6	29.8	77.4	29.0
Minnesota	19,426.7	935.8	8,934.3	29,296.8	66.3	3.2	30.5	39.3	89.9	39.5
Missouri	44,739.4	731.7	7,331.9	52,802.9	84.7	1.4	13.9	32.6	64.7	34.2
Nebraska	4,713.2	57.7	8,086.5	12,857.4	36.7	.4	62.9	46.6	112.7	41.0
North Dakota	9,448.9	11.5	0	9,460.4	99.9	.1	0	15.0	90.9	0
South Dakota	309.9	849.1	612.2	1,771.1	17.5	47.9	34.6	33.1	77.0	.1
Total	102,091.3	3,349.1	57,804.1	163,244.5	62.5	2.1	35.4	35.3	78.9	35.1
South Atlantic:										
Delaware	3,437.5	4,095.5	41.0	7,574.0	45.4	54.1	.5	58.4	80.0	68.9
District of Columbia	1,343.4	4,934.0	0	6,277.4	21.4	78.6	0	59.2	72.8	0
Florida	22,614.3	59,331.6	25,707.1	107,653.0	21.0	55.1	23.9	45.2	58.7	43.6

Georgia	45,633.1	2,844.8	4,762.6	53,240.5	85.7	5.3	8.9	42.5	54.3	43.8
Maryland	13,336.0	24,187.3	0	37,523.3	35.5	64.5	0	52.0	66.6	0
North Carolina	77,539.0	5,758.7	317.6	83,615.4	92.7	6.9	.4	46.6	52.6	51.0
South Carolina	22,473.8	350.3	1,003.0	23,827.0	94.3	1.5	4.2	49.4	60.6	50.2
Virginia	17,874.8	21,101.7	318.9	39,295.4	45.5	53.7	.8	43.8	48.8	39.3
West Virginia	89,285.2	0	22.1	89,307.4	100.0	0	0	35.7	0	30.9
Total	293,537.1	122,603.9	32,172.3	448,313.3	65.5	27.3	7.2	43.0	59.5	43.9
East South Central:										
Alabama	78,836.4	0	204.7	79,041.2	99.7	0	.3	41.5	0	36.1
Kentucky	81,809.2	1.8	640.0	82,451.1	99.2	0	.8	30.4	79.7	32.1
Mississippi	1,619.0	4,854.2	8,096.0	14,569.1	11.1	33.3	55.6	37.1	79.5	38.3
Tennessee	86,084.9	0	989.6	87,074.5	98.9	0	1.1	38.0	0	30.0
Total	248,349.6	4,856.0	9,930.3	263,135.9	94.4	1.8	3.8	36.6	79.5	37.0
West South Central:										
Arkansas	0	4,452.1	10,495.4	14,947.5	0	29.8	70.2	0	69.1	33.4
Louisiana	0	4,255.1	60,363.7	64,618.9	0	6.6	93.4	0	71.5	32.3
Oklahoma	0	33.6	35,927.0	35,960.6	0	.1	99.9	0	60.8	27.2
Texas	11,172.0	5,805.4	196,925.4	213,902.8	5.2	2.7	92.1	12.8	93.5	25.5
Total	11,172.0	14,546.2	303,711.6	329,429.8	3.4	4.4	92.2	12.8	79.5	27.3
Mountain:										
Arizona	1,617.7	5,979.5	10,481.8	18,079.0	8.9	33.1	58.0	31.5	93.3	41.0
Colorado	15,063.9	545.7	7,956.1	23,565.7	63.9	2.3	33.8	29.0	75.6	32.6
Idaho	0	0	0	0	0	0	0	0	0	0
Montana	2,635.9	203.0	156.0	2,994.9	88.0	6.8	5.2	21.5	93.6	18.0
Nevada	14,308.4	143.0	7,358.4	21,809.8	65.6	.7	33.7	29.0	84.5	47.9
New Mexico	25,652.0	537.6	8,732.0	34,921.6	73.5	1.5	25.0	15.0	71.3	32.2
Utah	4,199.6	206.9	722.1	5,128.6	81.9	4.0	14.1	32.1	39.0	31.6
Wyoming	12,740.9	0	0	12,740.9	100.0	0	0	18.5	0	0
Total	76,218.5	7,615.7	35,406.4	119,240.6	63.9	6.4	29.7	22.5	88.9	38.1
Pacific:										
California	0	69,117.6	87,437.2	156,554.9	0	44.1	55.9	0	85.2	41.2
Oregon	0	61.0	247.0	308.0	0	19.8	80.2	0	75.6	49.3
Washington	8,100.0	573.8	0	8,673.8	93.4	6.6	0	41.7	68.0	0
Total	8,100.0	69,752.4	87,684.2	165,536.6	4.9	42.1	53.0	41.7	85.1	41.2
U.S. Total	1,432,741.8	457,798.5	557,824.3	2,448,364.6	58.5	18.7	22.8	39.4	70.4	33.5

[1] Until twelve months data are available this table includes onlyt hose month(s) appearing in Tables 4, 8 and 11.

Mr. NASSIKAS. Table 6 of my prepared statement shows Commonwealth Edison Co. is within striking distance. As of January 1974, the average price for fuels, for residual oil No. 6, was 67.4 cents a million Btu. In January 1973, No. 6 was 58.7 cents a million Btu. For coal, Commonwealth Edison Co. paid 44.1 cents in January, 1973. In January, 1974, 52.1 cents. Natural gas in January 1973, they paid 58.3 cents, in January 1974, 80.1 cents.

Representative BROWN. May I just interrupt you?

Mr. NASSIKAS. Yes, sir.

Represenatative BROWN. Those numbers, however, that you are citing in table 6 of your prepared statement seem to go all over the lot in many of these different areas. Now, I can only assume the reasons for the differences is the difference in the length of the contracts for the supply of the energy resource.

Mr. NASSIKAS. It is not only that but that is a factor, yes Congressman Brown. The length of the contracts is a factor but also the volume of purchases makes a difference, particularly as to the natural gas prices that are reflected here, because much of this gas might be used simply to start a boiler to burn coal.

Representative BROWN. All right, and perhaps also the efficiency of the plant, is that correct?

Mr. NASSIKAS. Yes. Efficiency is an obvious factor also.

Representative BROWN. To what do you attribute the increased activity in gas exploration and supply at this particular time?

Mr. NASSIKAS. Two primary factors. I believe the Federal Power Commission's pricing policies over the course of the past 4 to 5 years, in addition to some of our accounting policies, which reflect on price also, have been——

Representative BROWN. Reflects on return or price?

Mr. NASSIKAS. The accounting policies reflect upon the price. What I mean by that is we have an advanced payments program where pipelines can make advances to producers and get repaid in gas by further exploration and development, or get repaid in cash through the investment in the rate base that we authorize for pipeline regulation.

Now, in some of the lease sales, recent ones, in South Louisiana, for instance, pipelines put up about a third of all the capital, $350 million. This advance payments program, our staff says accounts for about 9.1 trillion cubic feet of gas which has been committed to the interstate market.

Now, you do not commit gas off the shelf, so to speak. You commit it when you find it and when you develop it. After all, we did review all area rates in the United States in the course of about 2 years and they went up. I think that there is a correlation between price and an exploratory effort.

A very important factor is also a dramatic change in our leasing program. There were no leases in the Federal domain in the United States for a barren 1 year and 9 months, someplace between 1969 and 1971. There was environmental opposition. There was a lack of a concerted energy policy in leasing Federal lands also. But all things accounted for, the lease program is now finally where it should be.

We had some very large lease sales. About 3 million acres of land were leased in the Federal domain out of 8½ million acres that were leased totally through the year 1973. Over 3 million of those 8 million acres were leased in a period of 18 months.

Now, as these leases take effect, and you have further production —pardon me—further exploration and development, we will also stimulate further production and also stimulate an exploration and development program. So the two factors are pricing and policies of the Federal Power Commission in increasing competition among producers, increasing the exploration and development efforts, in deliberately establishing incentives to improve that effort through incentive ratemaking, through discharge of refunds in cases that are pending before the U.S. Supreme Court, and the leasing policy.

Representative BROWN. I will not ask you to tell us more than you know about or more than you can verify and I do not want you to get too far out on a limb, but could you in these four primary factors which you say are going to increase the cost of electric power to the consumer break out the percentage or the impact of the various things you have mentioned, market escalation, cost of fuel to the utilities, environmental protection devices and procedures, increased cost of capital and the effects of inflation on the cost of utilities construction and equipment? Perhaps you want to think about that and I will not press you for an answer at this moment.

[The following information was subsequently supplied for the record by Mr. Nassikas in the context of the above interrogation by Representative Brown:]

BUREAU OF POWER STAFF ANALYSIS

The following table represents an effort to break out the percentage impact of the various sources of cost increases projected for the privately owned sector of the electric power industry.

Sources of cost increase to consumers of electricity by sources

Sources of cost increases:	*Percentage of total projected cost increase*
Construction cost increase	50
Added costs of environmental protection devices and procedures	8
Increases in embedded senior capital costs [1]	6
Fuel cost increases	21
Inflation of other O. & M. costs	15
Total	100

[1] Long-term debt and preferred stock.

The table shows that the most important source of the total cost increase is the increase in construction costs which accounts for about half of the total. Part of the construction cost increase reflects an increase in the proportion of nuclear capacity in the total generation mix. This, of course, also has the effect of dampening to some extent the fuel cost increase since nuclear is substantially cheaper than fossil fuel.

Representative BROWN. I would rather if we can, to transfer our thinking for a moment to another subject because I do not want to overlabor our discussion on any one of these issues. But rather, try to hit several of them.

You say in your prepared statement that, "We simply don't know very much about the elasticity of demand for electricity so that the impacts of various forms of inverted rate schedules are largely unknown," and then you suggest that we might, "In the absence of substantial evidence of cost related demand elasticities, we should not adopt the inverted rate concept as a matter of public policy of general application to all utilities."

Is the inference of that that you would like to try it experimentally some place and is that a realistic approach?

Mr. NASSIKAS. Inverted rates?

Representative BROWN. Yes.

Mr. NASSIKAS. That part of it? I would like to see that tried experimentally and in a typical market area to try to measure the demand elasticities.

Representative BROWN. Now, let me ask you a question in that connection.

Mr. NASSIKAS. I think the Wisconsin Commission, by the way, Congressman Brown—I believe you have a witness that is coming here before this committee that was a witness in the Wisconsin proceeding. Maybe he can help out on this, too.

Representative BROWN. Do I understand why the largest users, and this is the reason I am pressing this area of questioning, one of the largest users of electricity is the aluminum industry in the processing of aluminum?

Mr. NASSIKAS. Yes.

Representative BROWN. And I am also under the impression that I have seen recently that the aluminum industry has figured out a way to cut the process cost by something like 40 percent.

Mr. NASSIKAS. Yes.

Representative BROWN. And that may or may not be a result of higher electricity rates.

Mr. NASSIKAS. True.

Representative BROWN. Now, if it is a result of higher electric rates, then it seems to me that where you would try some kind of an experiment, if the technology existed or was findable at a price, that you might stimulate that in that area but you might not stimulate it industrywide and thereby you would discourage the stimulation of it. If you tired it nationally, then whatever the process, is that they are heavy users of electricity, you would have to concentrate at the national level on trying to reduce their costs, again even in the transmission costs or other areas.

Mr. NASSIKAS. Yes.

Representative BROWN. That is why I am concerned about whether a spot experiment would really accomplish what you want to accomplish.

Mr. NASSIKAS. It would not be conclusive but it would at least be empirical evidence, of which we have none at this stage, as to whether or not there is substantial demand elasticity as the price goes up. We have heard a lot of theoreticians and a lot of economists and I have great respect for economists both present at this table and elsewhere, but the economists theorize and the fair ones say that we really do not know but based on these assumptions this

should happen. I do not think that we should have a national policy based upon speculation. I think we should have a national policy concerning rates that is based on evidence.

Now, let me carry this a step further. As to the Federal Power Commission's jurisdiction, we basically control the rates that are charged by the electric utilities to the rural electric cooperatives and to the municipalities and also rates as beteween utilities. We also have jurisdiction to some extent over Federal systems, too. But basically, we do determine the rate that is charged by an electric utility to a municipality like the city of Cleveland or to a rural electric cooperative.

Now, if we should, as a matter of public policy, decide to use an inverted rate structure in our regulation of bulk wholesale rates and the State utility commissions use a promotional rate, there is immediate discrimination between the rate structure which we would impose under inverted rates and the rate structure that would be imposed by the State commissions, that is, the municipalities would end up paying more for the same volume of electricity as was purchased by a retail customer of a utility regulated by a State commission.

So what I am saying is that on an inverted rate structure, where you do have dual jurisdiction between the FPC and State commissions, that any experiment should take cognizance of that particular factor because it is an important one.

Representative BROWN. In this exprimental idea, let me just question you on one other comment that you made because I think it may not be quite accurate and may not truly reflect your views.

In your prepared statement you say, "If we are to increase the rates charged at higher levels of usage, we must necessarily reduce the rates charged a lower levels." I would submit if your increases are going to be excessive or—I should not say excessive—if they are going to be rapid, then that may not be a proper conclusion. You may be charging sharply higher for higher usage but you may also be charging higher rates anyway for residential users, is that correct?

Mr. NASSIKAS. Yes.

Representative BROWN. In other words, if they were stable, if the rates were stable, obvously what you say is true here but——

Mr. NASSIKAS. The sentence would be more accurate, I think, if we were to qualify it to say consistent with a just and reasonable return to the utility. All this is intended to say is that let us be careful if we do increase rates as the usage goes up and in the event that the revenues of the utility do not prove to be elastic, then we want to be sure that we do not give a windfall to the utility by giving it an excessive rate of return.

Chairman HUMPHREY [presiding]. I think that we ought to——

Representative BROWN. Mr. Chairman, if I may, I would like to ask permission for him to give me some additional information.

Chairman HUMPHREY. Surely.

Representative BROWN. It relates to the prices that you were giving me on the intrastate and federally regulated prices of gas. The difference between the Mcf price and the cost of gas in both in-

stances was rather large, 12 percent the cost of gas in the federally regulated price, and I would like to have a breakdown of what makes up the difference between that 12 percent cost of gas and the higher cost and then some estimates as to whether or not in the increased cost of gas, let us say, from 25 cents up to 60 cent possibilities, whether you anticipate sharp increases in those other costs that make the difference between the 25-cent current price of gas and the $1.39 Mcf price currently at the household connection.

Mr. NASSIKAS. Yes. I will be happy to, but for the moment here, I would like to add a statement now that we cannot simply attribute an increase in the wellhead price of gas and then compute the consumer bill by saying just add that amount. We have to also consider ancillary impact such as the impact upon renegotiated prices for flowing gas contracts and I will be happy to give you a breakdown with specific examples of what you have asked for, Congressman Brown, and also indicate to the extent that we can some of the additional impacts that there might be in case gas prices go up.

[The following information was subsequently supplied for the record:]

BUREAU OF NATURAL GAS STAFF ANALYSIS OF THE COSTS INVOLVED IN THE DELIVERED PRICE OF NATURAL GAS

This is a continuation of the discussion which took place at the hearing. The relationship there discussed was between a wellhead price of 25¢ and a delivered price to the consumer of $1.75. Thus, wellhead price currently represents abour 14 percent of the total delivered price. The $1.75 price corresponds closely with the gas heating rate of $1.79 quoted for New York City-NE New Jersey in table 8b of the Chairman's statement. According to FPC records, the average wholesale gas price in the New York City area at this time (July, 1973) was about 54¢. Thus, a transportation charge of 29¢ can be inferred for this particular delivery. The remaining cost of $1.21 is the charge made by the local distributing company to cover the cost of delivering the gas to the ultimate consumer. In terms of the cost components for this particular delivery, then, production cost would represent 14.3 percent, transmission 16.6 percent and distribution 69.1 percent.

If the wellhead price for all wellhead sales were raised to 60¢ (total deregulation with immediate consumer impact), the total price to the consumer on a direct passthrough of the increase would be $2.10. The cost components of this supply would then be: production, 28.6 percent, transmission, 13.8 percent, and distribution 57.6 percent.

On the other hand, if we assume deregulation of new wellhead sales only, and further assume that new sales will represent 10 percent of total sales each year, than the first year impact on the consumer would be only a 3½¢ increase [1], again with a direct pass-through of the increase and no increases in any other components of cost. Each year the cost would escalate as more and more new gas constituted the overall supply.

Both of the above examples are over simplified. Other factors which would have to be considered are increasing financing costs (the prime rate is now at 10%), increasing labor and materials costs, increasing volumes of expensive supplemental supplies, and, to the extent total supply is still not sufficient to fill our gas pipelines, increased costs due to underutilization of facilities and the need for more rapid facilities depreciation.

In addition to the factors mentioned above, one would have to consider the impact on consumer prices of renegotiations of prices for flowing gas contracts and the rededication of supplies at new gas prices upon expiration of existing contracts. No one knows the precise impact of these factors, but they would generate increases over and above that associated with new gas supplies dedicated to interstate commerce for the first time.

[1] 25¢ × 90% + 60¢ × 10% = 28.5¢

Chairman HUMPHREY. Mr. Nassikas, just before you leave, let me —because even as I walked out of the room here I have had people ask me questions such as this: Well, what do you say, Senator Humphrey, to the angry consumer who is facing these increased utility rate prices or increased prices for electricity, for example, and out of this hearing what I get is: As yet we do not have any clear cut answer. We have the situation, however, as you so aptly put it, that it appears that the reward for the patriotic citizen who has conserved on the use of energy, particularly in electrical energy, is a higher rate and, of course, this is no way to encourage conservation. I think it should be recognized that rates will be higher. It is a question how much. And just like food prices are higher and interest rates are higher and transportation rates are higher, et cetera. There is a higher level of price structure throughout the country. But you have given us two possibilities of giving some relief to the consumer, one of them referred to just a moment ago of what we call the inverted rates.

Mr. NASSIKAS. Peakload.

Chairman HUMPHREY. And peakload reading. On the inverted rate structure, what we have had recently is as you lower electric usage you get a lower rate. What we are talking about here, keeping the solvency of the utilities, that is a rate structure that will permit them a reasonable rate of return on their investment. We are talking about the possibility that as you conserve, that the rate increase will not be as much to you as a conservationist as it would to you as one that uses large amounts of energy. So that we could have trial runs, so to speak, to see if the so-called inverted rate structure is not helpful or the inverted rate structure is helpful. In other word, if you are a good citizen and you can serve at the request of your Government you will not be penalized by just a general rate increase. There will be some effort made to give you a lower rate even though there may be some increase in the rate.

Mr. NASSIKAS. Yes.

Chairman HUMPHREY. And if you use a large amount you will be penalized in a sense, to make you more of a conservationist by a higher rate. Is that correct?

Mr. NASSIKAS. Yes, sir; it is correct. We can eliminate some discrimination in rate design to aid some of the smaller consumers of——

Chairman HUMPHREY. You are talking about householders now?

Mr. NASSIKAS. Yes. householders. We can assist them by eliminating some of the promotional tilts in rate design and rate patterns both on the electric power side and the natural gas side and we have taken affirmative action at the Federal Power Commission to assign more costs to the commodity side in our natural gas regulation so that the costs, overall costs paid by large industrial users will increase relative to the cost paid by the smaller consumers.

Chairman HUMPHREY. That is it—that is what we have got to do. I mean some way, some how, we have got to find a way so that that homeowner who was convinced to electrify his home and, of course, electricity is as vital as water and air today to the average homeowner, as he conserves and as he responds to the plea of his Govern-

ment to cooperate in an energy conservation program, that he is not in a sense literally made the victim of his own good deed by having very sharp rate increases, and I want to thank you very much for what you have been able to tell us today. I think we must be fair, though, with our people. We have not any sure answer as yet.

Mr. NASSIKAS. I agree, Senator Humphrey, and, of course, our primary mission at the FPC, this is the reason we exist, is to protect the consumer.

Chairman HUMPHREY. Thank you very much.

Now we have two witnesses, Mr. Charles Cicchetti, and Mr. Alan Roth. Mr. Cicchetti is a professor of economics, University of Wisconsin. I believe he is accompanied by Edward Berlin, general counsel, Consumer Federation of America, and Mr. William Gillen. Mr. Alan Roth is commissioner-designate, New York Public Service Commission.

We will start our testimony if it is agreeable with Congressman Brown, with Mr. Cicchetti, because Senator Javits wants to be here when Mr. Roth testifies.

Mr. Cicchetti, will you come forward, please.

Mr. BERLIN. Senator, I am Edward Berlin. If I may state, I think Mr. Roth will feel more comfortable appearing by himself following our presentation.

Chairman HUMPHREY. Fine. We will do so.

Mr. BERLIN. Mr. Cicchetti is to my right, and Mr. Bill Gillen, who also worked on this matter is to my left.

Chairman HUMPHREY. Thank you very much. Mr. Cicchetti, we will get your testimony now and we will hold for Mr. Roth until Senator Javits arrives.

STATEMENT OF CHARLES J. CICCHETTI, PROFESSOR OF ECONOMICS, UNIVERSITY OF WISCONSIN, ACCOMPANIED BY EDWARD BERLIN, GENERAL COUNSEL, CONSUMER FEDERATION OF AMERICA, AND WILLIAM GILLEN

Mr. CICCHETTI. Mr. Chairman, Congressman Brown, I would first like to take this opportunity to thank you for permitting me to testify concerning my ideas on electricity pricing and in particular on the so-called conservation adjustments.

Due to the relative short notice of my appearance, I would like to apologize if my remarks are overly terse in some parts, perhaps long-winded in others.

Chairman HUMPHREY. May I say that you qualify for full representation in Congress. Do not worry about that.

Mr. CICCHETTI. I intend to discuss several points with you this morning and will be happy to cooperate further if any of the ideas covered become areas that you would like to consider further.

The first point I would like to make is that the electric utility industry in this country is not benefiting from our current energy crisis. This is in marked contrast to most of the other components of the energy sector of our economy. There are several reasons for their unenviable distinction.

First, they are customers of the fossil fuel producers and are thus confronting the same rising prices that all the rest of us face. Those electric utilities that have "automatic fuel clause adjustments" that permit them to adjust their prices with each change in fuel purchase costs are, however, in a markedly superior position than electric utilities that do not.

Chairman HUMPHREY. Excuse me. Do you have a prepared statement for us?

Mr. CICCHETTI. Yes, I do.

Second, inflation has hit electric utilities in a particularly hard way. The practice of tying revenues to historic costs and/or average costs in a period of rising nominal and in some cases rising real costs has had a profound impact on the electric utility industry. The very visible symptom associated with such casual factors is the annual and in some cases semiannual appearance before regulatory commissions requesting revenue relief, and increases in the allowed rate of return and prices. For an industry which has historically been growing at rates more than twice the overall real growth in the economy, revenue erosion and further expansion pressures have all contributed to finance problems that increase the cost of capital to the industry. This results in a further increase in costs and the vicious cycle is compounded.

The financial problems of the industry are not taking place in a vacuum. In fact, the striking feature of the current round of price increases in the electric utility industry is that it follows more than two decades of declining or constant prices. While the social and environmental costs imposed on society by the production and consumption of electricity may have been high, prices have historically remained low. Indeed, larger user quantity discounts have been the rule. The unprecedented growth in per capita electrical consumption has doubtless been related to this pricing practice.

In the past, while social costs tended to be grossly understated in the resultant price, the private—or firm—costs of electricity fell as both larger plants and new and cheaper technology was installed. Additional savings in transmission also contributed heavily to this decline in cost as use expaneded The situation has now changed dramatically for several reasons.

First, as electric utilities gained efficiency the physical and engineering limits began to be reached.

Second, nuclear technology has generally proved less reliable and more costly than original estimates.

Third, fuel costs began to increase as lower cost coal was replaced by higher cost oil which was a less polluting fuel. The current escalation in the cost of oil has and will compound this higher cost.

Fourth, a growing environmental concern has resulted in more costly construction techniques.

Finally, to summarize the previously-mentioned problems, the general price inflation of the last few years has hit the electric utility industry particularly hard. Construction costs and raw materials prices have grown steadily. Higher interest rates have particularly impacted the electric utility industry, which is in the unenviable position of currently being both a large capital investor and highly dependent on outside sources of finance.

Throughout this period, prices of electricity—which were tied both in the minds of regulators and, oftentimes, management to the prior period of declining costs—have been retained. Quantity discounts—or declining rate block pricing—and large user lower prices have generally been retained despite a period of almost annual price increases and extended rate hearings. Revenue continued to erode, costs continued to climb. Regulatory commissioners began to find their dockets overloaded with applications for unprecedented price increases. Opposition to this historic pricing practice began to surface from environmentalists, alarmed at increasing consumption; and consumers, alarmed at higher monthly bills. At the same time, economists—often ignored when it came to pricing—started to restate and clarify existing price theories and explain why the historic pricing practice may be a prime causal factor in the current industry crisis.

The solution to the industry's problem represents a surprising consensus among economists. First, costs should be the basis of pricing. If costs are rising and excess revenue would result from marginal cost pricing, then prices should be lowered proportionately more for the most price inelastic users. These are doubtless the smaller users, who make up the broad class of residential use. The problem is that in the past in order to take advantage of lower costs afforded all users through growth and increased use the opposite pricing policy was adopted. Reversing the thinking behind such imbedded tariffs is the current problem.

There are two additional subtleties that compound the above statement of the problem. First, inflation will doubtless continue and it is important to separate real cost patterns and the pricing they imply and general price inflation. The latter should probably be dealt with by an inflation adjustment, which would protect both the consumer and the industry and not make them semiannual combatants in which they both must eventually lose.

Chairman HUMPHREY. May I just interrupt? You do not mind, sir?

Mr. CICCHETTI. No, I do not.

Chairman HUMPHREY. What you are saying is there ought to be kind of a built-in adjusting factor, is that right?

Mr. CICCHETTI. That is right.

Chairman HUMPHREY. For general inflation.

Mr. CICCHETTI. That is what I am saying.

Chairman HUMPHREY. So you do not have to go through the tedious long protected arguments before regulatory commissions, et cetera.

Mr. CICCHETTI. You might set prices for a 3-year period and then during each of those subsequent years if you are having inflation you might make a standard adjustment that would be preestablished, and at the end of that 3 years you might look back and see whether the company had a sufficient adjustment or perhaps maybe it had too great an adjustment and take it into account in perhaps the next 3-year period. Currently consumers get alarmed because 1 month they read about the request for a rate of return increase, the next month they read about a request for some kind of a revenue in-

crease, and then the next month they read about a request for some type of a price increase.

All of these are really the same kind of adjustment that we are seeing. I think it leads to a great deal of the emotion and outrage of the part of consumers.

Chairman HUMPHREY. Very good.

Representative BROWN. May I just inquire at this point, however, would you—what would you make your cost increase factor? It certainly could not necessarily be the cost of living increase because——

Mr. CICCHETTI. No.

Representative BROWN [continuing]. The utility may in some breakthrough cut down the expense of generation. You mentioned transmission, a couple of other things here.

Mr. CICCHETTI. I think what we would like to do is to make the adjustment something that would be perhaps set up on a State level because electric utilities are regulated at the State level. And then if the utility was able to do better than inflation, it can actually earn income. That is, it can increase profits it if can do better than the statewide average of inflation that all the utilities in the State might be going through.

On the other hand, if the utility happened to be careless or mismanaged or for some reason have cost increases which exceeded inflation, then they would have to be penalized to some extent. Perhaps they would have to wait 3 years to finally recoup those losses.

Representative BROWN. I do not want to further interrupt your statement, but just two points on that. One is, if there is efficiency developed in the process of the production of the energy, then I am sure the company might want to put it into effect and get the benefit of the cost savings that that would provide.

On the other hand, the company might very well resist the idea of trying to resolve some of the social costs which you mention, the environmental impacts, burying electric wires, et cetera, for instance, and you might discourage that kind of advance if it were not likely to be able to go back and get an increase because of that. I think you would have to build that into the system, although I think it is a very attractive idea.

Mr. CICCHETTI. First of all, I agree with the need to build flexibility into the system. In addition to that, I do not think these agreements are locked forever. I would view them as a 4-year period. And second of all, I think that we should get into a period of time where we think about rate hearings as something exceptional if they occur during that 3-year period rather than the automatic appearance before regulatory commissions, sometimes three or four times a year, on just a current order of business-type schedule. I think that has to come to an end.

Chairman HUMPHREY. Thank you very much.

Mr. CICCHETTI. Second, the costs of supplying each user are not equal. There are several components of costs and there are likely to be large differences between serving different users with electricity. In each case the prices charged should be based upon separable and shared costs. One case is particularly troublesome for the development of a simple pricing policy.

Costs are tied to several factors but the most quantitatively significant of these is the time of day in which electricity use takes place. When the system is serving a large number of customers at a high level of use it is by necessity utilizing its plants which are most expensive to operate and at lesser levels of demand would not be utilized. In addition, it is to meet these peak periods of demand that additional higher cost generating facilities are built.

Chairman HUMPHREY. What you are really saying here is you are coming around to where Mr. Nassikas was talking about peak pricing rate schedules.

Mr. CICCHETTI. That is right. I am trying to point out there are two reasons why peak costs are higher. One, because you have to build a lot more plants. Two, even if you have that plant on line you are probably using some of the older, less efficient plants to meet that peak. By definition, the fixed costs or capacity costs are going to be higher at peak.

Economists have long favored a pricing practice which is based upon such on and off peak costs differences. In France, the United Kingdom and elsewhere this pricing system is practiced in some form. In the United States the efforts have been primitive by comparison and oftentimes they have tended to worsen the problem by encouraging each customer to spread out his own load without assurances that it is improving the system load. The result is often higher costs, more generating facility investments, and higher prices. In today's energy conservation world that practice was and continues to be wrong-headed.

Every effort should be made to reform the current pricing practice and to base prices on costs. If small users are contributing to a greater level of costs than large users then so be it that they pay higher prices. But this must be demonstrated first and electric utilities should not be permitted to stand on what has been proved to be an incorrect pricing practice for today's world. It is far more likely that if a system of peak load pricing can be instituted that both small and large users alike will benefit because the electric utilities' overall costs will fall as it invests less and has a more efficient utilization of its existing equipment. If the high growth in use at peak periods continues then the higher prices those responsible for such growth will pay for that use will be both fair and efficient.

I would now like to turn to a more immediate problem. The so-called conservation adjustment that several utilities have been talking about.

Representative BROWN. Mr. Chairman, may I just interrupt here? I am expecting a quorum call on the House side and that is why I am being a little impertinent. But, have you done an analysis of what creates the peakload, and the reason I ask the question is, is it the consumer; that is. the household consumer, the basic responsibility factor in the peakload or is it the massive user? I can imagine that that would vary from circumstance to circumstance. But what I am getting at is this. Would the householder be inconvenienced by being impacted by that peakload? Let us say that it is an industrial operation where the peakload runs at a certain particular time, and then the householder if he jumps on that peakload time with cook-

ing supper on the electric range or whatever it might be, that then costs him more. You see what I am asking?

Mr. CICCHETTI. Yes. There are really two parts to the answer I would like to give. The first part is that it is very simply that everybody using electricity at peak is contributing to peak. Most utilities in this country are now on a peak period which occurs in the summertime. Residential air-conditioning load is occurring at peak. Industrial use, which is also taking place during those hot summer afternoons and even during some of the winter months in other parts of the country, are also contributing to the park. There can be turndowns in air-conditioning thermostats. There can be turndowns or air-conditioners can in fact be turned off in certain periods of time, left off during the day when nobody is home, but industry is probably the place with the greatest possibility for altering the use of electricity. In those parts of the country where electric users are engaged in heavy metals or heavy industry, where there are several shifts working, processes where the timing is not important, they are the ones who will find it most easy to take advantage of the low off-peak electricity prices. Residential users are probably going to pay higher prices under a system of peak pricing, pay higher prices when they are using it at peak, but if they can get some of their use shifted, they will find stringingly lower prices for their off-peak use. There will also be incentives to turn down thermostats or heat-sensitive weather settings which are the types of things we have seen this past winter that households will do if they think they can save some money and perhaps also aid our present energy crisis.

Mr. BERLIN. If I could add one thought, in the limited studies we have undertaken thus far in an effort to determine the disparity that one might see between an on-peak and off-peak rate, we find that the order of magnitude may be as much and indeed, higher than an order of 5 to 1. So if one were to establish a rate differential based upon time of day pricing that fully priced both peak consumption at its marginal cost and off-peak consumption at its appropriate cost, there would be a very strong economic inducement to any consumer, whether it be residential, commercial, or industrial, to do whatever that consumer could to shift that load off peak and take advantage of the greatly reduced off-peak rates. You have a combination effect of a very high rate on peak and a very low rate off peak that should supply the necessary inducements, and if we are also concerned as we should be with fuel conservation, if one were to look at a utility's procedure for selecting the plants which it utilized to serve each increment at load, we find again that in terms of fuel consumption, variance is several fold between the more efficient units and the less efficient units. It may well turn out that if we could correct some of the very difficult load factor situations that we have, in this city, for example, Pepco's load, at peak, is 50 percent weather sensitive. It has a 50-percent load factor. It, therefore, must build plants to meet a skiked spite peak load, and must use every energy-inefficient gas-burning turnbine it can utilize, to serve that load. We could, we are convinced, lower the peak, increase total kilowatt hour consumption that it made available to all classes of consumers, including industry, and do it at a cheaper private cost to utility and a cheaper selling cost to society.

Excuse me for interrupting.

Chairman HUMPHREY. This is very helpful testimony, may I say, on this whole business of the peak pricing and load factors and the utilization of modern equipment. I was interested in what you call the weather factor. What is this?

Mr. BERLIN. If you look at the load patterns in typical urban utility situations you find at times of system peak, and it applies both to summer peaking utility and a winter peaking utility, the load that is most responsible for a skied peak is a weather sensitive load, whether it is air-conditioning in this part of the country or space heating in northern Wisconsin.

Chairman HUMPHREY. I see.

Mr. CICCHETTI. I now would like to turn to the more immediate problem, so-called conservation adjustment, that several utilities have been talking about recently. First, it is necessary to realize that the previously mentioned problems in the industry were with us before we entered the current phase of the energy crisis.

Second, the electric utility industry has been suffering along with the rest of us. The problems of those customers who have all-electric homes and which purchase electricity from a utility with a fuel clause adjustment and a foreign source of fuel oil are the consumers hardest hit by our current crisis. While they are comparatively few in number their relative penalty for our current national energy fiasco is far out of line with any duplicity they may share with the rest of us for this sad state of affairs. Some form of tax relief or limit on price increases is probably necessary to ease their plight but theirs is not the main problem.

Some electric utilities have found that there is less use of existing plants as their kilowatt-hour sales have fallen. Residential use, at least in some parts of the country, appears to have been the main source of decline. But residential users are paying higher-than-average prices and each kWh conserved brings a greater than average revenue loss. To a large extent the industry's problem is due to the factors mentioned above. Fixed costs should be recovered by increasing on-peak prices, not off-peak prices. This will discourage facility expansion and any price increase today will reduce future price increases. Perhaps this is overly simplistic, but if prices were cost based, as discussed above, each reduction in costs would be offset by an equal reduction in revenue and the electric utility would not be suffering from an earnings erosion problem. The problem is real but the solution must be based on a broad industry pricing reform and not a temporary short-sighted solution that increases all prices to all customers.

Consumers, who are trying to help by reducing energy use, are being asked to shoulder the burden by paying higher prices. This is a politically stupid move on the part of those firms making the request, in my opinion. If electric utilities plan to continue their past pricing mistakes, when seeking relief from this problem, they should not be bailed out by the Congress or regulatory commissions. Instead, I believe the stockholders should replace the current management with people who will follow their common sense and have greater faith in the level of intelligence of the average American consumer.

There is a basic error in the argument that implies to consumers that they must pay higher prices or give up their energy conservation efforts. The fact is that prices will increase in any case, but if energy conservation is forgotten, then this will increase the utilities investment requirements and mean even greater costs and prices in the near future. Discouraging conservation is short-sighted at best and any utility engaging in it is being mismanged.

Chairman HUMPHREY. Would you not say there is a definite need now for spokesmen in the Government, and particularly at the regulatory level and also at the executive and congressional level, to signal to the utility industry that their traditional pricing practices no longer relate to the fuel and energy needs of our country?

Mr. CICCHETTI. I believe that very much, Senator.

Chairman HUMPHREY. They have to start—to base price upon cost—to have fluctuating rate schedules like peak pricing rates or peak use rates. Then for the person that is served, to give him some incentive for conservation by not permitting the price increases at that level to be as much as they would, may I say, at other levels of use?

Mr. CICCHETTI. I think that is absolutely essential both from our own domestic needs and worldwide needs, to start to encourage people who are seeking their own self-interest, to help the rest of us instead of the current situation where the price system encourages users to spread their loads but does not encourage that use to in anyway reduce the costs for the rest of the consumers in the system. I think that has to come to an end. I think it is relatively straightforward and I think there is a great consensus on the part of economists on how that might be implemented and we have experiences in Western Europe and West Pakistan and other parts of the world that have implemented this pricing system quite successfully. I think it has proven itself and it is a question of redirecting the thinking on the part of the industry.

Chairman HUMPHREY. This also tends to reduce the excessive costs that have to go into plants and equipment to meet what we call peak loads. Is it not also possible that under our tax structure we could also avoid in this by encouraging industry to get rid of equipment that really is relatively obsolete and get to a more—a greater efficient type of equipment where the conversion rate from the fuel that is used to generate the electricity is better? In other words, you get more electrical power out of your basic fuel, your primary fuel.

Mr. CICCHETTI. I think if we are thinking about congressional action from a tax standpoint, one of the—greatest things that might be done would be to have some kind of accelerated depreciation or favorable tax treatment for any electric utility that invested in changing their current meters so that this pricing system we are talking about will in fact be encouraged in order to start to have utilities move in the direction.

The biggest problem when the utilities hear about these kinds of issues and through appearances of all of us—that are sitting at the table now—in regulatory proceedings throughout the country, one of the biggest problems mentioned is the cost of putting in the meters or the cost of changing the meters that are also in place.

Representative BROWN. What would be that cost, could you tell me?

Mr. CICCHETTI. I think Mr. Gillen could probably answer that somewhat better than I. That is one of the reasons I asked him to sit at the table.

Chairman HUMPHREY. Another quorum call.

Mr. GILLEN. Congressman, I recently became a consultant to a firm that manufactures such equipment and they advised me it is between $15 to $30 depending on the specific function to be performed.

May I interject something, Congressman, in view of a point Senator Humphrey raised before he left. With respect to the increased capital costs associated with meeting peak loads, there has been much concern evidence this morning—with respect to the increased cost of fuel but I suggest that the increased costs of fuel and the impact that that is having on consumer payments for electricity are nothing like the impact we are going to see when the electric utility industry tries to raise the hundreds of billions of dollars that are going to be required for the additional capacity that are presently forecasted. The Wall Street Journal recently said the electric utility industry, which has always been a major factor in the bond market, is very soon going to become the biggest entity in the bond market. The magnitudes of money that industry is going to have to raise is just staggering.

Representative BROWN. Well, I have no argument with that.

Mr. Nassikas mentioned that and the utilities have been mentioning it for some time. The question of thereby saving on the consumption of oil by reducing consumption or whatever the energy source is, I am sure is a worthy saving provided the capital costs are not exacerbated beyond logical economic decisions in accomplishing that.

Now, clearly, conversion to more efficient methods of changing energy into electricity is very desirable but the question is how do you phase that in? In other words, do you replace all your current plants in order to get the peak loading or the more efficient use of peak loading or more efficient use of whatever your fuel source, or do you build your new plants in this new and more efficient method and keep your old plants on line? That is I suppose, a decision that one has to make depending on what the cost of that capital is. This is why I asked Mr. Nassikas for a breakdown of the cost of capital as a part of some of these other costs that are going to increase the cost of electricity generally.

But to get back to the meter problem, it is your conclusion, then, that the meter cost would be $25 to $30 per household meter, is that correct?

Mr. GILLEN. That is an estimate that one manufacturer has provided, that is correct.

Representative BROWN. How does that relate, say, to the cost of a new plant which might make more efficient use or more efficient cost saving? What—for instance, take a city like Washington and the number of meters that are here or whatever city you might want to come up with. What does that $30 cost translate to in terms of percentage of cost of the current plants?

Mr. GILLEN. That is a very interesting but a very complicated question, sir. First of all——

Representative BROWN. It depends, I suppose, on the size of the system.

Mr. GILLEN. Yes, sir. The $15 or $30 cost is, of course, a gross cost and the particular device I have in mind performs additional function that would relieve the utility of the necessity to incur additional expenses or other expenses. For example, going around and reading the meter could now be done remotely so there are savings, so that the net cost is less than the $15 to $30 range, but whatever that net cost is, we multiply by the number of consumer installations there are. Now, in comparison to new capacity, I recently participated in a proceeding——

Chairman HUMPHREY. Not future but existing capacity. In other words, what does the percentage across the plant represent by individual meters at the range of $25 to $30 per meter in all the households served by the utility.

Mr. GILLEN. Excuse me. I understand it would be very small. The utility's investment in meter equipment is very small compared to its total investment but I think there is an additional interesting point to be made there sir. I recently participated in a proceeding in New York involving a company that expects to spend over the next 5 years something on the order of $1.2 billion in new capacity. Well, if some significant portion of that $1.2 billion could be obviated and that expenditure could be made in metering devices, then the utility would have in effect implemented peak load pricing at no cost. I think it is an interesting comparison if the comparison between implementing peak load——

Representative BROWN. Let us go back to my question and can you give me an answer?

Mr. CICCHETTI. I am not an engineer and maybe I will stick my neck out with a simple calculation but the average residential customer of electricity in this country consumes 6,000 kilowatt hours per year. Let us suppose they just take that load evenly so that we assign one kilowatt to each customer. Let me say that the—there are 8,000 some odd hours a year but let us suppose that people only use electricity three-quarters of the year just to make things simple. Actually, people probably are going to be using electricity on a greater level at some point and other times not at all, but let us just say the load is roughly 6,000 hours out of the year that you use one kilowatt of electricity.

Now, the cost of putting in a kilowatt of electricitiy of generating capacity, depending upon whether it is fossil fuel or nuclear, is possibly $200, $300, maybe even $400. Compare that with the cost of installing a meter for a single customer of $25. In some cases the cost coming out of Western Europe might have been $50 or $60 and older technology. The cost of the meter, per customer, is only a fraction of, let us say—it is $50, and let us say new electricity is $400. We will come up again with our 12 percent that we had with the past witness.

Representative BROWN. If you could give me that fraction, if you could submit it later, what that percentage cost is in an average city to replace the metering system, that would be very helpful.

[The following information was subsequently supplied for the record:]

ENECON, INC.,
Washington, D.C., April 3, 1974.

HON. CLARENCE J. BROWN,
House of Representatives,
Cannon Office Building,
Washington, D.C.

DEAR MR. BROWN: The following information is offered in response to your request made during the Hearings of the Joint Economic Committee, Subcommittee on Consumer Economics held March 28, 1974, on the subject of electric utility rates.

(1) metering devices for electricity consumption constitute approximately 1.9% of total electric utility plant.[1]

(2) the cost of modifying existing metering systems to permit peak-load pricing would be approximately $15 per customer (plus installation), based on information furnished to me by the manufacturer. For the approximately 76 million electricity consumers in the U.S., the total acquisition cost, therefore, would be on the order of $1,140 million.

Please call on me if I can be of further assistance.

Sincerely,

WILLIAM J. GILLEN.

Representative BROWN. Excuse me. Go ahead, Mr. Cicchetti.

Mr. CICCHETTI. If electricity use is to be conserved as a national goal, then a price-tax system, which discourages use and rewards those who meet the preset goal and penalizes with higher prices those that do not, is what we need. As a long run goal it is necessary to remove the current quantity discounts and replace them with a peak load cost-based price system. At a minimum flat prices based upon long-run incremental costs, with separate customer costs and probably an inflation adjustment should replace the current pricing practices. This interim step would tend to ease the problem, but only after we start basing prices on time of day or diurnal cost-based differences, will the industry's problems come under reasonable control.

There is a related problem to the energy conservation-price increase conflict. Historically electric utilities and regulatory commissions have assumed that the quantity of electricity consumed was insensitive to the price charged. That is, they have presumed the price elasticity of electricity demand to be zero. When revenue targets were set and prices reduced this was a conservative assumption, since revenue requirements would be underestimated. Today, however, that price of electricity is being increased and continuing to assume zero price elasticity of demand means that the approved revenue requirements will not be earned. Many of the current round of annual rate proceedings are due to requests on the part of electric utilities to earn revenue previously authorized but not earned. The current round of high prices caused by fuel clause adjustments and recent rate increases may have a lot to do with current consumer kilowatthour reductions. Yet, the industry still seems unwilling to accept the price elasticity argument and protect itself. It seems bent on self-destruction. I cannot explain their logic or reasoning. My only guess for their seemingly irrational behavior is that they may

[1] From *Statistics of Privately Owned Electric Utilities in the United States,* Federal Power Commission, 1971 (the latest year available). The investor-owned utilities provide approximately 83 percent of all kilowatt-hour sales.

fear that accepting a price elasticity argument in a revenue proceeding will mean that they would have to accept them in facility licensing proceedings and thereby reduce their use forecasts and facility needs. Belief that regulatory commissions will bail them out is the final segment that closes the vicious circle in which all participants are losers.

Thank you for your time.

Senator JAVITS [presiding]. Thank you very much. Do any of your associates wish to make any statement?

Mr. BERLIN. I think we have probably made our statements, Senator Javits. Thank you.

I would just, if I could, conclude by saying the type of pricing material that Mr. Cicchetti has been addressing himself to, and I was delighted to hear Mr. Nassikas alluding to it with some favorable reference as well, we are convinced is a theory that not only would be beneficial to consumers but will serve in the short and long run to ease the very oppressed burdens that are now before the utilities and that make it necessary for them to seek repeated applications for rate relief and the continual inability to achieve even their authorized rates of return. I think on this issue, and it is the first one that I have had the experience on and I am delighted with it, the interests of consumers and the interests of those with whom they are traditionally doing battle, the regulated industry, in fact are directly comparable and lead to precisely the same results.

Thank you very much.

Senator JAVITS. Thank you very much, gentlemen. We appreciate your testimony. If there are any other questions that the Chairman wishes to ask of you—he had to go and vote—then, we will put them in writing and ask you to respond in writing.

Mr. BERLIN. Thank you very much.

[The following article was subsequently supplied for the record by Mr. Cicchetti in the context of his testimony:]

PRICING ELECTRICITY: CRITICAL CROSSROADS OR NEW GROUP PARTICIPATION SPORT

(By Charles J. Cicchetti)

There are two objectives of electricity pricing, which must be understood in order to bring order to the current conflict concerning electricity pricing. First, spreading the use of a given fixed generating and transmission system is a laudable goal for *all* concerned. The more kwh's sold for a fixed KW of installed capacity the greater its utilization and in the industry vernacular the system's load factor will improve and short run average costs will fall and therefore prices may be reduced. Second, the costs expended to expand capacity should be avoided unless capacity expansion is expected to reduce the unit costs of providing electricity.

Historically, a pricing system evolved which tended to meet the requirements of both the short run load factor improvement and long run capacity expansion objectives. Typically, electricity (kwh) is sold to small users (e.g., residential customers) in a declining block fashion, which means the more used the less the unit price charged. Larger users are generally confronted with a two part tariff. One component is a declining energy charge similar to the smaller users' tariffs, but usually at lower prices. The second is a capacity charge which depends upon the kilowatts of installed capacity utilized at the time of maximum customer use. This tariff is also usually priced in a declining block fashion.

It is easy to understand how the first objective will tend to be met by this pricing practice. Quantity discounts encourage greater use. For a specific point

in time this will mean greater spreading of fixed costs and therefore tend to improve system load factors. A conflict arises, when expansion in energy consumption occurs at the same time that other customers want to use electricity. This is called the system peak and if energy consumption exceeds the installed capacity's generating capability the system must expand its facilities. In the past technological improvements generally meant that when such system expansions took place the utilities reduced their unit costs. This meant that promoting use in both the short run and long run were not in conflict. Excepting any external costs such as environmental degradation, promotional pricing was, therefore, appropriate.

The fact that some large customers may have improved their individual load factors but worsened the system load factor was therefore not a serious problem under such circumstances. Promotional pricing made sense and was most appropriate and unit costs declined over time.

The conflict that we are currently experiencing comes from two sources. New installed capacity is being brought on line at significantly higher costs per KW than historical costs. Part of this is due to inflation out-running technology. Part of it is rising relative prices such as environmental improvement, higher site values, etc. Unit costs are no longer declining as expansion continues (long run) but in a fixed time (short run) period it is still true that the greater the use, the greater the spreading of fixed costs. Thus the long run and short run objectives of electricity pricing are no longer identical and the current pricing policy has come under criticism. Avoiding incremental capacity costs and at the same time improving system load factor are the dual objectives that currently are in conflict.

A third factor not discussed thus far further complicates the situation. "Economies of scale" is a term with different meanings. Some of the above decreasing cost situations are loosely referred to as examples of "economies of scale". The economist uses the term in a far narrower context. To the economist "economies of scale" refers to a single point in time with fixed factor prices and technology, and it means simply that if a larger plant is built the unit costs will be lower than a smaller plant. In other words the company interested in minimizing costs would be better advised to build one 800 MW plant than two 400 MW plants. There is some evidence that such plant size related scale economies may be leveling out, but this does not mean that a period of "diseconomies of scale" has arrived. Under such a situation larger plants would mean higher unit costs. (Note environmental considerations and forced outage rates could in some circumstances lead one to believe that bigger is more expensive from a social standpoint. The emphasis should be on the word *some*, since the reverse is also possible.)

Some form of "economies of scale" or at least constant long run unit costs are still with us. Yet it is also an undeniable fact that when the long run is extended to more than one time period the costs of additional capacity are rising. It is this latter factor which is in direct conflict with the short run load factor fixed cost spreading objective and "economies of scale", even if significant, are almost meaningless to the electric utility system which has evolved to a size where it currently is expanding its installed capacity with nothing but optimal scale plants.

Current pricing encourages expansion and may lead to a situation, where an individual customer improves his load factor but worsens the system's load factor. Two pricing schemes which concentrate on the avoidance of unnecessary expansion objectives have recently surfaced. Both would estimate long run incremental costs (LRIC), which may deviate from the economist's notion of long run marginal costs (LRMC) in which input prices and technology must be held constant, and use this as a basis for pricing. (See Ralph Turvey, (1968) and (1971) for a discussion of the distinction between LRIC and LRMC and note that technological improvement in the future increases current long run incremental costs.) One would reverse the current declining blocks with rising blocks and therefore bring about large user penalties. The second would simply institute a flat rate based upon long run incremental costs.

Both the inverted block and flat price systems are atempts to discourage expansion. If long run incremental costs are estimated to be greater than historical costs then prices based upon such costs will probably yield revenue, which will exceed the regulatory commissions notion of a fair return. The low use lower priced blocks are the method proposed by proponents of "inverted block

pricing" to deal with this problem. Those, who propose flat tariffs, suggest the adoption of something called the "inverse price elasticity rule". It simply means that long run incremental costs are the basis of pricing and that if excess revenue results prices should be reduced proportionately more for those users, who are least likely to expand their consumption when confronted with a lower price. This means the more price inelastic the user the greater the deviation between the flat price charged and long run incremental costs.

The informational requirements of the rising block pricing system are staggering. The flat price is simpler to implement and represents a smaller deviation from the past. A modification of the flat price to recover customer costs over the energy charge for small levels of use also means that the flat price system might actually have a slight declining block in practice and deviate even less from the current pricing systems.

Both of the above pricing reforms represent an improvement in the avoidance of capacity cost objective over the current pricing practice. However, they are both likely to worsen the fixed cost spreading or load factor improvement objective. Indeed the "inverted block pricing" system has the potential of either worsening the load factor or at least making predictions most difficult, therefore it should almost be rejected out of hand when compared with a flat price coupled with the "inverse price elasticity" rule.

The basic dilemma is that the current pricing system can still be defended when it is demonstrated that short run average costs are reduced through individual load factor improvement. The pricing reforms mentioned above focus on the long run rising costs associated with real and inflation related cost increases, the latter may be handled by replacing regulatory proceedings with automatic cost adjustments, while real cost increases are a less tractable problem.

An alternative price system has long been available but until the present circumstances it was not given serious consideration. It is called "peak load pricing" and directly confronts the short run load factor improvement objective and long run capacity cost expansion avoidance objective. (Note even with declining costs avoiding capacity expansion is important although ambiguous as stated earlier.) It performs such magic by charging a low price based upon variable costs "off peak" and a high price based upon variable and capacity costs "on peak." Price differences of about five to one between the hours of the year designated "peak" and the hours designated "off peak" will encourage system load factor improvement. The problem of individual load factor improvement that worsens system load factor evaporates. Additionally any expansion that requires the expenditures of resources to add additional capacity is discouraged, since high prices are charged for use that takes place at times when the system must confront the prospects of expansion directly.

The biggest bottleneck to such pricing is the cost of metering. In most cases large users already have such meters. Most would probably select on and off peak prices rather than flat or inverted block pricing, both of which would fall heavily on the large industrial user. In France, the United Kingdom and elsewhere peak load pricing is practiced. In the United States the main question is the cost of residential metering. Several reported break-throughs have indicated dramatic cost reductions and would make use of meters already in place. Additionally, savings in meter reading and billing are likely. Under current circumstances peak load pricing is a solution whose time has come in the United States and as Francis X. Welch, the editor of *Public Utilities Fortnightly*, recently exclaimed, "Nowadays for all utilities this would be just like finding money in the street."

If peak load pricing is rejected, regulators, electric utilities and their customers must confront the specific tradeoff implied either (1) by retaining promotional pricing at a time when capacity costs are rising; or (2) discouraging expansion through some form of incremental cost pricing and then find that system load factors may have deteriorated and prices must be raised further. The choice between two mixed good and bad alternatives is always difficult, especially when a pricing system that provides a way out of the dilemma and ties prices more closely to costs is available. As patience wears thin and the semi-annual regulatory combatants despair, the time to make plans that will facilitate the implementation of peak load pricing will be realized by those who can free themselves from the bonds of institutional inertia.

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Record in the proceeding: Application of Madison Gas and Electric Company for Authority to Increase Gas and Electric Rates: 2–U–7423; especially Messers Steltzer, Mahoney, and Cicchetti as well as briefs and reply briefs of Company and Intervenor Capital Community Citizens and Environmental Defense Fund.

Senator JAVITS. Our next witness is Alan J. Roth, commissioner-designate of the New York State Public Service Commission.

Mr. Roth, will you come forward? Mr. Roth, you are very welcome as a representative of the regulatory body on utility rates of my own State and would you make your presentation. I would hope very much that you could summarize your statement in the next 10 minutes, as we are short of time and I do have some questions for you.

Without objection, the whole prepared statement and the tables will be made part of the record and the Chair wishes to congratulate you on being the commissioner-designate yourself.

STATEMENT OF ALAN J. ROTH, COMMISSIONER-DESIGNATE, NEW YORK PUBLIC SERVICE COMMISSION

Mr. ROTH. Thank you very much, Senator. It is a pleasure to appear before you.

Before I move to a summary of my statement, may I take a moment to comment about clocked meters and peak hour pricing, the subject just discussed by the previous witnesses.

The Public Service Commission staff is studying clock meters and their advantages for utility rate structuring. I should note that it costs perhaps $400 for a kilowatt of capacity to serve an average residential user of electricity, roughly speaking, and a meter may cost $40 as estimated by the prior witness, though I do not have with me any evidence that the meter under discussion will work for our purposes and meters may be available that are more costly or perhaps even less costly. But the proper comparison is not between the $40 meter and the $400 worth of capacity because the extra costs of the clock meter will not eliminate the need for the 100 kilowatts for the kilowatts of capacity. It will only reduce the peak, and peaking facilities cost much less than $400 per killowatt. They are in the $200 range and indeed, a clock will not even eliminate the need for peaking facilities. It will reduce but not eliminate the need.

I do not want to squelch the notion that clock meters are appropriate. They may well come to be appropriate, especially for needle peaking utilities; that is, utilities that face sharp rises in peaks during certain seasons or certain hours of the day.

I shall first describe briefly the trend in electric rates in New York during the sixties and early seventies and then discuss more recent developments including the impact of increases in primary

fuel costs on utility rates. Later I shall roughly outline some major near-term inferences in utility costs and utility bills including a very brief discussion of rate design developments which have led to a shift in rates and charges towards larger volume commercial, industrial, and residential customers in recent years.

Revenues per kilowatt hour of electricity in New York State declined slightly during the sixties but began a climb in the early seventies and in more recent years, have climbed very sharply. I should point out, however, that for residential customers, for example, the price of electricity paid in the early 1970's was very little more than paid in the early 1960's, especially viewed on a constant dollar basis. Indeed, when electricity prices for residential users are adjusted for the U.S. Consumer Price Index, at 1967 dollar bases, the price in 1960 shows to be 3.64 cents per kilowatt hour and declined to 1970 at 2.62 cents per kilowatt hour in 1972.

I should also note that residential utility bills increased over the period even though the average unit price for electricity was not much higher in 1972 than 1960. The increases, of course, are attributable to a near doubling in the average consumption per residential customer. That shows at table 5 in my prepared statement. Likewise, bills rose sharply for commercial and industrial customers because, while the average price increased about 28 percent from 1960 to 1972, consumption per customer, that is, industrial and commercial customers, again nearly doubled.

Since the Arab oil embargo last October, electric utility rates in New York have taken a dramatic upward turn. Based on calculations in mid-February this year, rates for downstate utilities dependent primarily on residual fuel oil, increased between 30 and 50 percent for fuel alone. I should tell you that the downstate utilities in New York are 100 percent dependent on imports for their residual fuel oil, or substantially speaking, 100 percent dependent.

At the same time, the three upstate utilities, New York State Electric and Gas, Niagara Mohawk, and Rochester Gas and Electric, did not face the same increase in fuel costs because they depend primarily on coal, nuclear fuels, and hydroelectric power. I should add that Niagara Mohawk does use substantial amounts of fuel oil, though not as much as it uses coal. Nevertheless, even their fuel oil costs did not go up because they take in heavy stocks of fuel in the fall to carry them through the winter at one of their plants because of the freeze on the St. Lawrence River.

Chairman HUMPHREY [presiding]. Table 6 of your prepared statement gives us the percentage of increase due to higher fuel costs. Are these actual percentages that are passed along or is this just to the company? I mean, these are the percentages for fuel, percentage increase for fuel costs for the companies.

Mr. ROTH. No. They are passed along after being experienced by the companies, by the utilities.

Fuel costs did not double. They more than doubled. But the revenue needs associated with the increase in fuel costs raised the utility revenue needs in the aggregate by as much as 50 percent in some cases. Actually, fuel prices quadrupled. Fuel costs were $4 to $5 a

year ago. They are now $15 to $20, at least in the spot market, though on contract some residual fuel oil comes in at lower prices.

I refer you to table 8 of my prepared statement, concerning more recent rate increases in March allowed the Consolidated Edison Co. It shows that other costs as well as fuel costs are rising but fuel costs continue to rise. Even within the 3-month period fuel costs shot up sharply.

Mr. Chairman, I can take your questions now or go on with my statement.

Chairman HUMPHREY. Might I suggest, Senator Javits, I would like to yield to you. You may want to do some questioning here.

Senator JAVITS. Thank you very much, Mr. Chairman.

Chairman HUMPHREY. Your prepared statement, Mr. Roth, will be placed in the record at this point.

[The prepared statement of Mr. Roth follows:]

PREPARED STATEMENT OF ALAN J. ROTH

Mr. Chairman and members of the subcommittee, thank you for your invitation of March 22 to testify at this March 28 hearing of the Subcommittee on Consumer Economics investigating the outlook for gas and electric rates. I shall first describe the trend in electric rates in New York State during the 1960's and early 1970's and then discuss more recent developments, including the impact of increases in primary fuel costs on utility rates. Later I shall roughly outline some major near-term influences on utility costs and utility bills, including a very brief discussion of rate design developments which have led to a shift in rates and charges toward larger volume commercial, industrial and residential customers in recent years.

UTILITY RATE TRENDS IN NEW YORK STATE, 1960–72

Revenues per kilowatthour of electricity in New York State declined slightly during the 1960's and then began to climb in the 1970's. However, as the data in the following table show, the price of electricity in the early 1970 s remained below the price in the early 1960's viewed in constant dollar terms.

TABLE 1.—REVENUE PER KILOWATT-HOUR FOR NEW YORK, TOTAL ELECTRICITY SALES: 1960–72

Year	In constant dollars [1]	In current dollars
1960	$2.27	$2.16
1961	2.27	2.15
1962	2.24	2.12
1963	2.22	2.10
1964	2.19	2.08
1865	2.15	2.07
1966	2.08	2.05
1967	2.10	2.10
1968	2.05	2.11
1969	1.98	2.10
1970	2.04	2.24
1971	2.10	2.39
1972	2.20	2.59

[1] Based on U.S. wholesale price index—total industrial commodities (1967=100).

For residential consumers the decline in the average price for electricity in constant dollar terms was dramatic over the period. Even in current dollar terms, the residential consumer paid very little more in the early 1970's per kilowatthour then he paid in the early 1960's. Again, however, by all measures the price began to climb in the early 1970's after hitting low points in the mid and late 1960's.

TABLE 2.—REVENUE PER KILOWATTHOUR FOR NEW YORK STATE RESIDENTIAL ELECTRICITY SALES

Year	In constant dollars		In current dollars
	CPI [1]	WPI [2]	
1960	3.64	3.39	3.23
1961	3.55	3.35	3.18
1962	3.48	3.33	3.16
1963	3.37	3.26	3.09
1964	3.29	3.21	3.06
1965	3.21	3.15	3.03
1966	3.06	3.02	2.97
1967	3.00	3.00	3.00
1968	2.81	2.86	2.93
1969	2.60	2.70	2.86
1970	2.48	2.62	2.88
1971	2.54	2.69	3.07
1972	2.62	2.79	3.28

[1] U.S. consumer price index, 1967 dollars.
[2] United States all commodities, wholesale price index, 1967 dollars.

The pattern was slightly different for industrial-commercial prices for electricity. In constant dollar terms the price fluctuated much less than the unit charge to residential consumers. In current dollar terms, the price per kilowatthour to commercial industrial customers remain fairly stable during the 1960's and then began rising sharply in the early 1970's.

TABLE 3.—COMMERCIAL-INDUSTRIAL REVENUE PER KILOWATT-HOUR

Year	In constant dollars (wholesale price index [1])	In current dollars
1960	1.98	1.89
1961	2.01	1.90
1962	1.99	1.89
1963	1.96	1.86
1964	1.93	1.84
1965	1.91	1.84
1966	1.83	1.80
1967	1.85	1.85
1968	1.81	1.85
1969	1.72	1.83
1970	1.77	1.95
1971	1.97	22.5
1972	2.06	2.42

[1] Based on U.S. Wholesale Price Index—Total Industrial Commodities.

Cost patterns did not track the changes in price or revenue per kilowatthour, as the data in the following table demonstrates. Fixed costs rose 28 percent, comparing 1972 to 1960, and fuel costs rose a dramatic 53 percent; but other variable costs actually declined over the period. Profits remained a fairly even percentage of sales revenues.

TABLE 4.—COMPONENTS OF ELECTRIC UTILITY REVENUE, CENTS PER KILOWATT-HOUR

[Current dollars]

	1960	1972	Percentage charge
Fixed costs	0.78	1.00	28
Fuel costs	.32	.49	53
Other variable costs	.65	.60	−8
Profit	.41	.50	22
Revenue	2.16	2.59	20

I should note that residential utility bills increased over the period even though the average unit price for electricity was not much higher in 1972 than 1960. The increase is of course attributable to a near doubling in the average consumption per residential customer. Likewise, bills rose sharply for commercial and industrial customers because, while the average price increased about 28 percent from 1960 to 1972, consumption per customer nearly doubled.

TABLE 5.—NUMBER OF CUSTOMERS, ENERGY SALES, AND ENERGY SALES PER CUSTOMER: COMMERCIAL-INDUSTRIAL AND RESIDENTIAL SECTORS, 1960 TO 1972 STATEWIDE

Year	Customers	BWH [1]	Average consumption [2]
A. Commercial and industrial:			
1960	697,614	27,196	38,980
1961	694,386	28,433	40,950
1962	698,968	30,340	43,410
1963	707,615	32,067	45,320
1964	705,466	34,308	48,630
1965	707,893	36,732	51,890
1966	710,672	39,283	55,280
1967	706,002	40,721	57,680
1968	696,784	43,134	61,900
1969	707,007	47,424	67,080
1970	703,470	48,866	69,460
1971	693,378	49,893	71,960
1972	690,231	52,152	75,560
B. Residential:			
1960	4,641,000	12,054	2,598
1961	4,690,000	13,035	2,779
1962	4,758,000	13,538	2,845
1963	4,828,000	14,410	2,985
1964	4,914,000	15,340	3,122
1965	4,987,000	16,424	3,293
1966	5,053,000	17,665	3,496
1967	5,120,000	18,907	3,693
1968	5,184,000	20,635	3,980
1969	5,235,000	22,445	4,288
1970	5,280,000	24,616	4,662
1971	5,313,000	25,777	4,852
1972	5,353,000	26,804	5,008

[1] Millions of kilowatt-hours.
[2] Consumption in kilowatt-hours.

THE RECENT SURGE IN UTILITY RATES

Since the Arab oil embargo, electric utility rates in New York have taken a dramatic upward turn. Based on calculations in mid-February shown in the following table, rates for downstate utilities dependent primarily on residual fuel oil increased between 30 and 50 percent for fuel alone. The three upstate utilities, New York State Electric & Gas, Niagara Mohawk, and Rochester Gas & Electric, use coal, nuclear fuels, and hydro power (mainly purchased from the Power Authority of the State of New York) for the most part; the fuel adjustments for these utilities in recent months have been comparatively negligible.

TABLE 6

Utility	Annual revenue 12 months ending Sept. 30 1973 [1]	Annualized effect of fuel adjustments since Sept. 30, 1973	Extrapolated percent increase to to higher fuel cost since Sept. 30, 1973
Central Hudson	70,368,869	$29,580,000	42.0
Consolidated Edison	$1,309,169,649	453,000,000	34.6
Long Island Lighting Co	295,641,772	95,541,000	32.3
New York State Electric & Gas	176,238,989	3,420,000	1.9
Niagara Mohawk Power Co	436,262,686	14,120,000	3.2
Orange & Rockland	51,127,801	25,169,000	49.2
Rochester Gas & Electric	110,436,073	(905,000)	(.8)

[1] Revenue from consumers subject to fuel adjustment, including such fuel adjustment.

The following tables of typical residential electric bills for downstate New York utilities show that, for the most part, fuel related charges nearly doubled from 1973 to 1974 while other costs rose from zero to $1 for small customers and from zero percent to roughly 5 percent for larger customers. (Orange & Rockland is an exception with both fuel costs and other charges rising dramatically in 1974.) For the three upstate companies fuel costs rose slightly or not at all, and other charges rose from a few cents to a few dollars per residential bill in 1974.

TABLE 7A.—TYPICAL RESIDENTIAL ELECTRIC BILLS BASED ON RATES IN EFFECT IN JANUARY EACH YEAR EXCLUDING SALES TAX, CONSOLIDATED EDISON CO. OF NEW YORK, INC.

	Other charges	Fuel related charges	Total bill
500 kWh:			
1969	$12.21	$2.41	$14.62
1970	12.21	2.41	14.62
1973	16.36	4.78	21.14
1974	17.56	9.42	26.98
5,000 kWh:			
1969	46.01	24.15	70.16
1970	46.02	24.14	70.16
1973	74.21	47.75	121.96
1974	77.05	94.15	171.20

TABLE 7B.—LONG ISLAND LIGHTING CO.

	Other charges	Fuel related charges	Total bill
500 kWh:			
1969	$10.05	$1.64	$11.69
1970	10.04	1.65	11.69
1973	10.82	2.90	13.72
1974	11.99	5.44	17.43
5,000 kWh:			
1969	58.32	16.37	74.69
1970	58.21	16.48	74.69
1973	60.91	28.95	89.86
1974	63.47	54.35	117.82

TABLE 7C.—CENTRAL HUDSON GAS & ELECTRIC CORP.

	Other charges	Fuel-related charges	Total bill
500 kWh:			
1969	$11.07	$1.50	$12.57
1970	11.07	1.50	12.57
1973	12.45	1.69	14.14
1974	12.45	3.04	15.49
5,000 kWh:			
1969	66.32	15.00	81.32
1970	66.32	15.00	81.32
1973	71.30	16.85	88.15
1974	71.30	30.40	101.70

TABLE 7D.—ORANGE AND ROCKLAND UTILITIES, INC.

	Other charges	Fuel related charges	Total bill
500 kWh:			
1969	$9.88	$1.74	$11.62
1970	9.67	1.95	11.62
1973	12.59	3.04	15.63
1974	15.71	6.54	22.25
5,000 kWh:			
1969	54.25	17.38	71.63
1970	52.18	19.45	76.63
1973	58.28	30.40	88.68
1974	85.01	65.35	150.36

Appendix A contains an array of typical residential electric bills for various levels of consumption at rates in effect in the month of January in 1974, 1973, 1970 and 1969.

I should add that since January Consolidated Edison was granted a temporary rate increase, which allowed substantial increases in base charges. Furthermore, Consolidated Edison has experienced recent further increases in fuel charges and has, pursuant to its tariff, passed them along to its customers.

TABLE 8.—CONSOLIDATED EDISON CO. OF NEW YORK, INC. TYPICAL RESIDENTIAL ELECTRIC BILLS IN 1974 EXCLUDING SALES TAXES

	Other charges	Fuel related charges	Total bill
500 kWh:			
Jan. 15	$17.57	$9.41	$26.98
Mar. 15	20.57	13.90	47.47
5,000 kWh:			
Jan. 15	78.71	94.14	172.85
Mar. 15	93.97	139.03	233.00

Other electric utilities have filed applications to increase their base charges.

By notable contrast, typical residential gas bills do not show the dramatic rapid increase experienced on the electric side, as indicated by the array of typical gas bills in Appendix B for the years 1974, 1973, and 1970.

THE SHORT-TERM OUTLOOK

The above data indicate that skyrocketing residual fuel oil costs are the principal cause of the rise in electric rates, although the data on Orange & Rockland and Consolidated Edison indicate that other factors such as the high cost of renewed or expanded debt, the high cost of new construction (especially troubled facilities which experience frequent outages), and a shift in charges toward large volume consumers are also important factors.

Fuel Costs. I cannot predict future residual oil prices. However, thus far the Arab producing countries have held their price line despite the end of the embargo and the increase in crude oil production in Saudi Arabia.

Eastern officials and consumer spokesmen have proposed a Federal allocation of domestic fuels as a means of diluting the price impact of imported oil on East Coast utilities and others. I should note that domestic oil supplies are not sufficient to provide for allocation to the East Coast without shifting foreign oil and related price impacts to other areas of the country. Of course, instead of physical allocation, it would be preferable (from New York's point of view) to require some sort of price averaging on the part of the oil companies so that users in all parts of the country pay a common price for residual oil, rather than the inland areas paying a lower price and the coastal areas as much higher price.

The Federal Energy Office, Consolidated Edison, and others have advocated the conversion of certain oil fired utility facilities to coal firing. Residual oil at $12 to $15 per barrel of $2 to $2.50 per million Btu costs twice as much as coal delivered at $25 to $30 per ton or $1 to $1.25 per million Btu (plus a modest extra charge for the extra cost of handling coal). Of course, other considerations come into play. Coal burning may be environmentally objectionable in some areas. For the immediate present, coal supplies may be adequate to accommodate only a limited number of conversions of utility facilities from oil to coal firing.

For the longer run Administrator Simon has suggested that the cost of crude oil will stabilize under $10. If true, residual oil should be supplied at under $10 too. Whether or not those projections prove out will depend in part on the success of domestic drilling operations, including off-shore drilling, processed coal and shale liquefaction projects and world oil supplies and demand and related political considerations.

Environmental Facilities. Present and prospective requirements for environmental protection will add to utility costs. As already indicated, the environmental preferences for residual oil, especially low sulfur residual oil, raise costs compared to the alternative of using more economical coal. Likewise requirement for facilities such as cooling towers increase the net cost of energy. Cooling towers use from 5 to 20 percent of the energy associated with major power facilities thus adding to the fuel requirements of the facility and adding to the gross generating capacity needed to meet loads for distribution. Stack gas control equipment can add $35 to $50 per kilowatt of capacity to construction costs for facilities that may otherwise cost roughly $300 per kilowatt for construction. I should note that environmental protection can produce economic benefits such as reduced medical costs, reduced crop damage, reduced cleaning, painting and similar maintenance costs; but these economic advantages are disassociated from electric bills, which tend to increase with environmental protection.

Interest Costs. Interest rates on utility bonds can be reduced through a number of government measures. For example, governmental guarantees of payment may reduce interest costs by perhaps a haf a point. On the other hand, the guarantee costs the government something and widespread use of such guarantees could raise interest costs to government itself. Furthermore, such guarantees may dilute management's incentive to be efficient.

The government might also make utility bonds tax free to the lender, thereby reducing interest rates to the utility just as tax exemption reduces interest rates for municipal bonds. Then, however, the tax on others must be increased to meet the government's revenue needs. Nevertheless, the burdens on utility ratepayers are such that it may be desirable to shift costs from utilities and their ratepayers through tax exemption for interest on utility bonds.

Efficiency. In deciding recently to grant Consolidated Edison a further rate increase, the Public Service Commission ordered the utility to pay for an efficiency study of Con Edison's management and operations by an independent qualified consultant to be supervised by the Public Service Commission (not the utility). Such independent evaluations, though costly, are necessary at least in some cases to ensure improvements in utility efficiency and to assure the consuming public that increases in utility rates are kept to the minimum necessary to meet the increased cost of utility services in these inflationary times.

Manufacturers of power equipment and construction enterprises may also need to improve their efficiency. Frequent outages of new facilities have undoubtedly increased the cost of utility service.

Taxes. Taxes on utility property and gross revenues (taxes other than income taxes) accounted for 16.9 percent of electric utility revenue in 1972. These taxes, coming on top of higher fuel costs and other increases in utility costs, heighten the need for rate increases. Some reduction in these tax rates would be helpful to utility consumers.

Rate Design. The Public Service Commission has redesigned utility rates to reduce the discount for volume purchases to the amount justified on a cost

basis and has imposed a summer surcharge (correspondingly reduced winter rates) for summer-peaking utilities in order to recognize that peak consumption adds to the need for costly facilities.

Some have proposed inverted or flattened rate schedules so that large volume consumers pay more per unit or the same per unit as small volume consumers. Except where inversions are cost-justified, they have deleterious effects. For example, they may induce industry and commerce to move to other jurisdictions which do not invert rates. Furthermore, to the extent that inverted or otherwise exaggerated rates tend to suppress consumption, the utility will be left with consumers purchasing underpriced services.

Peak load pricing (under which higher prices are charged at the hours of peak load in order to recognize the high cost of extra facilities needed) may help control consumption and reduce the need for facilities. Unfortunately, peak load pricing requires expensive clock meters appropriate only for large volume consumers. I should add that the New York State Public Service Commission and other regulatory agencies do allocate costs among service classifications partly on the basis of their contribution to peak day loads, a measure which goes part way to the objective of peak load pricing.

I append a summary of the principal pros and cons of the major alternative rate design methodologies.

Consumer conservation. Even while utility rates go up, consumers can help limit the increase or actually reduce bills by using less energy. The electric utilities in New York estimate that consumer conservation has reduced loads from 5 to 10 percent this winter. With the onset of the summer air-conditioning loads, consumers who experience their highest bills in summer will benefit substantially by consumer conservation through warmer air-conditioning settings and other measures. For the longer run, to cite one example, buildings can be designed and constructed to reduce by half the amount of energy needed for lighting, space conditioning, and other purposes.

Consumers must be troubled to hear utility regulators encourage conservation and then allow "conservation adjustment" rate increases. Conservation rate adjustments appear to be necessary in some cases and do not eliminate the advantage to consumers of energy conservation. The matter can be explained through the following example. Suppose a utility incurs $2 billion in fixed costs (including capital costs) and $2 billion in variable costs (including fuel costs) with sales of 100 billion kilowatthours annually. The fixed costs will amount to 2 cents per kilowatthour and variable costs 2 cents per kilowatthour for a total cost to the utility and price to the consumer of 4 cents per kilowatthour. A consumer who uses one thousand kilowatthours per month will incur a bill of $40.

Now suppose that energy conservation reduced utility sales 10 percent to 90 billion kilowatthours per year. Fixed costs will remain at $2 billion but will rise on a unit basis to 2.2 cents per kilowatthour ($2 billion divided by 90 billion kWh). Variable costs decline 10 percent with usage and would amount to $1.8 billion, still 2 cents per kilowatthour on a unit basis. Thus the unit rate rises to 4.22 cents. However, the consumer will have reduced his monthly consumption 10 percent from 1000 to 900 kilowatthours for a total bill of $37.98 (900 times 4.22 cents).

Unfortunately, rising fuel costs may raise the consumer's bill whether he conserves energy or not; but conservation as such will limit or reduce his bill despite allowed conservation adjustments in unit rates.

APPENDIX A

TYPICAL NET MONTHLY RESIDENTIAL ELECTRIC BILLS,[1] JAN. 15, 1974, BASE USE: LIGHTING, SMALL APPLIANCES, AND REFRIGERATION

Locality	Initial bill		Base use only	Base use and cooking	Base use, cooking, water heating	Base use, cooking, water heating, air conditioning		Base use, cooking, water heating, space heating[2]		Utility serving locality
	Amount	Kilowatt-hour included	175 kWh	300 kWh	700 kWh	Amount	Kilowatt-hour including	Amount	Kilowatt-hour including	
3-bedroom home:										
Albany	$1.70	15	$7.30	$9.89	$17.06	$24.24	1,100	$85.22	4,500	Niagara Mohawk Power.
Binghamton[3]	1.75	12	7.27	10.41	16.83	26.23	1,100	68.58	4,100	New York State Electric & Gas.
Buffalo	1.70	15	7.30	9.89	17.06	22.44	1,000	94.19	5,000	Niagara Mohawk Power.
Huntington	1.84	12	7.95	11.97	21.93	36.02	1,200	100.06	4,200	Long Island Lighting Co.
Massena	1.70	15	7.30	9.89	17.06	19.75	850	81.64	4,300	Niagara Mohawk Power.
Middletown	2.37	13	10.07	15.02	28.79	42.15	1,100	135.12	4,400	Orange & Rockland.
Rochester	1.57	12	7.56	10.99	19.25	25.01	1,000	86.22	4,500	Rochester Gas & Electric.
Syracuse	1.70	15	7.30	9.89	17.06	24.24	1,100	87.02	4,600	Niagara Mohawk Power.
Utica	1.70	15	7.30	9.89	17.06	24.24	1,100	87.02	4,600	Do.
Yonkers	2.88	10	12.05	19.00	33.61	53.62	1,100	153.39	4,400	Consolidated Edison.
			150 kWh	250 kWh	600 kWh					
2-bedroom home:										
New York City (except Manhattan)	2.92	10	10.80	16.43	30.69	49.12	1,000	125.80	3,500	Do.
Queens	1.89	12	7.32	10.61	20.14	30.60	1,000	86.49	3,500	Long Island Lighting Co.
Poughkeepsie	1.52	12	7.83	10.15	17.63	26.18	1,000	80.93	3,900	Central Hudson.
			125 kWh	170 kWh	450 kWh					
Apartment:[4] NYC—Manhattan	2.92	10	9.39	11.93	25.65	37.86	800	86.37	2,300	Consolidated Edison.

[1] Bills shown are for use in typical single family dwellings in indicated localities.
[2] Assumed highest monthly use during season, adjusted for weather conditions.
[3] 700 kWh includes 350 kWh off-peak; over 700 kWh includes 35 percent off-peak.
[4] Individually metered.

COMPARISON OF NET MONTHLY BILLS, ELECTRIC—RESIDENTIAL—AT RATES IN EFFECT ON JAN. 15, 1974

Company	0 kWh	100 kWh	250 kWh	500 kWh	750 kWh	1,000 kWh	1,500 kWh	5,000 kWh
Central Hudson	$1.52	$6.00	$10.15	$15.49	$20.84	$26.18	$36.87	$101.70
Consolidated Edison:								
New York City—6.1 percent tax	2.77	7.98	16.43	27.33	35.73	49.12	75.05	175.08
West—4.75 percent	2.73	7.88	16.22	26.98	35.27	48.50	74.09	172.85
West—3.75 percent	2.71	7.81	16.07	26.72	34.94	48.04	73.39	171.20
Fishers Island:								
Annual	1.25	13.39	16.45	24.43	32.41	40.39	67.59	168.02
Seasonal	1.25	15.79	21.45	29.43	37.41	45.39	85.09	173.02
Lawrence Park	2.15	7.19	14.29	24.46	34.64	44.81	65.16	207.61
Long Island Lighting Co.:								
New York City—2.35 percent tax:								
Summer	1.81	5.68	10.61	17.84	23.60	30.60	46.27	-------
Winter	1.81	5.68	10.61	17.84	23.60	30.20	44.54	120.59
1 percent tax:								
Summer	1.79	5.60	10.47	17.60	23.29	30.20	45.66	-------
Winter	1.79	5.60	10.47	17.60	23.29	29.80	43.95	119.00
No tax:								
Summer	1.77	5.55	10.36	17.43	23.06	29.90	45.20	-------
Winter	1.77	5.55	10.36	17.43	23.06	29.51	43.51	117.82
New York State Electric & Gas:								
Main territory	1.75	5.38	9.15	12.99	18.09	24.20	34.33	81.71
C. & R. southeast area	1.75	5.44	9.30	13.29	18.52	24.79	35.20	84.62
Niagara Mohawk Power	1.70	4.91	8.99	13.48	17.96	22.44	31.41	94.19
Orange & Rockland	2.25	7.02	13.04	22.25	30.42	38.60	56.39	150.36
Peach Lake:								
Annual	1.20	6.48	13.08	23.08	30.58	38.08	53.08	158.08
Seasonal	3.00	10.00	25.00	50.00	75.00	100.00	150.00	500.00
Penn Electric:								
Nonheating	1.20	5.52	9.52	13.98	18.17	23.93	33.83	-------
Space and water heating	5.25	5.52	9.51	13.98	18.14	23.30	30.63	81.90
Rochester Gas & Electric:								
4.75 percent tax	1.57	5.51	9.62	15.12	20.28	25.01	34.24	94.77
3.75 percent tax	1.56	5.46	9.53	14.97	20.09	24.77	33.91	93.87
Sherrill-Ken	1.50	4.45	8.20	12.95	17.50	21.25	28.75	81.25
Brocton	.80	2.95	5.70	9.45	13.20	16.95	24.45	76.95
Freeport	1.30	5.37	11.13	18.89	24.65	30.40	45.42	122.54
Green Island	.75	3.26	6.76	11.76	16.76	21.76	31.76	101.76
Greene	1.00	3.84	6.63	9.83	13.63	18.13	25.90	69.08
Greenport:								
Nonheating	1.50	5.54	10.50	16.86	23.96	31.56	45.72	-------
Space and water heating	3.75	6.04	10.50	17.61	23.51	28.61	37.82	119.26
Holley	.81	3.04	5.51	8.89	12.26	15.64	22.39	69.64
Jamestown	1.50	3.81	6.75	11.17	15.60	20.02	28.87	90.82
Richmondville	1.25	4.39	7.71	11.59	15.46	19.34	27.09	81.34
Rockville Center	.75	4.52	8.83	15.03	21.13	27.23	39.43	116.03

TYPICAL NET MONTHLY RESIDENTIAL ELECTRIC BILLS,[1] JAN. 15, 1973, BASE USE: LIGHTING, SMALL APPLIANCES, AND REFRIGERATION

Locality	Initial bill		Base use only	Base use and cooking	Base use, cooking, water heating	Base use, cooking, water heating, air-conditioning		Base use, cooking, water heating, space heating[2]		Utility serving locality
	Amount	Kilowatt-hour included	175 kWh	300 kWh	700 kWh	Amount	Kilowatt-hour included	Amount	Kilowatt-hour included	
Three-bedroom home:										
Albany	$1.70	15	$7.26	$9.83	$16.92	$24.01	1,100	$84.30	4,500	Niagara Mohawk Power.
Binghamton[3]	1.75	12	7.27	10.41	16.84	26.24	1,100	68.61	4,100	New York State Electric & Gas.
Buffalo	1.70	15	7.26	9.83	16.92	22.24	1,100	93.17	5,000	Niagara Mohawk Power.
Huntington	1.32	12	6.76	10.05	17.10	27.15	1,200	76.32	4,200	Long Island Lighting Co.
Massena	1.70	15	7.26	9.83	16.92	19.58	850	80.75	4,300	Niagara Mohawk Power.
Middletown	1.77	13	7.86	11.19	19.17	26.85	1,100	79.86	4,400	Orange & Rockland.
Rochester	1.57	12	7.58	11.01	19.30	25.08	1,000	86.56	4,500	Rochester Gas & Electric.
Syracuse	1.70	15	7.26	9.83	16.92	24.01	1,100	86.07	4,600	Niagara Mohawk Power.
Utica	1.70	15	7.26	9.83	16.92	24.01	1,100	86.07	4,600	Do.
Yonkers	2.16	10	10.29	15.42	26.07	40.15	1,100	108.48	4,400	Consolidated Edison.
			150 kHw	250 kHw	600 kHw					
2-bedroom home:										
New York City (except Manhattan)	2.19	10	9.29	13.69	23.90	36.83	1,000	89.39	3,500	Do.
Queens	1.32	12	6.10	8.73	15.41	22.71	1,000	64.48	3,500	Long Island Lighting Co.
Poughkeepsie	1.52	12	7.42	9.47	16.00	23.47	1,000	70.36	3,900	Central Hudson.
			125 kHw	170 kHw	450 kHw					
Apartment:[4] NYC—Manhattan	2.19	10	8.18	10.19	20.16	29.17	800	62.07	2,300	Consolidated Edison.

[1] Bills shown are for use in typical single family dwellings in indicated localities.
[2] Assumed highest monthly use during season adjusted for weather conditions.
[3] 700 kWh includes 350 kWh off-peak; over 700 kWh includes 35 percent off-peak.
[4] Individually metered.

COMPARISON OF NET MONTHLY BILLS, ELECTRIC—RESIDENTIAL—AT RATES IN EFFECT ON JAN. 15, 1973

Company	0 kWh	100 kWh	250 kWh	500 kWh	750 kWh	1,000 kWh	1,500 kWh	5,000 kWh
Central Hudson	$1.52	$5.73	$9.47	$14.14	$18.80	$23.47	$32.81	$88.15
Consolidated Edison:								
New York City—6.1 percent tax	2.13	6.95	13.70	21.41	27.66	36.84	55.99	123.53
West—4.75 percent	2.11	6.87	13.52	21.14	27.31	36.37	55.28	121.96
West—3.75 percent	2.09	6.80	13.40	20.94	27.05	36.02	54.75	120.80
Fishers Island:								
Annual	1.25	13.20	15.98	23.48	30.98	38.48	64.73	158.48
Seasonal	1.25	15.60	20.98	28.48	35.98	43.48	82.23	163.48
Lawrence Park	2.15	6.49	12.54	20.96	29.39	37.81	54.66	172.61
Long Island Lighting Co.:								
Main territory	1.29	4.79	8.73	13.72	17.95	22.71	33.82	89.86
East Hampton	1.29	6.14	12.40	21.23	29.31	37.92	56.73	166.67
New York State Electric & Gas:								
Main territory	1.75	5.38	9.15	13.00	18.09	24.21	34.34	81.76
C. & R.—Southeast area	1.75	5.44	9.30	13.29	18.53	24.79	35.21	84.66
Niagara Mohawk Power	1.70	4.89	8.94	13.37	17.81	22.24	31.11	93.17
Orange & Rockland	1.75	5.64	9.86	15.63	20.06	24.88	34.73	88.68
Peach Lake:								
Annual	1.20	6.48	13.08	23.08	30.58	38.08	53.08	158.08
Seasonal	3.00	10.00	25.00	50.00	75.00	100.00	150.00	500.00
Penn Electric	1.00	4.43	7.68	9.98	13.85	17.73	25.28	65.50
Rochester Gas & Electric:								
4.75 percent tax	1.57	5.52	9.64	15.16	20.34	25.08	34.35	95.15
3.75 percent tax	1.56	5.47	9.54	15.01	20.15	24.85	34.03	94.24
Sherrill-Ken	1.50	4.45	8.20	12.95	17.50	21.25	28.75	81.25
Brocton	.80	2.95	5.70	9.45	13.20	16.95	24.45	76.98
Freeport	1.30	4.82	9.74	16.11	20.48	24.85	37.08	94.75
Green Island	.75	3.26	6.76	11.76	16.76	21.76	31.76	101.76
Greene	1.00	3.84	6.63	9.83	13.63	18.13	25.90	69.05
Greenport:								
Nonheating	1.50	5.00	9.15	14.15	19.90	26.15	37.60	100.60
Space and water heating	3.75	5.50	9.15	14.90	19.45	23.20	29.70	92.20
Holley	.81	3.04	5.52	8.89	12.26	15.64	22.39	69.64
Jamestown	1.50	3.77	6.65	10.97	15.30	19.62	28.27	88.82
Richmondville	1.25	4.39	7.71	11.59	15.46	19.34	27.09	81.34
Rockville Centre	.68	4.00	7.53	12.43	17.23	22.03	31.63	90.03

COMPARISON OF NET MONTHLY BILLS, ELECTRIC—RESIDENTIAL—JAN. 1, 1970

Company	0 kWh	50 kWh	100 kWh	250 kWh	500 kWh	750 kWh	1,000 kWh
Central Hudson:							
1a Main Territory	$1.25	$3.05	$5.01	$8.20	$12.57	$16.95	$21.32
1b Ellenville	.85	2.80	4.55	8.00	11.50	15.25	19.00
Consolicated Edison:							
2a New York City	1.72	3.67	5.70	10.08	14.82	18.68	24.27
2b Westchester	1.70	3.62	5.62	9.95	14.62	18.43	23.95
Fishers Island:							
3a Annual	1.25	6.95	12.95	15.35	22.23	29.10	35.98
3b Seasonal	1.25	7.85	15.35	20.35	27.23	34.10	40.98
Lawrence Park	.85	2.85	5.10	8.60	13.60	18.60	23.60
Long Island Lighting Co.:							
5a Main territory	1.05	2.67	4.38	7.79	11.69	15.19	18.99
5b East Hampton	1.05	3.24	5.70	11.36	19.01	26.26	33.81
5c Fire Island west	2.10	3.02	5.32	9.52	14.32	19.07	23.82
New York State Electric & Gas:							
6a Central-Niagara	1.10	2.75	4.47	7.85	11.28	15.81	21.44
6b Central-St. Lawrence	1.10	2.73	4.43	7.74	11.07	15.49	21.01
6c Col.-southeast area	1.10	2.77	4.52	7.97	11.52	16.17	21.92
6d Western-Niagara	1.10	2.37	3.49	6.87	10.30	14.53	19.41
Niagara Mohawk Power	1.50	2.79	4.26	7.68	11.57	15.46	19.36
Orange & Rockland	1.25	3.10	4.80	8.19	11.62	15.37	19.12
Peach:							
9a Annual	1.20	3.48	6.48	13.08	23.08	30.58	38.08
9b Seasonal	3.00	5.00	10.00	25.00	50.00	75.00	100.00
Penn. Electric	1.00	2.68	4.43	7.68	9.98	13.85	17.73
Rochester Gas & Electric	1.00	2.80	4.52	7.90	12.33	16.45	20.18
Sherrill-Ken	.83	2.50	3.75	6.33	10.08	13.83	17.58

COMPARISON OF NET MONTHLY BILLS, ELECTRIC—RESIDENTIAL—JAN. 1, 1970

Municipality	0 kWh	50 kWh	100 kWh	250 kWh	500 kWh	750 kWh	1,000 kWh
Brocton	$0.80	$1.70	$2.95	$5.50	$ 9.45	$13.20	$16.95
Freeport	1.00	2.50	4.10	7.80	13.05	18.30	23.30
Green Island	.75	1.91	3.26	6.76	11.76	16.76	21.76
Greene	1.00	2.40	3.84	6.63	9.83	13.63	18.13
Greenport	1.50	3.25	5.00	9.15	14.15	19.90	26.15
Holley	.81	1.92	3.04	5.52	8.89	12.26	15.64
Jamestown	.85	2.05	3.18	5.43	9.18	12.93	16.68
Richmondville	1.25	2.90	4.39	7.71	11.59	15.46	19.34
Rockville Centre	.60	2.03	3.73	6.98	11.33	15.58	19.83

TYPICAL ELECTRIC BILLS, JAN. 1, 1969, FEDERAL POWER COMMISSION, NEW YORK STATE—RESIDENTIAL

Company	Minimum bill		100 kWh	250 kWh	500 kWh	750 kWh	1,000 kWh
	Amount	Kilowatt-hours included					
Central Hudson:							
Main territory	$1.25	14	$5.01	$8.20	$12.57	$16.95	$21.32
Ellenville	.85	11	4.55	8.00	11.50	15.25	19.00
Consolidated Edison:							
New York City	1.72	10	5.70	10.09	14.82	18.69	24.26
Westchester	1.70	10	5.62	9.96	14.62	18.44	23.94
Lawrence Park	.85	10	5.10	8.60	13.60	18.60	23.60
Long Island Lighting	1.05	12	4.38	7.79	11.69	15.19	18.99
N.Y. State Electric & Gas:							
Central-Niagara	1.09	12	4.47	7.84	11.26	15.78	21.40
Central-St. Lawrence	1.10	12	4.49	7.89	11.36	15.94	21.61
Col.-southeast area	1.10	12	4.52	7.97	11.52	16.17	21.92
Western Niagara	1.09	12	3.49	6.86	10.28	14.50	19.37
Niagara Mohawk:							
Eastern-Central	1.25	15	3.83	7.10	10.87	14.65	18.43
Western	1.25	15	3.83	6.80	10.57	14.35	18.13
Orange & Rockland	1.25	13	4.80	8.19	11.62	15.37	19.12
Pennsylvania Electric	1.00	15	4.43	7.68	9.98	13.85	17.73
Rochester Gas & Electric	1.00	12	4.57	8.02	12.57	16.82	20.67
Sherrill-Kenwood	.83	12	3.75	6.33	10.08	13.83	17.58
Municipality:							
Freeport	1.00	10	4.10	7.80	13.05	18.30	23.30
Green Island	.75	17	3.26	6.76	11.76	16.76	21.76
Greenport	.90	12	5.08	9.63	14.63	21.00	28.27
Jamestown	.85	20	3.18	5.43	9.18	12.93	16.68
Rockville Centre	.68	14	3.78	6.98	11.33	15.58	19.83

APPENDIX B

TYPICAL NET MONTHLY RESIDENTIAL GAS BILLS FOR CERTAIN LOCALITIES,[1] JAN. 15, 1974

Locality	Initial bill		Cooking only, 10 C ft[2]	Cooking and water heating, 30 C ft[3]	Cooking, water heating and space heating[2]		Utility serving locality
	Amount	100 ft[2] included			Amount	100 ft[2] included	
3-bedroom home:							
Albany	$1.79	3	$3.81	$8.36	$50.01	350	Niagara Mohawk Power.
Binghamton	1.54	2	3.48	6.56	39.87	300	Columbia.
Buffalo	2.33	4	3.11	5.72	53.31	400	Iroquois.
Huntington	2.12	2	5.28	10.66	69.57	350	Long Island Lighting Co.
Lockport	1.84	3	3.57	7.74	58.72	400	New York State Electric & Gas.
Middletown	1.99	3	4.30	7.72	52.84	350	Orange & Rockland.
Rochester	1.35	3	3.22	7.84	59.30	350	Rochester Gas & Electric.
Syracuse	1.79	3	3.81	8.36	50.01	350	Niagara Mohawk Power.
Utica	1.79	3	3.81	8.36	50.01	350	Do.
Watertown	1.79	3	3.81	8.36	50.01	350	Do.
Yonkers	2.44	3	4.36	9.73	61.62	350	Consolidated Edison.
			7 C ft[2]	25 C ft[3]			
2-bedroom home:							
New York City:							
Brooklyn	2.20	3	3.40	8.29	55.81	300	Brooklyn Union.
Bronx	2.47	3	3.58	8.50	54.89	300	Consolidated Edison.
Manhattan[3]	2.47	3	3.58				Do.
Richmond[4]	2.27	3	3.52	8.56	57.66	300	Brooklyn Union.
Queens	2.20	3	3.40	8.29	55.81	300	Do.
Do	2.47	3	3.58	8.50	54.89	300	Consolidated Edison.
Do	2.17	2	4.36	9.66	62.18	300	Long Island Lighting Co.
Poughkeepsie	2.05	2	4.05	9.61	53.51	300	Central Hudson.

[1] Bills shown are for use in typical single family dwellings in indicated localities.
[2] Use dependent on weather conditions in locality; assumed peak heating month.
[3] Individually metered apartment.
[4] 5th Ward only; balance of Richmond same as Brooklyn.

COMPARISON OF NET MONTHLY BILLS, ALL UTILITIES, GAS—RESIDENTIAL—JAN. 15, 1974

Company	0	10 C ft³	20 C ft³	30 C ft³	50 C ft³	150 C ft³	300 C ft³	400 C ft³
Brooklyn Union:								
Main territory	$2.17	$4.31	$7.05	$9.53	$13.51	$30.65	$55.81	$71.85
Richmond (5th ward)	2.24	4.45	7.28	9.84	13.96	31.67	57.66	74.23
Central Hudson	2.05	5.24	8.52	10.70	14.75	30.25	53.51	69.01
Columbia:								
Bing-Walton	1.50	3.48	5.02	6.56	9.64	21.73	39.87	51.96
Olean-Wat Glen	1.50	3.05	4.29	5.52	7.99	19.68	37.22	48.91
Consolidated Edison								
New York City—6.1 percent	2.45	4.41	7.14	9.85	14.01	32.33	54.89	69.94
West—4.75 percent	2.42	4.36	7.05	9.73	13.83	31.92	54.20	69.05
West—3.75 percent	2.40	4.32	6.98	9.64	13.70	31.62	53.68	68.39
Corning	1.60	1.88	2.98	4.08	6.23	16.72	32.46	42.96
Fillmore	2.60	2.86	4.32	5.78	8.52	21.22	38.77	50.47
Granby	1.40	3.91	6.62	9.03	13.85	37.95	74.10	98.10
Iroquois	2.23	3.11	4.42	5.72	8.32	21.34	40.68	53.31
Long Island Lighting Co.:								
New York City—2.35 percent tax	2.12	5.40	8.27	10.91	15.75	34.84	62.18	80.24
1.00 percent tax	2.09	5.33	8.16	10.76	15.54	34.38	61.36	79.18
No tax	2.07	5.28	8.08	10.66	15.39	34.04	60.75	78.40
New York State Electric & Gas:								
Elm area-Dans	1.75	2.99	4.54	5.98	8.86	20.76	38.60	50.49
Elm area-Elm	1.75	2.95	4.46	5.85	8.65	20.12	37.33	48.81
Goshen	1.75	4.20	6.77	8.50	11.97	23.98	41.98	53.99
Ithaca	1.75	3.58	5.78	7.67	11.44	24.00	42.84	55.40
Lockport	1.75	3.57	5.79	7.74	11.64	25.09	45.27	58.72
Mech	1.75	3.96	6.50	8.51	12.53	25.86	45.85	59.18
On and Nor	1.75	4.19	6.87	8.85	12.81	26.82	47.84	61.84
Owego	1.75	3.49	5.57	7.34	10.89	22.42	39.72	51.25
Niagara Mohawk Power	1.75	3.81	6.28	8.36	11.75	25.11	43.78	56.23
Orange & Rockland	1.95	4.30	6.10	7.72	10.65	25.27	46.03	59.65
Pavilion	1.80	3.17	5.10	6.66	9.07	21.10	39.14	51.17
Penn Gas:								
General	2.02	2.25	3.39	4.52	6.63	17.18	33.00	43.55
Space heating	3.47	3.70	4.84	5.97	8.08	18.63	34.45	45.00
Penn & So:								
Nonheating	$1.44	$3.81	$6.51	$8.63	$11.95	$25.53	$44.82	$56.60
Space heating	3.32	3.39	5.12	6.84	9.20	19.99	36.01	46.69
Reserve	1.30	1.30	1.80	2.70	4.50	13.50	27.00	36.00
Rochester Gas & Electric:								
All purp Mix	1.25	2.03	3.42	4.81	7.59	19.14	33.40	42.01
All purp-Nat	1.25	3.22	5.89	8.40	12.94	32.31	56.66	71.95
Wt ht-Mix	1.76	1.93	3.38	4.57	6.96	17.27	30.34	39.06
Wt ht-Nat	1.76	3.27	5.56	7.84	12.42	29.27	54.38	71.12
Sp ht-Mix	1.76	1.93	3.33	4.50	6.84	15.55	28.11	36.48
Sp ht-Nat	1.76	3.22	5.47	7.73	11.01	27.11	51.25	67.35
St. Lawrence	1.50	2.71	4.62	6.43	9.60	23.21	43.62	57.23
Sulburn	2.97	13.36	24.71	34.98	54.84	137.20	256.45	335.95
Syr Sub	1.54	31.7	5.11	6.76	9.53	22.40	41.71	54.58
Valley	2.00	3.17	6.28	8.65	12.99	32.69	62.24	81.94
Muncipality:								
Bath	1.30	2.65	4.10	5.26	7.57	17.94	32.28	41.85
Woodhull	1.78	1.78	2.77	3.76	5.74	15.39	28.99	37.89

TYPICAL NET MONTHLY RESIDENTIAL GAS BILLS FOR CERTAIN LOCALITIES,[1] JAN. 15, 1973

Locality	Initial bill		Cooking only	Cooking and water heating	Cooking, water heating and space heating[2]		Utility serving locality
	Amount	100 ft³ included	10 C ft³	30 C ft³	Amount	C ft³ included	
3-bedroom home:							
Albany	$1.66	3	$3.57	$7.87	$46.68	350	Niagara Mohawk Power.
Binghamton	1.54	2	3.48	6.54	45.57	350	Columbia.
Buffalo	2.24	4	2.91	5.12	45.42	400	Iroquois.
Huntington	2.04	2	5.05	10.08	63.37	350	Long Island Lighting Co.
Lockport	1.77	3	3.33	6.99	48.79	400	New York State Electric & Gas.
Middletown	1.79	3	3.79	6.53	41.60	350	Orange & Rockland.
Rochester	1.32	3	3.11	7.52	55.56	350	Rochester Gas & Electric.
Syracuse	1.66	3	3.57	7.87	46.68	350	Niagara Mohawk Power.
Utica	1.66	3	3.57	7.87	46.68	350	Do.
Watertown	1.66	3	3.57	7.87	52.47	400	Do.
Yonkers	2.30	3	4.22	8.97	55.66	350	Consolidated Edison.
			7 C ft³	25 C ft³			
2-bedroom home:							
New York City:							
Brooklyn	1.65	3	2.81	7.34	49.27	300	Brooklyn Union.
Bronx	2.33	3	3.44	7.89	49.61	300	Consolidated Edison.
Manhattan[3]	2.33	3	3.44				Do.
Richmond[4]	1.70	3	2.90	7.57	50.83	300	Brooklyn Union.
Queens	1.65	3	2.81	7.34	49.27	300	Do.
Do	2.33	3	3.44	7.89	49.61	300	Consolidated Edison.
Do	2.04	2	4.09	8.95	55.43	300	Long Island Lighting Co.
Poughkeepsie	2.06	2	4.06	9.66	54.00	300	Central Hudson.

[1] Bills shown are for use in typical single family dwellings.
[2] Use dependent on weather conditions in locality.
[3] Individually metered apartment.
[4] 5th ward only; balance of Richmond same as Brooklyn.

COMPARISON OF NET MONTHLY BILLS, ALL UTILITIES, GAS—RESIDENTIAL,—JAN. 15, 1973

Company	0	10 C ft³	20 C ft³	30 C ft³	50 C ft	150 C ft³	300 C ft³	500 C ft³
Brooklyn Union:								
Main territory	$1.58	$3.68	$6.24	$8.44	$11.97	$27.11	$49.27	$77.35
Richmond (5th)	1.63	3.80	6.44	8.71	12.35	27.97	50.84	79.81
Central Hudson	2.02	5.26	8.56	10.75	14.83	30.50	54.00	85.33
Columbia:								
Bing-Walton	1.50	3.48	5.01	6.54	9.60	21.59	39.57	63.55
Olean-Watkins Glen	1.50	3.04	4.27	5.49	7.94	19.53	36.92	60.10
Consolidated Edison								
New York City	2.32	4.27	6.71	9.07	12.81	29.31	49.60	76.67
West	2.29	4.22	6.62	8.95	12.65	28.94	48.97	75.70
West	2.27	4.18	6.56	8.87	12.53	28.66	48.51	74.97
Corning	1.59	1.75	2.71	3.68	5.56	14.72	28.45	46.77
Fillmore	2.60	2.81	4.22	5.63	8.27	20.47	37.27	59.67
Granby	1.40	3.50	5.80	7.80	11.80	31.80	61.80	101.80
Iroquois:								
Main territory	2.21	2.91	4.01	5.12	7.33	18.38	34.76	56.08
Production territory	2.07	2.82	3.94	5.06	7.30	18.50	35.12	56.80
Long Island Lighting Co.	2.00	5.05	7.68	10.08	14.46	31.36	55.43	87.21
New York State Electric & Gas:								
Elm area-Dans	1.75	2.89	4.33	5.67	8.34	19.18	35.45	57.13
Elm area-Elm	1.75	2.82	4.19	5.46	7.99	18.15	33.38	53.69
Goshen	1.75	4.11	6.58	8.22	11.50	22.55	39.13	61.24
Ithaca	1.75	3.48	5.57	7.35	10.91	22.43	39.70	62.73
Lockport	1.75	3.33	5.29	6.99	10.40	21.37	37.82	59.75
Mech	1.75	3.89	6.34	8.28	12.14	24.71	43.56	68.70
On & Nor	1.75	4.08	6.66	8.54	12.29	25.25	44.69	70.60
Owego	1.75	3.33	5.25	6.87	10.09	20.03	34.93	54.80
Niagara Mohawk Power	1.60	3.57	5.91	7.87	11.07	23.53	40.89	64.05
Orange & Rockland	1.75	3.79	5.24	6.53	8.83	20.31	36.36	57.32
Pavilion	1.80	3.06	4.86	6.31	8.49	19.36	35.66	57.40
Penn Gas:								
General	2.00	2.10	3.09	4.08	5.91	15.05	28.76	47.04
Space heating	3.44	3.54	4.53	5.52	7.35	16.49	30.20	48.48
Penn & So:								
Nonheating	1.44	3.81	6.52	8.64	11.96	25.56	44.88	68.48
Spaceheating	3.32	3.39	5.12	6.85	9.21	20.02	36.07	57.47
Reserve	1.30	1.30	1.80	2.70	4.50	13.50	27.00	45.00
Rochester Gas & Electric:								
All purp-mix	1.25	1.98	3.31	4.64	7.31	18.32	31.74	47.84
All purp-nat	1.25	3.11	5.67	8.08	12.40	30.70	53.45	81.90
Wt ht-mix	1.76	1.88	3.27	4.41	6.68	16.44	28.68	45.00
Wt ht-nat	1.76	3.17	5.34	7.52	11.88	27.67	51.17	82.50
Sp ht-mix	1.76	1.88	3.22	4.33	6.56	14.72	26.45	42.09
Sp ht-nat	1.76	3.11	5.26	7.41	10.48	25.50	48.04	78.10
St. Lawrence	1.50	2.72	4.65	6.47	9.67	23.40	44.00	71.46
Sulburn	2.25	9.63	17.83	24.95	38.51	88.63	159.13	253.13
Syr Sub	1.54	3.02	4.82	6.32	8.80	20.20	37.51	60.11
Valley	1.65	3.13	5.36	7.39	11.05	27.37	51.85	84.49
Municipality:								
Bath	1.30	2.63	4.08	5.22	7.51	17.76	31.93	50.83
Woodhull	1.73	1.73	2.66	3.60	5.47	14.57	27.34	44.04

COMPARISON OF NET MONTHLY BILLS, ALL UTILITIES, GAS—RESIDENTIAL—JAN. 1, 1970

Company	0	10 C ft³	20 C ft³	30 C ft³	50 C ft³	150 C ft³	300 C ft³	500 C ft³
Brooklyn Union	$1.35	$3.13	$5.30	$7.15	$10.05	$22.03	$39.50	$61.46
Central Hudson:								
Winter	1.25	4.17	7.10	9.31	13.01	26.51	46.76	73.76
Summer	1.25	4.17	7.10	9.15	12.05	21.55	35.80	54.80
Columbia:								
Bing-Walton	1.10	2.70	3.94	5.18	7.67	16.55	29.87	47.63
Olean-Watson Glen	1.10	2.10	1.01	3.92	5.73	13.70	25.66	41.60
Consolidated Edison:								
New York City	1.50	3.28	5.49	7.62	10.68	23.10	40.05	58.65
Westchester	1.48	3.24	5.42	7.52	10.54	22.79	39.51	57.85
Corning	1.51	1.55	2.33	3.10	4.59	11.82	22.67	37.13
Fillmore	2.45	2.53	3.66	4.79	6.87	16.27	28.87	45.67
Granby	1.25	3.14	5.24	7.04	10.64	28.64	55.64	91.64
Iroquois	1.79	1.97	2.82	3.68	5.39	13.95	26.59	42.91
Long Island Light Co	1.50	4.44	6.89	9.05	12.94	27.80	48.84	76.58
New York State Electric & Gas:								
Dans-Nunda	1.25	2.10	3.11	4.12	5.95	14.06	26.23	42.45
Elmira	1.25	2.05	3.01	3.97	5.68	13.27	24.66	39.84
Goshen	1.50	4.16	5.63	7.09	9.47	18.60	32.30	50.56
Ithaca	1.25	2.72	4.51	5.99	8.96	17.81	31.09	48.79
Lockport	1.45	2.88	4.67	6.27	8.82	18.29	32.50	51.45
Mech	1.10	3.23	5.31	7.10	9.79	19.14	33.17	51.87
On and Nor	1.25	3.28	5.57	7.25	10.28	20.34	35.43	55.55
Owego	1.25	2.66	4.38	5.81	8.66	16.90	29.26	45.75
Niagara Mohawk Power	1.50	3.26	5.38	7.14	9.93	20.34	34.63	53.69
Orange and Rockland	1.25	3.06	4.33	5.59	7.52	17.15	30.81	48.07
Pavilion	1.10	2.19	3.81	5.06	6.85	15.79	29.20	47.08
Penn Gas:								
General	1.75	1.77	2.53	3.29	4.69	11.67	22.14	36.10
Space heating	3.00	3.02	3.78	4.54	5.94	12.62	23.39	37.35
Penn & So:								
Nonheating	1.30	3.38	5.76	7.61	10.49	22.19	38.72	58.72
Space heating	3.00	3.00	4.50	6.00	8.00	17.10	30.60	48.60
Producers	1.25	2.08	3.11	4.14	6.20	14.99	28.17	45.75
Reserve	1.30	1.30	1.80	2.70	4.50	13.50	27.00	45.00
Rochester Gas & Electric:								
All purpose—M	.93	1.55	2.77	3.99	6.43	16.27	27.96	41.75
All purpose—N	.93	2.58	4.92	7.09	10.97	27.00	46.35	70.27
Water heating—M	1.64	1.67	2.89	3.87	5.83	14.12	24.31	37.90
Water heating—N	1.64	2.80	4.67	6.55	10.30	23.47	43.07	69.19
Space heating—M	1.64	1.67	2.84	3.80	5.72	12.52	22.26	35.25
Space heating—N	1.64	2.75	4.59	6.44	8.99	21.45	40.14	65.06
St. Lawrence	1.50	2.70	4.50	6.10	8.85	20.35	37.60	60.60
Sulburn	2.25	9.63	17.83	24.95	38.51	88.63	159.13	253.13
Syr. Sub	1.45	2.70	4.20	5.41	7.30	15.77	28.47	45.40
Valley	1.25	2.42	4.17	5.72	8.42	19.92	37.17	60.17
Municipality:								
Bath	.95	2.10	3.21	4.10	5.89	14.32	26.49	42.71
Woodhull	1.61	1.61	2.43	3.25	4.89	12.84	23.89	38.29

APPENDIX C

STATE OF NEW YORK PUBLIC SERVICE COMMISSION,
February 19, 1974.

To: The Commission.
From: Office of Economic Research.
Subject: Some thoughts on rate structure policy.

The theory of rate structure has been receiving increasing public attention over the last few years because it has been integrally linked with issues of energy conservation and the intervention of environmental groups in rate cases and hearings for plant siting permits. The purpose of the attached summary review of rate structure concepts is to provide a rudimentary checklist of pros and cons frequently at issue in the discussions.

It may be useful for the Commission to review its current theoretical position with a view to considering a more standardized approach to ratemaking within and across industry lines (e.g. electric, gas, telephone) and on a statewide basis. The Commission may wish to reflect on how the use of one particular theoretical underpinning alone or in conjunction with another can yield up the best trade-off among the major goals of current rate-making, ranging at one end of the spectrum with the concern to meet the financial revenue requirement and on the other to promote economic efficiencies within the industry and the economy. The view of the relative advantages or disadvantages of each type of approach will, of course, be heavily influenced by the priority set by the Commission for the various goals.

Respectfully submitted,

DIANA E. SANDER,
Principal Economist.

FULLY-DISTRIBUTED COSTS

Definition: Fully-distributed costs, or cost of service, is a cost-price standard of rate-making designed to yield total revenues to the producer adequate to permit the recovery of all monetary costs incurred. These are related to past fixed investment, and operating costs measured in some base period and include an allowance for a capital—attracting rate of return. (Total common and joint costs are allocated to various classes of service on some reasonable but flexible basis so that 100% of these costs, as well as specialized costs related to these classes of service, are recovered)

I PROS

1. Fully-distributed cost studies are faced with fewer uncertainties with respect to the data which are required to perform them than other types of cost analyses since these are based on past recorded costs.
2. Fully-distributed costs as a basis for price, by definition, can be expected to provide the utility with a reasonable approximation of the revenue requirement to meet its monetary obligations without the need to go to the legislature for tax subsidy, regardless of whether it is experiencing decreasing or increasing costs.
3. Fully-distributed cost analysis can easily produce a first approximation of a nondiscriminatory rate structure. Each class of service will earn the same return on investment.
4. The fully-distributed cost method tends to allocate economies of scale from common facilities in accordance with relative usage.
5. Ratepayers view rates based on the distribution of historic costs and the contribution of the rate class to overhead as fair and nondiscriminatory.
6. Fully-distributed costs provide the regulator with a practical test of accountability, establishing a cost measure which may be used either as a minimum or maximum. Thus a curb is placed on utility management in loading undue revenue requirements on their monopoly services compared with the more competitive services.
7. Whether or not regulation requires each service to yield the same rate of return or not in the light of other than purely economic considerations, such a study at least focuses attention on the need for special justifications for those classes of service which deviate from the common rate of return.
8. The use of average cost as a standard for price necessarily implies cross-subsidies but offers the utility the opportunity to tap new underdeveloped mar-

kets (geographic, etc.), in the absence of significant competition and the threat of cream skimming.

9. This standard for determining costs works best when the system is marked by low demand elasticities and relatively stable average costs. However, even in periods of rapid and uneven inflation, this system of pricing tends to avoid loading more and more future costs on present demand in the name of rate stability. It avoids requiring current customers to subsidize future demand by requiring them to overpay a portion of future demands in 'hard dollars' instead of in cheap dollars down the road.

10. It may be argued that under fully-distributed cost computations the limits within which the estimate of average total cost will fall is constrained by the *existing* total system (whatever the judgmental allocations of joint or common costs). In other types of costing techniques, possible size and configurations of the system and market are far broader and open-ended (e.g. long-range marginal cost of 8-10 year future period) and the range for price is, therefore, far broader and depends heavily on the optimism of the utility manager on a wide variety of inputs.

II CONS

1. Average price practice which flows from fully-distributed costs analysis has some obvious shortcomings in bringing about *optimum* economic efficiencies and allocation of resources, according to marginal cost pricing theory, since it departs from setting prices at marginal costs.

2. Fully-distributed cost analysis does not throw light on how incremental supply and demand may affect *future* costs and revenues. Historical or sunk costs are not necessarily reliable measures of future costs, if the profile of supply and demand are altered.

3. Even though total embedded costs for all services combined are presumably known with accounting precision, costs assigned to various categories under fully-distributed cost analysis lack that precision and are necessarily estimated based on judgment. Judgment may be influenced by the outcome desired.

4. Fully-distributed costs are a better standard for determining rate levels than a measure for devising individual rate detail within a schedule.

5. Fully-distributed costs do not accurately indicate whether existing rates make a contribution to company revenues over and above the costs for which there is responsibility, particularly when marginal costs diverge significantly from average costs.

6. Insistence on charging fully-allocated costs to each service would cause underutilization of capacity in the face of a high degree of demand elasticity for some service. Lower prices for such a service could bring in enough revenue to not only pay for itself but to defray some of the overhead expense attributed to other categories, thus resulting in subsidization of other services.

7. Fully-distributed costs are not a measure of 'escapable' cost and not the relevant cost for evaluating competitive markets or signaling potential competitive entrants or new customers.

8. The use of average cost based on fully-distributed costs instead of marginal costs when the latter are below average cost can foster excessive capital investment and expansion of the rate base.

9. Fully-distributed costs, or average total costs alone, do not accurately reflect the significance to the system of declining or increasing unit costs (multi-part pricing around these average rate levels can overcome this deficiency, however.)

VALUE OF SERVICE

Definition: Value of service as a principle of rate design is most frequently interpreted as one which permits differences in prices charged by a given utility for its various services to be based not only on differences in cost of production but also in part on differences in the relative price elasticities of demand for these services. (It is often also referred to as 'price discrimination', i.e. a discrimination among consumers related to their demand elasticities.)

I PROS

1. The price flexibility which fully-distributed costs as a basis for price lacks can be provided by using such costs in combination with value of service

estimates. By recognizing differential price elasticity of demand, value of service considerations can foster fuller utilization of capacity and lower costs for all services.

2. Assuming that there is no single *best* combination of regulated monopoly and competition that is valid for all industries and in all times and places, the value of service concept allows for the flexibility to make that choice by authorizing the utility to 'discriminate' among other customer groups, i.e. charge them different rates.

3. The value of service approach permits regulation to attempt to define the "upper limit" for utility price or what is often referred to as 'what the traffic will bear' in contrast for example to the lower limit which "incremental price" might represent.

4. Although costs are a factor in determining rates, the rates themselves conversely may be a factor in affecting costs. Value of service recognizes this role and attempts to exploit demand elasticities in a judgmental way by setting varying rents for the use of facilities. (The demand charges levied on off-peak electric power customers for their use of capacity might be viewed as such a rent).

5. A strong argument for limiting competition and new entrants via authorized discriminatory pricing by the utility is the presence of long-run decreasing average costs, the greatest benefits of which would be foregone without value of service pricing.

6. Value of service has an important role in determining differential rates when rates in excess of marginal cost must be charged in order to meet a utility's revenue requirement.

II CONS

1. Value of service pricing presents regulation with the formidable problem of deciding between desirable and undesirable rate discrimination in meeting various and perhaps conflicting goals.

2. Provides the maximum flexibility to utility managers in determining cross-subsidies among customers and, by the same token, the most challenging job to regulation in monitoring and reconciling goals of equity and economic efficiency.

3. Value of service pricing may, by eliminating competition for a service, leas to serious inefficiencies at the customer level i.e., in markets where customers of the utilities compete.

4. Where there are no truly important economies of scale in operations and/or none of the categories of demand is sufficiently elastic for discriminating rate reductions to confer cost and price advantages on all customers, value-of-service based rates involve making some customers better off at the expense of others and must have justification in noneconomic criteria.

5. If preferential rates based on value of service standards inadequately reflect incremental capital costs associated with supplying that service, there is a real danger that "favored" consumers will secure a kind of grandfather clause for maintaining their preferential treatment, even after the economic basis has long disappeared.

6. Value of service pricing is a discriminatory monopoly type of pricing even if it is undertaken in the public interest and is, therefore, fraught with special dangers linked to noncompetitive market behavior.

7. Value of service as a standard of costing presents major problems in estimation and administration—uncertainties relative to determining (a) the elasticities of demand. (b) identifying proper classifications and groupings of customers, (c) problems of enforcement of delimitations of such groups (d) satisfying noneconomic goals of presumed fairness and political acceptability.

8. Value of service costing standards involve the regulatory agency in the possibility of setting off ingenious and discriminatory types of promotion.

9. Value of service as a standard is particularly problematical unless confined to situations where marginal costs for service in question falls below average total costs.

MARGINAL COST PRICING

Definition: Marginal cost pricing holds that price should be set at marginal cost, defined as the increase in total cost associated with providing an additional unit of output. 'Short-run' marginal cost refers to the period in which plant capacity does not change and additional supply is costed out excluding capacity charges.

'Long-run' marginal cost covers a rather flexible open-ended time period but allows for the inclusion of future variation in plant capacity (total and mix) in the cost determination of an increase in supply. Only future capacity costs for which additional production can be causally responsible are involved in the calculation of long-range marginal costs, not sunk costs. Theoretically, public utility rates based on marginal costs are narrowed in function to one major goal primarily the control of consumer demand for service (total and type).

I PROS

1. Economic theory holds that a maximum economic efficiency and optimal allocation of resources can be achieved by setting rates equal to marginal costs rather than fully-distributed costs.
2. In a period of rising costs, pricing on the basis of marginal costs will reduce the need for frequent rate cases in order to provide adequate revenues and provide customers with appropriate signals for decisions on future consumption.
3. Marginal cost determinations can serve regulation with a tool for surveillance against promotional practices or predatory competition by providing a floor for price.
4. Marginal cost pricing can exploit the elasticities of demand for various services and lead to fuller utilization of existing capacity in the short run and determine optimum size of system in the long run to the benefit of all consumers of the system.

II CONS

1. Marginal cost pricing theory relates to the idealized world of economic theory. Its merits for regulatory policy guidelines are undermined by economic reality of the nonperfect market and the importance of dynamic factors (e.g. technological innovations) in determining long-term costs.
2. Optimum allocation of resources will not be achieved unless all firms in all industries use the same marginal pricing principle. Application of marginal cost pricing in the electric power sector alone may aggravate misallocations of resources compared with alternate fuel and power industries production and every other branch of the economy.
3. Marginal cost pricing fails to assure the private utility an adequate amount of revenue to meet its requirement for fiscal independence, thus making it dependent on government taxation for deficits incurred during periods of decreasing costs. When marginal costs are higher than average costs, too much revenue would be raised and the total would exceed the regulatory budgetary restraint of a fair return on capital.
4. The solutions suggested for adjusting the level of revenues obtained via marginal cost pricing up or down the regulatory budgetary requirements automatically undermine the claims for marginal cost pricing as an optimum allocator of resources by distorting the optimum consumption patterns of those whose prices are reduced below marginal price or of those consumers who pay more.
5. Data for calculating elasticities of demand required to make the suggested adjustments from marginal price among classes of customers are currently inadequate to derive reliable forecasts of changes in demand.
6. Long-run marginal costs are computed at current cost levels. If the key to future costs and price is as much or more the result of an upward movement in the general level of cost for all factors, prices based on long-range marginal costs will neither provide the customer with appropriate signals nor reduce the number of rate hearings significantly.
7. Marginal costing is less applicable to regulated utilities than to firms that operate in the more competitive part of the market and are freer to determine their own equilibrium points of operation to maximize profits. A public utility does not have the same options in deciding the size of its capacity but must meet new demand in a reliable and safe way.
8. The allocation of all capacity charges to peak usage as required by marginal cost pricing theory ignores the judgmental privilege of regulation to charge a rent for benefits derived from off-peak usage. Applied in a mechanical way, such a requirement is also frequently misinterpreted and calculated on the basis of total capacity, whther or not all equipment is in fact the same or differentiated within the system, and whether or not peak usage is supplied

solely from one utility system or an interconnected system with offsetting seasonal peaks.

9. The computation of long-run marginal costs in a meaningful way requires such a wealth of data and forecasts and is so complex that regulation may not be able to cope with it. It requires broad judgments on the approriateness of the future scenarios of supply/costs, price/demand relationships presented by management, as well as broad evaluations of the appropriateness of the number of service segments for which marginal prices are to be derived. There is no point in attempting to set up fine distinctions in respective costs that cannot be estimated wtih tolerable accuracy or reliability and must be abandoned in the end because of budgetary restrictions.

10. Regulation is concerned not only with economic efficiency but also extra-economic goals that may dictate departures from marginal cost pricing. (national security, issues of competition, reliability, 'fairness, etc.)

INCREMENTAL PRICE OR COMPETITIVE PRICE

Definition: Incremental or competitive cost and price is differentiated from the term marginal incremental cost often used in marginal cost pricing discussions to recognize that as a practical matter supply is expanded not one unit at a time but in substantial blocks or increments. Incremental price is a variation of that marginal concept and contrasts with it by defining the relevant cost calculation to include a portion of *current* as well as future capacity charges. The difference, between the present values of two cost streams—between the anticipated current and future costs *before* and *after* an increase in demand (and supply) is defined as the relevant incremental cost of a change in output. It deals with the intermediate' long run as a time frame and considers inherited plant, and not with the perfectly long-run of marginal analysis, where no consideration is given to plant inherited from the past. By definition, it is presumed that incremental pricing will earn the utility no less than a full-cost price could provide.

I PROS

1. Incremental pricing recognizes that competitors to regulated industry are going to base their policies on calculations of additional operating and capital costs—current and future—and not sunk costs and holds that unless the public utility recognizes this, it will be eliminated from many areas of service.

2. Recognizes that both cost and demand relationships are important factors in setting price and that cost data alone (fully distributed or any other) can never be used to set price effectively, although cost data are useful as a price floor.

3. In periods of declining average costs, incremental pricing tends to expand services with relatively elastic demand and maximizes their contribution to aggregate system revenues and profits, also benefiting basic service customers with less elastic demand.

4. Incremental costs are the only relevant ones by which to determine if a service is a burden for the system as a whole and for making rate decisions to maximize system profits.

II CONS

1. Attributes to monopoly service (or basic service) customers all of the overhead costs or the full average cost of their service, while customers of new competitive services pay only the incremental cost of serving them, thus the distribution of scale or other production economies are skewed to the small new service. (Monopoly service revenues have to make up the differential between lower incremental costs and average total costs, which under marginal cost pricing would be made up via taxation).

2. Assumes continued stable production of basic services with no elasticity of demand between basic and new competitive services.

3. Errors in assumptions and forecasts of past investment commitments incrementally priced will be borne automatically by the basic service customers. This diminishes management incentive to perceive adverse long-run effects of its investment decisions and tends to bias estimates of incremental costs by minimizing them for competitive services with tendency to burden other services.

4. Full additional cost approach proposals (e.g. AT&T) are experimental and fail to approximate traditional marginal cost conditions of economic theory for treating capital costs and expenses.
5. Incremental pricing may prevent effective regulation by creating a need to rely on both soft allocations of current cost data and soft forecasted data.

Senator JAVITS. Now, I think the thing that interests us the most here is to what extent is anyone at fault in respect of this heavy dependence in Consolidated Edison and what you show for the so-called downstate New York, which I see would also include the Long Island Lighting Co. as well as the Central Hudson, which has the biggest percentage increase in all, although it is not a major company. Who is at fault if there be a fault? What is the rationalization for the heavy, as you say, 100-percent dependence on imported oil, residual oil, of this particular group of utilities?

Mr. ROTH. There are a number of reasons why the downstate utilities have become so dependent on imported oil. First, imported oil was cheap. Even while there were import controls on most petroleum products, controls on residual oils were lifted soon and residual oil could be freely imported at very low cost per barrel, even $2 per barrel. So there was a strong economic temptation in past years to import the oil and burn it in our utilities.

Then, too, there was a strong environmental movement against the further use of coal. All the utilities you refer to relied primarily on coal not very many years ago, but they converted. Consolidated Edison converted its last coal facility, Arthur Kill unit 3, in February of 1972 and most of its facilities earlier than that. Indeed, you may know that the Federal Energy Office is now attempting to encourage some utilities, not necessarily Consolidated Edison, to reconvert old coal units that had gone on oil back to coal. But because of the low price of oil and the environmental objection to coal burning, the utilities switched to oil and, in a manner of speaking, we became overdependent on imported oil. Domestic residual oil was not cheap and it did not come in large enough volumes to warrant the switch. Only imported oil did.

I think those are the principal ingredients of the switch and the predicament we are in now.

Senator JAVITS. Now, you say an effort is being made to encourage our utilities to go back to coal. I am advised that Con Ed, its Ravenswood plant, has the permission and has the coal. Why don't they go back?

Mr. ROTH. Consolidated Edison has permission to burn coal at its Arthur Kill 3 unit, not its Ravenswood unit. To catch up with your point, the State did authorize coal firing at Arthur Kill 3 and Ravenswood Unit 3 for coal. The authority was granted for coal at Arthur Kill 3 in mid-December. The company began conversion operations but not immediately because it needed the capacity for a time and could not take the unit out. After it converted the boiler to coal firing capability it discovered other problems at the unit and in short, the unit went on coal in mid-March and its authority to use coal ends March 31. It has an application for further permission to use coal after March 31, a proceeding at which I presided.

The answer is not in my hands alone. The matter is to be decided by the Commissioner of Environmental Conservation of the State of

New York, also by city authorities, and finally, by the Federal Government.

Senator JAVITS. Now, in the case of the Ravenswood, is it fair to say that New York State regulatory authorities and Federal regulatory authorities disagree?

Mr. ROTH. Disagreed. In the past they did disagree. Yes. The State authorized Ravenswood 3 for coal and the Federal authority did not. Nor did the city authorities.

Senator JAVITS. Nor did the city authorities. Was that on environmental grounds?

Mr. ROTH. Oh, yes. In the minds of the Federal and city authorities, the environmental detriment of the coal burning outweighted the power and economic advantages of coal firing. In the minds of the State the balance was seen in another way.

Senator JAVITS. And this was strictly on environmental grounds in all three cases?

Mr. ROTH. No. The State decision to authorize coal was not on environmental grounds. It was on the ground that the economic advantage of coal outweighted the environmental disadvantages.

Senator JAVITS. Exactly, but they also considered the environmental question in the States.

Mr. ROTH. Very much so, yes?

Senator JAVITS. And the city, of course, found that decisive and so did the Federal Government, is that not correct?

Mr. ROTH. Yes, it is.

Senator JAVITS. How much of the capacity of Con Ed is encompassed in this Ravenswood plant?

Mr. ROTH. Ravenswood Unit 3, about 10 percent.

Senator JAVITS. 10 percent.

Mr. ROTH. The company has 10,000 megawatts of capacity not all of which are in service at any one time. There is some need for repair at all times.

Senator JAVITS. Would it have had an effect on the rate structure of Con Ed to have sustained the State in the decision on coal so the rates would be——

Mr. ROTH. Yes. If the unit could have been brought on to coal firing, the average reduction in bills when fully fired by coal, when the unit was fully fired by coal, the average reduction in a bill would be $3 per month per customer and the average customer uses a thousand kilowatt hours per month; that is, industrial and residential average. Larger customers would save more. For example, an electric space heater uses not 1,000 kilowatt hours in the winter months but 5,000, so he might have saved five times—five times nearly $3.

Senator JAVITS. What was the aggregate? How many customers do they have?

Mr. ROTH. 2.9 million customers.

Senator JAVITS. So it would be roughly——

Mr. ROTH. $8 million.

Senator JAVITS. $8 million a month.

Mr. ROTH. $8 million a year if both Ravenswood 3 and Arthur Kill 3 are on coal.

Senator JAVITS. I understand.

Do you recommend any legislative action by us to reconcile these various agencies? I mean, that is pretty costly proposition in money and a pretty costly proposition in resources.

Mr. ROTH. Yes. The Energy Emergency Act contained provision for——

Chairman HUMPHREY. The one that was vetoed?

Mr. ROTH. I regret.

Senator JAVITS. And that would have allowed the Federal Government to have overriden these findings, is that right?

Mr. ROTH. Yes, but I do not want to leave you with the impression that the Federal Government then would have acted to require coal at Ravenswood. In fact, the Federal Government recently authorized coal only at Arthur Kill 3 and may not even renew its authorization for Arthur Kill 3.

Senator JAVITS. What I would like to know, did the veto bill, the fact that they had no authority, did that stop it or did the substantive decision even if they had authority stop it?

Mr. ROTH. The veto of the bill, in my view, did not stop coal burning in New York City. It was the substantive decision of certain environmental authorities.

Senator JAVITS. Whether or not they had the authority?

Mr. ROTH. The authority in the bill would have posed this advantage. The Federal Government could order a unit on coal, order it, require it. At the moment without the Energy Emergency Act, the Federal Government can only permit it and the city can continue to say no.

Senator JAVITS. That is a critically important distinction. Now, were the savings of cheap residual oil passed on to the consumer?

Mr. ROTH. O, yes.

Senator JAVITS. They were?

Mr. ROTH. Yes.

Senator JAVITS. Just as the burden of very expensive imported oil is also being impacted on the consumer, is that right?

Mr. ROTH. Yes.

Senator JAVITS. Now, does the Public Service Commission of New York have any authority to deal with that pattern?

Mr. ROTH. Yes. We can decide whether or not a given utility is allowed to pass through its fuel costs. As a constitutional matter, I do not think we can deprive a utility of its costs but we need not authorize semiautomatic flow-through. In fact, however, we have authorized semiautomatic flow-through.

Senator JAVITS. But can you direct this utility to reorient its use away from residual oil to some other product, coal, for example?

Mr. ROTH. We can——

Senator JAVITS. Can you order?

Mr. ROTH. Yes. We could try. We could order them and hopefully would be sustained by the courts, now, however, environmental authorities do have the prerogative to say no to coal and we cannot override those State or Federal environmental authorities.

Senator JAVITS. Cannot override. I see.

Mr. ROTH. Whether or not we could override city environmental authority is a matter that may be debatable between the State and city.

Senator JAVITS. Whether or not you can.

Now, are there any suggestions, any ideas, that the PSC has respecting the assistance to consumers? Of course, one idea would be to cut use, would it not? In other words, consumers would continue strong conservation measures and thereby cut down their bills by using less current.

Mr. ROTH. Yes, Senator. One approach to the problem is for the consumer to conserve energy but I should tell you that Senator Humphrey has raised a challenge to regulators. He has said as the consumers reduce their consumption, they are confronted with rate increases that wipe out the advantage of their savings. As I point out in my prepared statement, which, of course, I will not read, which reasons through a hypothetical calculation but exemplary calculation showing that consumers do save. While unit rates may need to be increased, because of conservation, they are not increased as fast as consumption declines and the bills do decline for conservation.

Now, unfortunately, at the same time, other pressures impose rate increases whether or not the consumer conserves. Skyrocketing oil prices, for example, may lead to a gross increase in his bill even as he conserves. But with regard to the specifics of the conservation adjustment, it does not wipe out the savings from energy conservation.

Senator JAVITS. I have just one other question, Mr. Chairman. Are there any other factors that are cranked into these high increases other than the fuel price passthrough which currently takes place?

Mr. ROTH. Yes. Not only are fuel costs increased but the utilities are faced with the need to introduce environmental controls which are costly. I do not say they are not worth the cost. But the advantage shows up in the improved environment. The disadvantage shows up in higher utility bills. The costs have led to utility rate increases.

To be blunt, utility inefficiencies and equipment manufacture inefficiencies or inadequacies may be contributing to rises in costs. If I may be blunter still, governmental inefficiencies may be leading to increases in utility costs as licenses for new facilities are being delayed, raising the cost of construction. They must be built but they cannot be put on the line, awaiting licenses. That is very costly.

Chairman HUMPHREY. That is State licenses?

Mr. ROTH. Well, the State licensing program is brand new and it is not working too bad. I refer in making the critical comments about some Federal license processes.

Taxes go up. I do not mean necessarily tax rates but percentage taxes on gross revenues, such as New York has, accelerates rate increases. All these various considerations are summarized in my prepared statement, and I make some recommendations for change which may be of interest to you as legislators.

For example, the possibility of guarantees on utility bonds, or maybe tax exemption on interest on utility bonds, may provide relief for utilities, which is partly a State and partly a Federal matter.

I also make a recommendation which may be favorably viewed by Senator Javits and unfavorably viewed by Senator Humphrey in my prepared statement, whereby the high cost of imported oil would be averaged with the lower cost of domestically produced oil so that all consumers in the Nation would be paying the same for residual oil.

Chairman HUMPHREY. Why do you think I would oppose that?

Mr. ROTH. Well, because I did not—I regret I said that. Maybe I should not have said that.

Chairman HUMPHREY. I think that is right.

Mr. ROTH. What I meant to say is consumers in the Midwest may not like to see their residual oil prices rise simply in order to help out consumers on the east coast.

Chairman HUMPHREY. We use domestic and Canadian oil. We do not get all that Arab oil. That does not get out our way.

Mr. ROTH. I was speaking of residual oil, however, With regard to residual oil, I am not aware that the Midwest imports much of its residual oil.

Chairman HUMPHREY. We do not use much of that.

Senator JAVITS. As a matter of fact, could not American refineries be somewhat switched to residual oil? Would they not be better able to help and less likely to run into trouble?

Mr. ROTH. Well, we could recommend it but I should caution you that limits on domestic crude oil availability and limits on domestic refining capacity may mean that putting out more domestic residual oil requires putting out less gasoline.

Chairman HUMPHREY. Does that not just add up that we ought to build some more refineries?

Mr. ROTH. Good heavens, yes. This Nation needs——

Chairman HUMPHREY. We are way behind in refineries.

Mr. ROTH. It is bad enough that we may be dependent on imports—let it be crude oil. Let us build some domestic refining capacity so we are not at jeopardy by the whim of foreign refiners that can cut off our life blood.

Chairman HUMPHREY. I certainly endorse highly that recommendation. In other words, I do not see why we need to frontally get into this matter of reallocating costs and as I say, people in the Middle West would be paying more money for their residual fuel oil. Even though it is not much discussed, I gather the big usage is in the East.

Mr. ROTH. Yes. Two-thirds of the residual oil consumed in America is consumed on the east coast, almost all of it is imported. The rest is consumed on the west coast, some of it imported, and in the gulf coast area almost all domestic. But building refineries is a long-term answer. It does not solve the immediate price burden faced by each utility and its consumers.

Senator JAVITS. The only way you can solve the immediate price burden, then, is to equalize the price in the hands of the companies that sell it, is that not right?

Mr. ROTH. In regard to fuel, that is right. With regard to residual fuel oil, that is right. There are avenues to take: Authorizing more coal firing, reducing interest rates by guaranteeing bonds, re-

ducing taxes, and other steps I mentioned in my prepared statement.

Chairman HUMPHREY. And how would you feel about peak use pricing?

Mr. ROTH. We have taken some steps in that direction. For example, we have imposed a summer surcharge which comes very close to peak hour pricing.

Chairman HUMPHREY. Yes.

Mr. ROTH. But it is a seasonal surcharge for all summer consumption.

Chairman HUMPHREY. Yes.

Mr. ROTH. On electric utilities including Long Island Lighting and Consolidated Edison. We also allocate utility costs, investment costs, partly on the basis of peak use, who used—what class of customers use—the facilities on the peak day, and that leads to higher rates for utility consumers that make use of facilities on the peak day.

Chairman HUMPHREY. You would not think that seasonal use was the total answer, though on this?

Mr. ROTH. No.

Chairman HUMPHREY. Peak use.

Mr. ROTH. We cannot have a flat load curve throughout the year. We need some peaks because valley time is useful for making some repairs. There is no point in seeking perfectly horizontal loads.

Senator JAVITS. Is there any relief that you could suggest for the all-electric home, especially in the areas so heavily impacted as you describe, with much higher residual fuel oil costs?

Mr. ROTH. Yes, but as Mr. Cicchetti said, it may take special measures to provide that relief. Indeed, the proponents of inverted rates would exacerbate the predicament of electric space heaters because electric space heaters use a lot of energy and if we inverted this rate, their rates would skyrocket even further than they have. So I think that, at least for established as distinguished from new electric space heaters, some special consideration may need to be given, and we are seriously considering such alternatives as grandfathering electric space heating rates for established customers and others. I do not predict what the results would be.

Senator JAVITS. But grandfathering might be a way to do it.

Mr. ROTH. That is one measure. It hurts because the costs not secured from those grandfathered customers must be borne by the stockholders or by the other customers. It is a terrible choice.

Senator JAVITS. Except that the utilities have had a benefit of nice acceleration in use because these people simply have been misled to their detriment that the power would be available at a reasonably mounting curve but not an unusual runaway price, is that not true?

Mr. ROTH. It is very true. It is a choice among horrible alternatives.

Senator JAVITS. Yes. Now, I notice that you had your recommendations, the short-term outlook. Is there any medium or long-term outlook that you wish to——

Mr. ROTH. Yes. There are two, I think, avenues to take in the long term which should lead to favorable results. One is to enhance research and development efforts in the country. I think Senator Jack-

son is taking the lead in that regard. I, for one, applaud his efforts to increase research and development. Mr. Swidler has, too. He helped move the industry to establish its own Electric Power Research Institute and right within New York State we have actually ordered the utilities to increase their R. & D. expenditures, which now amount to over 1 percent of revenues because the utilities had been sadly remiss in their research programs. Through research we can hope to provide in the future less expensive, more environmentally compatible sources of energy.

The other avenue I might suggest is long-term consumer conservation, all the way from using radial tires on automobiles to save a little bit of gasoline, to building cities with less suburban sprawl, and better planning so that we can use more mass transit and less energy.

Senator JAVITS. Thank you.

Chairman HUMPHREY. I have just two questions that I would like to put to you.

Did I understand correctly that you do provide for fuel cost passthrough on rates now?

Mr. ROTH. Yes.

Chairman HUMPHREY. Then, what will happen if the large fuel cost passthroughs due to a very high increase in fuel costs now in effect result in future reductions in demand for gas and electricity? Will that also become a reason for granting still higher rates and higher prices? And is this not really just a deadend street?

Mr. ROTH. No. It is not a deadend street. The calculation——

Chairman HUMPHREY. Let us get the first question. Will this also become a reason for granting still higher rates?

Mr. ROTH. Yes, absent other factors that might reduce fixed costs.

Chairman HUMPHREY. Did I not understand in New York you just passthrough the fuel costs?

Mr. ROTH. We passthrough the fuel costs, yes, and as less fuel is used the consumer gets the benefit of that.

Chairman HUMPHREY. Have you seen less fuel used?

Mr. ROTH. Yes, indeed. Electric energy consumption in New York State is down 10 percent.

Chairman HUMPHREY. But that is the reason they are asking for a rate increase.

Mr. ROTH. Only with regard to the fixed costs. My calculation in my prepared statement shows that although the unit rate may increase the consumer bill goes down.

Chairman HUMPHREY. That is because he is using less.

Mr. ROTH. Yes.

Chairman HUMPHREY. But the point that I am making is, and this is the point that seems to come out, that as the consumer responds to the national request of the President, the Congress, and others, to conserve on the use of fuel, the more he conserves, the higher his price goes.

Mr. ROTH. No.

Chairman HUMPHREY. I mean the unit price.

Mr. ROTH. The unit price goes up.

Chairman HUMPHREY. That is what we are talking about.

Mr. ROTH. The bills go down.

Chairmen HUMPHREY. Wait a minute. That is like saying if you only eat two meals a day your bill goes down because you are really talking about using fewer units. I am saying that the unit price goes up as he conserves.

Mr. ROTH. With permission, Senator, that is not right. It is not like two meals a day. The unit price is going up 5 percent but the use goes down 10 percent. The bills will decline by 5 percent.

Chairman HUMPHREY. Wait a minute. We can all play with these things. Let us take an average household now where the woman of the house has a coffee pot, has an electric stove. She may have an electric space heater and electric blanket. All right. Now, these are all things of comfort for that home and the electric stove she has and the electric coffee pot may be the only coffee pot she has.

Now, if she can cut down on the use of those, that is possible. She can cut down and maybe knock off the electric blanket and even turn down the thermostat, not use the space heater as long. What she has really done from her point of view is to inconvenience herself and the family at least on the basis of standards that they were accustomed to and that they are propagandized into doing by the same electric utility company. You know, buy it all. We have got electricity for everybody. And the more you buy, the lower your rates. OK?

Now, they come along and the President and others say, and rightly so, we have got to conserve. We have got an energy problem here, a shortage. The patriotic housewife, the family conserves and because it conserves, the utility company says we have got smaller amounts of revenues and the revenues are so small we have got to increase the rates.

Why do we have to increase the rates? Because Mr. and Mrs. Smith were good citizens and conserved on fuel and on the use of electricity. Now I am simply saying that the present situation results in that when the family or the individual conserves and cuts back in electrical utilization and utilization of electricity that the answer so far has been to increase the rate to that consumer, the unit rate.

Mr. ROTH. Yes, but not proportionately as follows.

Chairman HUMPHREY. All right. Let us get the "as follows."

Mr. ROTH. Suppose the utility incurs $2 billion in fixed costs and $2 billion in variable costs with sales of 100 billion kilowatt hours. The fixed costs will amount to 2 cents per kilowatt hour and variable costs, 2 cents per kilowatt hour, for a total cost to the utility and price to the consumer of 4 cents, 4 cents per kilowatt hour. A consumer who uses 1,000 kilowatt hours per month will incur a monthly bill of $40.

Now, suppose that energy conservation reduced utility sales 10 percent, to 90 billion kilowatt hours per year. The fixed costs will remain at the $2 billion level because they are fixed. But they will rise on a unit basis to 2.2 cents. That is the $2 billion divided by the 90 kilowatt hours. Variable costs will decline 10 percent with usage and would amount to $1.8 billion, 10 percent below $2 billion, but still 2 cents per kilowatt hour on a unit basis. What has happened? The unit costs have gone up to 4.22 cents. However, the consumer will

have reduced his monthly consumption 10 percent, from 1,000 to 900 kilowatt hours, and his total bill will be $37.98.

Chairman HUMPHREY. What you are really saying is that if the price of beefsteaks goes up to $2 a pound, if you eat less beefsteaks you are not going to spend as much money for beef. That is really what you are saying.

Mr. ROTH. That is right.

Chairman HUMPHREY. I mean, what kind of a system is that? You do not have to be very smart to figure that out but I am saying that all that really counts is the unit cost. It is like the gallon of gasoline, whatever it may be. What we have here is a system in which we are passing through to the consumer and I want to know what kind of economies the regulatory commissions are compelling the utilities to take to try to reduce these units costs. I am not talking about the aggregate because it is unit costs, that is what is important here.

Mr. ROTH. You have turned to a separate topic of critical importance, how to improve the efficiencies of utilities, whether or not consumers conserve. The consumers are entitled to an efficient utility whether they increase or decrease or hold constant and we are terribly concerned about efficiencies by the utilities in New York and their suppliers. We are working on that.

I wish I were better than I am. I wish I had an answer on how to improve the efficiency, double it or what have you, among utilities in New York and elsewhere.

Chairman HUMPHREY. Well, we do not have easy answers, I know.

Mr. ROTH. It is slow, hard work. I have been in the utility regulatory business a long time and I would hate to tell you that I come here without any answers for you. There are some. We can compare costs. We have investigated problems as they occurred in underground networks in Consolidated Edison systems, billing problems and the like, but you are right when you say we have to be on guard to improve the efficiency of the utilities. When we come to the point where we have the most perfectly efficient utility possible and consumers reduce their consumption, their unit price may go up, but their bills will go down.

Chairman HUMPHREY. The think that bothers me in all of this is, for example, in one of our other committees, Foreign Relations Committtee, what do we find on that? We find when the Arabs increase the price of oil, particularly in the consortium we have, Aramco, the president of that organization has to admit it just increases the profits of the oil companies because it is a percentage on the unit cost and, in other words, if the price of oil goes up from $4 a barrel to $8 a barrel and you have got a 10 percent margin, your profits increase. What I worry about here in the utilities is that as these passthroughs go through, they come in and ask for rate increases. I notice the FPC denied a request by the New England Power Company for a so-called conservation adjustment in rates. The chairman of the Vermont Public Service Board is quoted in the Library of Congress report that I am releasing today as stating that the argument for such adjustment is based upon spurious logic and is a phony issue; namely, as the use goes down you have got to have

more rates. Yet, the New York Public Service Commission reportedly has approved such a rate increase for Consolidated Edison and will presumably do so for other New York utilities.

How come?

Mr. ROTH. Senator, if Aramco is earning too much profit, I hope that the American Government will legislate away those excess profits so the American consumer of oil can have the advantage of lower-priced oil and not pay the oil companies exorbitant profits. The utilities in New York are not earning exorbitant profits. To some extent, it has been accused that they have low profits because they are inefficient. I return to that point: We must work on it. But when we get to the point of an efficient utility, declining consumption with fixed costs may lead to unit rate increases, but declining bills.

Chairman HUMPHREY. Well, I think we have come to the end of the line here today. We really thank you very much, Mr. Roth. This is a highly complicated subject but it still stands as we adjourn this session today, that Mr. Patriotic Consumer that conserves, gets stuck.

Senator JAVITS. Well, I would not like to leave it at that, Mr. Chairman. Mr. Patriotic Consumer, who conserves in the first place as has been said, reduces his gross bill. The satisfaction of his not getting stuck is that he will simply pay more aggregate money which he has not got. But I thoroughly agree with you that we have to find a way in which to reduce the real bulge here which is this residual fuel cost which seems to be very excessive and it seems to me to have been the result of very little forethought on the part of these utilities who simply blundered into a situation that made them extremely vulnerable, contingencies that great management is also supposed to look forward to, to wit, that its source of supply may be imperiled and this is a very, very damaging development, certainly in the State of New York, and in the Northeast generally.

I hope we will have enough brains to see that this kind of untrammeled executive decision does not fall into the abyss right as its feet as it did in this particular case.

Mr. ROTH. Senator, I should note that Mr. Swidler and the Public Service Commission agree with that view, that we in New York, especially in the downstate area, have become overdependent on foreign oil, a trend that is worth trying to stop and reverse.

Chairman HUMPHREY. I hope that we may enlist your interest in and attention to the testimony of Mr. Cicchetti this morning, because I thought he got at the pricing problem very well and it just seems to me that most of the regulatory commissions that we have studied across the country do not have a cost-pricing on rates.

Mr. ROTH. Well, we try to——

Chairman HUMPHREY. I know you have done more of it in New York—Mr. Cicchetti made note of that today—than most places. This seems to me to offer some relief and some hope for the consumer.

Mr. ROTH. Yes, on a cost basis.

Chairman HUMPHREY. Thank you very much. The subcommittee is adjourned.

[Whereupon, at 1:30 p.m., the subcommittee adjourned, subject to the call of the Chair.]

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