

1972

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## Recommended Citation

Edmund W. Kitch, "The Shortage of Natural Gas," University of Chicago Law Occasional Paper, No. 2 (1972).

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**OCCASIONAL PAPERS  
FROM THE LAW SCHOOL  
THE UNIVERSITY OF CHICAGO**

**NO. 2**

**1972**



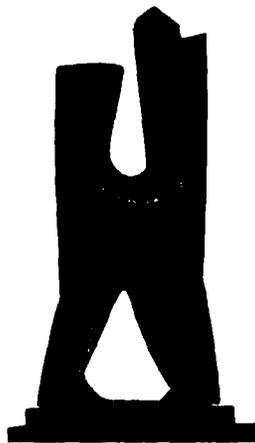
# Occasional Papers

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## The Shortage of Natural Gas

By EDMUND W. KITCH





# **The Shortage of Natural Gas**

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## The Shortage of Natural Gas

By Edmund W. Kitch\*

*The pricing, utilization, and taxation* of our petroleum and natural gas resources is a subject that has proven itself too important to be ignored by politicians. It is also a subject that is too important to be left to politicians. Tonight I hope to stimulate a reexamination of our national policies toward the natural gas industry, a reexamination free of the sectional and ideological biases that have beclouded if not completely obscured these policies in the past.

The widely publicized shortage of natural gas is but the best known symptom of the policy. Harried utility executives explain their inability to meet new demands for natural gas on the ground that there is a shortage. Producing companies use the existence of the shortage to support their requests for higher gas prices. But when we turn from claims to fact, we find that this much discussed shortage is an extraordinary phenomenon. The total marketed production of natural gas in the United States has not been decreasing. It has been increasing. The most recent figures are those for deliveries by the interstate pipelines. They show a steady increase. Natural gas provides roughly one-third of the energy consumed in the American economy, perhaps the most significant comparative advantage we enjoy. By contrast, the German economy obtains only 3.4 percent of its energy from natural gas. We have, along with the Russians, enjoyed the unique advan-

\*This paper is based upon a presentation made by Edmund W. Kitch, Professor of Law, The University of Chicago, May 27, 1971, at a seminar in Washington sponsored by the Law School. The original study on which this paper was based was sponsored by the Law and Economics Program at the Law School.

tage of substantial natural gas reserves within economic and political reach of our population and industrial centers. It is not an advantage we should lightly throw away.

When we turn from statistics on the current consumption of natural gas to future availability, the picture is less bright. Reserves have almost been keeping pace with production. But because of the increased production, the ratio of reserves to production has been falling. The Federal Power Commission 1969 staff study on the supply of natural gas showed that in 1969 the interstate pipelines had sufficient reserves to maintain 90 to 95 percent of their delivery rate for six and one-half years, down from 13 years in 1963. But these declining reserve ratios and deliverability periods are difficult to interpret. There is no theory which tells us what the optimum level of reserves is. Is the present decline a decline from a level of abnormally high inventory toward a more optimum level? Or is it a decline toward disaster? We can predict on the basis of past experience that new reserves will be discovered. Perhaps these new discoveries will be sufficient to maintain the present level of production for many years to come. All observers agree that potential reserves within the lower 48 states — those reserves not yet found but likely to be found in time — exceed those already produced. Whether or not the new discoveries will be sufficient to support continued production at the present rate past 1975 is a question that must keep not a few gas company executives awake at night. Whatever alternative use might be developed for the immense in place natural gas pipeline system which their companies own, I suspect that that use will be less productive of revenue than is the transmission of natural gas. There is no way to predict future discoveries of natural gas other than by projecting recent trends into

the future. These trends suggest that declining production will be upon us by the end of the decade.

*In spite of the basic abundance* of natural gas with which our nation is blessed, and in spite of an acceptable although worrisome near term supply situation, we are at the present time experiencing shortages in the interstate consumer market for natural gas. These shortages result not from the inadequacy of nature's bounty, but from the regulation of the Federal Power Commission effectively imposed on the field market for natural gas in 1961. I first became aware of the fact that this regulation would necessarily lead to a shortage in the interstate consumer market — an excess of demand in relation to supply — during my early research into the regulation and the industry during 1967. I reasoned that since the regulation froze the price of natural gas to the consumer subject only to possible marginal increases that might be obtained through the complex and snarled procedures of the Commission, and since the long term trend of all energy prices in the United States is up, the regulation would operate to make natural gas the cheapest energy source and therefore an energy source many consumers would desire to obtain. In my article on the subject, published in the *Journal of Law and Economics* in 1968, I developed this argument in full. I there had to deal at length, however, with one embarrassing fact. Why, if the regulation would necessarily cause a supply demand imbalance and had been in effect since 1961, had no such imbalance been reported? The answer I there offered was that due to a short term down trend in the price of coal for electric power generation, the total demand for natural gas had not been increasing through the early 1960's. Price indices for non-regulated seg-

ments of the industry seemed to confirm this hypothesis. I now think that that argument oversimplified, and that, as is suggested by Paul MacAvoy in an article also published in the *Journal of Law and Economics* and appropriately entitled: "The Regulation Induced Shortage of Natural Gas," price stability was also achieved in the mid-1960's by a dilution of the economic quality of the product. This decline in quality resulted from the decline in certainty that delivery rates could be maintained in the future. The consumer was able to buy natural gas at the same or even slightly lower price per thousand cubic feet of gas, but for his money he got less assurance that he could rely on the availability of natural gas in the future. Apparently as a result of these two factors, the shortage which I considered inevitable had not appeared by 1968. In my article I predicted that when and if the demand for natural gas increased, there would be a shortage.

Since the publication of that article the demand for natural gas had increased and a shortage has begun to develop.

The existence of this regulation induced shortage is not of itself harmful. It simply means that energy users desire to purchase more natural gas at the regulated price than they can obtain. Unable to obtain it, they must turn to other fuels. But if the price rose, that would also force consumers to turn to other fuels. Indeed, for reasons that I shall develop in more detail, it is my view that this shortage will disappear within the next three to five years. The price freeze which causes the present disequilibrium is, however, harmful to the national interest for two reasons. First of all, the price freeze denies to interstate consumers of energy supplies of natural gas that could be produced at costs lower than the alternative forms of energy to which the con-

sumers are forced to turn. Second, the price freeze bargain price encourages the continuation of economically inferior end uses of natural gas instead of stimulating the reallocation of gas supplies to users who would obtain a greater economic benefit from them.

The Commission's regulation of sales by producers of natural gas to interstate pipelines affects the supply of natural gas available to those pipelines in a number of different ways. First, and most dramatically, the regulation has made it difficult for the interstate pipelines to purchase gas at all. In the unregulated intrastate markets the price of natural gas has moved above the Federal Power Commission ceiling prices. Needless to say, producers prefer, whenever they can, to sell to an intrastate customer at a higher unregulated price under contracts that can provide, unlike Commission regulated contracts, for future price increases if the demand for natural gas increases still further. There is only one area where the interstate pipelines now can hope to obtain substantial quantities of natural gas and that is the federal domain offshore Louisiana and Texas. All gas produced there moves in interstate commerce as it comes onshore and therefore is subject to Commission regulation. There is no competing unregulated market. But outside the federal offshore area, the regulation operates in the same way that a prohibition on purchases of gas by interstate pipelines would operate.

*More generally, the federal regulation* depresses the price of natural gas in all markets. This lower price means that natural gas reserves that would be found and produced at the higher price are simply left unfound and unproduced. Firms exploring for natural gas will drill those geophysical prospects that offer a positive risk reward ratio. A higher

price would increase the potential reward and therefore the risk that those firms would be willing to assume. It is impossible to predict a priori the amount of gas that would be found as the result of higher prices. Research on past price changes shows that the impact on new discoveries has always been significant. One of the particular ironies of the situation is that a very substantial increase in the field price of natural gas would mean only a relatively small increase to consumers. For instance, in 1967 the average well head price for gas in Louisiana was 18.5 cents per thousand cubic feet while the average price to the residential user in New York was 142.3 cents. Thus a doubling of the Louisiana field price to 37 cents would have meant only a 13 percent price increase to the residential user. The consumer price index has itself increased more than 13 percent since 1967, but the price of gas in the offshore federal domain has risen less than 20 percent.

The impact of the lower regulated prices on the critical federal offshore area is particularly important for the interstate pipelines. The federal government is the owner of the federal offshore area. It makes this acreage available to exploration companies by offering leases with a 16 percent royalty rate for competitive bidding. The firm offering the highest cash payment obtains the opportunity to explore for and produce any natural gas on the leased acreage. The most dramatic effect of the regulation in the offshore domain is to decrease the price which the federal government receives on its own leases. But since the Department of the Interior, as the responsible custodian of these national properties, is unwilling to give them away, it will not lease tracts that receive only nominal bids. These tracts — which would have substantial value were it not for the regulation and would then

be leased — are, because of the regulation, unavailable for exploration. The President of the American Gas Association has suggested that this problem could be solved by following British practice and giving the tracts to the producing companies on condition that they do a certain amount of exploration work. This method has its own serious difficulties as the studies of the British gas leasing system by Kenneth W. Dam published in recent issues of the *Journal of Law and Economics* have shown, but I need only note here that it is more than a little ironic to first hold down the price of natural gas in order to limit the profits of exploration companies and then to turn around and attempt to overcome that effect by providing the exploration companies with the opportunity to make free use of a valuable national asset.

The detrimental impact of the regulation on the supply of natural gas results not only from the present low ceiling price. It also results from the unpredictability of the regulatory process itself. In an unregulated market, producers could predict simply through an examination of world wide energy supply and demand trends that the price of domestically produced natural gas would rise. They could then proceed to make exploration expenditures now based on their expectation of higher prices in the future. But the vagaries of the regulatory process make any prediction as to the future price of natural gas difficult if not impossible. The Commission now seems set on a course toward higher prices, albeit in a confused and halting way, subject to substantial risk at any point of judicial reversal. But the election of John F. Kennedy to the Presidency in 1960 brought the imposition of the present price freeze, and the election of another New Englander in 1972 might quickly halt the move to higher prices. The producing

companies can only wait and see what will happen.

*The price freeze on natural gas* has consequences not only for the supply but also for the demand side of the market. These effects may be the most important of all. The period when natural gas could increase its share of our national energy supply is over. Our best hope is that natural gas can for the next ten to twenty years hold its own, supplying around 30 percent of our energy needs. It is important that that 30 percent constitute the best uses to which the gas can be put. In brief, our best strategy seems to be to reduce the amount of natural gas consumed by large industrial users who are in a position to burn coal with sufficient exhaust treatment to satisfy clean air requirements and move the gas thus made available to those users who are unable to economically employ exhaust treatment facilities. The problem of the end use of gas is usually discussed under the rubric of industrial versus non-industrial uses. This is somewhat misleading because many industrial uses of natural gas are vital to the economy. The clean and uniform burning properties of natural gas are necessary for a number of important industrial processes. But the only statistics available on gas utilization categorize uses as industrial, commercial and residential and therefore we must employ those categories simply to discuss the problem.

We know that the price of natural gas has an important impact on the percentage of gas which is used industrially. This is shown, for instance, by the regional variations in industrial use which correlate with the price in that region. The ability of higher prices to reallocate the end use of gas was dramatically displayed during the gas supply crunch of the early 1920's. At that time the natural gas in-

dustry was confined to a small area located along the Appalachian gas fields. The wholesale market price was unregulated because a substantial part of the gas originated in West Virginia but was consumed in Ohio, Pennsylvania and New York. This interstate commerce was beyond the reach of any state and there was no federal regulation. The supply of gas dropped off rapidly. But so did the percentage of industrial use.

Can a regulatory system do as well? There is no doubt that the Federal Power Commission and the state regulatory agencies will attempt to reallocate the end use of gas if the present shortage becomes more serious. But the low regulated price of the gas to the consumer will give all users a substantial incentive to continue their present purchases. The authority of the regulatory agencies to terminate service to present customers is at best murky and probably non-existent. So they will be forced to simply prohibit all new customers from buying gas without regard to the particular customer's need for it. And if the regulatory authorities do attempt to sever old customers from the system, they will be forcefully resisted by any class of customers slated for termination. Higher prices on the other hand would cause those customers who need the gas least to voluntarily surrender their gas supply.

*But not only is there reason* to think that the present regulatory system cannot reallocate the available gas away from industrial users who are in a position to economically use alternative fuels. There is good reason to think that the present system has had the effect of increasing the amount of gas used industrially. This is due to two facts. First of all, the Federal Power Commission regulates only sales for resale. Sales by interstate pipelines to ulti-

mate users — and these so-called “direct” sales are all to industrial users — are not subject to price regulation by the Federal Power Commission. As a result, industrial users have had an advantageous position from which to bid for the available supplies of natural gas. It is true that the Federal Power Commission has power to limit these sales by refusing to certify the construction of the facilities necessary to make delivery. But in an age of air pollution, the argument that each sale would mean cleaner air has effectively neutralized that potential power.

The second reason that the present regulation has encouraged the industrial uses of natural gas is related to the regional distribution of those industrial uses. The West South Central area is composed of the states of Texas, Louisiana, Arkansas and Oklahoma. In these states natural gas is largely supplied by the intrastate market. This area is the most intensive natural gas consuming area in the nation. The area consumes 34 percent of the natural gas produced in the United States. Ninety-one percent of the gas consumed in this region is consumed industrially. Put another way, 40 percent of all natural gas in the United States which is consumed industrially is consumed in the West South Central area. By holding down the price of natural gas within the region, the federal regulation has effectively acted as a subsidy to this industrial market, and therefore as a subsidy to the industrial growth of the southwest. The only practical way to reduce the industrial use of gas within the southwest is to raise the price of gas in that region. The federal regulation prevents that from happening, and by foreclosing the out of state residential gas consumer from purchasing the gas, leaves it for the southwestern industrial user. Put another way, the residential gas consumer of the Pacific Coast, upper

midwest and the east coast is prevented by federal law from paying 10 to 15 percent more for his gas, thereby making gas in the American southwest 50 percent cheaper than it would otherwise be and subsidizing the movement of industry from the consumer's home region to the southwest.

The present federal regulation of natural gas imposes higher costs on the interstate consumer of natural gas by (1) forcing him to purchase more expensive alternative fuels, (2) reducing the dependability of his gas supply and (3) subsidizing the industrial use of natural gas in intrastate markets.

*In order to explain the effects* of the regulation, I find it illuminating to compare it to the oil import program. On the surface, no two programs could be more different. The oil import program restricts the importation of foreign crude oil into the United States, thereby raising the price of oil to energy consumers and benefiting the owners of oil production in the southwest. The import program has been fought by the representatives of the northeast, it has been championed by the representatives of the southwest. Natural gas regulation, on the other hand, is designed to hold down the price of natural gas to the consumer, hurting the owners of gas production in the southwest. It has been championed by the representatives of the consuming states and opposed by the representatives of the southwest. Thus the oil import program and natural gas regulation would seem to be two perfectly offsetting government programs. One holds prices up. The other holds prices down. One stimulates the search for domestic reserves; the other discourages it. Indeed, it was for the Chairman of the Federal Power Commission, serving as a member of the President's Task Force on Oil Import Controls, to point out the

symmetry of the two programs. He argued that the oil import program was necessary to hold up the price of oil in order to stimulate the search for petroleum which would otherwise be unduly depressed by the low natural gas prices imposed by the Commission he heads.

Unfortunately, however, if the programs are properly analyzed, they can be shown not to be offsetting but harmonious. The effect of the oil import program is to limit the ability of American energy consumers to bid for inexpensive foreign crude oil. The effect of the Federal Power Commission's regulation of natural gas is to limit the ability of American energy consumers outside the southwest to bid for relatively inexpensive natural gas. The consumer loses not once, but twice.

*What, then, will happen now?* First of all, I believe that the shortage will end in time barring some dramatic shift in total American energy supply, and that it will end without regard to whether or not the field price of natural gas is raised. The interstate pipelines and the distribution utilities cannot long tolerate a shortage because of their vulnerability to the political reaction which will be caused by inadequate service. And all that is necessary to end the shortage is higher prices to the consumer. The utilities can raise their prices if they can raise their costs. This they are proceeding to do with gusto. Barred from paying more for domestically produced natural gas, they will spend their money some other way. They will buy unregulated gas from Canada at higher prices. They will buy unregulated Liquid Natural Gas from Algeria and Venezuela at prices more than double what they are presently paying for domestic gas. They will construct enormous gassification plants first using natural gas liquids, then if necessary, coal, as a feedstock. They will

make millions of dollars in advances to natural gas producers in exchange merely for an option to buy any gas found if they can include those advances in their rate base. In short, they will do anything necessary, including wasting money, in order to drive up their costs and hence their prices and to restore equilibrium in the consumer market for natural gas. They know that if they fail, they probably face complete government supervision if not ownership of all of their operations. It would be so easy to simply let them pay for the gas they need.

Secondly, I believe that representatives of the consuming states will rapidly lose their enthusiasm for natural gas regulation as those states experience natural gas shortages. This is already evident in Congressman Murphy's misnamed sanctity of contracts bill which makes some minor but helpful changes in the direction of deregulation. But it will take some time before the consuming states wake up to what is happening.

Thirdly, I believe that in time the representatives of the southwest will oppose termination of the regulation. These states are no longer dominated by the petroleum industry, and that industry is no longer dominated by its American production. Natural resource rich regions have generally preferred to use those resources to stimulate the development of industry at home rather than exporting them in raw form to industries located elsewhere. Indeed in the early parts of this century the producing states attempted to do just that, prohibiting the export of natural gas. Fortunately, the Supreme Court intervened under the interstate commerce clause to invalidate such regulation. But I now wonder whether the producing states, having obtained such a position courtesy of the federal government, will lightly give it up.

*Editor: Frank L. Ellsworth*

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FROM

THE LAW SCHOOL  
THE UNIVERSITY OF CHICAGO  
1111 EAST 60TH STREET  
CHICAGO, ILLINOIS 60637

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Philip B. Kurland, November 1, 1971.

No. 2. "The Shortage of Natural Gas"  
Edmund W. Kitch, February 1, 1972.

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