

Distribution of Natural Gas: The Final Step in the Transmission Process

This report analyzes the role of local distribution companies (LDCs) and transmission pipelines in delivering natural gas supplies to end-use customers, focusing upon the years 1996 through 2006. It also examines the changing dynamics of natural gas end-use markets, especially the trend toward large-volume users such as electric power generation plants and large industrial users receiving greater portions of their supplies from mainline natural gas transmission pipeline companies rather than the traditional LDC. Questions or comments on the contents of this article should be directed to James Tobin at james.tobin@eia.doe.gov or (202) 586-4835.

Each day, close to 70 million customers in the United States depend upon the national natural gas distribution network, including natural gas distribution companies and pipelines, to deliver natural gas to their home or place of business (Figure 1). These customers currently consume approximately 20 trillion cubic feet (Tcf) of natural gas per annum, accounting for about 22 percent of the total energy consumed in the United States each year. This end-use customer base is 92 percent residential units, 7 percent commercial businesses, and 1 percent large industrial and electric power generation customers.¹ However, the large-volume users, though small in number, account for more than 60 percent of the natural gas used by end users.

The more than 1,500 companies that carry out the natural gas distribution process are quite varied in size and type (see box, “Distributors of Natural Gas”). They include natural gas local distribution companies (LDCs) serving millions of customers, as well as those that serve less than 100. They also include mainline natural gas pipeline companies that provide direct service mostly to large-volume end users, although the bulk of the natural gas transported by pipelines usually reaches end users via LDCs.

The role of natural gas distributors has changed dramatically over the past 2 decades as legislative and regulatory initiatives have combined with market forces to create a more competitive end-use marketplace. This evolution was triggered primarily by the mandated restructuring of pipeline transmission operations in the 1990s and the growing competition between pipeline and local distribution segments for the large-volume natural gas customer. As a consequence, LDCs and pipeline companies alike had to restructure their operations and their way of doing business to remain economically viable and competitive.

A major factor in the reform of the natural gas industry was the requirement under Federal Energy Regulatory Commission (FERC) Order 636 (1992) that interstate pipeline companies provide open-access transportation and no longer buy and sell natural gas. This transformation allowed large-volume users of natural gas to buy their

supplies in an open and competitive market rather than from a single source pipeline, at least at the interstate level.

The switch to open-access suppliers by many large-volume users reduced the customer base for LDCs, which generally provided only bundled sales and delivery services. As part of an effort to minimize such “bypassing” of LDCs, a number of States instituted open-access programs of their own that permitted, and in some cases required, LDCs to institute open-access-like policies, although these programs also often had other goals as well.

LDCs also faced a problem of declining markets. Natural gas deliveries declined in all end-use sectors except the electric power generation sector in the late 1990s and mid-2000s. The decline in average consumption per customer was especially pronounced among residential and commercial users who are the core customers of LDCs, accounting for more than half of all natural gas deliveries to end users.

This report examines the changing role of natural gas distributors between 1996 and 2006 and the various regulatory and operational factors underlying these changes. By 1996, when the transition to open-access transportation by interstate pipelines was complete and a number of States had initiated comparable programs for intrastate pipelines and LDCs, the business and operational profile of many LDCs had changed significantly.

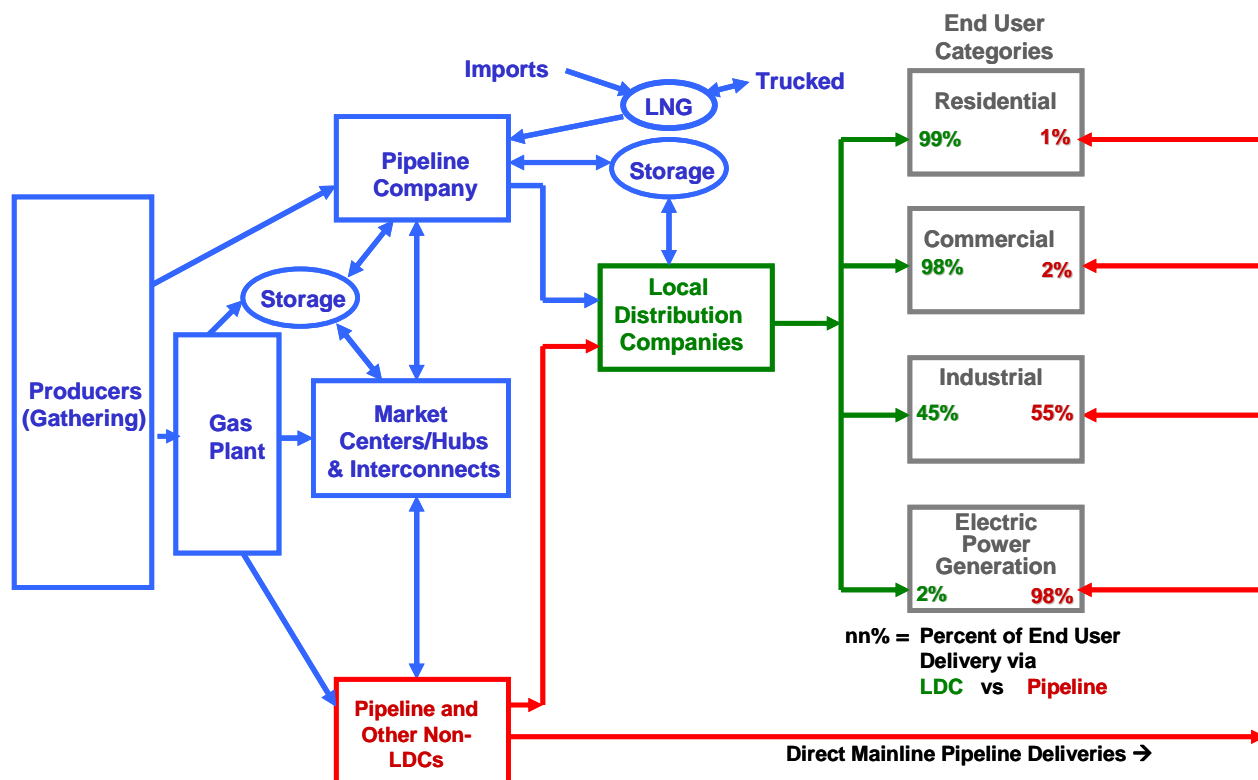
Overview

The bulk of the natural gas consumed by end users is delivered by LDCs. LDC operations in 2006 accounted for approximately 60 percent of the 19.9 Tcf of natural gas delivered to the four principal natural gas customer categories: residential, commercial, industrial, and electric power generation (Figure 1). In fact, LDCs are the primary conduit for natural gas delivered to almost all residential and commercial customers, including the small number of customers who use natural gas as a vehicle fuel.

The remaining 40 percent of natural gas delivered to end users arrives directly via mainline pipeline systems. These pipeline systems, nonetheless, supply about 98 percent of the natural gas consumed by electric power generation facilities, which currently account for about 6.2 Tcf, or 31 percent, of all end-use natural gas consumption (Figure 2).

¹Energy Information Administration (EIA), Form EIA-176, “Annual Report of Natural Gas and Supplemental Gas Supply and Disposition” database.

Figure 1. Natural Gas Distribution Segments, 2006



Source: Energy Information Administration, Office of Oil and Gas.

In addition, pipeline companies provide about 55 percent of the natural gas consumed by industrial users, although they account for only 2 percent of commercial customer deliveries (Figure 1). However, much of that 2 percent goes to large-volume commercial users while the smaller commercial users generally are served by LDCs.

Although LDCs still account for almost two-thirds of all the natural gas delivered to end users, over the past 10 years their portion of the market has declined as the natural gas end-use market and its operating environment have changed under the influence of market restructuring (see box, “Restructuring Abstract”). In 1996, LDCs accounted for 71 percent of deliveries of natural gas to end users; by the close of 2006 that had fallen to 60 percent. Moreover, volumes delivered by LDCs declined by 16 percent despite the fact that the number of customers served by LDCs increased by 8 million, or about 14 percent, during the period (Table 1).

Several factors helped precipitate these changes.

- Market restructuring and open-access transportation brought about greater competition between LDC and natural gas pipeline companies. Several FERC orders, e.g., Order 490 (1988), made it easier for

new electric power generation plants to negotiate directly, and locate strategically, to access mainline pipeline deliveries.²

- The shift to open-access transportation by interstate pipelines encouraged under FERC Order 436, and mandated under Order 636, provided opportunities for large-volume natural gas users to contract directly with mainline transmission companies.³ Large-volume customers could purchase their own supplies on the open market and have them transported to their facilities under open-access rules and at lower cost. Consequently, end-use deliveries by interstate pipeline companies, which principally flow to the electric power generation and large industrial sectors, increased significantly (Table 1).

²See Energy Information Administration, *Energy Policy Act Transportation Study: Interim Report on Natural Gas Flows and Rates*, Chapter 2 (Washington, D.C., 1995). http://www.eia.doe.gov/pub/oil_gas/natural_gas/analysis_publications/energy_policy_act_transportation_study/pdf/060295.pdf.

³Details on these FERC Orders can be found in EIA’s *Natural Gas: Major Legislative and Regulatory Actions (1935-2004)*, at http://www.eia.doe.gov/oil_gas/natural_gas/analysis_publications/ngmajorleg/ngmajorleg.html.

Distributors of Natural Gas

Natural gas is delivered to end users by several different types of business organizations. These entities are organized with the objective of selling and/or transporting natural gas to specific customer groups. The Energy Information Administration, in its “Annual Report of Natural and Supplemental Gas Supply and Disposition, Form EIA-176” survey, requests natural gas local distribution company (LDC) respondents to identify their firms as investor-owned, municipal, privately-owned, cooperative, or something other than these. In 2006, 257 firms classified themselves as investor-owned, 931 as municipals, 104 as privately-owned, and 15 as cooperatives.

Investor-Owned: An LDC whose stock is publicly traded, it is generally granted exclusive territorial contracts covering large areas within a State. The State public utility commission (PUC) has jurisdiction over all operational aspects of an investor-owned LDC. The PUC also approves service rates and reviews the quality of service.

Privately-Owned: An LDC that is owned by private investors and whose stock is not publicly traded. Like an investor-owned LDC, it is subject to the State PUC regulations and rate-setting guidelines.

Municipal: An LDC that is owned and operated by a municipal government. Most municipal LDCs were organized in areas located along the long-distance routes of the large interstate natural gas pipelines that were built during the first half of the 20th century but where the potential rates of returns on investment were not attractive enough for investor-owned or privately-owned utilities to build a distribution network. Many municipalities that operate their own natural gas distribution system contract with investor- or privately-owned utilities, granting an exclusive territorial contract (monopoly franchise arrangement) to the utility while retaining authority over rates, operations, and the type and quality of services provided within its jurisdiction.

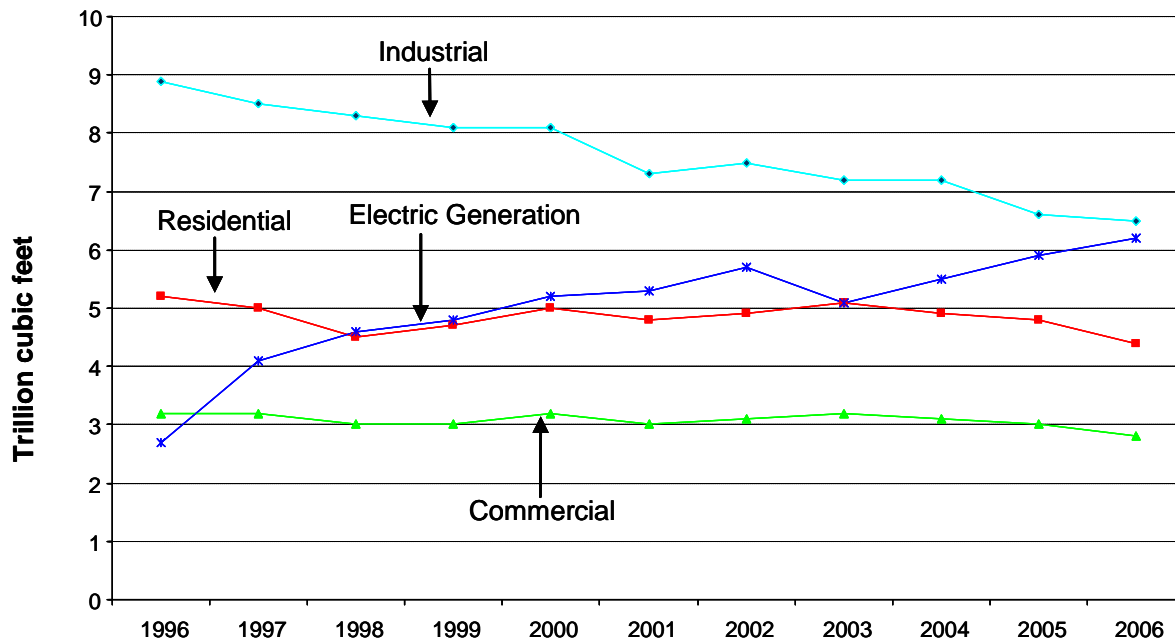
Cooperative: An LDC that operates on a cooperative nonprofit basis for the mutual benefit of its members. No interest or dividends are paid out of earnings although the company is obligated to pay, by credits to a capital account for each member, any excess revenues received beyond annual operating costs and expenses. Anyone, or any firm, may become a member by paying a fee, agreeing to purchase its natural gas needs from the cooperative, and being approved for membership by the board of directors.

In addition to the above LDC categories, intrastate and interstate pipeline companies deliver natural gas supplies directly to end users, primarily to large-volume users. Ancillary amounts of natural gas have also been reported as delivered to end users by natural gas producers, gatherers, and natural gas storage operators. In 2006, 49 non-pipeline natural gas companies reported direct deliveries to end users. The two largest non-LDC deliverers of natural gas to end users are:

Intrastate Natural Gas Pipeline: A large-diameter mainline system that operates totally *within one State*. These natural gas pipelines may provide open-access transportation services or engage in purchasing natural gas from producers and suppliers for reselling to large-volume customers such as local natural gas distribution companies, electric utility companies, and industrial customers. They are subject to the jurisdiction of a State PUC or State Energy Office. In 2006, 84 intrastate pipeline companies reported direct deliveries to end users.

Interstate Natural Gas Pipeline: A long-distance, large-diameter, open-access pipeline system that transports natural gas supplies from supply sources located in one State to local markets usually located in another State. Generally, they deliver natural gas to LDCs (citygates) who, in turn, sell or distribute the natural gas to end users. They also deliver supplies directly to large-volume end users such as industrial and electric power generation facilities, bypassing LDCs. Interstate natural gas pipelines are subject to the jurisdiction of the Federal Energy Regulatory Commission (FERC). In 2006, 57 interstate pipeline companies (of the 108 under FERC jurisdiction) reported direct deliveries to end users.

Figure 2. Natural Gas Delivery Volumes by End-User Category, 1996-2006



Source: Energy Information Administration (EIA), *Natural Gas Annual*, (various issues).

- For many LDCs, overall natural gas delivery volumes declined as their core clientele (residential, commercial, and small-volume industrial customers) conserved in the face of rising natural gas prices. This decrease in natural gas use not only reflects short-term cutbacks in reaction to higher natural gas prices, but the improved efficiency from new natural gas equipment in new homes and businesses and replacements of older natural gas appliances in existing units.

Background

The natural gas end-use market looks quite different than it did 10 years ago. During that time natural gas as a fuel for electric power generation increased significantly while its use in all other sectors decreased. In 2006, the total volume of natural gas delivered to electric power generation users was on the verge of overtaking industrial end use for the first time (Figure 2).

Between 2000 and 2006, deliveries of natural gas to ultimate end users declined by 6 percent from 21.2 Tcf to 19.9 Tcf (Table 1). This decline occurred even as the number of natural gas end users increased by almost 6 million, or 9 percent, during the period, as residential,

commercial, and industrial users responded to higher natural gas prices by using less natural gas.⁴

A decline in average consumption per residential household began in the late 1980s. For example, per-customer use in the residential sector in 2000 was about 84 thousand cubic feet (Mcf) per annum, down 12 percent from 95 Mcf in 1996 (Figure 3). By 2006 that average had fallen to 68 Mcf, for an overall decline of 28 percent since 1996. Similarly, average commercial customer use fell by 20 percent between 1996 and 2006, with 15 percent of this decline between 2000 and 2006.

Variation in the generally downward trend occurs because residential consumption is especially responsive to temperatures. The weather-normalized average consumption per customer series shows that the long-term decline is even more apparent without the variability caused by temperature variation.⁵ Factors behind the decline in average residential

⁴Between 2000 and 2006, the average wellhead price for natural gas rose 74 percent, while the average residential price rose 77 percent, industrial 50 percent, and electric power generation 54 percent. See Energy Information Administration, *Natural Gas Annual*, 2004 and 2006 editions, Table 1. Also, http://tonto.eia.doe.gov/dnav/ng/ng_cons_top.asp.

⁵This method to develop the weather-normalized series was adapted from work of the American Gas Association. The description of the method is available in Appendix C of the EIA report, *Impact of Higher Natural Gas Prices on Local Distribution Companies and Residential*

consumption include greater appliance and building efficiencies. Declining consumption by core customers is especially problematic for the LDCs because their systems are designed to meet core customer demand on peak days.

Average industrial use decreased by 25 percent between 1996 and 2006, with a decline of 20 percent occurring between 2000 and 2006. During these same 10 years, the increasing demand for natural gas as a fuel for electric power generation led to a 130-percent increase in the use of natural gas for that purpose, from 2.7 Tcf to 6.2 Tcf per year (Figure 2). Deliveries to industrial end users declined as the price of natural gas increased, causing the economics of continued use to become less competitive, such as in the production of nitrogen-based fertilizers. Since 2000, imports of nitrogen-based fertilizers have risen three-fold, replacing domestically-produced products and now accounting for over half of such fertilizer used in the country.⁶ In addition, large industrial plants often possess the capability to switch fuels, alternating between fuels whenever differences between prices warrant a change.

The only end-use sector that experienced an overall increase in deliveries of natural gas since 2000 has been electric power generation. Its growth can primarily be attributed to the addition of new natural-gas-fired electric generation units in existing coal- and oil-fired power plants and the construction of new large natural-gas-fired power plants.⁷ Electric power generation facilities became the prime users of transportation programs as they are large-volume users of natural gas with the resources to arrange and manage their own natural gas acquisition programs. Indeed, many operators of new natural-gas-fired electric power generation units have located and built their facilities specifically to link to an interstate natural gas pipeline system.

The percent of all natural gas deliveries to electric power generation plants via transportation programs consequently grew to 98 percent in 2006, compared with 80 percent in 2000. This shift to transportation programs by electric power generating companies resulted in a corresponding shift to interstate pipeline companies, which can deliver high volumes of natural gas at generally lower rates. The share of deliveries to electric power generation plants via

Customers (August 2007), available at http://www.eia.doe.gov/pub/oil_gas/natural_gas/feature_articles/2007/ngpristudy/ngpristudy.pdf.

⁶United States Department of Agriculture, Economic Research Service, U.S. Fertilizer Imports/Exports data sets, see <http://www.ers.usda.gov/data/fertilizertrade>.

⁷Between 1996 and 2006, the number of installed natural-gas-fired electric generating units grew by about 820, with total nameplate capacity increasing by 225,000 megawatts. That represented an increase of more than 103 percent in natural-gas-fired generating capacity over what was in place in 1996. See Energy Information Administration, Form EIA-867, "Annual Nonutility Power Producer Report" and Form EIA-860, "Annual Electric Generator Report," for 1996 and Form EIA-860, "Annual Electric Generator Report," for 2006.

Restructuring Abstract

Regulatory reform arguably began in 1978 with the passage of the Natural Gas Policy Act (NGPA). The final stage of natural gas industry restructuring into the open-access form of today began in 1992 with the issuance of Order 636 by the Federal Energy Regulatory Commission (FERC). The list below very briefly chronicles several of the major initiatives that resulted in the issuance of Order 636 and led to the current status of the restructuring process.

NGPA of 1978 -- Purpose: Liberalize price ceilings on natural gas production, eliminate price ceilings on certain categories of natural gas, and extend FERC authority to intrastate wellhead pricing to avoid disparities between it and the interstate market while providing limited control over the pace of natural gas price increases. **Consequence:** Constraining price ceilings created supply/demand imbalances that forced pipelines to abrogate an increasing number of take-or-pay contracts with producers. This created a spot market for stranded natural gas that needed transportation services.

FERC Order 436 (1985) – Purpose: Allow interstate natural gas pipelines to develop open-access transportation programs to move spot market volumes. **Consequence:** Because natural gas pipeline companies were encouraged, but not required, to provide open access services, only limited restructuring of the pipeline network occurred.

FERC Order 636 (1992) – Purpose: Require interstate natural gas pipelines to unbundle (separate) their sales from their transportation services. **Consequence:** Increased competition among natural gas suppliers and consumers, generated new market flexibility, and contributed to changes in production, transportation, and consumption patterns.

State Transportation Service Initiatives (1994-2006) – Purpose: Encourage competition on a statewide level by requiring LDCs to unbundle their natural gas supply services while setting out guidelines for making transportation services available to large-volume customers and marketers. **Consequence:** Many States introduced open-access transportation for large-volume customers. During the period, at least 23 States introduced customer choice programs intended to benefit small-volume customers. Two States discontinued their programs when performance did not meet expectations.

For a more comprehensive discussion of the above actions visit EIA's web sites at: http://www.eia.doe.gov/oil_gas/natural_gas/restructure/historical/2006/restructure.html and http://www.eia.doe.gov/oil_gas/natural_gas/analysis_publications/ngmajorleg/ngmajorleg.html.

Table 1. Natural Gas End-Use Deliveries By Type of Distributor, 1996, 2000, and 2006

Type of Distributor	1996			2000			2006		
	Volume Delivered (Bcf)	Percent of Total Volume	Number of Customers (000)	Volume Delivered (Bcf)	Percent of Total Volume	Number of Customers (000)	Volume Delivered (Bcf)	Percent of Total Volume	Number of Customers (000)
Investor-Owned	13,307	67	54,023	13,222	62	57,833	11,081	55	61,369
Municipal	804	4	3,993	815	4	4,328	772	4	4,931
Privately-Owned	219	1	675	167	*	514	176	1	768
Cooperative	19	*	50	20	*	91	19	*	98
Subtotal LDC	14,349	71	58,741	14,224	67	62,766	12,048	60	67,166
Interstate Pipeline	1,602	8	14	2,466	12	1	3,464	17	1
Intrastate Pipeline	3,761	19	1,420	4,313	20	1,386	4,256	21	2,669
Other ¹	294	1	6	215	1	4	177	1	2
Total	20,006	100	60,181	21,218	100	64,157	19,945	100	69,868

¹Include miscellaneous natural gas producers, gatherers, underground storage operators, and liquefied natural gas peaking fuel suppliers.

* Less than one-half of 1 percent.

Note: Totals may not equal sum of components due to independent rounding.

Source: Energy Information Administration (EIA), Form EIA-176, "Annual Report of Natural and Supplemental Gas Supply and Disposition."

interstate pipelines increased to 43 percent in 2006 from 27 percent in 2000. During the same period, the percentage of deliveries to electric power generation facilities by LDCs dropped from 42 to 25 percent, even as electric power's share of total end-use deliveries increased from 24 to 31 percent (Figure 2). Although only limited data, mostly anecdotal, are available regarding the number of times LDCs clearly were subjected to "bypass" by previous electric utility customers during the period, the shift in market share indicates that the practice probably increased.

Each type of natural gas distributor has been affected to some degree by the restructuring of the natural gas industry. Where once LDCs and pipeline companies primarily operated as both buyers and sellers of natural gas, providing transportation as part of a bundled service, today their business and operational environments are significantly different.

The issuance of Order 636 by the FERC in 1992 mandated that interstate pipelines reorganize from being a merchant (sales) business to a transportation-only operation (open-access),⁸ By allowing the multiple buyers and sellers of natural gas to contract directly, the monopoly or monopsony position of the pipelines in the up- and downstream markets was eliminated. The greater number of market participants were expected to create a more competitive environment, thus theoretically, promoting greater market efficiency and likely lower average natural gas costs for consumers. Open-access operations on the interstate market initially seemed to stabilize natural gas prices and result in more efficient flowing of natural gas supplies.

⁸FERC Order 636 required interstate natural gas pipeline companies to unbundle their distribution, sales, and storage services, effectively transforming interstate pipeline companies from merchants of to transporters of natural gas. FERC Order 636 was updated in February 1999 through FERC Order 637, further refining pipeline transportation regulations.

Although Order 636 targeted only the interstate natural gas pipeline industry, it seems to have influenced the future track of some intrastate natural gas pipelines and LDC operations as well. The success of Order 636 set into motion attempts at the State level to adapt the concept to local markets as well. Although the details of these programs differ, in general, they require LDCs and intrastate pipeline companies to institute and provide unbundled transportation services to independent natural gas marketers or brokers.

Many States established requirements for open-access transportation service that allowed large-volume consumers, such as industrial and electric power generators, to contract with the LDC for transportation only. Additionally, the regulatory reform movement addressed the needs of small-volume customers—residential, commercial, and some industrial customers. In several States, "customer choice" programs were devised by State regulators, State legislatures, or in some cases, local distribution companies themselves. While the individual customer choice programs vary by State, their principal objective was to open the small-volume distribution market to competition.⁹

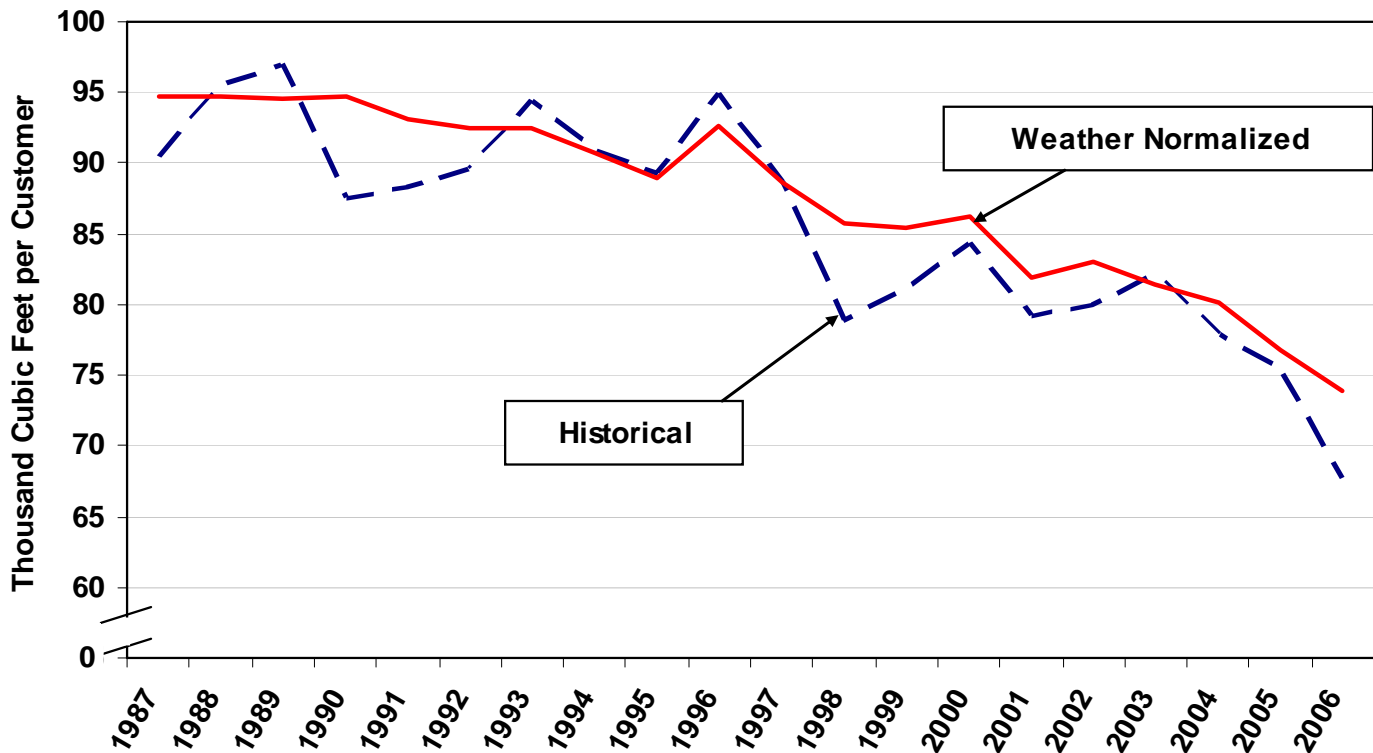
By 2007, at least 23 States had implemented choice programs in one form or another.¹⁰ Today, these States require most of their LDCs to offer unbundled transportation-only service to residential and other small-volume customers, although in almost all cases the LDC also provides a bundled service that includes the cost of buying and selling of natural gas to end users.¹¹ Some

⁹See Energy Information Administration, *Natural Gas Marketer Prices and Sales To Residential and Commercial Customers: 2002–2005*, June 2007, http://www.eia.doe.gov/pub/oil_gas/natural_gas/feature_article/2007/marketprices/marketprices.pdf.

¹⁰Energy Information Administration, *Natural Gas Residential Choice Programs*, http://www.eia.doe.gov/oil_gas/natural_gas/restructure/restructure.html.

¹¹LDCs and those intrastate pipelines that own the natural gas they deliver to their customers pass through the cost of the commodity without a

Figure 3. Average Consumption per Residential Customer, 1987-2006



Source: Energy Information Administration, Natural Gas Division, derived from EIA data published in the *Natural Gas Monthly* (consumption) and *Natural Gas Annual* (number of customers); and EIA’s Short-Term Integrated Forecasting System (heating degree-days and normal heating degree-days).

LDCs have affiliates separate from their pipeline transportation divisions that operate on a nondiscriminatory basis with competing natural gas merchants.

Shifts in Natural Gas Distribution Patterns

The influence of the implementation of open-access programs can be seen in the shift in the percentage of natural gas deliveries to end users from a “Sale,” or bundled, basis to a “Transported-for-Others,” or unbundled, basis (Table 2). For instance, the percentage of total delivery volumes provided on a bundled basis decreased from 52 percent in 1996 to 40 percent in 2006, resulting in a corresponding increase in the unbundled category from 48 to 60 percent. This shift can be attributed to the transition of many large-volume customers to transportation-only service.

mark-up. That is, they do not profit from the sale of the commodity. LDCs are only permitted by regulatory authorities to recover their cost of distribution services and generate a specified rate of return on investment.

The impact of restructuring at the local level is illustrated in the percentage change in LDC natural gas deliveries reported to the Energy Information Administration under the “Delivered for the Account of Other” category.¹² This category of natural gas delivery represents the volume of natural gas delivered to the several end-user groups (residential, commercial, industrial, electric power generator, and vehicle consumption) that is owned by the recipient or other party. In 2006, on average, about 46 percent of all LDC deliveries to end users were “Deliveries for the Account for Others,” while 10 years ago the percentage was less than 10 percent.¹³

The shift from bundled service deliveries to unbundled transportation service appears to have reached a plateau for several individual distributor types in 2000. Since then the trend appears to have slowed somewhat, perhaps indicating a maturity of the transition process. For investor-owned

¹²Natural gas that is “delivered for the account of others” is gas that is not owned by the company that delivers it to the consumer. It includes quantities covered by long-term transportation contracts and natural gas involved in short-term or spot market sales.

¹³Energy Information Administration (EIA), Form EIA-176, “Annual Report of Natural Gas and Supplemental Gas Supply and Disposition” database.

Table 2. Percent of Natural Gas Delivery, Bundled Versus Unbundled Service, by Type of Distributor and Sector, 1996, 2000, and 2006

Type of Distributor	Year	Bundled Service (Percent)					Unbundled Transportation Service (Percent)				
		Residential	Commercial	Industrial	Electric Power Generation	Total	Residential	Commercial	Industrial	Electric Power Generation	Total
Investor-Owned	1996	36	16	7	2	61	0	5	28	6	39
	2000	31	13	4	2	51	3	8	25	14	49
	2006	32	14	4	1	51	3	9	24	13	49
Municipal	1996	36	21	24	5	87	0	1	11	0	13
	2000	32	19	22	6	84	0	1	10	5	16
	2006	32	22	22	6	81	0	1	12	5	19
Interstate Pipeline	1996	0	0	1	0	1	0	1	58	41	99
	2000	0	0	0	0	0	0	1	46	54	100
	2006	0	0	0	0	0	0	1	23	77	100
Intrastate Pipeline	1996	2	1	20	9	32	0	0	45	23	68
	2000	3	1	16	13	33	0	1	46	19	67
	2006	4	2	19	9	33	0	1	31	34	67
Other ¹	1996	20	13	34	14	81	0	3	13	3	19
	2000	10	12	35	16	73	1	4	17	6	27
	2006	14	9	23	18	64	1	3	20	12	36
Average²	1996	26	12	10	4	52	0	4	32	12	48
	2000	22	10	8	5	44	2	5	31	19	56
	2006	20	9	8	3	40	2	5	25	28	60

¹Includes privately-owned and cooperative LDCs as well as non-LDCs such as natural gas producer, gatherer, and storage pipelines. Combined, these respondents supplied 2 to 3 percent of the natural gas delivered to end users in 2006.

²Weighted by volume.

Note: Totals may not equal sum of components due to independent rounding. Share of volumes distributed for vehicle consumption is less than 0.10 percent in all cases.

Source: Energy Information Administration (EIA), Form EIA-176, "Annual Report of Natural and Supplemental Gas Supply and Disposition."

LDCs (see box, "Distributors of Natural Gas"), the level of unbundled transportation-only deliveries changed from 39 percent in 1996 to 49 percent in 2000, but has remained constant at that level since then (Table 2). A significant part of the increase from 1996 through 2000 was due to the decision by Atlanta Gas Light Company, the largest investor-owned LDC in Georgia, to become a transporter-only distributor. By State law it no longer provides any sales service and must transport 100 percent of the natural gas it delivers to its nearly 1.7 million residential customers (Table 3). For the 20 largest investor-owned LDCs in the country, the percentage of deliveries currently "transported" averages about 53 percent.

Municipal LDC operations have shifted to transportation service to a lesser degree, although unbundled service volumes are increasing as a share of their overall deliveries. About 25 percent of current deliveries by the top 20 municipal LDCs fall under transportation programs while the smaller municipal LDCs have only about 11 percent of their total deliveries under transportation programs. Overall, however, since 1996, transportation programs run by municipal LDCs grew from 13 percent of total deliveries to end users to 19 percent in 2006 (Table 2), while their total deliveries fell only slightly (Table 1).

In contrast to interstate pipeline companies, the intrastate pipeline segment has remained relatively unchanged in its ratio of bundled to unbundled deliveries over the past 10 years. Many intrastate natural gas pipelines, especially those located in States with large natural gas resources such as Wyoming, Colorado, Texas, and Louisiana, were

designed and built primarily to transport natural gas production from field areas to large end users and interconnections with other pipeline systems, almost always on behalf of producer/shippers.

The intrastate pipelines that primarily serve end-use market areas within a State have adopted open-access programs as a competitive measure to retain their large-volume customers. However, because their total deliveries are relatively small, their transition to providing transportation services had relatively little effect upon the aggregate ratio of bundled to unbundled transportation service for the intrastate pipeline segment between 1996 and 2006, with the exception of a significant increase in transportation services to electric power generation customers.

Redirection Among Distributor Types

The implementation of open-access transportation at the Federal, and then State, level not only led to a major shift in natural gas deliveries from bundled to unbundled transportation-only mode, it also brought about a significant change in market share among the various types of natural gas distributors. For instance:

Table 3. Largest LDCs, by Ownership Category, 2006

State	Company Name	Natural Gas Deliveries		Percentage of Total Volume Delivered to:				Percent Bundled Services	Percent Unbundled Transportation Service ¹
		Volume (MMcf)	Number of Customers (000)	Residential Consumers	Commercial Consumers	Industrial Consumers	Electric Generation		
Investor-Owned									
California	Southern California Gas Co.	810,040	5,392	31	12	34	23	44	56
California	Pacific Gas And Electric Co.	722,900	4,251	27	17	26	30	38	62
Illinois	Nicor Gas Inc.	424,250	2,145	50	24	25	1	54	46
Texas	Atmos Energy Corp.	321,878	1,822	25	18	32	25	45	55
Michigan	Consumers Energy Co.	308,778	1,708	51	22	19	7	72	28
New Jersey	Public Service Electric & Gas Co.	305,836	1,720	40	37	9	14	62	38
New York	Consolidated Edison New York Inc.	261,606	1,149	22	38	1	39	36	64
Ohio	Columbia Gas Distribution Co.	253,745	1,406	39	24	36	0	31	69
Ohio	Dominion East Ohio Gas Co.	242,644	1,216	45	20	35	0	24	76
Indiana	Northern Indiana Public Service Co.	233,457	710	23	13	64	0	34	66
Colorado	Public Service Co. Of Colorado	225,763	1,244	39	17	45	0	55	45
Georgia	Atlanta Gas Light Co.	208,951	1,696	45	18	36	0	0	100
New York	Keyspan Energy (Long Island)	177,164	529	23	20	0	57	37	63
New York	Keyspan Energy (Brooklyn Union Gas Co.)	169,414	1,180	59	12	2	26	64	36
Illinois	Peoples Gas Light & Coke Co.	165,196	818	60	30	10	0	59	41
Minnesota	Centerpoint Energy Inc. (Minnegasco)	143,749	781	43	36	17	4	87	13
Nevada	Southwest Gas Corp.	143,699	623	20	15	8	57	31	69
North Carolina	Piedmont Natural Gas Co.	134,223	622	24	21	37	18	48	52
Utah	Questar Gas Co.	128,187	810	47	27	22	5	75	25
Louisiana	Atmos Energy Corp.	127,059	347	9	5	78	8	91	9
	Subtotal	5,508,539	30,169	35	20	27	17	47	53
NA	Other Investor Owned LDCs (237) ²	5,571,955	31,200	34	24	30	11	56	44
	Total Investor-Owned	11,080,494	61,369	35	22	29	14	51	49
Municipals									
Pennsylvania	Philadelphia Gas Works	59,275	503	56	25	10	9	80	20
Texas	San Antonio Public Service Board	58,519	320	15	18	2	65	99	1
Tennessee	Memphis Light Gas & Water Co.	48,982	321	37	28	35	0	76	24
Indiana	Citizens Gas of Indiana	45,621	266	42	27	22	8	70	30
Nebraska	Metropolitan Utilities District Of Omaha	29,428	196	51	33	11	5	100	0
Colorado	Colorado Springs Utilities	28,029	182	41	36	0	23	73	27
Alabama	Southeast Alabama Gas District	21,199	29	8	1	49	41	40	60
Virginia	Richmond City Of Dept Of Pub Utilities	19,359	105	31	28	24	16	79	21
Alabama	Clarke Mobile Counties Gas District	13,889	6	1	1	95	2	66	34
Missouri	Springfield City Utility	11,566	82	42	30	17	11	100	0
Alabama	North Alabama Gas District	11,248	15	5	4	91	0	11	89
California	City of Long Beach	11,020	139	50	20	26	4	78	22
Tennessee	Knoxville Utilities Board	10,563	92	43	37	20	0	89	11
Georgia	Dalton Utilities Inc.	9,580	8	3	13	84	0	22	78
Kentucky	City of Carrollton Utility	9,233	2	1	1	98	0	100	0
Georgia	Albany Water, Gas & Light Commission	7,697	15	6	7	88	0	13	87
Tennessee	Jackson Energy Authority	7,008	29	22	17	61	0	46	54
Tennessee	Middle Tennessee Utility District	6,670	52	35	16	49	0	100	0
Alabama	Decatur Utility Gas Department	6,189	14	8	7	85	0	46	54
Georgia	City of Warner Robins	5,760	12	8	4	53	36	64	36
	Subtotal	420,836	2,391	32	22	29	17	75	25
NA	Other Municipals (911) ²	351,585	2,541	31	24	38	6	89	11
	Total Municipals	772,421	4,931	32	23	33	12	81	19
Cooperatives and Privately-Owned									
Idaho	Intermountain Gas Co.	47,820	281	38	23	39	0	58	42
Arizona	UNS Gas Inc.	23,193	142	30	20	7	43	54	46
Pennsylvania	Phillips T.W. Gas & Oil Co.	23,174	60	21	18	61	0	41	59
Texas	West Texas Gas Inc.	13,569	20	6	16	79	0	77	23
Kansas	Midwest Energy Inc.	10,655	41	21	16	63	0	35	65
New York	Saint Lawrence Gas Co.	9,177	15	17	15	64	4	31	69
Ohio	Ohio Gas Co.	8,977	46	40	18	42	0	0	100
Texas	North Texas Gas Co.	8,963	2	0	0	100	0	100	0
Wisconsin	National Gas & Oil Cooperative	5,062	31	36	25	39	0	100	0
Pennsylvania	Hanley and Bird Inc.	3,638	*	0	0	100	0	78	22
Mississippi	Willmut Gas & Oil Co.	2,866	20	24	72	4	0	100	0
Wisconsin	Superior Water Light & Power Co.	1,788	12	47	34	19	0	100	0
Wisconsin	Midwest Natural Gas Inc.	1,768	14	48	19	33	0	100	0
New Mexico	Zia Natural Gas Co.	1,760	24	60	40	0	0	100	0
Ohio	Suburban Natural Gas Co.	1,584	15	70	28	1	0	97	3
Indiana	Lawrenceburg Gas Co.	1,502	6	32	14	54	0	49	51
Texas	Regency Intrastate Gas LLC	1,405	*	0	100	0	0	0	100
Ohio	Piedmont Gas Co.	1,233	2	9	17	74	0	25	75
Virginia	Southwestern Virginia Gas Co.	1,206	5	16	29	55	0	93	7
Alaska	Barrow Utilities Electric Cooperative	1,183	1	18	23	0	59	100	0
	Subtotal	170,522	738	27	26	42	5	67	33
NA	All Others (99) ²	24,667	128	39	25	34	3	68	32
	Total Cooperatives and Privately-Owned	195,189	866	28	21	45	6	58	42
Total All LDCs		12,048,104	67,166	35	22	29	14	54	46

¹ Reflects level of natural gas volumes delivered to customers who are on Customer Choice programs and/or large volume customers using open-access transportation programs to reserve pipeline capacity to deliver their natural gas supplies to consumption locations.

² Number of remaining LDCs in the category.

* = less than 1,000 customers. MMcf = million cubic feet. NA = not applicable. LDC = Local distribution company.

Source: Energy Information Administration (EIA), Form EIA-176, "Annual Report of Natural and Supplemental Gas Supply and Disposition."

- **Interstate pipeline companies became the principal deliverer of natural gas to electric power generation facilities.** As total natural gas deliveries to electric power generation facilities rose from 5.2 Tcf to 6.2 Tcf between 2000 and 2006 (Figure 2), interstate natural gas pipelines managed to capture a 42-percent share of this growing market segment, up from a 27-percent share in 2000 (Figure 4). A principal reason for this was that as newer and larger natural-gas-fired electric generation plants were built, the sponsors of many of these projects opted to locate where they could connect directly to a large-capacity mainline interstate or intrastate pipeline system, as an alternative or in addition to access to a LDC.
- **Intrastate natural gas pipeline companies increased their share of total deliveries to industrial users by 6 percentage points (Figure 4), although overall deliveries of natural gas to industrial customers fell by more than 20 percent, or 1.6 Tcf, between 2000 and 2006 (Figure 2).** Intrastate pipeline deliveries to industrial customers stood at 33 percent in 2006, up from 27 percent in 2000 (Figure 4). This increase was partly because intrastate pipeline companies in some States successfully mimicked their interstate counterparts and became full or partial open-access transporters in an effort to stay competitive and attract these large-volume customers. Investor-owned LDCs, however, continue to account for the largest portion of natural gas deliveries to the industrial market, at about 48 percent.
- **The share of total natural gas deliveries by investor-owned LDCs fell by 7 percentage points from 62 percent to 55 percent between 2000 and 2006 (Table 1).** Loss of market share to, and competition from, pipeline companies in supplying large-volume natural gas customers accounted for a sizable portion of this dropoff. Nevertheless, natural gas deliveries by investor-owned LDCs still accounted for 92 percent of the total volumes delivered to end users by LDCs in 2006, an average of about 181 Mcf per customer, compared with 167 Mcf per customer by other types of LDCs.

Nine different types of natural gas companies reported deliveries to one or more end-user groups in 2006.¹⁴ However, four types of companies predominated, either by volume delivered or number of customers served: investor-owned LDCs, municipal LDCs, intrastate pipelines, and interstate pipelines (Table 2). Each of these companies is distinctive in its business operations and also in the type of

¹⁴ In addition to the five types listed in Table 1, miscellaneous natural gas producers, gatherers, underground storage operators, and liquefied natural gas peaking fuel suppliers reported some natural gas deliveries to end users.

markets and customers it primarily serves. In 2006, these four types of natural gas companies accounted for 98 percent of the natural gas delivered to end users (Table 1).

Investor-Owned

There are approximately 257 investor-owned LDCs currently doing business in the United States. These companies provide service to more than 61 million natural gas end users, supplying them with more than 11 Tcf of natural gas per year, or about 55 percent of all natural gas deliveries to end users in 2006 (Table 1). The residential customer is the core market of the investor-owned LDC, accounting for about 35 percent, on average, of their total natural gas deliveries in 2006 (Table 3). Investor-owned LDCs are the primary deliverer of natural gas to residential customers in the United States, supplying 88 percent of all volumes delivered to this sector in 2006.

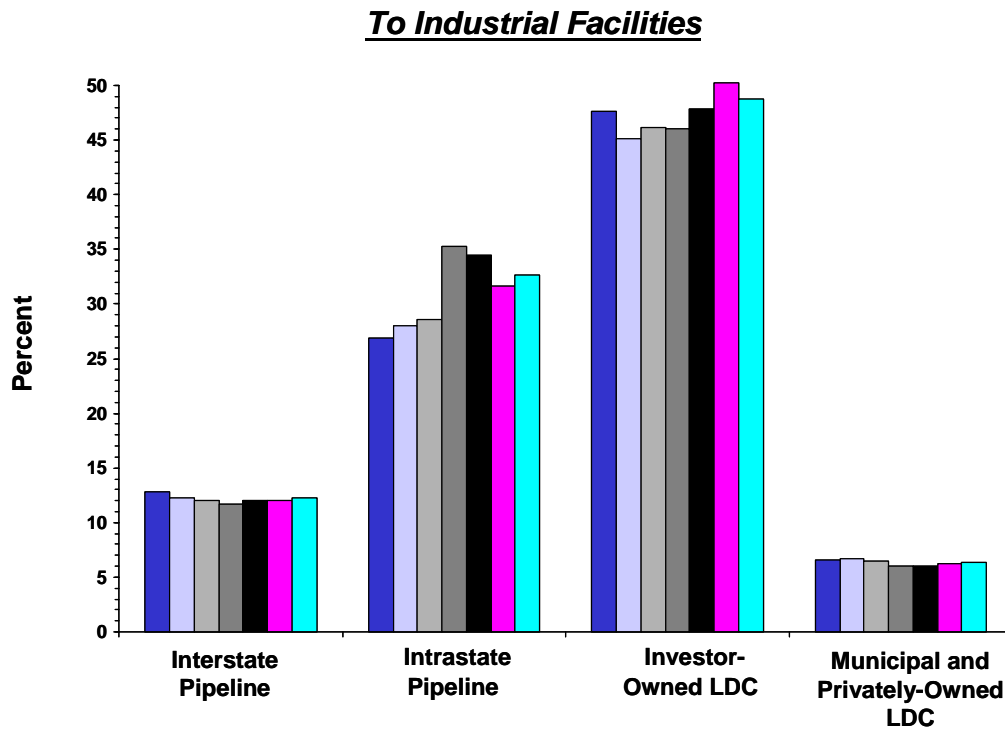
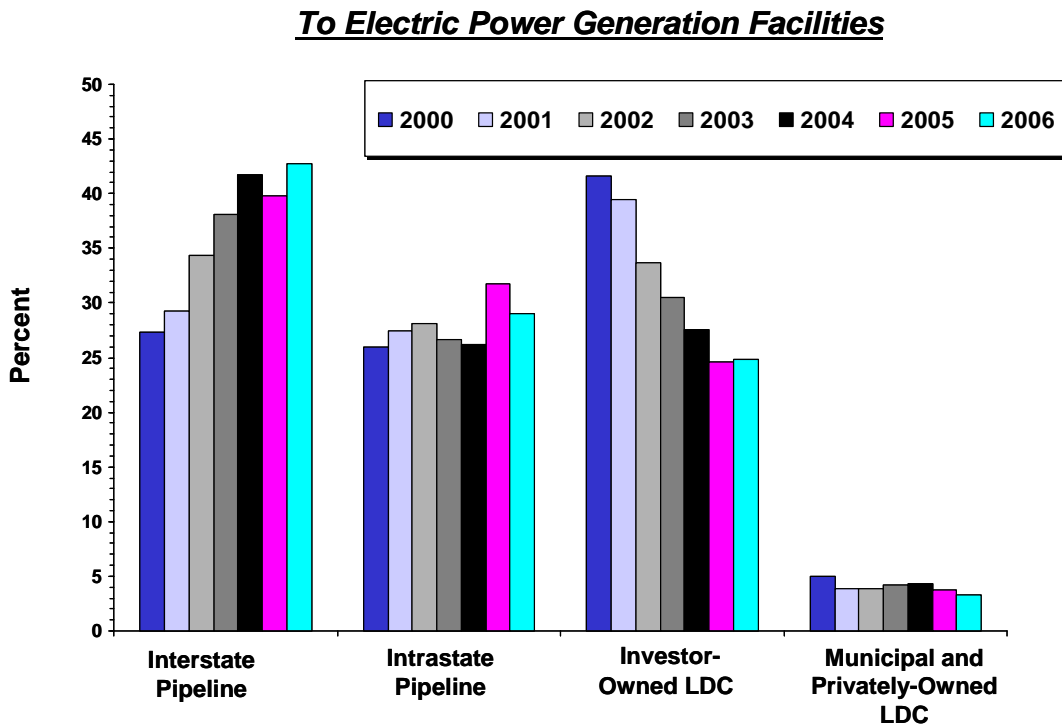
The two largest investor-owned LDCs in the country, Southern California Natural Gas Company (SoCal) and Pacific Gas and Electric Companies (PG&E), are located in California, with each accounting for about 4 percent (8 percent overall) of the natural gas delivered to end users in the United States. Northern Illinois Gas Company (NICOR) in Illinois is a distant third, accounting for about 2 percent of all deliveries to end users (Table 3).

Several major investor-owned LDCs also operate in the northeastern and midwestern United States. New York and New Jersey are the home of several of the Nation's largest investor-owned LDCs. Keyspan Delivery Inc., has major operations in eastern New York State. It also operates investor-owned LDC subsidiaries in Massachusetts and New Hampshire. In the Midwest, the States of Indiana, Michigan, and Ohio host several of the top 20 (by volume delivered in 2006) investor-owned LDCs in the country, such as Dominion East Ohio Gas Company and Northern Indiana Public Service Company.

Many investor-owned LDCs operate in service territories that cover large portions of a given State (Figure 5). In California, for instance, one LDC, Southern California Gas Company, serves almost all the southern portion of the State while another, Pacific Gas and Electric Company, serves most of the northern portion of the State. With the exception of some municipal gas distribution company service areas, almost all of the natural gas consumed within the State is covered by their operations. Such territorial expansiveness is also pervasive in States such as Texas, Virginia, North Carolina, South Carolina, and Arizona, to name a few.

In 2006, the top 20 investor-owned LDCs delivered 5.5 Tcf of natural gas to end users, about as much as the remaining 237 investor-owned LDCs combined (Table 3). These larger investor-owned LDCs also engaged more in

Figure 4. Percent of Natural Gas Deliveries by Type of Distributor, 2000-2006



LDC = Local distribution company.

Source: Energy Information Administration (EIA), Form EIA-176, "Annual Report of Natural and Supplemental Gas Supply and Disposition."

transportation programs than did the smaller investor-owned LDCs. On average, these majors delivered about 53 percent of their deliveries on an unbundled transportation-only basis, while the remaining 237 investor-owned LDCs unbundled an average of 44 percent of their deliveries. One possible reason for the difference may be that 14 of the top 20 investor-owned LDCs operate in States that have implemented full or partial customer-choice programs.

Investor-owned LDCs adapted quickly to the demands of their customers for more open-access transportation service and less single-source sales. Between 1996 and 2000, transportation service by investor-owned LDCs gained 10 percentage points, with little change thereafter (Table 2). The largest shift occurred in providing transportation services to their large-volume electric power generation customers. In Nevada, for instance, deliveries for electric power generation by Sierra Pacific Company, one of the several investor-owned LDCs operating in the State, grew from zero in 2000 to 23 Bcf in 2006, as its electric power affiliate installed new electric power generation facilities within the State.

Municipals

Municipal (government-owned) LDCs make up the largest group by number of local natural gas distribution enterprises operating in the United States. Many of these utilities were formed by small to medium-sized communities that could not find a privately-owned company willing to put up the investment capital needed to develop the local infrastructure to support their natural gas needs. Today, more than 930 municipal natural gas companies operate throughout the country and, although the largest is less than half the size of any of the top 20 investor-owned LDCs in volumes delivered, several have grown relatively large (Table 3).

The four largest municipal LDCs in the country are the Philadelphia Gas Works (Pennsylvania), the San Antonio Public Service Board's CPS Energy (Texas), the Memphis Light Gas & Water Company, and Citizens Gas of Indiana. They accounted for about 27 percent of the 772 billion cubic feet (Bcf) of natural gas delivered by municipal LDCs in 2006.

The greatest number of municipal LDCs is found in the Southeast and Southwest regions of the country (Figure 6). Texas and Louisiana account for about 20 percent, with 83 and 85 municipal LDCs, respectively. Georgia, Tennessee, and Alabama each have more than 65. Collectively, the 15 States in these two regions account for more than 60 percent of all municipals in the United States.

For municipal LDCs as a whole, bundled services rather than transportation-only programs represent the vast majority of the natural gas delivered to their end-use customers. While the 20 largest municipals currently deliver on average about 25 percent of their supplies under

transportation-only programs (Table 3), only about 11 percent of the remaining 911 municipal LDCs also transport such a high percentage. Because of the nature of their clientele and their limited size and service territory, municipal LDCs have moved away from bundled services to a much smaller degree than the other LDC types. Between 1996 and 2006, bundled service deliveries decreased by 6 percentage points. The 81- and 19-percent mix between sales and transport in 2006 remains the highest among distributor groups (Table 2).

Although the vast majority of municipal LDC customers are residential, this sector accounts on average for only about 32 percent of all municipal LDC deliveries of natural gas compared with the industrial sector which accounts for 33 percent. Indeed, several of the top 20 municipals also deliver significant portions of their supplies to electric power generation facilities and industrial clients (Table 3).

Pipeline Companies

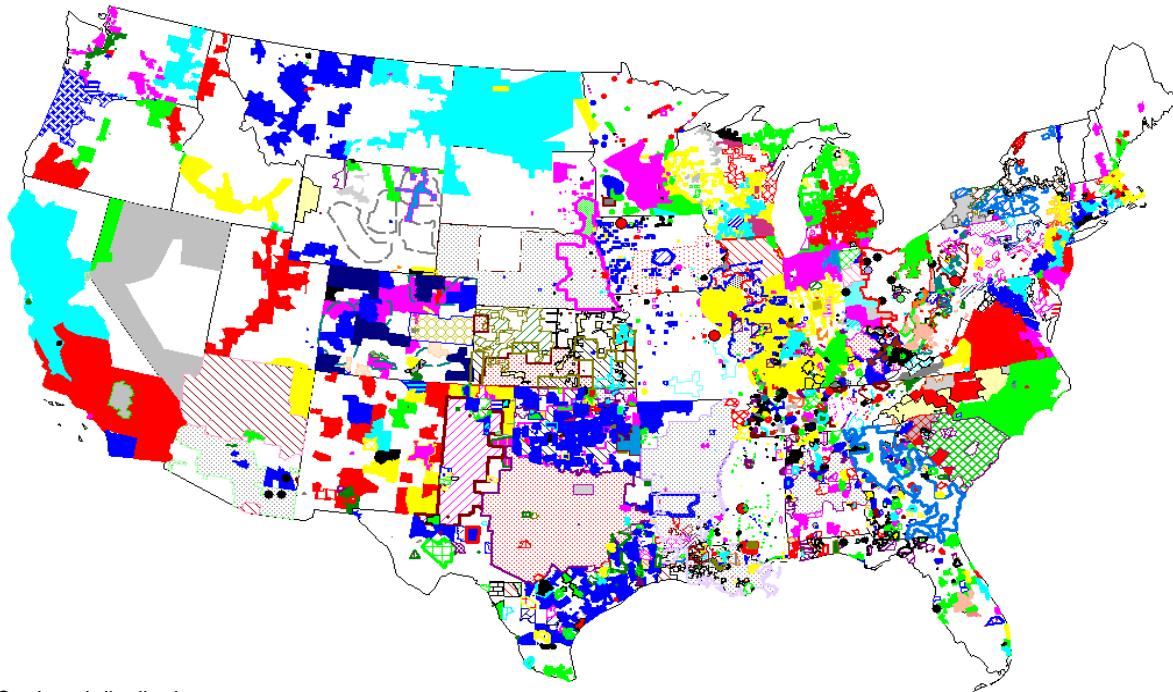
Mainline interstate and intrastate natural gas pipeline companies deliver 38 percent of the natural gas distributed to end users, the bulk of which goes directly to large-volume natural gas users (Table 1). In large part, these large natural gas mainline pipeline systems are the primary suppliers of natural gas to electric power generation plants. Interstate natural gas pipelines accounted for about 36 percent of all volumes delivered to electric power generators during the past 10 years, while intrastate natural gas pipelines, which operate exclusively within a State's borders, delivered about 29 percent (Figure 4). Investor-owned LDCs accounted for about 25 percent, while municipal LDCs, 2 percent.

Natural gas pipeline companies have accounted for an increasing share of the total natural gas delivered to natural-gas-fired electric power plants each year. Between 2000 and 2006, the share of natural gas deliveries by interstate pipeline systems to electric power plants increased from 27 to 43 percent, and the share delivered by intrastate pipeline systems grew from 27 to 29 percent. Meanwhile, the share of all LDC deliveries to such plants fell from 45 percent in 2000 to 28 percent in 2006.

The largest U.S. market for natural gas deliveries to electric power generation facilities is in Florida. In 2006, the two largest natural gas pipeline systems serving the State, Florida Gas Transmission Company and Gulfstream Natural Gas System, delivered more than 720 Bcf to Florida customers, 99 percent of which was to electric power generation plants.¹⁵ Since 2000, such deliveries have doubled, made possible by the added pipeline capacity made available with the completion of the Gulfstream system in 2002.

¹⁵In fact, in 2006, electric power generation accounted for about 84 percent of the natural gas consumed in the State. See Energy Information Administration, *Natural Gas Annual*, 2006, Table 35. http://www.eia.doe.gov/pub/oil_gas/natural_gas/data_publications/natural_gas_annual/current/pdf/table_035.pdf.

Figure 5. LDC Service Territories, 2006

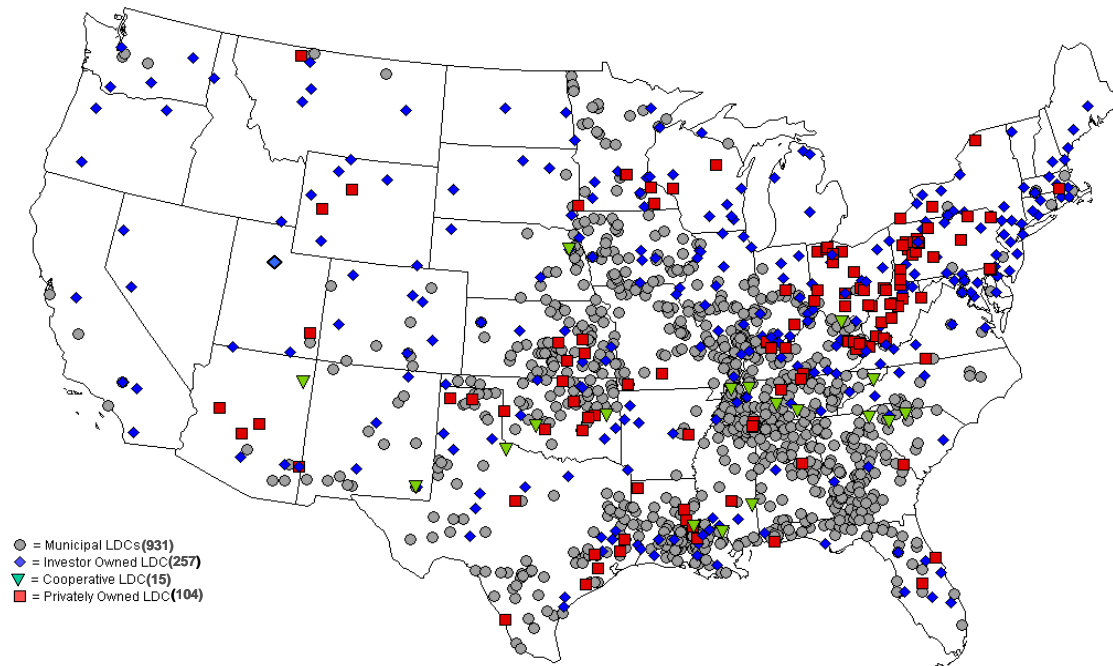


LDC = Local distribution company.

Note: Clear (white) areas represent geographic regions where little or no natural gas service is available. A large number of municipal LDC's are not shown because their service territories are too small to be reflected at this scale. Color shading and patterns do not have any significance other than to distinguish between adjoining LDC service territories.

Source: Energy Information Administration (EIA), Office of Oil and Gas.

Figure 6. LDCs by Type, 2006



- = Municipal LDCs(931)
- ◆ = Investor Owned LDC(257)
- ▼ = Cooperative LDC(15)
- = Privately Owned LDC(104)

LDC = Local distribution company.

Note: Each symbol location is relative and does not reflect the size or area covered by the respective LDC service territories.

Source: Energy Information Administration (EIA), Office of Oil and Gas.

In the Western United States, El Paso Natural Gas Pipeline Company and Kern River Transmission Company are the major suppliers of natural gas to electric power generation facilities; the former supplying more than 230 Bcf in Arizona and the latter 130 Bcf in California in 2006. These delivery levels represent a huge increase over such deliveries occurring as recently as 2000. In that year, El Paso Natural Gas delivered only 82 Bcf in Arizona and Kern River Transmission delivered 17 Bcf in California. Moreover, by 2006, the Kern River Transmission Company had increased its deliveries to electric generating facilities in Nevada to 82 Bcf in 2006, from a low of 2 Bcf in 2000. This growth spike was primary due to the installation of several new electric generation plants outside the city of Las Vegas.

In Nevada, one of the fastest growing State markets for natural gas in the Nation (consumption increased by 36 percent between 2000 and 2006), two interstate pipeline systems, Kern River Transmission Company and Tuscarora Pipeline Company, overtook the State's two largest investor-owned LDCs, Sierra Pacific Company and Southwest Gas Corporation, in their deliveries of natural gas to large-volume customers. Nevertheless, mainly because overall natural gas demand within the State continued to grow, deliveries by investor-owned LDCs did not drop as much as in other States, California for instance.

Within the State of California, Southern California Natural Gas Company and Pacific Gas and Electric Company, both investor-owned LDCs, remained the largest suppliers of natural gas to electric generation facilities, delivering 184 and 186 Bcf, respectively, in 2006. However, these levels of natural gas deliveries by both companies represented a more than two-thirds decrease in natural gas deliveries to these facilities from the total volume delivered in 2000.

Intrastate pipeline systems also made significant gains in increasing their share of the large-volume natural gas market over the period in the region. In California, for instance, Calpine Corporation's intrastate CPN Pipeline subsidiary more than doubled its deliveries to electric power generation customers over the past 7 years, increasing them from 36 Bcf in 2000 to 76 Bcf in 2006 (these deliveries peaked at almost 100 Bcf in 2004).

In the Southwest, the five intrastate pipeline companies with the largest volumes delivered in the country in 2006 operate within the State of Texas. The Kinder Morgan Tejas Pipeline and the Kinder Morgan Texas Pipeline systems dominate the list, accounting for more than 22 percent of all deliveries to end users made by the 84 intrastate natural gas pipelines reporting deliveries to end users. Moreover, these two particular pipeline companies confined their end-use deliveries strictly to large industrial or electric power

generation customers, making no natural gas deliveries to residential or commercial users.¹⁶

Summary

The natural gas industry has undergone significant changes since the early 1990s, motivated greatly by an interstate restructuring of pipeline transmission operations under FERC Order 636, which stimulated a growing competition between pipeline and local distribution segments for the large-volume natural gas customer. As a consequence, LDCs and pipeline companies alike had to restructure their operations and their way of doing business to remain economically viable and competitive.

The switch to open-access suppliers by many large-volume users reduced the customer base for local distribution companies, which generally provided only bundled sales and delivery services. As part of an effort to minimize such "bypassing" of LDCs, a number of States instituted open-access programs of their own that permitted, and in some cases required, LDCs to institute open-access-like policies, although these programs also often had other goals as well.

LDCs faced another trend of considerable consequence during this period. Natural gas deliveries in all end-use sectors except the electric power generation sector declined in the late 1990s and mid-2000s. The decline in average consumption per customer was especially pronounced among residential and commercial users who are the core customers of local distribution companies, accounting for more than half of all their natural gas deliveries.

The overall level of natural gas deliveries by LDCs has decreased by 15 percent since 2000 and some of their large-volume customers have switched to mainline pipeline systems. Nonetheless, the LDC remains the backbone of the natural gas distribution network. In 2006, deliveries by LDCs still represented nearly 60 percent of all the natural gas delivered in the country (Table 1). In addition, they provide the more than 63 million residential and 4 million commercial customers with a secure and reliable supply of natural gas on a daily basis.

¹⁶These two natural gas pipelines did, however, deliver significant volumes of their natural gas flows to other pipeline companies and LDCs within the State. In the case of KM Texas as much as 35 percent of its flow went to other pipelines or LDCs while for KM Tejas 26 percent went to these parties.