Policy Analysis

Cato Institute Policy Analysis No. 20: Natural Gas Regulation: Throwing Out Supply and Demand

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Executive Summary

The front page of the September 2 Washington Post carried a strange headline: "Natural Gas Surplus Leads to 20 Pct. Price Rise." The article stated that "Washington-area consumers will be paying 20 to 25 percent more for natural gas over the next six months" because Columbia Gas System, a large pipeline supplier to the area, "has a huge surplus of expensive gas and has shut down 20,000 small wells in Appalachia that were selling fuel for one-third that price."[1]

What is going on? It seems absurd that inexpensive gas is apparently being shut in or possibly even vented into the air when more expensive gas is being transported by the pipelines. Further, what has happened to the age-old law of supply and demand, under which surpluses are supposed to result in lower prices?

The readers of the Post have been quick to assign blame. One reader attributes the increases in price to "big producers and suppliers" that are "greedy, corrupt and unscrupulous."[2] Another faults the "regulatory agency (the Federal Energy Regulatory Commission) that allows Columbia Gas System to close thousands of wells producing gas at one-third the price they are paying and passing the cost on to the consumer."[3] The chairman of Columbia Gas says that higher rates "are not the result of wells being shut in the Appalachian Basin in favor of more expensive gas elsewhere," nor "the result of the current short-term supply surplus," but rather "the direct result of higher wellhead prices provided for us by the Natural Gas Policy Act of 1978 (NGPA)."[4] The president of the Natural Gas Supply Association blames the venting of cheap gas and the shipment of expensive gas on the "NGPA, which sets the prices of natural gas and encourages the most expensive gas to be brought to market first."[5] A vice president of the American Petroleum Institute states: "The phenomena described in the Post article are exactly the sort caused by federal intervention and would not occur were such intervention removed."[6]

Background

It is valuable to consider the underlying causes of the Columbia Gas phenomena: prices rising in the face of a temporary surplus; lower-cost gas being shut in or vented while more expensive gas is being transported. These phenomena result from deep-seated problems in the natural gas industry, problems that grow out of this industry's mixed direction, for, in part, natural gas prices are dictated by government regulatory agencies; in small part, only, are prices determined by consumers' demands and by marketers' reactions to market influences. Because the problems are so deep-seated, similar market malfunctions will continue to recur as long as the current regulatory climate prevails.

The first key to understanding the Columbia Gas phenomena is to note that there is a "supply surplus." This strongly suggests that pricing and allocation are influenced by the government far more than by the market. In the economist's

theoretical model there could be no "supply surplus." If a surplus began to arise in a pure free market setting, prices would drop so that all of the product available would be sold at the competitive, market-clearing price.

But, as is now well known, natural gas prices are not in fact set by the market (i.e., by the interactions of individual decisions to produce or not to produce, to consume or not to consume). Rather, prices are set by government functionaries. State public utility commissions set the rates that distribution companies charge to different classes of customers. Acting pursuant to the Natural Gas Act, the Federal Energy Regulatory Commission (formerly the Federal Power Commission) sets the prices that interstate pipeline companies charge to natural gas distribution companies. In addition, as a consequence of the Supreme Court's 1954 Phillips decision,[7] the Federal Power Commission was required to set the wellhead prices that producers charge to interstate pipeline companies.

Once government begins to set prices, it then becomes possible to have either a "surplus" or a "shortage." If prices are set above the competitive, market-clearing price, and if the government is willing to guarantee that schedule of prices, producers will produce more than consumers will be willing to purchase -- at that fixed price. A "surplus" will be the inevitable result. This is the process that has produced our present dairy product "surplus." If, as has more commonly been the case with natural gas, prices are set by government fiat below the competitive, market-clearing price, the incentive to produce is diminished; and insufficient supplies will be forthcoming to meet the superheated demand that exists at that fixed, below-market price. One of the clearest examples of "shortages" induced by government price regulation is the natural gas "shortage" that occurred in the early 1970s.

Although government regulation of natural gas in the United States has failed abysmally, Congress, in its infinite wisdom, has not comprehended the need to fully deregulate the natural gas industry. Rather, in 1978, the regulation of wellhead prices was perversely extended to include the previously well-functioning, non-regulated intrastate natural gas markets, those operating within a single state. Because the intrastate markets had not previously been regulated, there were no gas shortages in those markets. Through this federal raid on resources previously well-husbanded by the states (under a wise policy of no wellhead price regulation), the natural gas available from on-shore production in states such as Texas, Louisiana, and Oklahoma became a convenient "cache" from which to satisfy the needs arising from government-induced shortages in the ill-regulated interstate market for natural gas.

As a part of the political package that allowed the interstate market to tap into the gas available in intrastate markets, Congress, in passing Carter's book-length energy legislation in 1978, did the following: prescribed a formula for the phased increase of the prices for various categories of "new" gas; provided for the elimination of wellhead price controls for "new" gas as of January 1, 1985 (subject to the possible extension by either the president or Congress); eliminated wellhead price regulation for certain categories of gas, such as "deep" gas; established curtailment priorities for the use of gas; prohibited certain uses of gas for boiler fuel; and provided that higher prices for gas must be passed on to industrial customers first, before they were passed on to residential and commercial customers. These multifaceted forms of government regulation, contained within the Natural Gas Policy Act and the Fuel Use Act, have been the precipitating causes of the Columbia Gas phenomena.

The Fear of Shortages. At the time of the passage of the Natural Gas Policy Act, all of the interstate pipelines, including Columbia Gas, faced some degree of actual or potential shortage, when they compared their projected demand against their reserve holdings. They were, accordingly, anxious to purchase gas, wherever it was available. With the "shortages" of the early 1970s seared in their memories, they were, indeed, overanxious to establish claims to reserves and future supplies, going far afield to nail down imported gas from Mexico and Canada, manufactured gas, and liquefied natural gas (LNG) from North Africa (cooled, compressed and shipped across the Atlantic in cryogenic tankers). Needlessly expensive facilities were built to handle LNG and needlessly expensive commitments were made to purchase unregulated gas. At that time, natural gas pipelines were even willing to pay acknowledged above-market-clearing prices for unregulated natural gas. This appeared rational only because government fiat was being relied on to keep the prices of regulated gas at below-market-clearing levels.

The misbegotten product of this mating of government direction and market direction was above-market-clearing prices for unregulated gas. Remember that prices for "old" and "new" gas were not set by competition. Rather, they were set by the government at a below-market-clearing level. This provided a so-called "cushion." High-priced unregulated gas could be "rolled in" with the low-priced regulated gas. Given the excess demand resulting from

government-mandated, belowmarket-clearing prices, market equilibrium could only be achieved by driving the price for the unregulated gas above (way above) the competitive, market-clearing price. (A byproduct of this exercise, as with government price control of petroleum, was to excessively enrich foreign producers -- even as domestic producers of regulated gas were deprived of a market price.)

In order to satisfy their projected needs -- based on the projections of their customers, the requirements of the Federal Energy Regulatory Commission, and any requirements in their debenture agreements -- the pipelines contracted for reserves, buying, as a rule, the lowest-priced gas available. Since wellhead gas prices irrationally varied -- because of government regulation -- the pipelines most in need of added reserves purchased the largest amounts of the marginal, high-cost, unregulated gas. Columbia Gas was among the pipelines thus imposed on by regulation.

Producers and Pipelines. The regulatory history of the natural gas industry as not only affected the prices set for unregulated gas -- it has shaped the overall contracts between producers and pipelines. From the inception of federal regulation of natural gas pipelines, the Federal Power Commission required long-term contracts (initially for 20 years) in order to ensure that pipelines had an adequate supply of gas. In addition, the Commission required that, in the absence of prior Commission approval, once a producer began providing gas from a well to a particular customer it could not switch customers or otherwise "abandon" that customer until the well ran dry.

Since, under the prevailing regulatory regime, producers were locked into selling gas from a particular well or series of wells to a particular pipeline under a long-term contract, they understandably wanted a guarantee that there would be a return on their investments within a reasonable time, even if the pipeline withdrew the gas at a slow rate. The contracts between producers and pipelines, because they were of such duration, did not specify set rates of production. Most of the producer's expenses had already been incurred when production began and so long as payments were based exclusively upon the production rates, those costs could be recouped only as fast as the pipeline withdrew gas. Accordingly, in order to obtain some degree of certainty that they would receive payments on a reasonable schedule, producers frequently insisted on "take or pay" provisions. Under these provisions, the purchasing pipeline company either had to take at a specified minimum rate or else pay the amount that it would have cost if it had taken at that rate. If the pipeline company did not withdraw gas at the specified minimum rate, it generally has a set number of years within which to later take the gas.

Thus, in contracting under the Natural Gas Act and the Natural Gas Policy Act regulations, gas pipeline companies, including Columbia Gas, ended up with portfolios of natural gas reserve holdings of varying vintages, at varying costs, some containing "take or pay" provisions and some not. Then, when demand fell, as it has during the current recession, pipeline companies naturally sought to draw gas from their contracted reserves in the manner that minimized their costs. Considering all of the elements of the various contracts, including "take or pay" provisions, it apparently costs some pipeline companies less to shut down the pumping of lower-cost gas -- if it is not subject to a "take or pay" provision -- and take higher-priced gas -- if that gas is subject to a "take or pay" provision.

With this background, one can understand one aspect of the Columbia Gas phenomena -- why Columbia Gas is shutting in low-cost gas while shipping higher-cost gas. Understanding the other aspect of the Columbia Gas phenomena -- rising prices at a time of short-term surplus -- requires further background.

First, we should ask why a surplus exists in the first place. Indeed, industrial demand for natural gas has fallen during the recession. But that is not the complete answer. At the margin, natural gas competes with heating oil. That is, as the price of natural gas rises, the first use of natural gas to be dropped is the use of natural gas for boiler fuel. Many companies that use natural gas for boiler fuel have fuel-switching capabilities. If the price of natural gas rises above the price of fuel oil, such users can and will switch to fuel oil. In a free-market setting, fuel-switching (or, indeed, even the prospect of fuel-switching) would hold down the price of natural gas so that it would not exceed the price of competing fuels. It can be argued that the most powerful influence restraining natural gas prices in past decades in the United States has not been regulation (which may at all times have been either ineffective, counter-productive, or superfluous) but, rather, the low price for crude oil in the pre-OPEC era. Since prices for natural gas are regulated, however, they do not, in any event, respond as they would in a free-market setting. In a regulated industry, whether prices go up or down, at least in the short term, is generally the function of government decision.

In the natural gas industry, furthermore, different prices are charged to different customers, and these price differences do not necessarily reflect different costs or different competitive conditions. Government demands and encourages uneconomic price discrimination. Thus, it should be recalled, Congress has mandated that higher costs of gas purchased by pipeline companies must first be passed on to industrial customers before they are passed on to commercial and residential users. In addition, in a misguided attempt to protect consumers (defined as residences, not businesses), state utility commissions have tried to keep residential prices low, while placing the greater burden of cost increases upon industrial uses. Therefore, at the same time that oil prices have been declining, the prices charged to industrial users of natural gas have been rising rapidly. Once the government-mandated prices for natural gas to industrial users surpass the price for fuel oil (as has apparently been the case in some markets), industrial users quickly switch to the cheaper fuel oil. Since the overhead costs of the pipeline companies and the distribution companies are fixed, the diminished use of gas by industrial customers means that the fixed overhead cost -- plus, of course, the higher fuel costs -- must be borne by the remaining smaller number of users. The alternative is that the regulatory agencies refuse to allow the pipelines and distribution companies to pass their increased costs through to customers, extracting the added costs from the shareholders. This would, of course, be the obvious result in an unregulated industry.

Thus, given the present pattern of regulation, it is possible to have price increases in the face of a supply surplus. This aspect of the Columbia Gas phenomena is the result of many causes, including: government-mandated long-term contracts; "take or pay" provisions; disparate wellhead prices resulting from government price regulation; increasing overall gas prices under the Natural Gas Policy Act; government rate regulation that discriminates against industrial end users; falling oil prices; and reduced energy demand because of the recession.

The Columbia Gas situation is not an isolated circumstance. The difficulties that Columbia Gas faces are similar to the problems that face almost every pipeline in the country. These problems are inevitable because, in the final analysis, it is not possible to have the pricing and allocation of natural gas simultaneously determined by government regulators and by the market. In the natural gas industry, Congress attempted to phase out the regulation of wellhead prices while leaving in place the existing regulation of "old" gas prices, of pipeline charges and service, and of distribution company charges and service. But, as the Columbia Gas story demonstrates, this mixed pattern of government direction and market direction has not worked well. Price and allocation regulation has so distorted price and contract relations in the non-regulated sector that neither the regulated sector nor the unregulated sector reflects conditions that would prevail within a competitive market.

Potential Solutions

There are a variety of potential solutions to the kinds of problems represented by the Columbia Gas predicament. First, government regulation could be expanded in an effort to correct the distortions that regulation has caused within the non-regulated sector. Second, an attempt could be made to isolate the regulated sector in a manner calculated to minimize distortions in the non-regulated sectors. Third, all or substantially all of the natural gas industry could be deregulated. Let us examine each of these three types of solutions.

Expanded Regulation. As we have seen, government direction of prices and allocation within the regulated sector of the natural gas industry has affected the contract terms within the non-regulated sector. The prices for the unregulated gas are above the market-clearing price precisely because the government has held regulated prices below the market-clearing level. This problem could be eliminated by expansion of government controls so that wellhead prices in the non-regulated sector would once again be regulated. This could be done, without additional legislation, by means of government regulation of the prices that pipelines could pay for gas. Such regulation should eliminate the phenomenon of pipelines shutting in low-priced gas while transporting high-priced gas.

It should be noted, however, that the long-run cost of reimposing price controls on deregulated wellhead gas would be very high. History demonstrates that government price regulation creates distortions that provide the basis for further expanded government regulation. The typical pattern is for government regulation to expand. Contraction of government regulation is an historical aberration. In the natural gas industry, for example, we began with state regulation of local distribution company pricing and allocation. This was expanded to encompass government regulation of the prices charged by interstate pipelines. Regulation of interstate pipelines led to wellhead price

regulation within the interstate market. Interstate wellhead price regulation resulted in gas shortages, and led to the extension of price regulation to intrastate gas production and the expansion of federal regulation to encompass control of end-use pricing and allocation. Congress probably thought that by promulgating the Natural Gas Policy Act it was beginning the process of deregulation. But the reimposition of price controls over deregulated gas would stifle the process of deregulation before it ever really began. We would be burdened, for the indefinite future, with the costs and inefficiencies of present natural gas regulation.

Isolating the Problem. A second potential solution to the problems demonstrated by the Columbia Gas phenomena would be an attempted isolation and sanitization of government regulation, so that regulation would not unduly distort those portions of a market in which competitive pricing and allocation were permitted. The original justification given for pipeline regulation was that pipelines had monopoly control over the transportation of natural gas. Similarly, the common justification for rate regulation of distribution companies is that they have monopoly power over the distribution of natural gas. Setting aside, for the moment, the question of whether there is a justification for transportation regulation, it would be theoretically possible to continue transportation regulation while eliminating the regulation of product pricing and allocation.

At present, transportation rates are implicitly regulated while product prices are explicitly regulated. The Federal Energy Regulatory Commission sells gas. The state public utility commissions regulate the rates charged by distribution companies. In order to separate transportation regulation from product pricing regulation, it would be necessary to convert natural gas pipeline companies and gas distribution companies to common carriers. Under such regulation the pipeline and distribution companies would carry gas for others, at governmentally-controlled transportation rates, but the prices at which gas would be bought and sold would be determined by the market, rather than by the government. In other words, existing pipeline and distribution companies would become transportation companies. This would require the emergence of a new class of natural gas merchants -- companies that did not own any transportation facilities but which bought and sold gas and transported it through pipelines and distribution facilities belonging to other companies.

If it could be achieved in practice, regulation of transportation charges which did not control product pricing and allocation would certainly be more efficient than the current regulations. The elimination of product-pricing control would allow a nationwide market for natural gas to emerge. A competitive price for all natural gas, whether "old," "new," "deep," imported, or manufactured, would emerge. The product could be allocated by price, so that those end users that could most efficiently utilize gas would have access to all that they desired to purchase -- at the prevailing competitive price.

A number of legislative changes would be necessary in order to eliminate government direction of natural gas pricing and allocation: the Natural Gas Policy Act would have to be repealed; the Natural Gas Act would have to be amended to eliminate wellhead price controls; the Fuel Use Act would have to be repealed; and federal legislation would have to preempt state regulation of the pricing and allocation of natural gas, leaving states free only to regulate transportation charges by distribution companies. Most significantly, perhaps, federal legislation would have to reopen existing contracts between producers and pipelines, on the one hand, and between pipelines and distribution companies, on the other.

A more detailed discussion of this needed reopening of existing contracts in the natural gas industry should be undertaken. Contracts are a form of governmentally enforced private ordering. In a free enterprise system, parties are free to contract -- to bind themselves to perform in the future. With rare exceptions, these contracts are honored and enforced by the government. Private ordering through contracts is the sinew that binds together any free enterprise system: Without freedom of contract, no modern free market system can exist. The question can properly be asked whether it is appropriate, then, to reopen contracts in the natural gas industry. The answer is clearly yes. These contracts are not the product or manifestation of a free-market system. All of the present contracts were entered into within the framework of pervasive administrative regimentation of the natural gas industry. That regulatory regime set the prices that were to be charged and determined the duration for which supply arrangements were to persist, two of the main elements of free-contract relationships. In order to move effectively from government direction to market direction of the natural gas industry, it will be both necessary and proper to reopen past contracts which came into being under this regulatory control and to allow the parties to decide for themselves, in a free-market setting, the

contractual terms that they find mutually agreeable.

Although it may theoretically be possible to eliminate natural gas pricing regulation while maintaining transportation regulation, achieving such an outcome would present serious practical problems. All of the firms that presently buy and sell gas -- the pipeline and distribution companies -- would have to get out of the business of buying and selling gas, and they would have to be replaced by an entirely new set of natural gas merchants. Tremendous disruptions with high transition costs would accompany such a change. Accordingly, as a practical matter, it does not seem feasible to separate transportation regulation from product pricing regulation in the natural gas industry, assuming that we have reached the policy decision that transportation regulation should be maintained.

Deregulation. Given the impracticality of separating transportation regulation from product pricing regulation, it becomes important to consider a third possible solution -- substantial deregulation of the entire natural gas industry. For three separate and independent reasons, it appears feasible to deregulate the entire natural gas industry, from wellhead to burner tip. First, public utility regulation of the natural gas industry has failed to benefit the consumer. Second, there is in fact significant actual or potential competition among pipelines. And, finally, natural gas must compete with other forms of energy, as well as with conservation.

George Stigler's seminal study, published in 1962, indicated that public utility regulation had not succeeded in reducing prices to consumers.[8] The 1974 study of Federal Power Commission regulation by Professors Breyer and MacAvoy concluded that "certainly FPC regulation did not achieve direct gains to consumers."[9] Given these studies, no reasonable basis exists for continuing the present regulation of natural gas.

In addition to pointing out the failure of public-utility type regulation in the natural gas industry, the evidence demonstrates that there is sufficient potential competition -- both between pipelines as carriers and between different fuels in use -- to indicate that a competitive market would more effectively protect consumers than have the existing forms of government regulation.

Although natural gas pipelines were once thought to be natural monopolies, there is now significant actual or potential competition among pipelines. Large numbers of pipelines receive natural gas in the major producing states, e.g., more than 50 in Louisiana.[10] Further, most delivery areas are potentially served by more than one pipeline. More than 85 percent of the U.S. population is in states served by three or more pipelines.[11] There are 431 distribution companies served by more than one pipeline, while an average of 3.6 pipelines serve each of these distributors.[12]

More crucial than the actual and potential competition between pipelines is the actual and potential competition between natural gas and other energy sources. Large industrial boilers in 1979 burned more than 2.5 trillion cubic feet of natural gas. More than 85 percent of this gas was burned in boilers with multiple fuel capability.[13] In addition, in the electrical utility industry large numbers of boilers are dual-fired and can burn either oil or natural gas.

No one will seriously argue with the proposition that many major utility and industrial end users can switch from gas to oil if the price for natural gas exceeds the competitive price. Nevertheless, it is still commonly assumed that natural gas rate regulation must be maintained to protect residential gas users that cannot easily switch to other fuels. This assumption is flawed. As natural gas prices rise, gas users can increase conservation -- by insulating water heaters, installing automatic turnback thermostats, adding attic and wall insulation, plugging air leaks, and improving the efficiency of gas furnaces. If prices continue to rise, residential users can install wood-burning stoves or switch to fuel oil. While it is true that inadequate knowledge of the proper conservation steps will result in a delayed and imperfect consumer response to rising gas costs, attempts to protect consumers from rising gas prices will merely delay the needed transition to more energy-efficient housing, will waste gas, and will, in the long run, increase the total cost to consumers of obtaining home heating.

It remains true, of course, that residential users as well as industrial feedstock and process gas users, cannot find substitutes for natural gas as easily or as readily as can industrial and utility boiler operators. But it does not follow that rate regulation for natural gas is required. Non-regulated natural gas distribution companies might have the ability to engage in price discrimination among customers, but, given the vast potential for fuel switching among large boiler operators (the marginal users of natural gas), they would not have the ability to control the competitive, nationwide price for natural gas. The base price of natural gas will thus be competitively determined, in orthodox fashion, by the

interaction of the marginal seller and the marginal buyer.

In summary, the Columbia Gas phenomena -- low-cost gas being shut in while high-cost gas is transported, and prices rising in the face of a supply surplus -- are the result of untenable attempts to combine market pricing and allocation with government pricing and allocation within the natural gas industry. The current regulatory regime is unstable and cannot continue unchanged. There are three potential solutions, only two of which are even potentially stable: the reimposition of total price control over the natural gas industry; the elimination of controls over product pricing and allocation while continuing to regulate transportation rates; and the substantial deregulation of the entire natural gas industry. Since it is not practicable to separate transportation regulation from product pricing regulation, the choice that emerges is between a return to comprehensive price controls, from wellhead to burner tip, or substantial deregulation of the entire natural gas industry. In the interest of equity, efficiency, and preservation of a free enterprise system, it is time to deregulate the natural gas industry.

FOOTNOTES

[1] H. Kurtz, "Natural Gas Surplus Leads to 20 Pct. Price Rise," Washington Post, Sept. 2, 1982, p. A1.

[2] Washington Post, Sept. 14, 1982, p. A18.

[3] Washington Post, Sept. 8, 1982, p. A18.

[4] Washington Post, Sept. 14, 1982, p. A18.

[5] Washington Post, Sept. 8, 1982, p. A18.

[6] Ibid.

[7] Phillips Petroleum Co. v. Wisconsin, 347 U.S. 672 (1954).

[8] G. Stigler and C. Friedlander, "What Can Regulators Regulate? The Case of Electricity,"Journal of Law and Economics, October 1962; reprinted in Crisis of the Regulatory Commissions, MacAvoy, ed. (New York: W. W. Norton & Co., 1970), p. 39.

[9] Stephen C. Breyer and Paul W. MacAvoy, Energy Regulation by the Federal Power Commission (Washington, D.C.: The Brookings Institution, 1974), p. 123.

[10] D. Mead, "Concentration in the Natural Gas Pipeline Industry," Office of Regulatory Analysis, Federal Energy Regulatory Commission, August 1981, pp. 17-18.