1-1979

Administration of Natural Gas Regulation

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INDEPENDENT STUDY

ADMINISTRATION OF NATURAL GAS REGULATION

by

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I. INTRODUCTION

The purpose of this paper is to analyze the regulation of natural gas and the effects of that regulation upon the industry, consumers and agency responsible for such regulation. The energy crisis in general and the natural gas shortage in particular has produced thousands of pages of studies, tables and recommendations on how to deal with the shortage problem. This controversy has pitted portions of the natural gas industry against other portions, Congress against the courts, and the commissioners themselves hold different ideas on how natural gas should be regulated, if at all.

Natural gas presently supplies approximately one-third of our nation's energy. The one thing everyone agrees upon is that there are trillions of cubic feet (TCF) of natural gas which are recoverable within the United States. The biggest problem has been how to assure a continued supply at a reasonable and fair price. Another area of agreement is that the artificially low prices caused the shortage. The disagreement arises about whether the moderate shortage of the early 1970's and the extreme shortage of the mid-70's was caused by the producing industry's failure to produce a product just to force a shortage and

hence higher prices or whether they truly could not economically afford to continue to produce natural gas at those low artificial prices.

The initial job of the Federal Power Commission was to assure an adequate gas supply at a reasonable cost to consumers. The subsequent regulation held the price of natural gas down while the prices of alternative energy sources were rapidly rising. This of course forced producers to place their money where the highest returns could be found. The uncertainty of FPC rate action and increasing likelihood of adverse changes in the regulation of the industry caused some companies to simply quit searching for natural gas.

A common misconception is that the natural gas "industry" is a unified body. This, however, is not true. The producers are seeking a higher price for their product while the pipeline and utility companies desire to keep a low price so that they are able to increase use and sell more gas whether it is imported Liquified Natural Gas (LNG), Synthetic Natural Gas (SNG) or natural gas. The FPC could only regulate the interstate market. The intrastate price, therefore, was determined by open market price action. As alternative energy types increased in cost, so did natural gas on the intrastate market. Gas producers began diverting more and more supply to this market. That is why during the shortage there was an oversupply in some areas while

others were critically short of natural gas.

Presently there is an oversupply of natural gas on the intra-state market and an adequate supply on the inter-state market.

The entire theory of regulation of the natural gas industry was reviewed by Congress and in 1978 the Natural Gas Policy Act (NGPA) was passed. The Department of Energy (DOE) was organized in 1977 and the Federal Energy Regulatory Commission (FERC) was established as an independent branch of the DOE. FERC's job was to continue regulation under the NGPA as the FPC had under the 1938 act.

This study will outline the FPC's organization, function, regulation and its effect on natural gas; the demands for change in regulation and the present structure, function and effectiveness of FERC under the new act.

II. ORGANIZATION OF THE FPC

When the FPC was originally formed, it had no powers regarding natural gas. The FPC was created in 1920.[1] This subchapter was passed for the purpose of developing and preserving to the people the water power resources of the country.[2] The commission was composed of five commissioners who were appointed by the President, by and with the advice and consent of the Senate. The chairman was designated by the President.[3] After initial staggered terms the commissioners were appointed for five year terms.

It was also required that no more than three of the commissioners could be from the same political party.[4] Three commissioners was a quorum for transaction of business.

Prior to 1930 the commission consisted of the Secretary of War, the Secretary of the Interior and the Secretary of Agriculture. Staff was also provided for by statute.[5]

The Natural Gas Act of 1938 placed the regulation of the Natural Gas industry on the FPC.[6] The necessity for the regulation was set out at the beginning of the act as follows:

> **§ 717. Necessity for regulation of natural gas companies**
>
> (a) As disclosed in reports of the Federal Trade Commission made pursuant to S.Res. 83 (Seventieth Congress, first session) and other reports made pursuant to the authority of Congress, it is declared that the business of transporting and selling natural gas for ultimate distribution to the public is affected with a public interest, and that Federal regulation in matters relating to the transportation of natural gas and the sale thereof in interstate and foreign commerce is necessary in the public interest.
>
> (b) The provisions of this chapter shall apply to the transportation of natural gas in interstate commerce, to the sale in interstate commerce of natural gas for resale for ultimate public consumption for domestic, commercial, industrial, or any other use, and to natural-gas companies engaged in such transportation or sale, but shall not apply to any other transportation or sale of natural gas or to the local distribution of natural gas or to the facilities used for such distribution or to the production or gathering of natural gas.
>
> (c) The provisions of this chapter shall not apply to any person engaged in or legally authorized to engage in the transportation in interstate commerce or the sale in interstate commerce for resale, of natural gas received by such person from another person within or at the boundary of a State if all the natural gas so received is ultimately consumed within such State, or to any facilities used by such person for such transportation or sale, provided that the rates and service of such person and facilities be subject to regulation by a State commission. The matters exempted from the provisions of this chapter by this subsection are declared to be matters primarily of local concern and subject to regulation by the several States. A certification from such State commission to the Federal Power Commission that such State commission has regulatory jurisdiction over rates and service of such person and facilities and is exercising such jurisdiction shall constitute conclusive evidence of such regulatory power or jurisdiction.
>
> June 21, 1938, c. 556, § 1, 52 Stat. 821; Mar. 27, 1954, c. 115, 68 Stat. 36.

This inauspicious start has evolved into the present regulatory nightmare created by Congress under pressure to assure future availability of natural gas by encouraging production through "deregulation" of prices yet maintaining sufficient regulation of prices to prevent "windfall" profits. This transition requires an analysis of the growth of the FPC's regulatory powers.

A. Growth of FPC's Power to Regulate

The FPC was probably one of the very few government agencies that interpreted its regulation capacity very narrowly. This resulted in its subsequent regulatory activity being forced upon the FPC by the action of the United States Supreme Court.

Prior to the Natural Gas Act of 1938, any regulation of gas production and gathering was left to the states. The regulation of interstate pipelines was beyond the power of state regulatory agencies. In fact, the Supreme Court had denied jurisdiction over the interstate pipelines to the state regulatory agencies.[7] State agencies, therefore, could only regulate the distribution prices. These prices, however, were often dependent upon the prices the distributor paid to the interstate pipeline for the product. Alfred Kahn points to this as the major reason for the regulatory legislation of the time:[8]

> For example as the progress of technology in the 1920's and 1930's made increasingly feasible the

> interstate transmission of electricity and natural gas, local and state commissions found an increasingly large component of the cost of service of the companies under their jurisdiction--namely the electric current or the gas imported from out of state--falling outside their reach. This growing gap was filled by the Federal Power Act of 1935 and the Natural Gas Act of 1938, which conferred on the Federal Power Commission regulatory authority over those wholesale rates.

The FPC, therefore, was given the power to regulate the interstate sales of gas. Exempted from the 1938 act, however, was regulation of "The production or gathering of natural gas."[9] The FPC interpreted this to deny them any jurisdiction over the sales of natural gas by independent producers even if the sales were made to interstate pipelines. There was pressure on the FPC to exert some jurisdiction over such producers. States in gas-consuming areas felt the FPC should have authority over the price at which the producers could sell their natural gas (the wellhead price), whereas gas-producing states in the Southwest bitterly opposed any regulation by the FPC over the producer's wellhead price. Those areas which opposed such jurisdiction by the FPC were able to get the Kerr Bill approved by Congress.[10] This bill exempted gas sales by independent producers to pipelines from the jurisdiction of the FPC. The bill was vetoed by President Truman in 1950 because he felt that the ownership of gas reserves was too concentrated and that, at that time, pipelines could not go from producer to producer to search for lower prices

and that it was in the public interest to prevent excessive prices.[11]

The problem of regulation became an issue in the 1952 Presidential campaign. Eisenhower campaigned in Texas and promised to sign a Kerr-type bill if elected. He would get his chance but not before a watershed decision concerning the issue by the United States Supreme Court was issued. Ignoring prior adverse action by the Congress in the Kerr bill and an opposing view by the Eisenhower administration, the Supreme Court decided that the FPC had authority and was required to regulate the sales price of natural gas sold by independent producers to interstate pipelines.[12] In that case, Phillips Petroleum Company v. Wisconsin, the Court found that the exempted processes of production and gathering were completed prior to the sale of natural gas. The majority opinion dismissed the prior legislative history in one paragraph. A part of the controversy surrounded the competitiveness of the gas producing industry. The consumer representatives entered testimony which tended to show that the industry was not competitive and that Phillips had a monopoly which created excessively high prices on their sales at the wellhead which in turn were passed on to the consumer. Phillips countered with evidence that during 1946 and 1947, about 2,300 independent producers or gatherers supplied gas to pipelines. Therefore the market was sufficiently competitive that federal regulation was not required.

In fact, Phillips not only sold gas it produced, but also sold gas to the interstate pipeline that Phillips had purchased from other producers.

The majority opinion delivered by Justice Minton concluded that sales by Phillips were not part of the "production or gathering of natural gas" exempted from regulation by § 1(b) of the Act. The exegesis of the Act and the description of its history were viewed by many observers as labored and inaccurate, but the result was clear:

> Regulation of the sales in interstate commerce for resale made by a so-called independent natural-gas producer is not essentially different from regulation of such sales when made by an affiliate of an interstate pipeline company. In both cases, the rates charged may have a direct and substantial effect on the price paid by the ultimate consumers. Protection of companies was the primary aim of the Natural Gas Act. [Citation omitted.] Attempts to weaken this protection by amendatory legislation exempting independent natural-gas producers from federal regulation have repeatedly failed, and we refuse to achieve the same result by a strained interpretation of the existing statutory language.[13]

Justice Douglas, dissenting, viewed the legislative history as "not helpful" and he urged that greater respect be given the contemporaneous construction of the Act of the Commission itself, which had consistently rejected the authority to regulate wellhead sales. He also emphasized practical considerations causing him to conclude that the Commission should not have regulatory power:

> The fastening of rate regulation on this <u>independent producer</u> brings "the production or gathering of natural gas" under effective federal control, in spite of the fact that Congress has made that phase

> of the natural gas business exempt from regulation. The effect is certain to be profound. The price at which the independent producer can sell his gas determines the price he is able or willing to pay for it (if he buys from other wells). The sales price determines his profits. And his profits and the profits of all the other gatherers, whose gas moves into the interstate pipelines, have profound effects on the rate of production, the methods of production, the old wells that are continued in production, the new ones explored, etc. Regulating the price at which the independent producer can sell his gas regulates his business in the most vital way any business can be regulated. That regulation largely nullifies the exemption granted by Congress.
>
> * * * * *
>
> [T]he battle should be won in Congress, not here. Regulation of the business of producing and gathering natural gas involves considerations of which we know little and with which we are not competent to deal.[14]

Justice Clark (with Justice Burton concurring) also dissented in an opinion emphasizing a different view of the legislative history. The natural gas industry was seen as being divided into three parts--production and gathering, interstate transmission by pipeline, and distribution to consumers by local service companies--and only the second of these parts was intended to be regulated by the Act. This opinion also noted certain consequences to be anticipated: ". . . federal regulation of these sales means an inevitable clash with a complex of state regulatory action, including minimum pricing."[15, 16]

While this decision forced the FPC to regulate the sales by independent producers it did not quiet the debate about whether the FPC should have jurisdiction over these producers.

> The controversy surrounding this ruling has arisen for two very important reasons. First, as already described, it is certainly not clear that Congress intended that the law be interpreted to include regulation of wellhead prices. Second, the nature of any market imperfection which one might cite as a basis for regulating wellhead prices was never made clear. Did producers of natural gas have sufficient monopoly power to warrant the extension of regulation to them? Kahn points out by analogy that in the electric power industry the assumption has been that suppliers of fuel oil or coal to electricity generating companies have been sufficiently competitive to protect the consumer, and "that as long as they remained financially independent, the regulated monopolists had no incentive to pay more than the competitive price." There is some debate as to whether the same is true for the natural gas field market.[17]

Contrary to the court's misguided opinion, the Congress was not ready, yet, to allow the FPC to regulate the producer's sales price. After the Phillips decision the FPC was slow to act because it expected Congress to amend the Natural Gas Act of 1938 and specifically exclude any FPC rate-making authority over the independent producers. By Congressional standards, Congress was quick to act. Just such an amendment, excluding rate-making authority, was passed by Congress in 1956. It was the Harris-Fulbright Bill.[18] The bill was passed only by strenuous efforts by Sam Rayburn in the House and Lyndon B. Johnson in the Senate. Both were said to have cashed in on many of the "I.O.U.'s" they had accumulated.[19] The bill was vetoed by Eisenhower who basically supported the objectives. Reports of bribery, scandal and illegal lobbying tactics, and specifically the attempted bribe of Frances Case of South

Dakota with a $2,500 campaign contribution prompted Eisenhower to regretfully veto the bill because he felt to approve the bill under such circumstances would create "doubt among the American people concerning the integrity of the governmental process."[20] The President expressed his regret in having to veto the bill by stating:

> I must make it quite clear that legislation conforming to the basic objectives of H.R. 6645 (the Harris Bill) is needed. It is needed because the type of regulation of producers of natural gas which is required under present law will discourage individual initiative and incentive to explore for and develop new sources of supply.[21]

Despite further efforts by Johnson and Rayburn, a similar bill could not be passed. While this may indicate the success of "questionable lobbying techniques" it did not help the FPC on whom the burden now fell to try and set rates for over 4,000 independent gas producers.

B. Independent Producer Regulation

The failure of Congress to amend the Natural Gas Act left the FPC to "regulate" the prices.

> After 1958 the conflict shifted from Congress back to the regulatory arena. The basic position of the F.P.C., which favored exempting producers, remained unchanged. However, since Congress had failed to amend the Natural Gas Act, the Commission turned to the problem of finding a formula for producer regulation as decreed by the Supreme Court in the Phillips decision in 1954.[22]

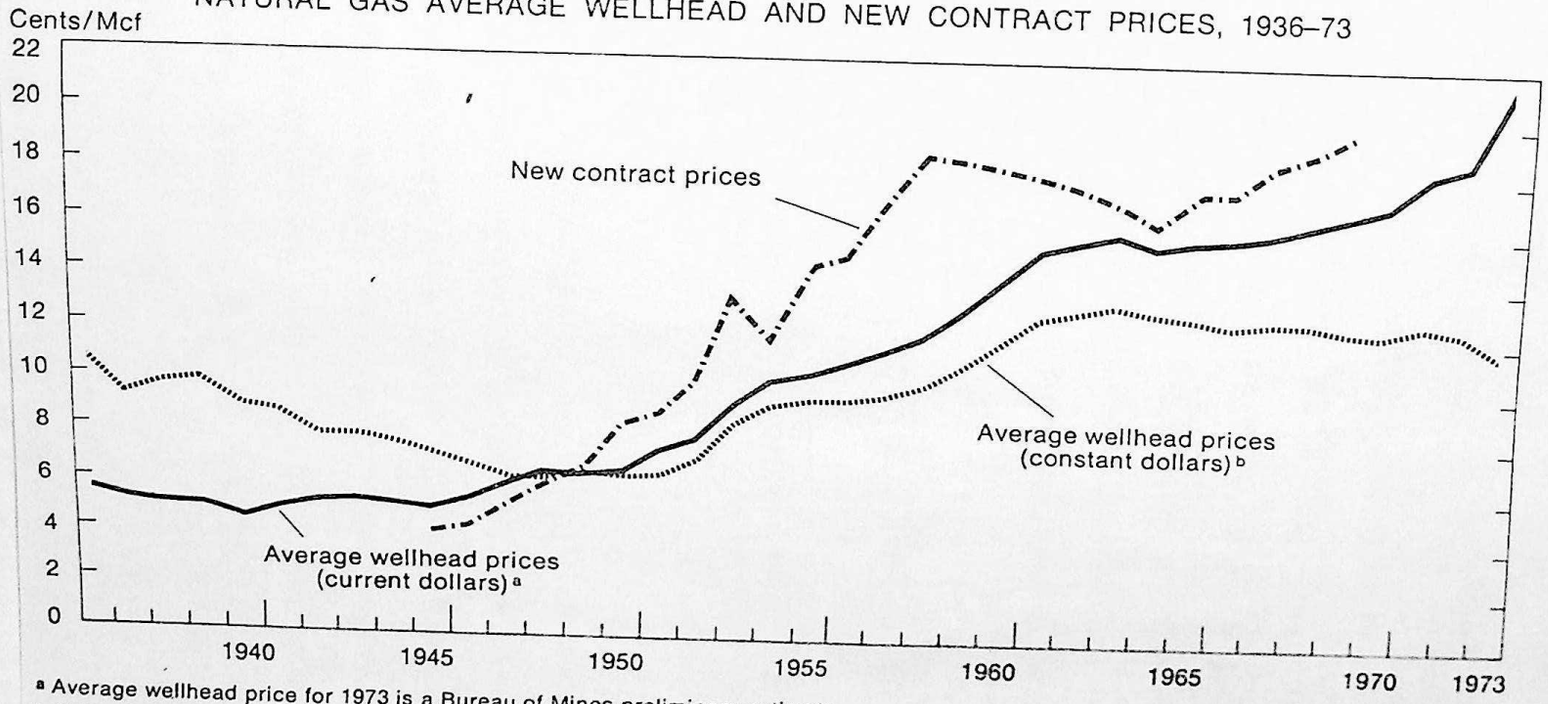
The FPC began wellhead price regulation as the desired method of regulating the selling price of gas to interstate pipelines. This required the producers to submit

rates and receive producer certificates. Prior to the 1954 Phillips decision, the FPC averaged about 100 certificate applications and 700 gas-rate filings annually. In the first year following Phillips, this increased to 6,047 producer certificate applications and about 11,000 producer rate schedules.[23] Between 1954 and 1960, the FPC had accumulated 11,091 rate schedules and 33,231 supplements to those schedules from 3,372 independent producers; in addition there were 3,278 producer rate increase filings under suspension and awaiting hearings.[24] The Commission estimated that it would finish its 1960 backlog by 2043![25] It was described as "the outstanding example in the Federal government of the breakdown of the administrative process."[26] The case-by-case rate of return/rate-base regulation was simply not working. In ten out of eleven cost-of-service cases the FPC approved the requested rate increases based on the method of FPC used to determine costs. Figure 1 on page 13 sbows that the new rate regulation was not able to keep field prices from rising.

This does not mean, as Helms stated in his evaluation of FPC price constrols, that the regulations did not impose additional costs. "Robert W. Gerwing has estimated that the costs imposed come to approximately 6 percent of the base price of natural gas in the Gulf Coast market during the years 1956 to 1958. The total cost to the industry was estimated to be about $84 million per year. By comparing interstate and intrastate

Figure 1

NATURAL GAS AVERAGE WELLHEAD AND NEW CONTRACT PRICES, 1936–73



[a] Average wellhead price for 1973 is a Bureau of Mines preliminary estimate.
[b] 1947–49 = 100.

Source: Average wellhead prices from U.S. Bureau of Mines, *Minerals Yearbook*, 1936–72. Weighted-average new contract prices for the seven southwest producing states from Foster Associates, Inc.

prices, Gerwing has concluded that producers considered this cost of regulation in negotiating their prices with interstate pipelines.[28]

It soon became obvious that the case-by-case rate-making over the individual producers was not going to work. Under increasing pressure to control rates and slow increases the FPC expressed its frustration and problems with individual producer regulation in Phillips II.[29] In its opinion the Commission decided upon, what has come to be known as area rate making. This approach was upheld by the Supreme Court which stated:

> The Commission's considered judgment, backed by sound and persuasive reasoning, that the individual company cost-of-service method is not a feasible or suitable one for regulating the rates of independent producers. We share the Commission's hopes that the area approach may prove to be the ultimate solution.[20]

C. Area-Rate Regulation

Area-rate regulation began in 1960 when the FPC divided the country's gas wells into 23 geographic locations. The procedure sounded and seemed simple enough. Establish a maximum price based on the cost of production in each of these areas. Hearings were to be held for each area to determine the just and reasonable rates. During this time, however, the Commission froze the prices in each area. This price freeze established what has been called the "in line" pricing doctrine. The doctrine was based on the

view that the way to protect consumers was to keep current prices "in line" with past prices.[31] The rates the FPC established contained a two-tier pricing rate for old and new gas. It was determined that the two-tier system was justified since it "was both undesirable and unnecessary to extend that higher price to old gas. Undesirable because to do so would confer windfalls on the owners of reserves, discovered and developed at lower costs in the past (a non-economic argument), and unnecessary because the investments in the old gas had already been made (an economic consideration)."[32]

The Permian Basin area rate hearings began in 1960. In August of 1965 the FPC finally announced its opinion.[33] After three more years the Supreme Court gave its approval.[34] While the FPC was undertaking its hearings it became aware of the statistics which showed a shortage of natural gas was imminent. Demand for the clean burning, efficient natural gas was increasing while exploratory drilling and reserves were declining. As the early 1970's passed, it was obvious that area rate making was too slow and inefficient to satisfy the FPC's justification for regulation which was to assure an adequate supply at a just and reasonable price. The FPC then moved on and decided to use nationwide rate making.

D. Nationwide Ratemaking

The FPC began to set nationwide rates in 1974. In determining the national rate the Commission adhered to cost as the basis. The rate was determined by projecting the average cost of finding and producing "new gas" over the estimated life of the producing well and adding a 15 percent annual rate of return.

> The overall cost determination was based on an evaluation of the following components: (1) Successful Well Cost, (2) Dry Hole Cost, (3) Lease Acquisition Cost, (4) Cost of Other Production Facilities, (5) Other Exploration Cost, (6) Exploration Overhead, (7) Production Operating Expense, (8) Net Liquid Credit (subtracted from costs), (9) Royalty Expense, (10) Recompletion and Deeper Drilling Cost (stipulated), (11) Regulatory Expense (stipulated), (12) Return on Production Investment, and (13) Return on Working Capital. The Commission did not include an element of cost for federal income tax but established a procedure whereby a producer can gain an increase for taxes paid upon jurisdictional activities by making an individual showing that such expense was actually incurred.[35]

The rates were changed rapidly during the coming months and years in an effort to alleviate the growing gas shortages.[36] At this time control of the wellhead price regulation was transferred to the Federal Energy Regulatory Commission which was organized as an independent branch of the Department of Energy when Congress enacted and the President signed the Department of Energy Reorganization Act of 1977. With this act came the end of the FPC in regulating the wellhead price of natural gas. It also ushered in the new era of the Federal Energy Regulatory

Commission and the Natural Gas Act of 1978.

The Natural Gas Act of 1978 is a confusing bill of compromises. A look at the conflicting data on the development of natural gas, its production and the debate over what caused the shortage is necessary to understand the extensive revisions in the natural gas industry.

III. EFFECT OF REGULATION UPON THE NATURAL GAS SUPPLY

The development of the method of ratemaking by the FPC shows a rather classic problem in a public sector program. Even though the FPC had a clearly defined goal, to assure an adequate supply of natural gas at a reasonable price, that goal was displaced and the means was transferred to be the goal. As the rate making methods failed, the FPC did not step back and evaluate how to best assure an adequate supply. Rather it concentrated on solely finding a method to determine prices at the wellhead. Even when it became painfully obvious that a shortage was imminent the FPC continued to focus on only part of its original goal, keeping prices artificially low at the wellhead.

Even when the shortage was looming all the FPC did was allow prices to rise as a quick fix attempt to resolve the crises. The question then arises, did the information exist to allow the FPC to fulfill its goal of insuring adequate supply also.

A. Causes of Shortage

Some opponents of deregulation firmly believe the gas producers simply did not produce the gas and did so to force a shortage and hence higher prices.[37] The definition of shortage is when the demand exceeds the supply of a commodity. As the shortage approached reserves to production (R/P) were decreasing. At the same time, demand was increasing. In a free market what happens is that the cost of using the commodity, which is in short supply, goes up as users compete. As the price rises certain users no longer desire the product thus alleviating some demand for the product. When supply and demand are approximately equivalent, a fair market price has been reached. If supply exceeds demand the price should fall. The FPC's job was to find that price which would assure an adequate supply at a price which would not allow such a great demand for a product which has an ascertainable value. What the FPC did, however, was only set a low price for those wishing to use natural gas, who would only use it at such a low price. Thus the consumers were subsidized with a low price with no method of controlling their demand. Suppliers will not search for and produce a product if they cannot make a profit. As the profit potential becomes larger, it is more probable that the effort to supply the product will increase. Therefore, as prices rise, so will supply. But the FPC held prices at an artificially low level. The price was

low enough and the regulations bothersome enough that independent producers did not wish to search for and produce natural gas. To determine the causes of the shortage more accurately, it is necessary to examine the demand and supply more carefully.

1. Increase in Demand

One report to Congress estimated that in times of shortage the price will not affect demand.

> Due to known existence of curtailments, an unregulated price may not affect consumption if only unsatisfied demand is being bid away. Conversely, a regulated price would not increase consumption, but would increase the quantity of unsatisfied natural gas demand.[39]

In other words, once the shortage is created, a lower price cannot increase the quantity of gas used if it is already used up. Prior to the shortage, however, price has a different effect on demand.

Between 1956 and 1970, consumption of natural gas doubled. As a percentage, natural gas increased from one quarter to one third of the energy fuels consumed in the United States during the FPC's price controls. After prices rose consumption fell back to one quarter with a shift to petroleum energy. See Figure 2, page 20.

As Figure 3 (see page 20) suggests,

> . . . the rate of growth of the pipeline and distribution system was greatest during the decade after 1945. Growth started to decline in the late 1950s as retail markets started to fill up. This change in the rate of growth of retail markets had

FIGURE 2

MINERAL FUEL RESOURCES AND ELECTRICITY—PRODUCTION AND CONSUMPTION, BY MAJOR SOURCE: 1940 TO 1978

[A British thermal unit (Btu) is the quantity of heat required to raise the temperature of 1 pound of water 1°F at or near its point of maximum density. Prior to 1960, excludes Alaska and Hawaii, except data for bituminous coal include Alaska for all years. For Btu conversion factors, see text, p. 599. See also *Historical Statistics, Colonial Times to 1970, series* M 76-92]

YEAR	Total production (quad. Btu)	PERCENT OF PRODUCTION				Total consumption (quad. Btu)	PERCENT OF CONSUMPTION			
		Coal	Crude petroleum [1]	Natural gas [2]	Electricity [3]		Coal	Crude petroleum [1]	Natural gas [2]	Electricity [3]
1940	25.1	53.3	31.3	11.9	3.5	23.9	52.4	31.4	11.4	3.8
1950	34.5	42.7	33.4	20.0	3.9	33.6	38.1	39.8	18.1	4.0
1955	39.1	32.6	37.0	27.0	3.4	39.2	29.1	44.2	23.3	3.5
1960	41.8	26.7	35.7	33.8	3.8	44.1	22.8	45.1	28.5	3.6
1961	42.3	25.4	36.0	34.7	3.9	44.7	21.9	45.2	29.2	3.7
1962	43.9	25.5	35.4	35.0	4.1	46.8	21.5	44.9	29.8	3.8
1963	46.2	26.4	34.6	35.2	3.8	48.6	21.7	44.5	30.1	3.6
1964	48.0	26.8	33.6	35.7	3.9	50.8	22.0	43.7	30.6	3.7
1965	49.7	27.0	33.3	35.6	4.2	53.0	22.3	43.6	30.2	3.9
1966	52.5	26.4	33.5	36.2	4.0	55.7	22.2	43.3	30.8	3.7
1967	55.4	25.7	33.7	36.3	4.3	57.9	21.0	43.5	31.3	4.1
1968	57.1	24.4	33.7	37.6	4.3	61.3	20.5	43.8	31.7	4.0
1969	59.4	24.0	32.9	38.5	4.7	64.5	19.6	43.8	32.4	4.3
1970	62.5	24.3	32.6	38.6	4.5	66.8	18.9	44.0	32.8	4.3
1971	62.0	22.1	32.5	40.2	5.2	68.3	17.6	44.7	32.9	4.7
1972	62.8	23.1	31.9	39.5	5.5	71.6	17.3	46.0	31.7	4.9
1973	62.5	23.1	31.2	39.7	6.0	74.6	17.8	46.7	30.2	5.2
1974	61.2	23.7	30.4	38.7	7.2	72.4	17.7	46.1	29.9	6.3
1975	60.1	25.6	29.5	36.6	8.4	70.7	18.2	46.4	28.3	7.2
1976	60.1	26.5	28.7	36.3	8.5	74.2	18.6	47.0	27.4	7.1
1977	60.4	26.3	28.9	36.3	8.5	76.6	18.5	48.6	26.0	6.9
1978, prel	61.0	24.8	30.1	35.3	9.8	78.0	18.1	48.4	25.4	8.1

[1] Production includes lease condensate. Consumption includes domestically produced crude oil, natural gas liquids, and lease condensate, plus imported crude oil and products. [2] Production includes natural gas liquids; consumption excludes natural gas liquids. [3] Comprised of hydropower, nuclear power, and geothermal energy.

Source: 1940, U.S. Bureau of Mines, *Minerals Yearbook*; thereafter, U.S. Energy Information Administration, *Annual Report to Congress*, vol. II.

FIGURE 3

CUSTOMERS SERVED BY NATURAL GAS COMPANIES, 1945-70

Year	Number of Customers (millions)	Percentage Growth
1945	11.8	—
1950	18.3	55%
1955	28.2	54
1960	33.7	20
1965	38.3	14
1970	41.9	9

Source: Bureau of Mines, *Minerals Yearbook*, various years.

> important effects on the field market. The decline in the rate of expansion of retail markets led to a decline in the demand for new gas in the field. This may be one reason contract prices for new gas in the field market started to decline about 1958, two years before FPC price ceilings were imposed.41

While the total number of customers leveled off, industry increased its use of natural gas due to increasing environmental concerns since natural gas is an efficient, clean-burning fuel.

While these figures would seem to show that natural gas did not have an undue demand, such is not the case. In the early years, the easiest gas to produce was the source of supply and many of the large gas deposits had been discovered. By 1968, the reserve additions had failed to keep up to production and consumption. Discoveries were not keeping up to consumption yet the FPC was still maintaining low prices, encouraging use and discouraging production.

2. Decline in Supply

The supply of natural gas actually increased until the mid-1970's; it has been falling slightly since. But with that fall, demand has also fallen off somewhat. As Figure 4 shows, the total production exceeded consumption by two trillion cubic feet even during the severe shortages which forced factories to close and curtailments in many areas.

These shortages occurred in areas of the country that do not produce natural gas. Therefore, their supply

FIGURE 4

. NATURAL GAS—SUPPLY, PRODUCTION, CONSUMPTION, RESERVES, AND MARKETED PRODUCTION, BY STATES: 1960 TO 1978

[Prior to 1960, excludes Alaska. See also *Historical Statistics, Colonial Times to 1970*, series M 147-161]

ITEM	1960	1965	1970	1972	1973	1974	1975	1976	1977	1978
Producing wells, 1,000	91	112	117	121	124	128	132	137	148	(NA)
Production value at wells [1], mil. dol.	1,790	2,495	3,746	4,186	4,894	6,573	8,945	11,572	15,834	18,068
Avg. per 1,000 cu. ft., cents	14.0	15.6	17.1	18.6	21.6	30.4	44.5	58.0	79.0	91.9
Proved reserves [2], cu. ft.	264	286	291	266	250	237	228	216	209	200
SUPPLY (bil. cu. ft.)										
Total supply	13,640	17,456	24,200	25,308	25,213	24,260	22,821	22,837	22,786	(NA)
Marketed production [1]	12,771	16,040	21,921	22,532	22,647	21,601	20,109	19,952	20,025	19,661
Drawn from storage	713	960	1,459	1,757	1,533	1,701	1,760	1,921	1,750	(NA)
Imports [3]	156	456	821	1,019	1,033	959	953	964	1,011	965
Consumption, total [4]	12,509	16,033	22,046	23,009	22,966	22,111	20,409	20,801	19,521	19,410
Residential	3,103	3,903	4,837	5,126	4,879	4,786	4,924	5,051	4,821	4,970
Commercial	1,020	1,443	2,057	2,287	2,288	2,263	2,268	2,383	2,243	2,310
Industrial [5]	8,386	10,687	15,152	15,596	15,799	15,062	13,218	13,366	12,457	12,130
Electric utilities	1,725	2,318	3,894	3,979	3,605	3,429	3,147	3,078	3,189	3,220
Field [4]	1,780	1,910	2,305	2,364	2,412	2,365	2,269	2,488	1,659	1,620
Refineries	775	860	1,029	1,071	1,074	1,040	946	928	914	(NA)
Pipeline fuel	347	501	722	766	728	669	583	548	533	520
Exports	11	26	70	78	77	77	73	65	56	52
Stored	844	1,078	1,857	1,893	1,974	1,784	2,104	1,756	2,307	(NA)
Transmission loss	274	319	228	328	196	289	235	216	41	(NA)
PRODUCTION (bil. cu. ft.)										
Marketed production: [1]										
Alaska	(Z)	7	112	126	131	129	160	166	188	203
Ark	55	83	181	167	158	124	116	110	104	107
Calif	518	660	649	467	449	365	318	354	311	314
Colo	107	126	106	117	138	145	172	184	189	184
Kans	634	793	900	889	893	887	844	829	781	854
La	2,988	4,467	7,788	7,973	8,242	7,754	7,091	7,007	7,215	7,230
N. Mex	709	937	1,139	1,216	1,219	1,245	1,217	1,231	1,203	1,192
Okla	824	1,321	1,595	1,807	1,771	1,639	1,605	1,727	1,770	1,774
Tex	5,893	6,637	8,358	8,658	8,514	8,171	7,486	7,192	7,051	6,548
W. Va	209	207	242	215	209	202	155	153	153	149
Wyo	182	236	339	375	358	327	316	329	330	335
Other	562	566	512	502	566	613	629	670	730	771
World production	(NA)	(NA)	37,542	43,525	46,144	47,179	47,518	49,459	51,394	(NA)
Percent U.S. of world	(NA)	(NA)	58.4	51.8	49.1	45.8	42.3	40.4	39.0	(NA)

NA Not available. Z Less than 500 million cubic feet.

[1] Comprises gas sold or consumed by producers, including loss due to natural gas liquids recovery, losses in transmission, amounts added to storage, and increases in gas in pipelines. Beginning 1965, data on pressure base of 14.73 pounds per square inch absolute; prior years, 14.65. [2] Estimated, end of year. Source: American Gas Association, Arlington, Va. (Copyright.) [3] Beginning 1970, includes imports of liquefied natural gas.

[4] Beginning 1977, excludes extraction loss. [5] Includes other use, not shown separately.

Source: Except as noted, through 1975, U.S. Bureau of Mines, *Minerals Yearbook* (in some cases data have been revised by EIA); thereafter, U.S. Energy Information Administration, *Natural Gas Production and Consumption*, annual.

comes from interstate pipelines who get their gas from producers whose price is regulated by the FPC. In order to achieve the best return possible, many producers had contracted their gas intrastate. Only by allowing increased rates and allowing emergency sales was the FPC able to get enough gas to the interstate market to alleviate the severe shortage. Figure 5 (page 23) shows the startling commitments to intrastate reserves rather than interstate.

FIGURE 5

LOWER 48 STATES NET RESERVE ADDITIONS
INTERSTATE VS. INTRASTATE

Year	Total Net AGA Reserve Additions	Net Interstate Reserve Additions (Form 15)		Inferred Intrastate Reserve Additions *	
	Tcf	Tcf	Percent	Tcf	Percent
1964	20.1	10.6	53	9.5	47
1965	21.2	13.3	63	7.9	37
1966	19.2	14.2	74	5.0	26
1967	21.1	14.8	70	6.3	30
1968	12.0	9.5	79	2.5	21
1969	8.3	6.1	73	2.2	27
1970	11.1	0.0	0	11.1	100
1971	9.4	2.0	21	7.4	79
1972	9.4	(0.2)	0	9.6	100
1973	6.5	1.1	17	5.4	83

Source: American Public Gas Ass'n v. FERC, — F.2d —, 14 F.P.S. 6-140 at note 5 (D.C.Cir. 1978).

* Derived by assuming that intrastate reserve additions are equal to the difference between total AGA reserve additions and the reserve additions committed to the interstate market. Brief for Petitioners at 8 (citing data from December 1974 Staff Report of FPC's Bureau of Natural Gas, entitled "A Realistic View of U.S. Natural Gas Supply").

During this time not only was gas being sold to the intrastate market rather than the interstate market, the United States total reserves peaked in 1967 and subsequently gross additions fell off sharply, as can be seen by Figure 6 (page 24).

In the face of falling reserves and increasing use of natural gas, the FPC chairman testified that they felt the area rate approach provided "the greatest incentive to producers to continue their search for needed additions to our gas supply."[43] That great incentive was 7.4 cents in eight years! Looking at the figures available while the

FIGURE 6

INTERSTATE PIPELINE COMPANIES:
TOTAL DOMESTIC RESERVES
AND GROSS ADDITIONS TO RESERVES, 1963-72
(trillions of cubic feet)

Year	Pipeline Domestic Reserves	Total Domestic Pipeline Production	Domestic Reserves ÷ Production	Gross Additions	Gross Additions ÷ Production
1963	188.5	9.4	20.1	—	—
1964	189.2	10.0	18.9	10.6	1.06
1965	192.1	10.4	18.5	13.3	1.28
1966	195.1	11.1	17.5	14.2	1.27
1967	198.1	11.8	16.8	14.8	1.25
1968	195.0	12.6	15.5	9.5	.75
1969	187.6	13.4	14.0	6.1	.45
1970	173.6	14.1	12.3	0.04	.003
1971	161.4	14.2	11.5	1.9	.134
1972	146.9	14.2	10.3	−0.24	−.017

Source: FPC, *The Gas Supplies of Interstate Natural Gas Pipeline Companies, 1972* (Washington, D. C.: Federal Power Commission, May 1974), pp. 2-9. Gross additions are the total of revisions to pipeline-owned or contracted reserves plus new additions.

industry was telling the FPC that rates needed to be higher and predicting a shortage because of shifting supplies to the intrastate market and falling reserves, the FPC chairman stated that there was insufficient data to establish a "supply curve that will show us the relationship between the price level and discovery of reserves."[44] His conclusion stated:

> We conclude that there is no immediate solution to the gas supply problem. No single factor is determinative in assuring new domestic gas supplies to meet growing demands. Strategic considerations governing related investments abroad or on the North Slope of Alaska, the effect on economic incentives

> of growth rates in investments, sales, profits, cost trends, tax laws, change in oil import policy--all these factors materially influence the rate of capital commitment to the search for, and development of gas and the magnitude of investment in pipeline and distribution facilities. The precise dimension or magnitude of the gas supply problem cannot be established until probative evidence relevant to the problem has been presented in rate proceedings before the Commission, or until a reliable gas survey has defined supply in relation to deliverability and demand. Analysis of deliverability in relation to projected demand compels the conclusion that we cannot defer decision to protect the consumer or the investor interest pending precise measurement or "mathematical nicety." The public interest requires full, continuous and expeditious examination of the gas supply problem and regulatory and governmental and industry action to assure adequate service to the consumer.[45]

On the threshold of a supply crisis and he is calling for a study on the effect of price on supply.

In the uncontrolled intrastate market, prices rose 650 percent from 1969 to 1975 on new gas contracts. On the interstate level, prices rose from .19¢ per MCF to .51¢ per MCF, a 158 percent increase. Even with these fantastic percentage increases, natural gas was still the lowest priced fuel available per BTU. See Figure 7, page 26.

By maintaining this low price the FPC encourages continued demand. For later years, however, the price per BTU is held low by the interstate controlled price. While the figures do not break down the price into inter and intra state prices, intrastate prices are probably in line with the energy price per BTU for other fuels. The interstate market is probably maintained only on existing contracts which could not be shifted to intrastate consumers. Now, however, there is sufficient supply.

FIGURE 7

FOSSIL FUEL PRICES IN CURRENT AND CONSTANT (1972) DOLLARS: 1960 TO 1978

[In cents per million British thermal units (Btu), except as indicated. All fuel prices taken as close to the point of production as possible. See text, p. 599, for explanation of Btu conversions from mineral fuels. Minus sign (−) denotes decrease]

FUEL	1960	1965	1970	1972	1973	1974	1975	1976	1977	1978, prel.	PERCENT CHANGE— 1960–1970	1970–1973	1973–1978
CURRENT DOLLARS													
Composite [1]	30.0	28.5	32.5	36.8	43.2	72.4	86.4	94.9	107.3	114.9	8.3	32.9	166.0
Crude oil	49.7	47.6	52.1	58.5	67.1	118.5	132.2	141.2	147.8	154.5	4.8	28.8	130.3
Natural gas liquids	55.2	48.1	50.7	56.0	72.4	124.9	116.7	141.0	173.0	(NA)	−8.2	42.8	(NA)
Natural gas (dry)	13.5	15.1	16.6	18.1	21.2	29.7	43.6	56.9	77.4	90.0	23.0	27.7	324.5
Bituminous coal [2]	18.3	17.5	25.5	31.9	35.5	66.4	82.9	83.9	89.5	97.8	39.3	39.2	175.5
Anthracite coal	33.0	35.3	47.1	53.0	50.2	98.4	137.9	147.5	154.5	162.2	42.7	6.6	223.1
CONSTANT (1972) DOLLARS													
Composite [1]	43.7	38.3	35.6	36.8	40.0	62.4	68.0	70.9	75.8	75.5	−22.7	12.4	88.7
Crude oil	72.3	64.0	57.0	58.5	63.4	102.1	104.0	105.6	104.4	101.6	−21.2	11.2	60.3
Natural gas liquids	80.4	65.0	55.4	56.0	68.4	107.7	91.8	105.4	122.8	(NA)	−31.3	23.5	(NA)
Natural gas (dry)	19.7	20.3	18.2	18.1	20.0	25.6	34.3	42.5	54.7	59.2	−27.6	9.9	196.0
Bituminous coal [2]	26.6	23.5	27.9	31.9	33.6	57.2	65.2	62.7	63.2	64.3	4.9	20.4	91.4
Anthracite coal	48.0	47.4	51.6	53.0	47.5	84.8	108.5	110.3	109.1	106.6	7.5	−8.0	124.4
GNP price deflators 1972 = 100	68.7	74.3	91.4	100.0	105.8	116.0	127.2	133.8	141.6	152.1	33.0	15.8	43.8

NA Not available. [1] Weighted by relative importance of individual fuels in total mineral fuels production. [2] Includes lignite.

Source: U.S. Energy Information Administration, *Annual Report to Congress*, vol. 2.

The theory of supply and demand and the effect of price on both can only occur when there is a free market with competition. Many decontrol opponents feel that that competition is absent from the present market.

3. Competition in the Gas Industry

A former FPC commissioner has written that he believes the oil and gas industry is not sufficiently competitive enough to ensure proper market action.[46] This belief was strongly supported by an association of municipally-owned gas distribution systems.[47] In fact, they placed lack of competition in the producer market as the number one problem behind the curtailment of gas to the interstate market. To support their claim of lack of competition, they cite

the number of producers which control a large percentage of production in any one field.[48] They also point to the joint operating interests and joint leases among the oil companies. The largest producer of natural gas, however, sold less than ten percent of the interstate market, with the largest 4, 8, and 20 firms supplying 26.7, 45.4 and 69.6 percent respectively. See Figures 8 and 9.

FIGURE 8

.—RANKING OF LARGEST COMPANIES IN THE PETROLEUM INDUSTRY (1970)

Natural gas producers	Liquid hydrocarbon production [1]	Petroleum refining	U.S. refined product sales	Natural gas sales to interstate pipelines
Exxon	1	1	1	1
Texaco	2	2	2	7
Gulf	3	5	7	2
Shell	4	7	3	3
Chevron	5	4	5	11
Amoco	6	6	4	4
Atlantic-Richfield	7	8	8	8
Mobil	8	3	6	6
Union Oil	9	10	11	9
Getty	10	15	17	17
Sun	11	9	10	12
Phillips	12	11	9	5
Continental	13	14	14	10

[1] Ranking is by domestic production in volume.

Source: Natural Gas Survey, 1975, vol. I, table 3-1, p. 55.

FIGURE 9

—SELECTED CONCENTRATION RATIOS FOR PRODUCERS

Concentration ratio, including this number of largest firms	Percentage of annual volume under new sales contract, 1969			National sales of natural gas to interstate pipelines, 1971 percentage of total sales
	Southern Louisiana	Permian Basin	Texas Gulf Coast	
1	11.1	21.1	21.9	9.8
4	38.4	57.8	62.6	26.7
8	63.7	71.5	71.5	45.4
20				69.6

Sources: National Gas Survey, vol. I, pp. 57-58.

These figures were discussed by Braeutigam in his study:

> First, the concentration figures are somewhat higher if we look at major gas producing regions instead of the national market. In [Figure 9], the concentration figures are shown by region for gas sold under new sales contracts during 1969. No single producer approaches domination in any regional market, although by some standards the concentration ratios are high enough in the Texas Gulf Coast and Permian Basin areas to appear oligopolistic. It should be noted that if concentration ratios are taken as an indicator of market power, there is an argument that the relevant market is national rather than regional. Many gas consuming regions receive gas from more than one major producing area. This would limit the extent to which producers in any single area could control the price of gas even if they attempted to collude in doing so.50

Additionally many of the figures proponents of regulation use to show a lack of competition are taken from offshore leases where there is a high number of joint leases among the producers. The number of joint leases is to spread the risk of a very high cost venture over several companies. Additionally, the leases sold for very high prices which necessitated joint ventures. The federal government also requires large financial resources to be able to bid for offshore leases. These high resources force smaller companies to either join or be precluded from bidding. While the exact measure of competitiveness in the gas industry cannot be gauged, it is obvious that the industry is forced to be competitive with coal, hydroelectric power, and any other energy sources such as Liquified Natural Gas (LNG), which is imported, or Synthetic Natural Gas (SNG). Thus, even if the gas producing industry is not completely competitive,

the energy industry is. On a per BTU basis, natural gas is still priced lower than alternative forms of energy.

C. Effect of Deregulation

The prospect of increasing prices and future deregulation has greatly increased the search for oil and gas. Gas is often found along with oil; such gas is called associated gas. Some areas, however, produce natural gas without any oil. Many of these areas which were unprofitable to work before because they contained only gas are now worth drilling at the higher prices for which the gas may be sold. The number of wells has increased dramatically. See Figure 10.

FIGURE 10

CRUDE PETROLEUM AND NATURAL GAS—WELLS DRILLED, FOOTAGE, AND DRILLING COST, BY TYPE OF WELL: 1960 TO 1977

[Includes all costs incurred for drilling and equipping wells to point of completion as productive wells or abandonment after drilling becomes unproductive. Based on sample of operators of different size drilling establishments]

ITEM AND YEAR	WELLS DRILLED		Footage drilled (mil. ft.)	DRILLING COST (mil. dol.)		Average depth per well (ft.)	AVERAGE COST PER WELL ($1,000)		Average cost per ft. (dol.)
	Total	Offshore		Total	Offshore		Total	Offshore	
All wells 1960	44,133	538	186.4	2,424	208	4,223	55	386	13.01
1965	39,596	1,037	178.7	2,401	428	4,513	61	413	13.44
1970	27,177	1,058	136.9	2,579	599	5,037	95	566	18.84
1973	26,244	888	136.7	3,075	578	5,207	117	651	22.50
1974	31,481	830	150.9	4,367	680	4,795	139	819	28.93
1975	36,960	1,028	177.6	6,571	1,174	4,806	178	1,142	36.99
1976	38,941	1,028	184.4	7,462	1,475	4,736	192	1,435	40.46
1977	43,826	1,217	212.7	9,956	2,056	4,853	227	1,689	46.81
Oil wells 1960	21,294	301	84.0	1,111	98	3,946	52	326	13.22
1965	18,857	487	76.5	1,067	193	4,059	57	396	13.94
1970	12,547	533	56.4	1,088	282	4,496	87	528	19.29
1973	9,705	296	44.7	1,007	182	4,602	104	615	22.54
1974	13,073	253	51.8	1,440	170	3,960	110	670	27.82
1975	16,276	283	66.1	2,257	253	4,059	139	892	34.15
1976	16,878	275	68.3	2,550	322	4,044	151	1,172	37.35
1977	18,077	288	74.7	3,073	419	4,130	170	1,454	41.16
Gas wells 1960	5,262	87	29.1	540	53	5,526	103	606	18.58
1965	4,772	118	26.5	486	67	5,552	102	571	18.35
1970	3,844	193	23.1	618	139	6,007	161	720	26.75
1973	6,427	193	36.3	998	154	5,654	155	798	27.46
1974	6,695	155	37.1	1,267	152	5,546	189	978	34.11
1975	7,654	271	43.4	2,005	338	5,667	262	1,247	46.23
1976	8,904	273	48.4	2,407	396	5,432	270	1,450	49.78
1977	11,479	393	62.5	3,599	675	5,446	314	1,716	57.57
Dry holes 1960	17,577	150	73.3	774	57	4,168	44	377	10.56
1965	15,967	432	75.7	849	167	4,739	53	387	11.21
1970	10,786	332	57.4	873	178	5,320	81	536	15.21
1973	10,112	399	55.7	1,070	242	5,504	106	608	19.22
1974	11,713	422	62.0	1,660	359	5,297	142	850	26.76
1975	13,030	474	68.2	2,309	584	5,234	177	1,232	33.86
1976	13,159	480	67.8	2,505	757	5,152	190	1,577	36.94
1977	14,270	536	75.5	3,285	963	5,292	230	1,796	43.49

Source: American Petroleum Institute, Independent Petroleum Association of Ame... Oil and Gas Association, *Joint Association Survey of the U.S. Oil and Gas Producing In...*

As Figure 4 showed previously, our proved reserves have decreased from 250 trillion cubic feet (TCF) in 1973 to 200 TCF in 1978. With the tremendous amounts of drilling and discovery a Phillips' Petroleum spokesman says such discoveries, "will at least arrest the decline in our reserves, even if they don't reverse it."[51] What has caused the increased supplies and frenzy of drilling? Increased prices and decontrol.

VI. NATURAL GAS POLICY ACT OF 1978

While the decontrol prospect has helped encourage increased drilling, it has not been all good. In an attempt to raise prices to encourage production, Congress also had to satisfy those wishing to retain regulation. The result is a complicated set of rates and regulations sixty-six pages long. The regulations issued occupy another 364 pages. It is tremendously complex. Administering the bill may require 300 additional employees above the 500 already authorized for FERC, said Chairman Curtis. The bill established about 29 different gas categories and 13 price categories.

It was estimated that the NGPA will cost $5 billion dollars in 1979.[52] This impact on consumers is substantial. The rise in price, however, has shown that it will effectively encourage production.

The entire sequence of events involving natural gas shows that the regulation attempt to keep prices too low

was ineffective. The pricing policy must involve adequate concern for allocation fo a scarce commodity.

A. Future of Regulation

The present act will decontrol prices at the wellhead in 1985. FERC will still have other responsibilities so it will still have much work to do. In fact, it will probably still be setting rates after decontrol at the present processing rate. The FERC had a backlog in 1978 and indicated this backlog will grow at a 12.1 percent annual increase.[53] Complete decontrol of wellhead prices should assure an adequate supply and the competition within the energy field including the new sources of power should keep prices at a fair market level.

B. Continued Regulation

If regulation is reestablished, such regulation must have as its goal assuring adequate supply for demand and that the price is in line with the costs of alternative energy sources. Only by assuring that gas is priced at what it is worth will we be able to distribute demand over many energy sources, thereby alleviating a severe crisis when a fuel source runs out. In addition only by pricing natural gas high enough will it force the search for alternative energy. Cheap fuel is a false blessing. When that fuel runs out it will only require a sudden shift to another source at a great cost of developing the source fast enough to replace the fuel which was prematurely used

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up because of a subsidy to those desiring to use that fuel. The marketplace is the best determiner of what the price of a valuable commodity should be, not the ballot booth.

C. Energy Policy

Natural gas is but one quarter of the total energy resources our country consumes. The rise in prices of all of these resources has been tremendous. See Figure 7 on page 26. This has encouraged production and discouraged use. Americans have favored highly efficient cars over the luxury models. Insulating homes has become a national pastime. Use of mass transit has increased. Even the price of fire wood has increased. All of this because of higher energy costs in all fields.

But was it American policy which was successful in providing us with increased supplies by discouraging use and encouraging production and the search for alternative sources/ The answer is a definite no! Our policies were forced upon us because of ourselves. The Arab oil boycott and the natural gas shortage showed us that our polices had to be changed. This change resulted in reorganization of our national energy policy. The first thing policy had to do was get control of a policy-making force. The 1976 Energy Act had six House committees and nine Senate committees at work on the Bill. Energy policy was being spread out all over. This consolidation resulted in the reorganization of the Department of Energy in 1977. Then with the passage of the Natural Gas Policy Act of 1978, FERC was given the

FPC's power to regulate with decontrol part of the eventual scheme of things. This raises an interesting question. Was the FPC's natural gas regulation power taken from it simply because it could not do the job?

I think the answer to that question is no. By the time the NGPA was passed, prices had reached a point where production was being encouraged and natural gas prices were falling in line with other costs. Admittedly, only because of a crisis did this come about. The FPC's power over regulation was shifted in order to form a better, more efficient organization for making and implementing an energy policy. The new policy of deregulation has been expensive to the consumer but it has worked. Reserves are being stabilized and alternative sources developed. I believe the regulation scenerio shows the folly of regulation directed at keeping prices artifically low. What may be an interesting turn of events, however, will be if alternative sources are developed too successfully and our petroleum and natural gas sources are produced too quickly because of the present profits available. Will this cause market prices to fall and therefore, the oil and gas industry calling for price supports in the "public interest" to prevent fuel from becoming too cheap which could create a wasteful economy again? Only time will tell whether we are in for a cycle of glut and shortage or whether policy will be developed to level out this cycle.

FOOTNOTES

1. 16 U.S.C. § 792 (1976).

2. Chapman v. Federal Power Commission, 191 F.2d 796 (4th Cir.) aff'd 345 U.S. 153 (1951).

3. 16 U.S.C. § 792 (1976).

4. Id.

5. 16 U.S.C. § 793 (1976).

6. Natural Gas Act. June 21, 1938 ch. 556, § 2, 52 Stat. 821.

7. Barrett v. Kansas Natural Gas Co., 265 U.S. 298 (1924).

8. An Examination of Regulation in the Natural Gas Industry, R. Braeutigam, Study for Senate Committee on Governmental Affairs, 95th Congress, 2d Sess., (1978), p. 668, citing Kahn (1971), Vol. II, p. 30.

9. 15 U.S.C.§717(b) (1964).

10. S.B. 1498, 81st Cong., 1st Sess. 1949.

11. 1950 Public Papers of the President of the United States, Washington, D.C.: Government Printing Office, 1965, at pp. 257-258.

12. Phillips Petroleum Company v. Wisconsin, 347 U.S. 672 (1954).

13. 347 U.S. at 685.

14. 347 U.S. at 690.

15. 347 U.S. at 698.

16. Williams, Maxwell & Meyers, Oil and Gas, Foundation Press (1974), pp. 79-80.

17. R. Braeutigam, Study, supra note 8 at 671.

18. H.R. 6645, 84th Cong., 1st Sess. 1956.

19. Williams, Maxwell and Meyers, Oil and Gas, supra note 16 at 78.

20. American Enterprise Institute, Natural Gas Deregulation Legislation (1973), p. 10.

21. Message from the President of the United States, Returning Without Approval the Bill (H.R. 6645) to Amend the Natural Gas Act, Document No. 342, February 20, 1956.

22. Carter, Lobbying and the Natural Gas Bill, p. 36.

23. Helms, Natural Gas Regulation, American Enterprise Institute, (1974), p. 19.

24. National Gas Survey (1975), Vol. 1, p. 85.

25. In re Phillips Petroleum Company, 24 FPC 537 (1960).

26. U.S. Department of the Interior, "Natural Gas." An "in-house" background report.

27. Helms, Natural Gas Regulation, supra note 23 at 21.

28. Id., citing to Robert W. Gerwing, "Natural Gas Production: A Study of Costs of Regulation," Journal of Law and Economics, Vol. 5 [October 1962], p. 85.

29. Phillips Petroleum Co., 24 FPC 537 (1960) at 542-548.

30. Wisconsin v. FPC, 373 U.S. 294 (1963) at 310.

31. Helms, supra note 23 at 22.

32. Kahn (1970) Vol. 1, p. 43, fn. 55.

33. Permian Basin Area rate hearings, opinion No. 468, 34 FPC 159 (1965).

34. Permian Basin Area Rate Cases, 390 U.S. 747 (1968).

35. Shell Oil Co. v. FPC, 520 F.2d 1061 (5th Cir. 1975), reh. denied 525 F.2d 1261 (5th Cir.), cert. denied 426 U.S. 941 (1976).

36. The initial national rate of 42 cents per Mcf (with upward or downward adjustments for gas with more or less than 1000 Btu's per cubic foot) was established by FPC Opinion No. 699 on June 21, 1974, for sales of natural gas from wells commenced on or after January 1, 1973, and new dedications of natural gas to interstate commerce on or after such date. 51 F.P.C. 2212. The rate was raised to 50 cents by Opinion No. 699-H on December 4, 1974, retroactive to June 21, 1974. 52 F.P.C. 1604. At the same time Interior Secretary Morton and Chairman Nassikas of the Commission asked Congress to drop all gas price controls to head off dangerous shortages. New York Times, Dec. 5, 1974, p. 1. col. 4. Although escalation of the national rate was by states, it was rapid. FPC Opinion No. 770-A (10 F.P.S. 5-854) [sustained in the Second National Natural Gas Cases (American Public Gas

Ass'n v. FPC), 567 F.2d 1016 (D.C. Cir. 1977), cert. denied 435 U.S. 907 (1978)], on Nov. 5, 1976, reaffirmed a rate of $1.42 per Mcf with a one cent per quarter escalator for sales from wells commenced on or after Jan. 1, 1975, and fixed a rate of 93 cents per Mcf with a one cent annual escalator for gas from wells commenced during the 1973-74 biennium. President Carter's original energy proposal in 1977 provided for a national rate of $1.75. The Natural Gas Policy Act of 1978, P.L. 95-621, provides for a price ceiling of $1.75 per million Btu's, as of April 1977, escalated with inflation. Williams, supra note 16 at 53, fn. 53.

37. Statement of Hon. Donald M. Fraser, before the Subcommittee on Energy and Power of the Committee on Interstate and Foreign Commerce, Hearings on Long-Term Natural Gas Legislation, 94th Congress, 2d Sess., (1977), p. 145.

Representative Fraser uses the declining number of developmental wells in known reserve areas to infer that the gas producers were holding back those areas for a time when the prices would be deregulated. What he fails to reveal is that under the rate system then existing such wells would have been regulated as "old gas" wells since they come from a known reserve which would mean the price for such gas would fall under the old price yet the wells would cost considerably more than those upon which the rate was based. The regulations forced the companies to find new areas to drill to achieve rates based upon the then existing costs

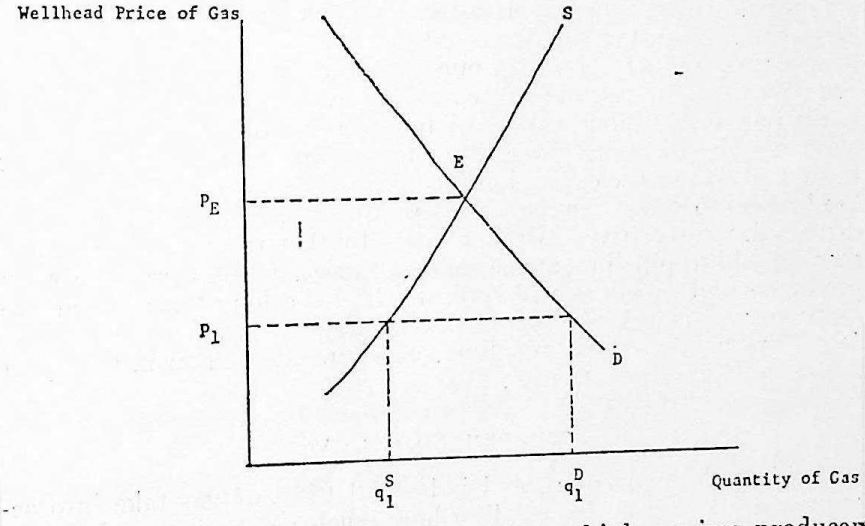
of sinking the well.

38. This discussion is brief. For a more detailed discussion see below from Braeutigam, supra note 8 at 679-681.

THE FORCES AND THE SHORTAGE

The effects of the forces at work in the production and consumption of natural gas can be illustrated using one of the most basic tools of economic analysis, supply and demand. In Fig. 2, S represents a supply schedule for gas. Faced with any prevailing price (e.g., p_1), producers will provide additional gas whenever the price (p_1) received for an additional Mcf exceeds the cost of producing the additional gas. At quantities less than q_1^s this is the case. At quantities larger than q_1^s, the cost of producing additional gas exceeds the revenues which could be earned given p_1, and producers would find it profitable to cut back production to q_1^s. Thus, given any prevailing price, the supply schedule S shows how much gas producers would supply.

FIGURE 2.—Wellhead market: Supply and demand.



As shown in Fig. 2, S slopes upward, i.e., at higher prices, producers would offer more gas for sale. This corresponds to the discussion developed above. At higher wellhead prices, producers would find exploration profitable for prospects deemed too risky at lower prices. Producers would also find development of deeper and tighter reservoirs profitable at higher wellhead prices. All of this would lead to more reserves available for production at the higher prices.

The steepness of the slope of S is important. It is sometimes argued (particularly by those who favor continued regulation of wellhead prices) that S is very steep, i.e., that at higher prices producers would not offer much more gas than they would at lower prices. By others it is argued that the slope of S is not so steep, particularly if higher prices were allowed to prevail over a time period long enough (e.g., a few years) so that producers could respond by increased exploration and development. In other words, in the long run, S might not be very steep, although in the short run S might be quite steep since producers cannot succeed in discovering and developing new fields in response to price changes over only a few months. The responsiveness of quantity produced to changes in price is an empirical question, and the available evidence will be discussed in section 4.

The demand schedule for natural gas is represented by the curve labeled D in Fig. 2. At any wellhead price (e.g., p_1) the quantity which consumers would be willing to purchase is represented by the quantity on D corresponding to p_1 (q_1^D in the example). Given the prices of other fuels, consumers can be expected to purchase less gas as the price of gas rises. For example, if the price of gas rises and the price of fuel oil remains unchanged, some consumers may find it cheaper to switch from gas to fuel oil. A higher gas price may lead other consumers to cut back on their gas consumption, even though they do not substitute other fuels for gas. These effects mean that the demand schedule will have a negative slope, as shown in Fig. 2.

At point E in Fig. 2 the market is said to "clear," since the quantity demanded equals the quantity supplied. At a price below p_E, the quantity demanded will exceed the quantity supplied. In other words, if regulators were to set a wellhead price such as p_1 (below p_E), then a resulting gas shortage would be expected. If the regulation holding the wellhead price at p_1 were removed, those consumers willing to pay more than p_1 to get gas would bid the price up. Only when the price has risen to p_E will consumers stop bidding the price up, for at that price can all consumers who are willing to pay p_E or more for gas actually purchase it.

The supply and demand framework will be used in the next section to illustrate several effects of regulation, although some modifications will be required to capture certain important features of natural gas markets.

39. Natural Gas Deregulation Analysis, FEA Technical Report to Subcommittee on Energy and Power, 94th Cong., 2d Sess. (1976), p. 329.

40. Statement presented before Subcommittee on Minerals, Materials, and Fuels, 91st Cong. 1st Sess. (1969), p. 232.

41. Helms, Natural Gas Regulation: An Evaluation of FPC Price Controls, American Enterprise Institute (1974), p. 11.

42. Id.

43. Permian Basin Area Rate Hearings, 34 FPC 159, 180, aff'd 390 U.S. 747 (1968).

44. Statement by Chairman Nassikas before Committee

on Interior and Insular Affairs, 91st Cong., 2d Sess. (1970), p. 70.

45. Id. at 74.

46. Ross, A Commissioner's Viewpoint, Regulation of the Natural Gas Producing Industry (1972), pp. 99-100.

47. Testimony before Subcommittee on Energy and Power, 94th Cong., 2d Sess. (1976), p. 1035.

48. Id. at p. 1035.

49. Braeutigam, supra n.8 at 710.

50. Id.

51. We're betting five inches against the world, Forbes, Feb. 4, 1980, p. 48.

52. Opening Statement, Subcommittee on Intergovernmental Regulations, 96th Cong., 1st Sess, 1979.

53. Statement of FERC Chairman, Subcommittee on Energy and Power, 95th Cong., 2d Sess. (1978), p. 3.