5. Consumer Prices Reflect Benefits of Restructuring

The restructuring of the natural gas industry has led to significant price changes in all phases of the industry, from the wellhead to the burnertip. Generally since restructuring began in the mid-1980's, national inflation-adjusted average gas prices to end-use consumers have been stable or falling while volumes of gas delivered have increased. This implies that gas is being produced and delivered more efficiently and that the benefits of this improved resource utilization are flowing directly to consumers.

Adjusted for inflation, average prices paid by electric utilities and customers purchasing gas from local distribution companies (LDCs) decreased by 13 percent between 1990 and 1995.[98] But some types of customers have benefited substantially more than others. The electric utility and industrial gas consumers have benefited the most with price declines of 36 and 24 percent, respectively, since 1990 (Table 11).[99] These customers have the option of multiple servers and may also have fuel-switching capability, which allows them to be more aggressive in negotiating contracts and services. In addition, many of them are large-volume, high-load-factor customers,[100] which enables them to take advantage of economies of scale in purchases.

Residential and commercial gas users also have experienced lower gas prices since restructuring, but their gains have been substantially less than in the industrial and electric utility sectors. In 1995 constant dollars, prices in the residential sector declined from $6.67 per thousand cubic feet in 1990 to $6.06 in 1995, while prices in the commercial sector declined from $5.55 to $5.05 per thousand cubic feet. Most of these customers have fewer options for service and require high quality service during periods of peak demand. These customers may also be paying an increasing share of the fixed costs of long-distance transportation and local distribution as more industrial and electric utility customers choose to purchase gas from third parties rather than LDCs.

Major changes in the roles of gas pipeline and gas distribution companies have contributed to consumer price changes. However, not all the implications of these changes can be observed directly because data collection efforts have not been able to keep up with the pace of change in the industry. Information on purchases of gas services by residential, commercial, and industrial consumers from LDCs has been collected and reported for many years. However, information on transactions between consumers and many of the new, nontraditional natural gas suppliers is not available. The most significant missing information is the price paid by industrial customers who purchase gas from sources other than their traditional supplier.

New Federal regulations providing open pipeline transportation access for many parties allow third-party gas merchants to sell gas to LDCs as well as to many ultimate consumers. These regulations encouraged many new entrants to gas markets and caused LDCs to change their product lines to meet direct competition.[101] By 1995, LDCs sold only about 63 percent of the gas they delivered (Table 12).[102] These sales are called the LDCs' onsystem sales, meaning that the LDC sells a bundle of all inclusive goods and services as a single package. The other 37 percent of the LDCs' deliveries involve gas sales by third parties. This development, often referred to as "offsystem" transactions, involves separate gas consumers, gas sellers, and gas transportation providers. The LDC sells gas distribution services; the final consumer buys gas from whomever it pleases; and the gas is delivered by pipeline and distribution companies as part of transportation services arranged through contracts and leases.

This chapter examines the differences in prices paid by final consumers for natural gas services in 1990 and 1995 (see box, p. 101). This period starts after the bulk of the changes in wellhead prices touched off by deregulation had already

[98]Prices are adjusted for inflation using the chain-weighted gross domestic product (GDP) price index from the U.S. Department of Commerce, Bureau of Economic Analysis. 1995=1.00.

[99]Percentage changes are calculated as the most recent year value less the initial year value divided by the most recent year value. For example, the percentage change in national average inflation-adjusted electric utility gas price is calculated as [($2.02-$2.74)/$2.02]*100 = -36 percent. Each percentage change expresses the difference in price over the time interval relative to the most recent year's price for that category of transaction; therefore, a $0.72 decline in inflation-adjusted electric utility prices equals a 36-percent price change. However, a price change of $0.72 in another category, such as average residential price, would result in a different percentage measure. A $0.72 change in the $6.06 national average residential gas price would be only a 12-percent price change.

[100]High-load-factor customers use gas at relatively constant daily levels throughout the year. In contrast, low-load-factor customers use gas at variable rates. For example, gas-heating customers usually use large quantities of gas daily during cold weather seasons; however, during the summer season, the amount of gas consumed by these customers is greatly reduced.

[101]One mechanism LDCs have used to retain customers is to unbundle their services. The LDC offers customers the option of purchasing transportation service, sometimes accompanied by offers of ancillary service. This practice is called unbundling because traditionally gas services were offered only as a single bundled package that included the gas commodity, transportation to move that gas, and ancillary services.

[102]Derived by Energy Information Administration, Office of Oil and Gas, from *Natural Gas Annual*, DOE/EIA-0131(95) (Washington, DC, November 1996).

Table 11. Constant Dollar Natural Gas Prices, 1990-1995
(1995 Dollars per Thousand Cubic Feet)

Sector	1990	1991	1992	1993	1994	1995	Percent Change 1990-1995
Wellhead	1.97	1.81	1.87	2.14	1.90	1.55	-27.1
Citygate	3.48	3.21	3.24	3.36	3.14	2.78	-25.2
Residential Consumers	6.67	6.44	6.34	6.46	6.57	6.06	-10.1
Commercial Onsystem Consumers	5.55	5.32	5.25	5.47	5.57	5.05	-9.9
Industrial Onsystem Consumers	3.37	2.98	3.06	3.22	3.12	2.71	-24.4
Electric Utilities	2.74	2.41	2.54	2.74	2.34	2.02	-35.6

Note: Values expressed in 1995 dollars based on chain-weighted gross domestic product (GDP) deflator from the U.S. Department of Commerce, Bureau of Economic Analysis.

Source: Energy Information Administration, *Natural Gas Annual 1995* (November 1996).

Table 12. Natural Gas Consumption and LDC Sales by Region, 1995
(Billion Cubic Feet and Percent of Lower 48 States)

Federal Region	Total Consumption	Residential Consumption	Commercial Consumption	Commercial Purchases from LDCs	Industrial Consumption	Industrial Purchases from LDCs	Electric Utility Consumption	Percent Estimated Offsystem
New England	593.4 (3.0%)	173.6 (3.6%)	143.9 (4.7%)	124.6 (5.4%)	184.7 (2.2%)	73.9 (3.6%)	91.2 (2.9%)	37.3
New Jersey & New York	1,719.6 (8.7%)	569.4 (11.7%)	370.4 (12.2%)	296.3 (12.7%)	487.6 (5.7%)	148.7 (7.2%)	292.2 (9.1%)	41.0
Mid-Atlantic	1,318.4 (6.7%)	467.0 (9.6%)	296.1 (9.8%)	2,23.7 (9.6%)	468.0 (5.5%)	82.1 (4.0%)	87.3 (2.7%)	41.4
Southeast	2,181.0 (11.1%)	406.5 (8.4%)	289.1 (9.5%)	267.8 (11.5%)	1,027.4 (12.0%)	385.4 (18.7%)	458.0 (14.3%)	51.4
Midwest	4,116.6 (20.9%)	1,664.4 (34.3%)	831.4 (27.4%)	600.7 (25.8%)	1,512.5 (17.6%)	233.6 (11.3%)	108.3 (3.4%)	39.3
Central	942.4 (4.8%)	328.2 (6.8%)	208.5 (6.9%)	169.1 (7.3%)	358.3 (4.2%)	49.5 (2.4%)	47.4 (1.5%)	42.0
Southwest	5,632.8 (28.7%)	397.6 (8.2%)	324.3 (10.7%)	241.5 (10.4%)	3,321.9 (38.7%)	882.6 (42.8%)	1,589.0 (49.7%)	73.0
Mountain	557.0 (2.8%)	208.9 (4.3%)	139.0 (4.6%)	124.9 (5.4%)	195.2 (2.3%)	27.0 (1.3%)	13.9 (0.4%)	35.2
Northwest	407.7 (2.1%)	93.9 (1.9%)	75.4 (2.5%)	70.0 (3.0%)	212.9 (2.5%)	54.5 (2.6%)	25.5 (0.8%)	46.4
West	2,050.6 (10.4%)	525.1 (10.8%)	325.7 (10.7%)	184.5 (7.9%)	746.2 (8.7%)	91.3 (4.4%)	453.6 (14.2%)	60.9

LDC = Local distribution company.

Note: Percentages do not sum to 100 because natural gas consumption for vehicle fuel and consumption in the States of Alaska and Hawaii are excluded.

Source: Energy Information Administration, *Natural Gas Annual 1995* (November 1996).

A Caution About the Reported Price Data

Changes in prices over an interval, such as the period between 1990 and 1995 used in this chapter, may not be representative of all the incremental changes that took place during subperiods of that interval. In this study, the years 1990 and 1995 show a picture of various natural gas prices at two points in time. These years were chosen to highlight the impacts of recent trends at work in gas markets, but other results may appear more important if different pairs of years, past or future, are chosen for comparison.

Differences in prices by customer class should be viewed with some caution because,with the exception of the electric utilities, these prices apply only to the customers who continue to purchase bundled gas services from their local distribution company (LDC). Therefore, many large industrial and some of the larger commercial users are excluded from these price data. Offsystem gas consumers are likely to pay lower gas prices than the LDC onsystem customers. Most customers who use offsystem providers could buy onsystem supplies at retail tariff rates from an LDC.* Therefore, industry observers believe that offsystem gas consumers choose to buy gas from offsystem suppliers because these consumers expect to pay lower prices to these suppliers.

Retail tariffs are the rates approved by regulators for services sold by regulated firms and generally are set to recover the company's total cost for providing the regulated service. Some States have replaced cost-of-service rates with incentive regulation (see Chapter 6). The full cost of the LDCs' regulated activities may, for example, include charges the LDC incurred in settling old take-or-pay contact disputes. (The LDCs and interstate pipeline companies shared the cost of buying down high-cost gas contracts as part of the restructuring of the industry.) While the LDC recovers the cost of these obligations, LDC prices may be higher than they otherwise would have been. It may also result in LDC prices being higher than other marketers' prices, putting the LDC at a disadvantage in competing to retain customers who have market choices.

Other data sources are being developed to capture some data on purchases from third-party suppliers that are not used in this study. The Manufacturing Energy Consumption Survey (MECS), conducted every four years by the Energy Information Administration (EIA), collects data on natural gas and gas transportation purchases of manufacturing establishments. The most recent MECS collected data for calendar year 1994 and the results will be released in late 1996. On release, the data will be posted on the EIA home page addressed as http://www.eia.gov/ (see the Energy Consumption directory). They will also be published in EIA, *Manufacturing Consumption of Energy*, DOE/EIA-0512(94), June 1997 (planned). These forthcoming data are based on the purchases of natural gas by manufacturers and will provide a detailed picture of gas procurement in the manufacturing sector, accounting for about 75 percent of the industrial sector gas consumption discussed in this report. In addition, the Bureau of Labor Statistics Producer Price Indexes include series that cover the change in the price of transportation services provided by LDCs to ultimate consumers.

*In some jurisdictions such as California, State regulators have divided consumers into core and non-core groups (see Chapter 6). Non-core customers must use market processes to obtain gas service and are not entitled to receive service from the LDC at tariff rates. Instead, these non-core customers buy gas services from competitive gas marketers. These gas marketers can include unregulated subsidiaries of some LDCs. The LDCs' jurisdictional to California are required to provide transportation to non-core consumers but are not allowed to offer these customers bundled gas service at regulated rates.

occurred. Thus it permits focusing on changes in pipeline and distribution companies' organizations and objectives and the potential impact they can have on gas markets. During this time, wellhead prices declined 27.1 percent in real terms while citygate prices, the prices paid by LDCs, declined 25.2 percent, and prices paid by electric utilities for delivered natural gas generating fuel declined 35.6 percent (Table 11).

These citygate and electric utility price changes clearly show that something more than the increased competition at the wellhead is at work in downstream markets. In fact, both improvements in the efficiency of transporting and distributing natural gas and a reallocation of joint costs among different consumer groups may account for the relative size of price changes experienced by different types of consumers.

What Determines Gas Prices?

Prices paid for natural gas vary. Gas prices are influenced by economic conditions, by weather, by regulations, and by taxes, particularly taxes on fuels and public utility franchises (see box, p. 103). However, setting these influences aside temporarily, price is generally a function of the quality of service, the location (both in time and space) at which a purchase is delivered, and the amount of competition among gas suppliers.

The quality of gas service is frequently measured by the firmness of the service, the so-called reliability of service. The stronger the assurance, the higher the price. Quality is described by the circumstances under which supply can be interrupted because interrupted service is considered less reliable. The most reliable service can be interrupted by only the worst events, such as natural disasters or acts of God, and commands a premium price. Service that can be interrupted under many circumstances, including the convenience of the supplier or shipper, is generally the least reliable and the least expensive.

The location of delivery also affects the price of gas service. Gas that is produced in places distant from the location where it will be purchased must be shipped, stored, and handled (compressed). All of these services add to the cost of serving any customer. The timing of the desired gas service also may add to the price because many gas-consuming activities are seasonal due to heavy consumption for space heating in winter months. Thus, firm gas service at great distances from reserves and in seasons of high demand commands premium prices. In contrast, interruptible gas service to locations close to producing reserves and at times of lesser demand is usually priced much lower. The mixture of the quality, location, and timing of gas purchases is reflected in national and regional prices. Moreover, changes in these three dimensions of gas service over time could appear to be changes in price but would actually reflect changes in the types of services used.

The amount of choice buyers have among providers of gas services also affects service prices. Buyers with several choices can fine tune their purchases to buy the service that best suits their needs. Buyers who have few choices buy the best available, but this can include paying for services that are of little value to them. Therefore, buyers with few choices pay higher prices per unit of service than would otherwise be necessary or forego services that they would otherwise enjoy. Moreover, sellers who must compete to capture customers are more careful in pricing their products because they are conscious that an unhappy or under-served buyer can easily turn to another seller. Therefore, choice enhances value both by allowing buyers to be selective in matching purchases to their needs and by shaping the sellers' concerns that the buyers perceive full value in the product.

Utilization patterns also affect prices. All other things being equal, the per unit cost of delivery for large volumes of gas is cheaper than for small volumes. Natural gas is costly to transport and distribute. Hence, large-volume consumers have a tendency to locate in areas with the lowest prices—the concentration of large industrial consumers in the Southwest, which is a major U.S. producing area, reflects the historic pattern of availability of low-cost gas in the region. Along those same lines, the Southwest and the West have a long history of using a much larger proportion of gas-fired electric generation than the other regions because gas was relatively cheaper than other fuels in those two regions. Concentrations of consumers encourage delivery systems for higher volumes of gas, put downward pressure on prices, and induce additional competitive suppliers to tailor supplies to customers' needs.

By regions, there are significant differences in the amount and purpose of gas use (Table 12). Residential consumption, primarily for heating, draws large quantities of gas into the Midwest, New York/New Jersey, West, and Mid-Atlantic regions. Gas consumption for electric generation is large in the Southwest, the Southeast, and the West, while industrial use is heavy in the Southwest, the Midwest, and the Southeast. These regional usage patterns influence and are in turn influenced by prices and price components in multiple ways.

Prices to Final Consumers

Residential Consumers Pay the Highest Prices

Among the factors that influence final consumers' willingness to purchase gas are its price and the prices and availability of competing fuels. Prices to final consumers vary greatly across the country (Figure 38). In all regions, however, residential consumers as a class pay the highest prices, ranging from $4.83 per thousand cubic feet (Mcf) in the Mountain States to $9.06 per Mcf in New England in 1995.[103] Between 1990 and

[103]Data presented in this study concentrate on 10 Federal regions: New England (NE), New York/New Jersey (NY/NJ), Mid-Atlantic (MA), Southeast (SE), Midwest (MW), Central (CE), Southwest (SW), Mountain (MO), Northwest (NW), and West (WE). Alaska and Hawaii are excluded because they are isolated from the primary domestic natural gas markets. The price data are volume-weighted averages of data reported for each State within each region. As such, they may not accurately portray individual transactions at each point within a region. However, these data do serve to indicate potential differences among individual activities in the national market.

Unintended Tax Effects of Restructuring

State and local taxes on natural gas consumption are normally designed to fit the traditional single-server, monopoly franchise organization of most public utility companies. Sales, receipts, and franchise taxes on public utility services are important sources of income for many governmental entities. However, the restructuring of public utility industries is having unintended impacts on State and local taxes, receipts, and the competitive positions of some industry participants. Events in the natural gas industry demonstrate the extent of these unanticipated outcomes. When final consumers purchase gas and transportation services from parties other than the locally franchised provider, they may avoid paying some or all of State and local taxes that would have been collected on a sale had it been made by the traditional provider. Consequently, it is sometimes less expensive for final consumers to purchase services from third-party, out-of-State vendors even when the third-party vendor's prices before taxes are higher than the traditional provider's. The out-of-State vendor gains an immediate price advantage over an in-State seller, and the State or local government loses tax revenues.

As regulated service companies, many LDCs and other franchised public utilities are a source of tax revenues for State and local government bodies. The amount and incidence of these taxes differ significantly from one place to another, sometimes even within the same State because local franchise taxes rates can vary by local jurisdiction. These taxes are usually collected for the government by the utility as part of its billing process or passed along to consumers through special levees identified on utility bills. Taxes can be a source of significant variance in the prices paid by consumers.

Average regional prices may smooth over some of the impacts of differences in taxes, but the influence of taxes can be so large that they may have a significant impact on the measured differences in prices. One study estimates the total effective sales tax rate varies from as much as 22 percent in Prince Georges County, Maryland—the highest tax incidence found in the study—to almost zero in New Hampshire.* Differences in the amount of tax included in prices to final consumers can be $0.50 per thousand cubic feet or more and could amount to nearly 10 percent of the average residential price.

As a result of the tax impact, an LDC can lose sales to out-of-jurisdiction competitors even when the LDC's prices are lower. One estimate shows that the average sales tax on a sample of LDCs amounts to 5.6 percent of the companies' revenues and ranges from 1.2 to 15.8 percent of revenues.** Many jurisdictions are now trying to remedy both the competitive and the revenue impacts of these taxes by replacing franchise and public utility sales taxes with energy importation or consumption taxes. At least one of these import tax mechanisms is currently being challenged before the U.S. Supreme Court (*General Motors Corp. (GM) v. Tax Commissioner Roger W. Tracy*. Roger Tracy is the tax commissioner for the State of Ohio). Furthermore, even if the replacement tax programs achieve their competitive and revenue objectives, they may still shift tax income to the State government and away from local government bodies. As the restructuring of the electric industry follows the pattern of the natural gas industry, these tax problems will likely have increasing financial ramifications for governments and service prices.

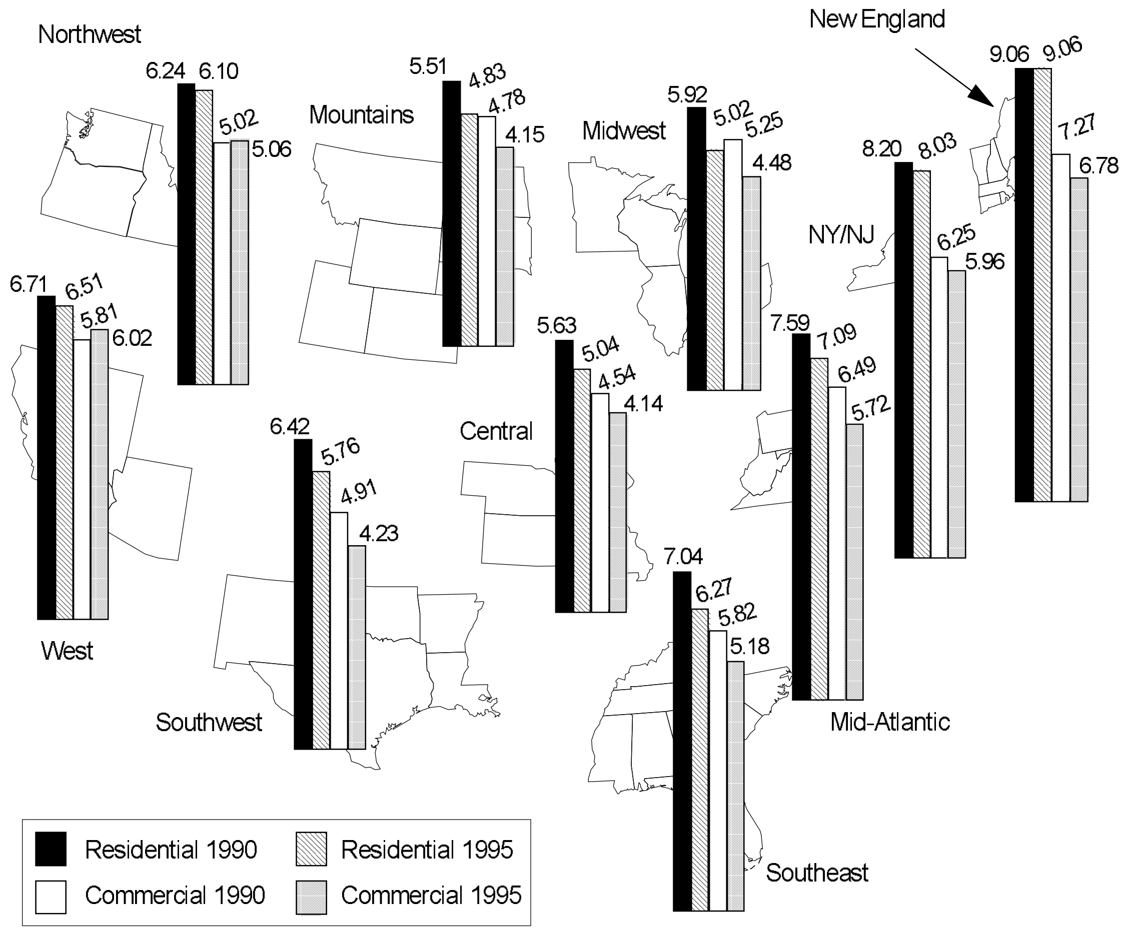
*Vincent J. Esposito, "Death by Taxes," *Public Utilities Fortnightly* (August 1995), pp. 23-25.
**American Gas Association, *Gas Distribution Industry Pricing Strategies, 1995 Update* (Arlington, VA, December 1995).

1995, the average national price of gas delivered to residential customers declined modestly from $6.67 per Mcf (measured in 1995 dollars) to $6.06 per Mcf, a decline of 10 percent.[104] Over this period, average prices to residential customers fell in nine regions and remained the same in New England. In the regions that experienced declining average residential gas prices, the price declines ranged from 18 to 2 percent with the largest decline occurring in the Midwest Region. By contrast, wholesale gas prices and prices paid by many other types of consumers declined by much larger percentages during this same period. For example, national average wellhead prices fell about 27 percent and average citygate prices declined 25 percent.

There appear to be several factors that have restricted the decline in residential prices. Residential consumers remain captive to LDC service in all but a few States that are now

[104]Natural gas prices cited in this chapter are based on data reported in the Energy Information Administration's *Natural Gas Annual 1995*, DOE/EIA-0131(95) (Washington, DC, November 1996).

Figure 38. Prices to Residential and Commercial Consumers, 1990 and 1995
(1995 Dollars per Thousand Cubic Feet)



Note: Values expressed in 1995 dollars based on chain-weighted gross domestic product (GDP) deflator from the U.S. Department of Commerce, Bureau of Economic Analysis.
Source: Energy Information Administration, *Natural Gas Annual 1995* (November 1996).

experimenting with programs to extend choice to smaller customers (see Chapter 6). Residential customers are the last class of customers to have options for service. Other LDC customers are now able to turn to alternative suppliers and negotiate better deals. As a result, despite price declines, the remaining LDC customers, who are increasingly restricted to the residential sector, appear to have absorbed the brunt of the transition costs that LDCs have been required to pay for restructuring of the gas industry. Residential customers also may be paying an increasing share of the fixed costs of long-distance transportation and local distribution networks because they typically demand the highest quality of service at the time of peak demand.

Changes in pipeline company rate structures developed by the Federal Energy Regulatory Commission (FERC) as part of Order 636 shifted some transportation fees into reservation charges and out of usage charges. This rate change caused most pipeline companies to put all of their fixed costs in the reservation charge. The reservation charge is a fee paid by all firm transportation customers to assure that pipeline capacity will be available to that customer whenever it is needed. By placing all of a pipeline company's fixed costs in the reservation charge, FERC shifted the initial risk for cost recovery away from the pipeline companies and to their customers. The transportation customers most likely to purchase large amounts of firm service, and therefore to pay these higher reservation charges, are the LDCs. Thus, the FERC-initiated change in pipeline rate structure had the effect of increasing transportation costs of the LDCs' onsystem gas customers. FERC has estimated that the change in rate design to straight fixed variable reallocated approximately $1.7 billion annually from the usage fee to the reservation fee component of transportation rates.

Among the fixed costs of providing LDC services are not only normal business expenses, but also a variety of charges that have been assigned to LDCs as a result of the restructuring of the interstate pipeline companies—take-or-pay gas contracts, transition costs, pipeline stranded-investment costs, and pipeline charges based on older transportation obligations. These transition costs are passed through to LDCs by the pipeline companies. Moreover, the LDC may find that it too has incurred direct obligations that are stranded by unbundling local service. Costs from both sources are added to the LDC's rates if State utility regulators approve it. All of these cost adjustments contribute to the LDC's revenue requirements and have the effect of raising average prices for onsystem service.

The Energy Information Administration (EIA) does not have detailed information on how these structural costs (e.g., take-or-pay, stranded costs, etc.) are included in individual consumer prices. As of August 1995, $2.7 billion in transition costs associated with Order 636 had been filed at the FERC for recovery through increased transportation rates.[105] Contract reformation costs resulting from take-or-pay settlements totaled about $10.2 billion as of May 1995, of which $6.6 billion is being recovered from consumers.

LDC Commercial Customers Pay the Next Highest Prices

Commercial customers have increasingly been allowed to choose competitive gas suppliers, and the onsystem sales of LDCs now provide service to a declining share of commercial facilities.[106] This is most noticeable in the West Region where onsystem sales in 1995 accounted for only 57 percent of commercial gas consumption. In the Southwest, Midwest, and Mid-Atlantic regions, onsystem sales to commercial facilities have declined to about 75 percent of commercial consumption (Table 12). In most regions, access to distribution, transportation, and the opportunity to purchase gas service from alternative suppliers is often controlled by the amount of gas a customer uses annually. The largest customers are generally the first to have this opportunity. Consequently, in regions where commercial onsystem sales have fallen significantly, it is generally the case that the smaller commercial customers are the ones that remain onsystem. Estimates show that the customers that remain onsystem consume on average only one-tenth the amount of gas in a year as those that buy gas from offsystem vendors.[107] This seems to imply that most of the remaining LDC commercial gas customers are small establishments that may use gas largely for heating during the winter season.

Between 1990 and 1995, national average gas prices for onsystem commercial customers declined by nearly 10 percent, from $5.55 to $5.05 per thousand cubic feet (Mcf) in constant dollars. Across regions, average prices to commercial customers ranged from $4.14 per Mcf in the Central Region to $6.78 per Mcf in New England in 1995. Average prices to this customer class were lowest in the Mountain and Central regions and highest in New England and the West. Commercial customers in all but two regions experienced declines in average natural gas prices between 1990 and 1995. Average prices increased by 4 and 1 percent, respectively, in the West and Northwest. But average commercial prices declined in all other regions, with the largest decline of 17 percent occurring in the Midwest and the smallest decline, 5 percent, occurring in New York/New Jersey.

All Onsystem Industrial Customers Have Had Large Price Decreases

Nationally, industrial customers who remained onsystem during the 5-year interval paid gas prices that declined by 24 percent, falling from $3.37 per Mcf to $2.71 by 1995. Regionally, industrial gas customers paid prices ranging from a low of $1.90 per Mcf in the Southwest to a high of $4.34 per Mcf in New England (Figure 39). Industrial onsystem customers in all regions experienced significant declines in average gas prices between 1990 and 1995. These real price declines ranged from 11 percent in the Northwest to 42 percent in the New York/New Jersey Region.

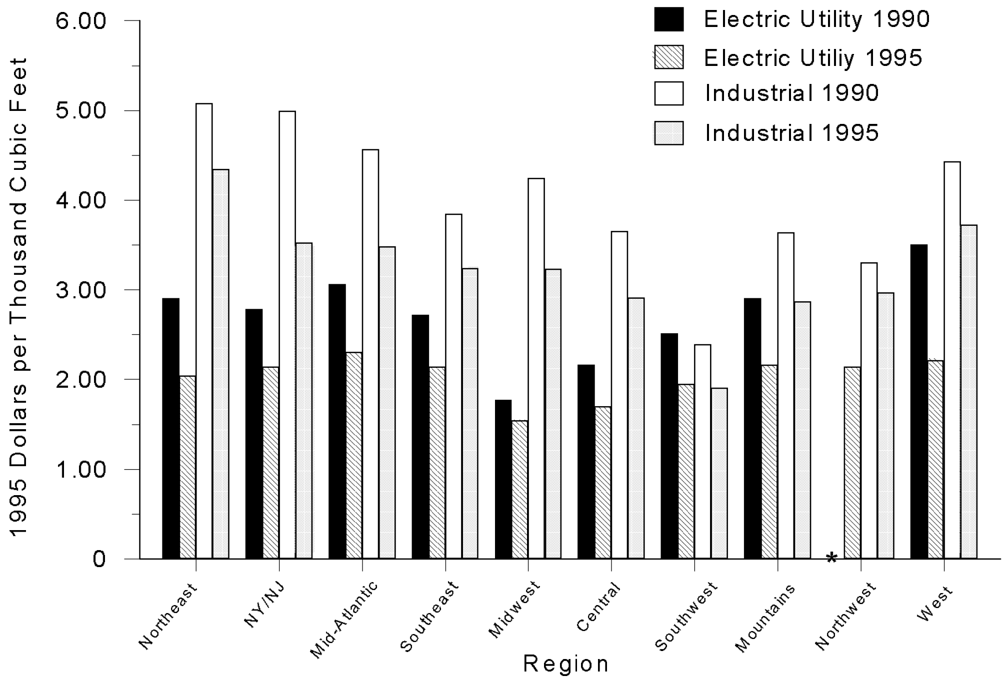
Few industrial customers remain onsystem customers of LDCs. In fact, in 5 of the 10 Federal Regions (West, Mountain, Central, Midwest, and Mid-Atlantic), less than 20 percent of industrial consumption comes from LDC onsystem sales. By 1995, no region had more than 40 percent of industrial consumption in onsystem sales. The decline in industrial prices to those who remain onsystem may in part reflect discounting by the LDCs to retain some industrial load. Even so, the industrial customers that continue to take onsystem service are likely to be small consumers with relatively low load factors.

[105] See Energy Information Administration, *Energy Policy Act Transportation Study: Interim Report on Natural Gas Flows and Rates*, DOE/EIA-0602 (Washington, DC, October 1995).

[106] Onsystem customers purchase bundled gas, transportation, and ancillary services as a single package from LDCs. Offsystem customers purchase gas from third-party gas suppliers rather than buying from regulated LDCs. However, many offsystem customers purchase transportation and other ancillary services from LDCs.

[107] Percentage share derived from Energy Information Administration, Office of Oil and Gas, *Natural Gas Monthly* Database, as of June 26, 1996.

Figure 39. Prices to Electric Utilities and Industrial Consumers, 1990 and 1995



*Electric Utility for 1990 is set to zero.

Notes: Includes only onsystem industrials. Values expressed in 1995 dollars based on chain-weighted gross domestic product (GDP) deflator from the U.S. Department of Commerce, Bureau of Economic Analysis.

Source: Energy Information Administration, *Natural Gas Annual 1995* (November 1996).

Electric Utilities Have the Most Choice and Pay the Lowest Gas Prices

Almost all electric utilities can take advantage of offsystem transportation and competitive gas supplies. The EIA data on electric utilities prices are derived from fuel costs reported for large generating units.[108] Unlike industrial and commercial prices, these data represent most gas consumed in electric utility generation.[109] In 1995, the average price of natural gas consumed in utility generation was $2.02 per Mcf, 36 percent lower than the constant dollar 1990 cost per Mcf. Regionally, utility gas costs in 1995 ranged from a high of $2.30 per Mcf in the Mid-Atlantic States to a low of $1.54 per Mcf in the Midwest.[110] Electric utilities in many regions[111] are able to concentrate their gas consumption in warmer summer months when gas prices are normally lower and transportation most readily available. The close proximity of Canadian gas supplies probably contributes to the ability of Midwestern electric utilities to purchase gas at prices below the average national wellhead price.

Electric utilities in most regions appear to have experienced a significant reduction in delivered gas costs over the past 5 years. In 1990, electric utility gas costs (in 1995 dollars) ranged from $3.50 per Mcf in the West to $1.77 per Mcf in the Midwest, 58 and 15 percent above the 1995 prices, respectively (Figure 39). The average price electric utilities

[108]Electric utility fuel costs are reported on FERC Form 423, “Monthly Report of Cost and Quality of Fuels for Electric Plants.”

[109]Gas used for electric generation at nonutility generators including cogenerators is treated as part of the industrial sector in this study.

[110]In 1990, electric utility gas consumption in the Northwest was small and sporadic. Price data in 1990 for this region are unreliable and therefore excluded here.

[111]Electric utilities in the producing areas still use natural gas in some old gas-fired boilers to meet base load demands. As these gas-fired generators are replaced with other generating sources or newer technologies, gas consumption in these regions is expected to become more sensitive to market conditions. Until recently, the use of gas for electric generation in the gas-producing areas was motivated primarily by regional economic forces and differed significantly from gas consumption for generation in the rest of the country.

paid for gas in 1990 and 1995 was below the average citygate price in all regions except the West. These low electric utility prices probably reflect the special seasonal and volume choices that many electric utilities are able to make.

Citygate Prices

The average price paid by LDCs for natural gas, the citygate price, declined between 1990 and 1995 (Figure 40). Although the price decline is substantially larger in some areas than in others, the trend of declining wellhead prices and changing transportation rates has significantly affected the citygate prices paid by LDCs throughout the country. These citygate prices should include, in addition to gas commodity costs, the expense of transporting, storing, and managing gas supplies for delivery to the citygate. However, there is some evidence that not all gas acquisition costs are accounted for in the citygate prices,[112] because of bookkeeping procedures that may not wholly reflect the restructuring of wholesale gas markets. Nevertheless, these average regional citygate prices are generally used to represent the wholesale cost of gas in scattered individual markets.

In 1995, the national average citygate price was $2.78 per thousand cubic feet (Mcf), down 25 percent from the constant dollar 1990 price of $3.48.[113] Thus, compared with the average wellhead price, which dropped nearly 27 percent (from $1.97 to $1.55 per Mcf), citygate prices have declined a little less than wellhead prices.

Regional average citygate prices show significant variation in both 1995 and 1990. In 1995, citygate prices varied from a high of $3.82 per Mcf in New England to a low of $2.07 per Mcf in the West. By way of comparison in 1990, constant dollar citygate prices in New England were $3.97 per Mcf, nearly 4 percent higher than the 1995 level, and $3.32 per Mcf in the West where citygate prices declined more than 60 percent over the 5-year period. Although average citygate prices were lowest in the West in 1995, in 1990, the lowest average regional citygate price was found in the Northwest at $2.41 per Mcf. By 1995, average citygate prices in the Northwest had fallen to $2.25 per Mcf, a decline of nearly 7 percent.

Theoretically, the regional variation in average citygate prices should reflect two things: first, differences in transportation costs and second, differences in LDC load, procurement, and management policies. Certainly the influence of each of these forces can be observed in the data. For example, in the Northwest, the close proximity and abundant supplies of Canadian gas provide LDCs with ready access to low cost sources that need be transported only a short distance from the Canadian border to the citygate.[114] Regional average citygate prices elsewhere in the country also show the influence of distance from sources of gas production. The New England citygate prices are about one-third higher than the national average, reflecting among other forces, the distance of these markets from gas fields.

The second set of determinants of citygate prices—load, procurement and management—is more difficult to summarize. Some aspects of LDC loads can be observed from commonly available statistics, such as the number and class of customers; however, the amount of gas demanded at specific times cannot be observed from aggregate data. In addition, LDC procurement and supply management policies are masked by averages and the complexities of accounting systems. Therefore, to the extent that load and policy differ by region, these differences are reflected in price differences by region.

For example, an LDC that wants to guarantee supply may sign long-term gas supply contracts that can increase its cost of gas supply vis-a-vis a company that relies on the spot market. Another company that is similarly concerned about deliverability may contract for a lot of firm transportation or storage close to its service territory. Expenditures on large amounts of high value transportation or large amounts of upstream storage would result in relatively high citygate prices when compared with other regions that chose to use a mixture of firm and interruptible transportation or to hold relatively little gas in outside storage. The available data on average citygate prices do not reveal LDC practices, and therefore cannot indicate how differences in practices contribute to the observed differences in prices.

Price Components

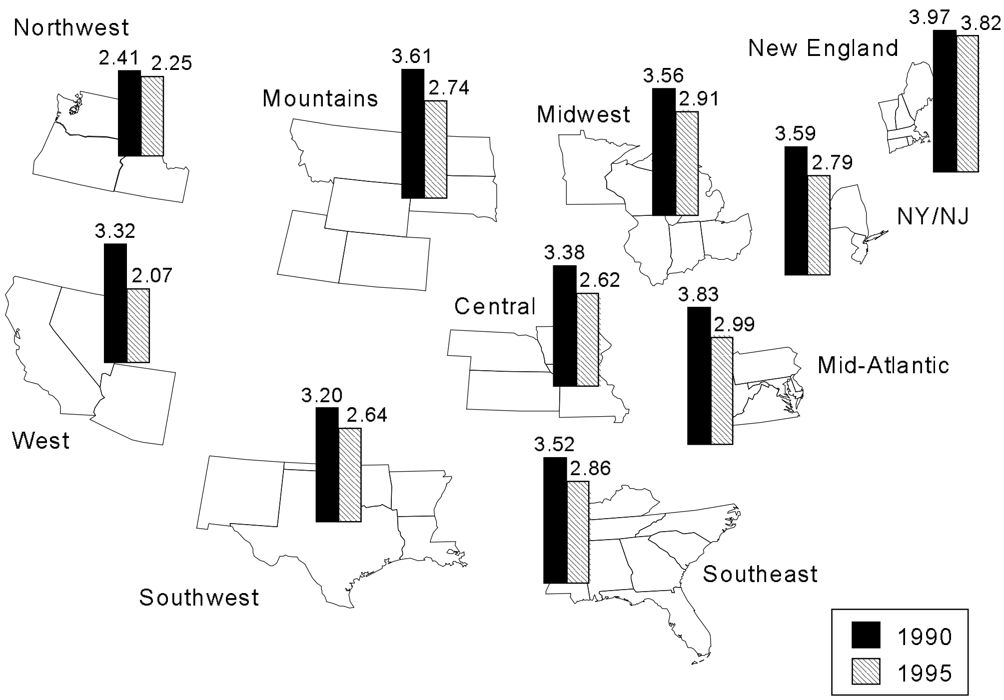
Differences in final prices to onsystem consumers are a reflection of differences in the cost of the elements that go into the final delivery of natural gas services. Some insight into the sources of price differences can be gained simply by observing the major components of average end-user prices.

[112]For example, the use of financial instruments to stabilize the cost of gas supplies may not be included in reported citygate data. Moreover, more generic research suggests that some items associated with gas acquisition costs are not included in the purchased gas adjustment usually used to estimate citygate prices. For example, see Mary Barcella, "Saving a Bundle? The Cost Impacts of LDC Unbundling," *Proceedings of the Fifth Annual DOE-NARUC Natural Gas Conference*, St. Louis, MO. Forthcoming.

[113]Citygate price data are derived from the Energy Information Administration, *Natural Gas Annual 1995*, DOE/EIA-0131(95) (Washington, DC, November 1996).

[114]U.S. imports of gas from Canada are sold inclusive of transportation to the border crossing.

Figure 40. Natural Gas Citygate Prices, 1990 and 1995
(1995 Dollars per Thousand Cubic Feet)



Note: Values expressed in 1995 dollars based on chain-weighted gross domestic product (GDP) deflator from the U.S. Department of Commerce, Bureau of Economic Analysis.
Source: Energy Information Administration, *Natural Gas Annual 1995* (November 1996).

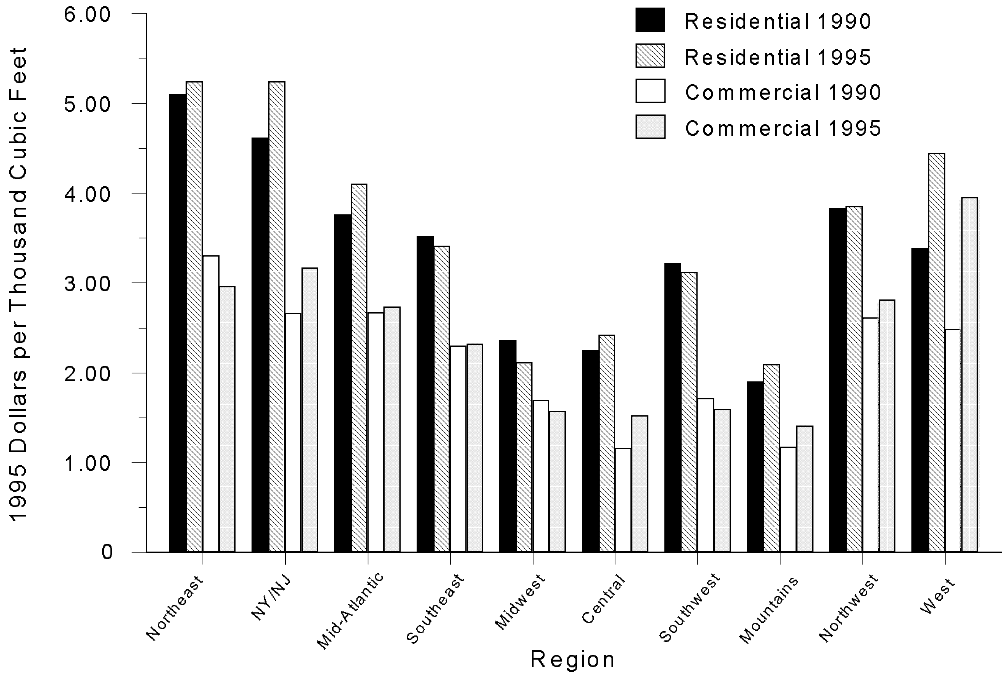
LDC prices for onsystem sales to final consumers can be disaggregated into two useful components: the cost of gas acquisition and the cost of distribution services. Arithmetically, these component estimates are calculated by subtracting the average citygate price from the average price to final consumers.[115] The differences between average end-user prices and average citygate prices are sometimes referred to as the "margins" or the "mark ups" for distribution services. Since citygate prices are an approximation of the LDC's costs of acquiring gas and having it delivered to central locations in a timely fashion, the remainder of the final price produces an approximation of the LDC's cost to deliver gas to customers' burnertips. LDC margins must recover all of the distribution costs—both fixed and variable—a company incurs. These include the costs of building and maintaining miles of distribution pipe, making safety inspections, reading meters, and billing customers. LDC margins are used as an indicator of the impact of distribution costs on final prices.

Distribution Margins

Gas distribution margins for residential and onsystem commercial consumers in 1995 ranged from $5.24 in New England and NewYork/New Jersey to $1.41 per thousand cubic feet in the Mountain Region (Figure 41). Residential consumers paid the higher margin in every region, but the price differences between the two types of customers range widely. Residential customers in the Southwest and New England regions on average paid nearly twice as much for distribution services than did onsystem commercial customers. By contrast, on average, residential customers in the West Region paid only 10 percent higher per-unit margins than onsystem commercial customers. In the other regions, residential margins ranged from 30 to 60 percent higher than onsystem commercial charges.

[115]The calculations of the components of end-user prices depend on several simplifying assumptions. First, they assume that each consumer in a customer class is charged on the same rate schedule and receives essentially the same quality of service. Second, since these data are calculated as regional averages, they reflect volume weights among the markets aggregated into each of the regions. If any of the regions contain disparate patterns of pricing activity, the regional average may produce misleading indicators of the prices charged to consumers by individual companies.

Figure 41. Distribution Margins for Residential and Commercial Customers, 1990 and 1995



Note: Includes onsystem commercial only. Values expressed in 1995 dollars based on chain-weighted gross domestic product (GDP) deflator from the U.S. Department of Commerce, Bureau of Economic Analysis.

Source: Energy Information Administration, *Natural Gas Annual 1995* (November 1996).

In 1995, the average national distribution margin for residential consumers was $3.28 per thousand cubic feet (Mcf), little changed from its 1990 value of $3.19 per Mcf (adjusted to 1995 prices). Across regions, the 1995 margins ranged from a high of $5.24 per Mcf in New England and New York/New Jersey to a low of $2.09 per Mcf in the Mountain Region. The range of distribution margins appears not to have changed significantly over this 5-year interval. In 1990, the range in the margins expressed in 1995 dollars was similar, with New England having the largest at $5.10 per Mcf and the Mountain States the lowest at $1.90 per Mcf. Between 1990 and 1995, however, residential distribution margins declined in three regions: Southeast (by 4 percent), Midwest (by 12 percent), and Southwest (by 3 percent) but increased in New England (by 3 percent), New York/New Jersey (by 12 percent), Mid-Atlantic (by 8 percent), Central (by 7 percent), Mountain (by 9 percent), Northwest (by 1 percent), and West (by 24 percent). All the increases in residential distribution margins over the 5 years were less than $0.65 per Mcf except in the West. The 24 percent increase in the West represents a $1.06 increase during the 5-year period. Increases in the New York/New Jersey and Mid-Atlantic regions amounted to $0.63 and $0.34 per Mcf, respectively.

There is no single pattern in the changes in residential distribution margins over the 5-year interval. Regions in the western third of the country (including Mountain, Northwest, and West regions) all show increases in distribution margins. As discussed in Chapter 3, there is some indication that gas markets in these regions are not thoroughly integrated with the rest of the Nation, and by 1995 two of these three regions (Northwest and West) had the lowest citygate prices in the country.[116] Consumption in the West Region is by far the largest of these three gas markets and is particularly affected by California. The rate of change in customer access, especially in the large California market, has been more rapid than in many other areas. The West Region ranked fifth in the level of distribution margins in 1990, but by 1995 the level was the third highest in the Nation.

Elsewhere in the country, residential distribution margins changed by smaller amounts. Margins increased by $0.63, $0.34, and $0.17 per Mcf in the New York/New Jersey, Mid-Atlantic, and Central regions, respectively, but fell $0.25 per Mcf in the Midwest and by smaller amounts in the Southwest and Southeast. The Midwest relies heavily on gas for

[116]Citygate prices in the Mountain Region nearly equal the national average citygate price.

residential heating, accounting for 34 percent of total residential gas consumption nationwide. The Southwest and the Southeast each accounts for only about 8 percent of the residential market.

The average national distribution margin for commercial onsystem customers in 1995 was $2.27 per Mcf, up slightly from the 1990 amount, adjusted to 1995 dollars, of $2.07 per Mcf. The range of 1995 distribution margins is $1.41 to $3.95 per Mcf, which is generally lower than the spread in residential margins across regions. However, changes in distribution margins for both classes of customers move in the same direction except in New England. In the western third of the Nation (Mountain, Northwest, and West), margins increased for onsystem commercial customers. As with residential margins, the largest increase was in the West at $1.47 per Mcf during the 5-year period. In most other regions, commercial margins also moved in the same direction as residential margins. And like the pattern in residential margins, the amount of change was generally small compared with the total price of gas service to this class of customers.

Impact of Switch to More Offsystem Transactions

The decline in industrial and commercial customer participation in onsystem sales means that those customers who do remain onsystem are likely to be paying more of the fixed cost of the distribution system. If reductions in fixed costs are smaller than the decline in gas sales, consumers that are still full service, bundled customers of an LDC will experience price increases. If the residential load does not expand rapidly enough or if the distribution costs cannot be reduced by efficiency improvements, the remaining onsystem customers end up paying higher prices.

The impact of competitive pressure to tailor special products to users' demands has been particularly influential as the restructuring of the natural gas supply industry has unfolded. One way to see this influence is to observe the aggregate percentage of customers who have gone offsystem. EIA collects and publishes data on the percentage of industrial and commercial onsystem gas deliveries. To round out the picture of the impact of changing industry structure, sales to the residential and electric utility sectors must be included. Since few residential customers had the opportunity to choose among competing suppliers in 1995, assume that all residential sales are currently made through LDCs. In contrast, almost all electric utilities have had the equivalent of access to competitive suppliers for several years; therefore, assume that all electric utility purchases are now effectively offsystem. This aggregate view of purchases shows that in the Southwest less than 30 percent of all gas deliveries to final consumers in 1995 were onsystem sales. Similarly California, the lead State in the West Region, started retail unbundling early, and by 1995 less than 40 percent of gas consumption was onsystem. However, in the Midwest where only 15 percent of industrial sales are onsystem, nearly 60 percent of all deliveries remain onsystem because offsystem industrial consumption is balanced by large amounts of residential consumption primarily in the winter heating season months (Table 12).

On the same note, some of the change in prices between 1990 and 1995 is due to reversing allocations of fixed costs that had been skewed to favor residential customers. When most end-use customers were dependent on the regulated LDCs to provide gas service, regulators could, and frequently did, deliberately allocate more of the fixed costs to industrial and large commercial consumers. As these customers acquire the opportunities to choose alternative suppliers who base their prices on the marginal cost of serving individual customers, they naturally choose the least cost supplier. If LDCs continue to impose extra premiums on industrial and commercial customers, these customers will choose alternative suppliers, and LDCs will raise prices to the remaining captive customers to cover the costs that had previously been assessed to their former industrial customers. As the gas industry is restructured, LDCs are losing the ability to force industrial customers to pay prices that exceed the cost of serving them.

When large-volume, high-load-factor customers switch to offsystem suppliers, the LDC’s business becomes increasingly concentrated in the peak season, high reliability customer. This concentration has a tendency to cause LDCs to increase the quality of the supplies and delivery services they buy and thereby raise the citygate prices and increase the unit costs of distribution services provided to lower volume retail customers. This may cause prices to rise because the LDC is servicing a more specialized customer and losing some of the advantages of aggregating different types of loads.

LDCs may find themselves discounting sales to high-volume customers in order to retain their industrial load. That is, the public utility gas provider may find that to retain high-volume customers, it is necessary to reduce prices to these customers below the full cost of providing them service. In the short run, as long as revenue requirements cannot be decreased in proportion to falling volumes, all customers receiving service may be better off if high-volume customers remain onsystem and continue to contribute some portion of the fixed costs of the delivery system. As long as the price charged to high-volume customers exceeds the variable cost of serving these customers, their business continues to contribute payments that cover some part of the fixed cost of providing service. Therefore, so long as other adjustments cannot lower costs, reducing prices to high-volume customers may be in the best interest of all customers.

Future Challenges

In the future as additional customers have the choice of using alternative suppliers, the ability of an LDC to price services to some customers below the full cost of serving them will be diminished. If most consumers can choose among suppliers, all are likely to select suppliers that offer the best price for the desired services. Under these circumstances, LDCs will be unable to sustain discounting policies for selected customers. However, providing gas distribution services does involve some economies of scale that cannot be attributed to any individual or set of customers. These savings, to the extent they exist, permit an LDC to use some strategic discounts to attract customers that may be particularly price sensitive.

Finally, the role of competitive pressure in determining the price to final consumers cannot be overlooked. Even when LDCs had a monopoly on the delivery of gas services to final consumers, they were never free of competitive pressures from other fuels and alternative locations. However, it is fair to say that customizing products and minimizing cost have assumed much more pronounced roles in the restructured gas industry than ever before. Those segments of the industry that have had access to competitive suppliers have experienced significantly reduced prices. While it is true that part of the reduction in prices for the more open sectors of the market may be due to reduced cross-subsidies and changes in the quality of service, prices also have fallen for many who do not have access to multiple suppliers. These customers have benefited from upstream access even when they did not have individual choices themselves.

The extension of competitive pressures to the remaining customer classes is largely a matter of reducing regulatory barriers in retail markets. These markets are supervised by the State public utility commissions. Just as the restructuring of the natural gas industry to date has grown from the deregulation of wellhead gas prices and the conversion of interstate gas pipeline companies from gas companies to transportation service companies, the next stage appears to be the transformation of the LDCs to distribution service companies rather than gas providers. This process is more diverse than the previous steps because each individual State will endorse changes that suit its circumstance. The next chapter provides a review of the status of this State regulatory transformation process.

The future of retail gas service can be very different from the past—these changes are not without costs and dangers but they also show promise to lower customers' prices. The reductions in citygate prices and in the prices paid by consumers that already have access to unbundled transportation over the past 5 years demonstrate the potential for change.

However, some additional costs have clearly been assigned to customers who have remained captive to LDCs. If these additional costs are transitory, prices to small commercial and residential customers could eventually decline even if there is no further restructuring of retail gas markets. These small customers might prefer not to be forced to find new gas suppliers or to choose among a variety of gas services, particularly if they are exposed to greater price fluctuation as a result of these new choices. The reduction in gas commodity prices and the efficiency improvements in long-distance transportation costs that have come from the restructuring so far have benefited all end-use consumers. Even though these benefits have not been distributed in equal proportion to all consumers, they are nevertheless real resource gains to households throughout the country. Whether or not the introduction of multiple marketers and individually tailored services can further reduce the cost of gas services to small consumers whose purchases are concentrated in peak demand periods will continue to challenge the industry, its regulators, and consumers.