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Natural Gas Deregulation

Vernon R. Eidman and Richard N. Weldon*

Introduction

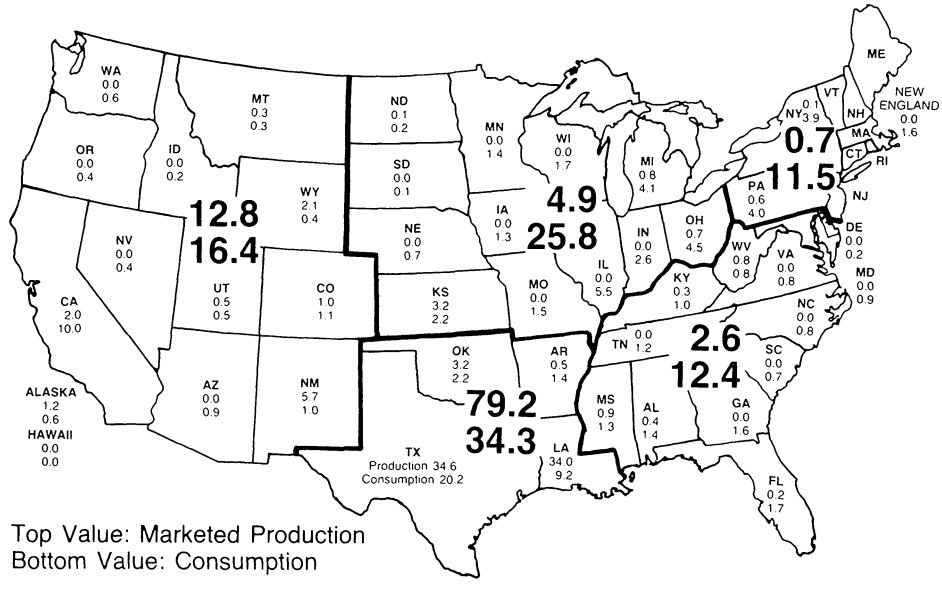
The natural gas industry has been a part of the United States national economy since the 1870s. However, the major portion of its growth has taken place during the last three decades, during which the production of natural gas has increased from a level of 7657.5 trillion Btu (7.5 trillion cubic feet) in 1951 to over 20,420 trillion Btu (20 trillion cubic feet) in 1981. Of the approximate 20,000 trillion Btu of gas produced in 1981, 41 percent was used in industry (including agriculture), 19 percent was used by electric utilities, 24 percent was used residentially, and 16 percent was consumed commercially.

The United States is the major producer of natural gas in the world market, producing 38 percent of the world supply of 54,624 trillion Btu (53.5 trillion cubic feet). It is also the major consumer, using 39 percent. The U.S.S.R. is both the second largest producer (27 percent of world supply) and the second largest consumer (25 percent). Canada, Mexico, the Netherlands, the United Kingdom, and Romania produce 17 percent of world supply. West Germany, the United States, Japan, France, and Italy are the five largest importers of natural gas, (collectively) importing 9 percent of total world supply.

Natural gas production within the U.S. is concentrated in the south central states, whereas consumption occurs throughout the nation. For example, Louisiana, Texas, and Oklahoma produced 79 percent of U.S. natural gas in 1981 and consumed 33 percent (Figure 1). On the other hand, California, Michigan, Ohio, New York, and Pennsylvania produced only 4 percent of 1981 natural gas production while consuming 27 percent of marketed production. Georgia, Idaho, Iowa, Minnesota, Missouri, Nevada, North Carolina, South Carolina, Washington, Wisconsin, and the New England states do not produce any natural gas, yet consume about 15 percent of annual production.

Natural gas is an important source of energy for agricultural production. The major uses are as a feedstock in the production of nitrogen fertilizer and pesticides, and as a fuel for irrigation pumping, poultry brooding, and crop drying. U.S. agriculture consumed 2,048 trillion Btu of energy in 1978 for crop and livestock production (Table 1). Of this, 143 trillion Btu from natural gas were used directly on the farm for

Figure 1 Percentage of Total U.S. Marketed Production and Percentage of Total U.S. Consumption or Natural Gas, by State and Region* for 1981.



Top Value: Marketed Production
Bottom Value: Consumption

*Source: U.S. Department of Energy, Energy Information Administration, 1982

Table 1. U.S. Agricultural Energy Consumption, 1978[a]

	Quantity (million)	Btu (trillion)	% of Total
Gasoline (gal)	3,516	441	21.5
Diesel (gal)	3,308	468	22.9
Fuel Oil (gal)	291	41	2.0
LP Gas (gal)	1,425	128	6.3
Natural Gas (cu/ft)	140,063	143	7.0
Electricity (kwh)	31,909	106	5.1
Invested		721	35.2
		2,048	100.0

[a]Source: Torgerson and Cooper.

*Eidman is a Professor and Weldon is a Research Specialist in the Department of Agricultural and Applied Economics.

irrigation pumping, poultry brooding, crop drying, and other uses (Table 2). In addition, production of the 9.95 million nutrient tons of nitrogen fertilizer used by farmers in 1978 required approximately 452 trillion Btu of natural gas[1] and the production of electricity consumed on farms required an estimated 47 trillion Btu of natural gas. Summing these uses indicates natural gas provided 642 trillion or 31 percent of the Btu consumed directly and indirectly by production agriculture. Total natural gas used by agriculture is somewhat larger than this total because smaller amounts are used in the production of non-nitrogen fertilizers and pesticides.

As shown in Table 3, the quantity of natural gas used directly on the farm is an insignificant portion of Minnesota's total natural gas use (15.3 billion of the state's 319.6 trillion Btu of natural gas, were consumed primarily for crop drying). However, Minnesota agriculture consumes large amounts of natural gas in the forms of nitrogen fertilizer and pesticides. In 1980, Minnesota farmers applied 617,700 tons of nitrogen fertilizer, which required approximately 28.1 trillion Btu of natural gas.

It is apparent that natural gas is a resource of relative importance to agriculture and that any major economic changes in the natural gas industry will lead to subsequent adjustments or cost changes in agriculture. The relationship between these two industries is examined in more detail in the remainder of this report. The next section describes recent regulatory action and the resultant market conditions for the natural gas industry. These changing market conditions are then traced through the agricultural industry and the anhydrous ammonia industry. The final section of this report discusses the policy options available relative to the natural gas industry and effects on the U.S. of each major option

Regulation of the Natural Gas Industry

The natural gas industry is comprised of three entities: the producer, who actually drills and owns the natural gas well; the pipeline company, which transports the gas to intrastate and interstate markets; and the gas utility companies, which distribute the gas to industrial, commercial, residential, and other end users. Consequently three markets exist: first, the well head market that has the pipeline companies buying from the producer; second, the market in which gas utility companies buy from the pipeline company; and third, the end-use market in which consumers purchase gas from the utility company. The latter two broad markets include several submarkets. The pipeline owner may sell the natural gas to a utility company on the interstate or intrastate market, or directly to end-use industrial users, as is the case with many fertilizer producers. The utility company sells its gas for residential, commercial, industrial, and electrical production uses.

Interstate natural gas in the United States has been regulated by the Federal Power Commission (FPC) since the passage of the 1938 Natural Gas Act. The Supreme Court in 1954 interpreted the Natural Gas Act of 1938 as meaning that production of gas at the well head, as well as interstate distribution, should be regulated. Natural gas utilities generally are regulated by state regulatory agencies. This left the intrastate market as the only unregulated market through the '50s, '60s and early '70s. These developments resulted in two distinct markets for natural gas—the regulated interstate market and the unregulated intrastate market. In the early 1970s prices in the free intrastate markets rose much faster than in the regulated interstate markets. This provided incentives to sell much of the new gas discovered on the intrastate market, and by the winter of 1972 shortages began to develop in states that did not produce gas and that relied on the interstate market. Over the next five years the FPC attempted to bring the interstate price in line with the ever-increasing intrastate price. In 1978, after 25 years of proposed and segmented legislation, Congress passed the Natural Gas Policy Act (NGPA). Under the NGPA, the Federal Energy Regulatory Commission (formerly the FPC) was given regulatory power over both interstate and intrastate natural gas, and was to escalate the regulated well head prices between 1978 and 1985, with the following goals: (a) complete deregulation of "high-cost gas" in December 1979; (b) complete deregulation of "new gas" in

Table 2. U.S. Agricultural Consumption of Natural Gas, 1978[a]

	cu/ft (million)	Btu (trillion)
On Farm		
Crop Drying	700	0.7
Irrigation	134,222	137.0
Lighting, Material Handling, etc.	472	0.5
Poultry Brooding	4,669	4.8
Total	140,063	143.0
Off Farm		
Electricity Generation	46,000	47.0
Nitrogen	443,000	452.3
Total	489,000	499.3
Total On Farm and Off Farm	629,063	642.3

[a]This does not include quantities of natural gas invested in non-nitrogen fertilizers or pesticides owing to insufficient data and information.

Table 3. Minnesota Agricultural Energy Consumption, 1978[a]

	Quantity (1,000)	Btu (billion)	% of Total
Gasoline (gal)	221,567	27,900	27.5
Diesel (gal)	158,056	22,444	22.2
LP Gas (gal)	70,673	6,475	6.4
Natural Gas (cu/ft)	15,000	15	—
Electricity (kwh)	904,000	3,083	3.0
Invested		41,406	40.9
		101,323	100.0

[a]Source: Torgerson and Cooper.

[1]This is based on consumption of 36,500 cubic feet of natural gas per ton of anhydrous ammonia (82 percent N).

January 1985; and (c) limited price increases, but no deregulation, of "old gas" and Alaskan gas.[2]

The overall intent of this law was to provide an orderly period of transition (for both producers and consumers) that would yield an unregulated natural gas market which would be competitive with the other unregulated energy markets. The evidence, though mixed, strongly indicates that the NGPA, as written, will *not* provide for a smooth transition period in terms of price and quantities.

There are several reasons the NGPA as written is unlikely to provide the smooth transition desired. First, the price escalators under the 1978 NGPA were tied to the 1978 oil price, and current oil prices (even though real oil prices fell some in the past year) are substantially above the 1978 real oil price. As a result, the regulated prices for new natural gas at the end of 1984 will be below the competitive market price for natural gas. Deregulation of new gas (approximately 50 percent of the total) on January 1, 1985, under NGPA is expected to result in a rapid increase in the price of that portion of the total supply.

The question arises: How high will natural gas prices go if all supplies are deregulated? Various sources (Russel; DOE/EIA, 1983) report that an unregulated market price for natural gas would be approximately 70 percent of refiners' acquisition cost of crude oil. The justification is that fuel oil becomes competitive with natural gas as a source of heat at this level. Since 30 percent of the natural gas in the U.S. is used for boiler fuel, enough users can be expected to shift from natural gas to fuel oil to keep the natural gas price from exceeding this level over any sustained period. The U.S. refiners' cost of crude oil in 1982 was $31.87 per barrel or about $5.49 per million Btu (MMBtu). The corresponding unregulated market price for natural gas in 1982 would have been $3.84 per MMBtu. The actual regulated price in 1982 was $2.41 per MMBtu, indicating that further increases in natural gas prices may be expected as deregulation occurs.

[2]High-cost gas is from wells that are believed to be significantly more expensive to develop, for example from wells deeper than 15,000 feet. New gas is from wells developed or extended after April, 1977. Old gas is from wells developed prior to April, 1977.

There are two additional aspects of current natural gas regulation that will complicate natural gas pricing during the 1980s. The interstate gas pipeline companies that have access to large amounts of price-controlled gas (and consequently pay lower prices) have a comparative advantage over the intrastate pipeline companies that purchase large proportions of higher priced deregulated gas. Thus intrastate pipeline companies are charging a higher average price for the gas they sell than interstate pipeline companies, resulting in some inequities among users and some inefficiencies in gas use. The other issue deals with two major provisions—"indefinite gas price escalator clauses" and "take-or-pay clauses" —that have been written into most of the gas purchase agreements between gas producers and pipeline companies. The indefinite price escalator clauses stipulate that, upon decontrol, the contract price will be set above a decontrolled market equilibrium. This is accomplished most often by tying the contract price to the price of fuel oil or by making the contract price equal to the average of the top one to three contracts made for gas from a particular producing area. Take-or-pay provisions require the pipeline company to agree to pay for a certain amount of gas even if it cannot take it at that time. As a result, a pipeline company may be forced to use higher priced gas when cheaper gas is available.

The overall effect of these and other factors on the future price of natural gas under NGPA is unclear. However, it is expected that future real gas prices will rise under the NGPA but remain below an unregulated market price.[3] Table 4 provides estimates of future natural gas prices under the NGPA from a recent DOE study (DOE/EIA, 1983). The price is expected to rise to $3.19 per MMBtu in 1985, a 17 percent price increase over 1984 due to the deregulation of new gas. The well head price in 1982 dollars under the NGPA in 1990 is estimated to be $4.88 per MMBtu, with 20 percent of the flowing natural gas (from old wells) still regulated.

This discussion on regulation of natural gas suggests that the future natural gas market under NGPA will be one of: (1) average price increases below those needed to make gas competitive with other energy sources, (2) rapid price rises in relatively short time periods, and (3) contract provisions that result in inefficient pricing of natural gas.

[3]This is reasonable, since old gas (approximately 40 percent of the total) will remain regulated under NGPA. This proportion is expected to decline throughout the decade owing to the normal decline in the production from old wells.

Effect of Decontrol Under NGPA on Agriculture

Fuel

Natural gas deregulation can be expected to increase the price of natural gas relative to other fuels. The average price (in nominal dollars) that U.S. farmers paid per million Btu for regular gasoline, diesel fuel, and LP gas on January 15 of recent years is shown in Table 5. The data indicate that the prices of all three fuels increased dramatically until 1983. The cost per million Btu has been somewhat higher for gasoline than diesel fuel and LP gas, reflecting the strong demand and the higher refining costs for gasoline.

The costs of diesel fuel and LP gas have been at comparable levels in recent years. There are many opportunities to substitute diesel fuel (and closely related petroleum products such as heating oil) for LP gas in a variety of uses for transportation, fueling stationary power units, and as a source of energy for heating. Sudden changes in the relative supply or demand for one fuel may cause the other to provide energy at a different cost per unit of energy over a period of up to two years in length. However, the two fuels can be expected to have comparable costs

Table 4. Natural Gas Prices Per Million Btu Under The Natural Gas Policy Act (1982 Dollars)[a]

	Well Head	Residential Dollars	Industrial
1982	2.41	4.97	3.42
1985	3.19	6.11	4.59
1990	4.88	8.35	6.65

[a]Source: U.S. Department of Energy, DOE EIA-0366, 1983.

Table 5. Average Price of Alternative Fuels to Specified Customers on January 15, 1977-83[a]

Year	Regular Gasoline Bulk Delivery, Farmers[b]	Diesel Bulk Delivery, Farmers[b]	LP Gas, Farmers[b]	Natural Gas, Electrical Plants[c]	Natural Gas, Residential Customers[c]
			Dollars per Million Btu		
1977	3.750	3.123	4.074	NA	2.076
1978	3.998	3.319	4.759	NA	2.346
1979	4.445	3.565	4.508	1.502	2.844
1980	7.420	6.536	6.597	1.952	3.446
1981	8.795	7.681	7.658	2.513	3.982
1982	9.195	8.406	8.115	3.008	4.718
1983	8.504	7.898	8.444	3.497	6.023

[a]Prices for natural gas, residential customers, are for entire month of January.
[b]Prices include federal, state and local taxes, but exclude state road taxes. Source: U.S. Department of Agriculture, Economics, Statistics and Cooperative Service, Crop Reporting Board, *Agricultural Prices*, monthly issues for January of the respective years.
[c]Source: U.S. Department of Energy Information Administration, *Monthly Energy Review*, December, 1977, 1978, 1979, 1980, 1981, and May, 1982.

following a period in which inventories of capital equipment are adjusted to make use of the lower cost fuel.

Natural gas prices have also increased rapidly in recent years (Table 5), but the cost remains well below the price of the other three fuels. A comparable price series for farm purchases has not been compiled for natural gas, but the January, 1983, prices delivered to residential customers was approximately 71 percent of the cost of LP gas on a Btu basis, with the cost to electrical plants (an interruptible user) at lower levels.

The deregulated price of natural gas can be expected to move closer to the price per Btu of LP gas and diesel fuel. While the price of all fuels may be increasing over time, the price of LP gas is not expected to increase relative to diesel fuel and gasoline. Approximately ⅔ of LP gas is produced fron natural gas wells. To the extent that natural gas deregulation increases the production of natural gas, it can be expected to increase supplies of LP gas as well. This suggests that the major change in fuel prices resulting from deregulation will be an increase in the relative price of natural gas.

Nitrogen Fertilizer

As the well head price of natural gas increases because of decontrol/deregulation, so will the prices increase in the residential, commercial, and industrial gas markets. The natural gas price increases in the industrial market will in turn affect the various product markets that use natural gas in their production processes. One such market is the nitrogen fertilizer market, which consumed approximately 452 trillion Btu of gas or 2.25 percent of the annual natural gas production in 1978. This natural gas is the basic feedstock that is required to produce anhydrous ammonia. Anhydrous ammonia in turn is used either directly as nitrogen fertilizer or to produce nitric acid, ammonia nitrate, urea, or nitrogen solutions, the other major forms of nitrogen fertilizer. Anhydrous ammonia is also combined with phosphoric acid to produce ammonium phosphates. Taken together, for the year ending on June 30, 1982, some 11.1 million tons of nitrogen from these various sources were consumed by U.S. agriculture (Table 6). This represents about 19 percent of total world consumption.

When the price of natural gas increases, the cost of producing nitrogen fertilizer will also increase in the U.S. The Fertilizer Institute estimates that the production of one ton of anhydrous ammonia uses 36.5 Mcf of natural gas. Assuming that the industrial price of natural gas increases from $3.42 in 1982 to $4.59 per MMBtu (or $4.69 per Mcf) under the NGPA in 1985 (Table 4), the cost of natural gas used in producing a ton of anhydrous ammonia will increase from $127.45 to $171.19. If there is full pass-through of the cost increase, then the price of anhydrous ammonia (82% nitrogen) to the farmer will increase by $43.74 per ton, and the cost of nitrogen will increase $53.34 per ton. However, it is unlikely the full cost increase can be passed through to farmers for two reasons. First, as discussed later, the amount farmers will purchase decreases as the price increases, providing downward pressure on prices as fertilizer producers attempt to maintain their volume. Furthermore, the increased fertilizer price is likely to rise to the world price for nitrogen, which will lead to an increase in nitrogen imports. As shown in Table 7, net import levels of anhydrous ammonia, which make up ⅔ of all nitrogen imports, are up substantially in the 1980s as compared with mid-1970s levels. Several countries, such as Canada, Mexico, Nigeria, and the USSR, are increasing levels of ammonia production and the amounts exported. Natural

Table 6. U.S. Consumption of Nitrogen Fertilizer[a]

Year	Agricultural	Non-Agricultural
	Million Nutrient Tons	
81-82	11.10	3.23
80-81	11.78	3.46
79-80	11.41	4.06
78-79	10.64	3.72
77-78	9.97	4.01
5-Year Average	10.98	3.696

[a]Source: U.S. Department of Agriculture, *Fertilizer—Outlook and Situation*, various issues.

Table 7. Exports and Imports of Anhydrous Ammonia[a] *(Hundred Metric Tons)*

Year	Exports	Imports	Net Imports
		Hundred Metric Tons	
1976	231	696	465
1977	264	878	614
1978	475	956	481
1979	502	1581	779
1980	704	2013	1309
1981	740	1960	1220
1982[b]	688	2035	1347

[a]Source: U.S. Department of Agriculture, *Fertilizer—Outlook and Situation*, various issues.
[b]Preliminary.

gas is relatively cheap and is often just flared or vented into the atmosphere in these countries because of low domestic demand. As a result, such countries may experience a comparative advantage in the cost of producing nitrogen fertilizer.

An increase in the relative price of nitrogen fertilizer will encourage farmers to use it more efficiently. The principal causes for inefficient nitrogen utilization by crops are losses from leaching and relatively rapid biological conversion of the ammonium form applied to nitrate. Improved efficiency in nitrogen use can be accomplished by increased use of nitrofication inhibitors (particularly with fall applications), which retard the nitrofication process and increase the amount of nitrogen available for plant uptake. Improved timing and placement of nitrogen applications as well as better drainage of soils to enhance plant growth and fertilizer utilization are other examples of improved management practices farmers can use to increase the efficiency of fertilizer use. Of course, higher nitrogen costs also will enhance the economic feasibility of including legumes in crop rotations.

Higher fertilizer prices also will encourage the development and subsequent adoption of new technology. Increased nitrogen prices will stimulate research on methods to increase the efficiency of nitrogen use as well as research on nitrogen fixation by corn, small grains, and other nonlegumes.

As natural gas prices increase owing to deregulation, the structure of the ammonia industry will change. Those fertilizer manufacturers that had lower production costs due to access to low-price regulated gas will see their costs of production increasing to levels in line with those firms that are already using higher-priced deregulated gas. Import competition will accelerate, assuming no restrictive trade constraints are imposed and some firms will exit the industry because of increased competition.

It appears then that deregulation of the natural gas industry will yield higher production costs for nitrogen fertilizer. The available evidence indicates nitrogen fertilizer prices in 1985 will be 10 to 20 percent higher than 1982 prices due to deregulation.

Grain Drying and Irrigation

Conventional high-temperature drying is probably the most common method of grain drying used by farmers and elevators. This process has been popular because it has been relatively low cost and because it dries grain to a storable moisture content in one operation, minimizing labor and management requirements. Assuming natural gas deregulation does not result in increased prices for LP gas, the on-farm impact of deregulation on drying costs will be limited to relatively few farmers. However, the use of natural gas for off-farm crop drying is more common. Data available indicate 27,251 billion Btu were used for this purpose in 1974 (source: Torgerson and Cooper). As the price of natural gas increases, the discount for high-moisture crops will increase, lowering the net product price farmers receive. Over the longer run this will encourage more on-farm drying.

Natural gas has been used historically to power irrigation pumps because it has been a low-cost fuel per Btu of energy provided. Irrigators have purchased some natural gas at the higher intrastate rates in recent years, but many irrigators have continued to benefit from long-term contracts and other arrangements. Hence, with deregulation, natural gas prices to irrigators as a group will increase substantially.

An increase in fuel costs will encourage better management of water and energy. Higher water-application costs will encourage irrigators to convert high-pressure sprinkler irrigation units to lower pressure systems (on soil types with an adequate water intake rate). Increased pumping costs also will enhance the use of soil moisture monitoring to schedule water applications based on soil water and crop conditions.

An increase in natural gas prices may encourage some shift to other conventional fuels, particularly where irrigators are faced with interruptible supplies of natural gas. However, natural gas is expected to remain a lower cost fuel per Btu, so this shift will probably be minimal. As the cost of conventional fuels increases, irrigators will attempt to shift to lower cost sources of energy. With appropriate off-peak pricing, it may be possible for irrigators to shift to electricity and apply water during periods of the day when other uses of electricity are at a low level. Over time it may be feasible to shift to the use of solar or biomass (methanol, ethanol and low Btu gas produced from biomass) to power irrigation units.

Space Heating

Relatively little natural gas is used for space heating in agricultural production and the impact in this area is expected to be small. Those using natural gas for space heating can be expected to increase use of insulation and to improve ventilation control. Higher fuel prices will encourage farmers to use heat exchangers to transfer heat from exhausted air to incoming air or to use ventilation systems which force air through a tile line buried deep in the earth to warm air in winter and cool it during the summer. As fuel prices increase it will become economical to use alternative sources of heat, including solar collectors, heat pumps, and biomass fuels, to heat livestock buildings.

Aggregate Effect of Deregulation

Over the long term there will be continuing pressures on the food and fiber system as a result of the higher natural gas prices that will result in adjustments like those just mentioned. The actual impact of natural gas deregulation on the agricultural economy as a whole, though, is difficult to quantify because the historical data reflect a regulated natural gas market and thus provide somewhat limited insight into price and quantity relationships that could be expected in a completely deregulated market. It is likely that higher nitrogen prices will result in reduced corn and wheat acreage (since these crops require relatively larger nitrogen input) and increased soybean acreage (since soybeans require relatively little nitrogen). These acreage shifts would be reflected in somewhat higher corn and wheat prices and lower relative soybean prices. In a separate study, Reisner estimated the impact of NGPA on agriculture through 1990. In this study baseline results were developed for 1984 through 1990 assuming the price of fertilizer and natural gas and liquid fuels were held constant in real terms. The impact of the NGPA was then estimated by comparing the baseline with a scenario of partial pass-through of higher nitrogen fertilizer production costs and then a scenario

assuming full pass-through of the higher costs with a 2.9 percent per year increase in real energy prices. The study shows that the overall changes in agricultural prices and income due to NGPA are small.

Under the partial pass-through scenario, the average farm prices for wheat and corn are 2 percent higher in 1990 than they would be if energy prices were held constant. The price of soybeans is down about 0.5 percent as production increases. Net farm income is estimated to be 2.4 percent lower in 1990 because of NGPA. Somewhat larger impacts on prices and income result from full pass-through of the increased fertilizer production costs and higher energy prices. With this scenario, wheat and corn prices increase 4.4 percent and 4.2 percent respectively. Soybean price falls 1.2 percent and net farm income is about 7 percent less than it would be if energy prices were held constant.

It appears then that the overall impact on agriculture will be significant, but of a smaller magnitude than price and income changes induced by weather, government agricultural policy, and international economic conditions. However, the impact on regions could be larger. Areas of the country such as the southwest, where natural gas is used extensively in irrigation, are likely to feel the impact of NGPA more than the farmers in areas such as Minnesota, where natural gas usage is small.

Regulatory Options

Given the evidence that a smooth transition from regulation to deregulation will not be realized under NGPA, Congress is expected to reconsider natural gas deregulation in 1983-84. Once the topic is reopened, any of several policy options may be chosen. These include (but are not limited to) the following: (1) retain the current policy (NGPA); (2) extend controls over a longer time period; (3) achieve full decontrol in 1984; or (4) phase decontrol over 1984 and 1985.

Various proposals are being considered by Congress to deal with natural gas regulation/deregulation. We will highlight the four major legislative proposals that are pending in Congress, and relate these to the main policy options.

Major Natural Gas Legislation Pending

Administration's Proposal—Submitted by the President on February 28, 1983, this bill, the Natural Gas Consumer Regulatory Reform Amendments of 1983, moves to deregulate both old and new natural gas at the well head by January 1, 1986. The bill contains specific legislation that prevents excessive (i.e., greater than the rate of inflation) price increases from being passed on to the consumer during the transition period. Specifically, the bill limits the amount of price increases that interstate pipelines can pass through to consumers. In addition, the proposal removes price controls on any new or renegotiated gas contracts and allows either party to "opt out" of any contract after January 1, 1985. Also, take-or-pay provisions in contracts can be altered to allow for more cost-efficient pricing.

Representative Gephardt's Proposal—Legislation introduced on March 18, 1983, by Representative Gephardt (D-MO) and 73 co-sponsors, entitled Natural Gas Consumers Relief Act—HR 2154, proposes to extend price controls. Specifically, the bill delays the deregulation and price ceiling increases due under NGPA on January 1, 1985, to January 1, 1987. In addition, the bill rolls back present price ceilings and puts a price ceiling on high-cost gas which is at present unregulated. Other major provisions call for the elimination of indefinite escalator clauses and allow for reduction of take-or-pay agreements to 50 percent of the maximum annual contract quantity.

Representative Addabbo's Proposal—The Natural Gas Policy Act Amendments of 1983-HR 1952 was submitted March 2, 1983, in the House by Representative Addabbo (D-NY) and on March 3, 1983, in the Senate by Senator Heing (R-PA). In general, the bill lowers ceiling prices and take-or-pay requirements. It also eliminates most indefinite escalator clauses and allows only those price increases specified and known at the date a contract is made; that is, no unpredictable price increases are allowed.

Representative Slattery's Proposal—Representative Slattery (D-KS) and Representative Coats (R-IN) on April 12, 1983, introduced the Natural Gas Policy Act Reform Amendments of 1983-HR 2508. In general, price ceilings are removed from new wells begun after the new bill becomes law, from wells under new contracts, and from wells not committed to interstate commerce on April 20, 1977. In addition, take-or-pay and certain indefinite escalator clauses are restricted, and cancellation and renegotiation authority is given to certain contracts.

At this point it is impossible to assess which of these four bills (or compromise bills) has the best chance of passage; however, it is helpful to view them in light of the four policy options listed above.

Current Policy

The NGPA discussed earlier is the current policy. We argue that it is likely to be quite disruptive to U.S. gas markets. Large price discrepancies between unregulated new gas and regulated old gas exist and will continue to exist under the NGPA. However, it will be difficult for Congress and the administration to agree on natural gas legislation, and so the NGPA may remain by default.

Extended Controls

Some members of Congress are recommending an extension of controls. One of the major issues is the period over which gas is decontrolled. Each year that controls are extended results in less efficient energy use, less domestic production of natural gas, and increased oil imports. However, this option will be given serious consideration because it reduces the price consumers must pay, particularly residential users, who have realized substantial rate increases since passage of the NGPA.

The administration's proposal, the Addabbo proposal, and the Gephardt proposal all contain a thrust towards extending price controls. The Gephardt proposal is more specific in its intention to move back deregulation two years.

Full Decontrol

Full decontrol would move the rapid gas price increase up to 1984 instead of 1985. But this option could

also decontrol all gas rather than just new gas as in NGPA. Economic output would be reduced in the 1984 period as firms adjust to the higher gas price. Consumer well-being would decline and after-tax income of gas producers would increase.

Though there is probably support for this option in both the House and Senate, there is little likelihood that the proposed complete decontrol legislation can be passed in 1984, especially with 1984 being an election year.

Phased Decontrol

Phased decontrol would speed up deregulation, allow gas price increases, and achieve the type of movement toward free market pricing intended in the NGPA. The proposal by Representative Slattery is essentially a phased decontrol option, with its provision to remove price ceilings for certain gas immediately. Phased decontrol would lead to price increases but over an extended period as compared to full decontrol. Consumer well-being would be lowered and revenue to gas producers would rise.

The Natural Gas Market Through 1990

A recent DOE study (DOE/EIA, 1983) compared the NGPA to some of the proposals and options given above. This study estimates production, consumption, and natural gas prices through 1990 for: (1) retaining current policy of NGPA, (2) the administration's proposal, (3) phased decontrol, and (4) extended controls.

Table 8 highlights the findings of the DOE study by comparing estimated household expenditures on natural gas, using the four scenarios. As expected, average household expenditures increase under all four scenarios, with phased decontrol having the highest level in 1990. Average expenditures in 1990 are the lowest under continued controls. It should be noted that the difference in expenditure from the high to the low option is less than 10 percent.

The impact of the NGPA on agricultural commodity prices, production costs, and net farm income was discussed earlier, while the quantitative impact of the other three options has not been estimated a qualitative assessment can be made. The effect of extended controls (which limit price adjustments of both old and new gas) should be less than the affect of continuing controls on only old gas with the NGPA. This suggests that the change in commodity prices and net incomes will be in the same direction but less severe than the 2 percent estimated for partial pass-through of nitrogen production costs under the NGPA. Like the impact on consumer expenditures for residential heating, either the administration's proposal or phased decontrol are expected to have a greater negative impact on agriculture than the NGPA or extended control. Furthermore, it should be recognized that the impact from any option selected will be concentrated on the anhydrous ammonia industry and the geographic areas using natural gas as the source of energy for irrigation.

Table 8. Estimated Average Expenditures for Households Using Natural Gas Under the NGPA and Proposed Policy Alternatives for Selected Years[a]

Region	Year	Average Household Expenditures			
		NGPA	Administration Proposal	Phased Decontrol	Continued Controls
		(1982 Dollars)			
All Regions	1983	521	514	528	523
	1985	605	647	675	597
	1987	672	757	715	655
	1990	743	779	791	722
Northeast	1983	642	635	641	642
	1985	738	789	833	730
	1987	821	914	874	796
	1990	900	940	955	881
North Central	1983	634	625	646	640
	1985	742	805	832	744
	1987	825	932	874	812
	1990	893	950	951	869
South	1983	452	443	456	453
	1985	535	565	590	524
	1987	592	668	632	577
	1990	644	666	683	640
West	1983	301	300	310	302
	1985	350	364	384	330
	1987	392	447	420	376
	1990	475	495	509	441

[a]Source: U.S. Department of Energy, DOE EIA-0366, *The Natural Gas Market Through 1990, An Analysis of the Natural Gas Policy Act and Several Alternatives*, May 1983.

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Dale C. Dahl . . . . . Editor
Prepared by the Agricultural Extension Service and the Department of Agricultural and Applied Economics. Views expressed are those of the authors, not necessarily those of the sponsoring institutions. Address comments or suggestions to Professor Dale C. Dahl, Department of Agricultural and Applied Economics, 1994 Buford Avenue, University of Minnesota, St. Paul, MN 55108.

Please send all address changes for Minnesota Agricultural Economist to Nancy Rush, 231 Classroom Office Building, 1994 Buford Ave., University of Minnesota, St. Paul, MN 55108.

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