Transmission

A vast network of interconnected pipelines provides for the transmission and delivery of natural gas to customers in the lower 48 States. Principally, natural gas flows from the producing areas in Texas, Louisiana, Oklahoma, and offshore areas of the Gulf of Mexico toward the northeast and midwest. Imports, primarily from Canada, have continued to provide significant contributions, helping the United States meet increasing demand for natural gas.

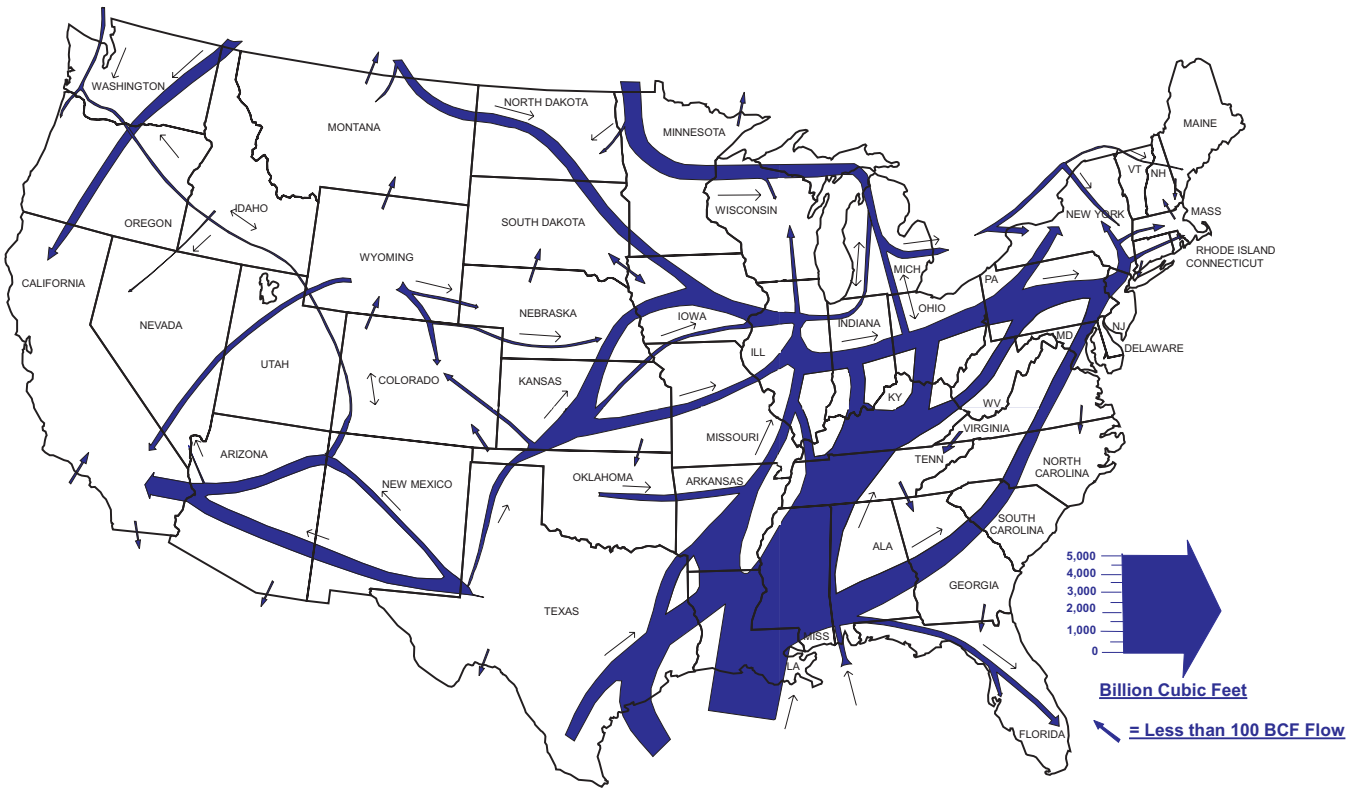
Imports and Exports

During 1997, net imports rose for the 11th consecutive year, representing 13 percent of U.S. natural gas consumption. Canada continued its role as the major supplier of natural gas imported into the United States. However, the growth rate of U.S. imports of Canadian gas was minimal because pipeline capacity utilization remained near its maximum level and capacity expanded very little during the year. Increases in pipeline capacity are under development and others have been proposed for the next several years. Crossborder trade with Mexico also increased in 1997, and that nation holds substantial promise for expansion on both the supply and demand sides of the market. Spot purchases of liquefied natural gas (LNG) rose as the United States responded to LNG availability in the world marketplace.

Trade with Canada

For the 11th consecutive year, natural gas imports from Canada increased, reaching a record 3 trillion cubic feet and accounting for 97 percent of total U.S. imports of natural gas. The average price of Canadian imports was $2.15 per thousand cubic feet, the highest average price since 1986. It rose 10 percent from the 1996 price and 45 percent above

Figure 6. Principal Interstate Natural Gas Flow Summary, 1997



1995's 20-year record low of $1.48 per thousand cubic feet. The increases in Canadian import prices follow the trend in the U.S. wellhead prices. The 1997 U.S. wellhead price was 3 percent more than the 1996 level and 44 percent above the 1995 price.

Despite the record import levels from Canada, the growth rate was minimal, less than 1 percent, in contrast to an average annual growth rate of 13 percent during the previous 10 years. The capacity of the pipelines that bring the gas across the border constrained the growth rate as current capacity is almost completely utilized and little capacity expansion occurred during 1997. More than 3 billion cubic feet per day of Canadian export capacity has been proposed over the next several years, principally into the U.S. Midwest and Northeast. For the most part, the proposals are driven by growing markets in the United States and by Canadian natural gas producers seeking market outlets for their expanding production capabilities. Capacity additions within the United States are also proposed for moving Canadian and domestic gas from the Midwest to the Northeast.

Two crossborder pipeline expansion projects, each with a projected in-service date of November 1998, will add large amounts of capacity. Northern Border's Chicago Project will increase capacity from the U.S. Canadian border at Port of Morgan, Montana into Iowa by 700 million cubic feet per day and extend the pipeline into Illinois just south of Chicago. The Portland Natural Gas Transmission System project will connect facilities at the border near East Hereford, Quebec and Pittsburgh, New Hampshire with Westbrook, Maine. The Portland project will add 138 million cubic feet per day of capacity.

Natural gas exports to Canada rose to 56 billion cubic feet, a 9-percent increase over 1996 levels. The average price of these exports was $2.52 per thousand cubic feet, 6 percent less than the 1996 price. Exports to Canada represented 36 percent of total U.S. natural gas exports during 1997.

Trade With Mexico

Exports of natural gas to Mexico rose in 1997 to 38.4 billion cubic feet, 13 percent above the 1996 level, but still well below the peak of 96.0 billion cubic feet in 1992. The price of exports to Mexico also climbed to $2.46 per thousand cubic feet, up 17 percent from 1996 and the highest price since 1988. The United States imported 17.2 billion cubic feet of natural gas from Mexico in 1997, 24 percent more than during 1996. The United States did not import gas from Mexico from 1985 through November 1993. Since trade resumed in December 1993, imports from Mexico have represented less than 1 percent of total annual U.S. natural gas imports.

The fact that gas exports to Mexico are still less than in 1992 may reflect the increased availability of gas in Mexico because of increases in production by Petroleos Mexicanos (Pemex) during 1997. This additional production may have displaced some U.S. Supplies. However, Mexico still holds substantial promise for expansion on both the supply and demand sides of the market. Extensive infrastructure development is underway that will increase crossborder flows of gas in both directions. This development includes construction in Mexico of gas-fired electric utilities as well as natural gas distribution infrastructure, which will promote expanded gas consumption. Mexican sources predict that exports from Mexico into the United States will continue to grow but that Mexico is expected to be a net importer of natural gas during the foreseeable future.

Liquefied Natural Gas

During 1997, the United States imported liquefied natural gas (LNG) from Algeria, the United Arab Emirates (Abu Dhabi), and, for the first time, from Australia. The shipments from the United Arab Emirates and Australia were spot purchases. LNG shipments totaled 77.8 billion cubic feet, almost double the 1996 level. They were received in Massachusetts and Louisiana and represented 3 percent of total natural gas imports. LNG was exported from Alaska to Japan. These exports accounted for 40 percent of total gas exports.

LNG imports from Algeria rose to 65.7 billion cubic feet in 1997, the highest level since 1993. This increase was primarily the result of the end of curtailments, which began in August 1994. Sonatrach, the state-owned oil and gas company in Algeria, curtailed exports because of a major renovation project on that nation's liquefaction plants. Those renovations have progressed so that the original capacities of its liquefaction plants have been restored. By late 1996, Algerian shipments into the United States returned to near pre-curtailment levels, measured as the average of Algerian imports during 1990 through 1993. During 1997, Algerian imports represented 84 percent of LNG imports, but only 2 percent of the total amount of natural gas imported into the United States. The price of Algerian imports was $2.67 per thousand cubic feet, 1 percent less than the 1996 price.

An LNG shipment of 2.4 billion cubic feet was imported from the United Arab Emirates in January. Shipments from Australia were received in May, September, and November, totaling 9.7 billion cubic feet. The price for the shipments from the United Arab Emirates averaged $3.74 per thousand cubic feet, and from Australia, $2.92 per thousand cubic feet. Purchasing of LNG on the spot market is likely to continue in the foreseeable future because of a world-wide surplus of LNG production capacity, reduced demand

caused by economic problems in the Far East, and reduced costs caused by new technological developments in the liquefaction process. Spot sales into the United States will continue if the market price of gas is high enough to justify long distance sales.[1]

LNG exports from Alaska to Japan fell by 8 percent from 1996 to 1997 to 62.2 billion cubic feet. This decline may reflect the economic difficulties in the Far East that have resulted in reduced demand for energy in general and LNG in particular. The price for these exports increased by 5 percent between 1996 and 1997 to $3.83 per thousand cubic feet.

At present, there are two LNG import facilities in the United States that are not receiving LNG shipments. The Cove Point LNG facility in southern Maryland continues to be used to liquefy and store gas for later regasification during peak demand periods. Currently the facility uses domestic gas, but in the long term it expects to be a receiving terminal for LNG tankers. The Elba Island LNG facility in Georgia is not scheduled for operation through 2000.

Two LNG projects are nearing completion that may have an impact on U.S. LNG trade:

- **The Trinidad and Tobago Export Facility.** This project would develop the natural gas resources off the east coast of Trinidad. It has one of the largest project-funding agreements ever to be completed in the Caribbean/Latin American region. Construction of an LNG facility on Trinidad began in 1996 with an anticipated completion date of mid-1999. This facility will target markets in the Northeastern United States, Spain, and Puerto Rico.

- **The EcoElectrica Power Plant in Puerto Rico.** EcoElectrica began construction of a power plant in January 1998 to be fueled by LNG supplied from Trinidad and other possible sources. EcoElectrica estimates that the facility will be completed and begin operations in 2000.

Storage

Underground storage plays an integral role in the restructured competitive markets by its ability to store natural gas which enables supply reliability during periods when demand is high. Many customers today are making their own storage arrangements to ensure supply reliability and as a result they have become increasingly conscious of the costs involved, and expect new and more flexible storage services. A number of market center operators and marketers offer storage services to support short-term gas loans, gas balancing, and peaking services. No fewer than 38 market centers/hubs are in operation in the United States and Canada, and most of them offer one or more types of storage service to prospective customers.

At the end of 1997, there were 418 active underground storage fields in operation in the United States, with nearly 4.0 trillion cubic feet of working gas capacity and nearly 75 billion cubic feet per day of deliverability. These storage facilities are distributed among 30 States, with the Midwest ranking first and the Southwest ranking second in terms of both working gas capacity and deliverability.

Each year, there is heightened interest in the level of working gas in storage at the beginning of the heating season (October 31) and the beginning of the refill season (March 31). In recent years the trend has been to keep smaller inventories, as evidenced by lower levels of working gas in storage at the beginning of heating seasons. The *Natural Gas Monthly* reports the levels of working gas in storage and net withdrawals at the end of each month. Storage information is given in this report, the *Natural Gas Annual*, as of December 31. For the year 1997, withdrawals from underground storage were larger than injections and resulted in a net change of minus 21.7 billion cubic feet. For LNG storage, additions exceeded withdrawals by 0.3 billion cubic feet. The net change for total gas in storage from January through December was minus 21.3 billion cubic feet. This change results in an addition to natural gas supplies.

Pipeline Expansions

During 1997, over 40 pipeline expansion projects were completed and placed in service in the United States representing more than 6.3 billion cubic feet per day of added pipeline capacity. These projects either added capacity directly to the interstate network, improved local intrastate service, or expanded access to producing fields or natural gas market centers. These projects plus others increased overall daily interstate capability by a little over 2 percent or 4.6 billion cubic feet per day. This amount was 202 percent more than the interstate capacity added in 1996.[2] Moreover,

[1] U.S. Department of Energy, Office of Fossil Energy, *Natural Gas Imports and Exports, Fourth Quarter Report 1997*, DOE/FE-0360-4 (March 1998).

[2] Energy Information Administration, *Natural Gas Monthly,* Natural Gas Pipeline and System Expansions, (DOE/EIA-0130(97/04) Washington, DC, April 1997).

the total number of completed projects in the United States was substantially more than in 1995 (41 vs. 26).

With only a few exceptions, all of the natural gas pipeline projects slated for completion in 1997 were placed in-service on schedule.[3] Two were canceled due to changes in market conditions or competitive pressures. Several others were postponed while their original designs were re-evaluated in light of conditional regulatory approval or shifts in construction priorities.

Some of the highlights of 1997 for U.S. pipeline expansions were:

- The increased development of gas resources in the Gulf of Mexico and specifically in the deeper waters (greater than 200 meters) off of Louisiana, Alabama and Mississippi contributed to the completion of 5 natural gas pipeline projects representing a total of 2.3 billion cubic feet per day of new pipeline capacity in the Gulf. Two of these projects, Nautilus and Texaco Discovery pipelines, now bring an additional 2.1 billion cubic feet per day to onshore Louisiana, while three others (1.1 billion cubic feet per day) operate as gathering systems linking new and expanding producing platforms located in the Gulf with mainlines directed to onshore facilities.

- In the San Juan Basin area of Colorado/New Mexico, the two major interstate pipeline systems operating in the region have undertaken efforts to expand and enhance facilities located on their respective systems. In 1997, Transwestern Pipeline Company and El Paso Natural Gas Company, completed projects that improved deliverability out of the basin and have several additional projects planned which would relieve the ongoing capacity constraint issue in the area. Transwestern Pipeline Company added an additional 0.25 billion cubic feet per day with the expansion of compression on its system within the basin while the El Paso Natural Gas Company completed its Havasu Crossover expansion project, expanding its capability on the westward-bound portion of the system to redirect supplies eastward (either physically or by displacement) just east of the California border. The expansion upgraded the crossover, which links the north and south parts of the El Paso system by 0.18 billion cubic feet per day.

- The KN Interstate Pipeline Company placed its Pony Express line (0.26 billion cubic feet per day) in service in August and the Trailblazer/Overthrust/Wyoming Interstate system (0.1 to 0.2 billion cubic feet per day) expansion was completed in the last quarter of the year. The latter expansion increased the system's deliverability to its interconnection with the Natural Gas Pipeline Company of America's Amarillo line. These projects are aiding Rocky Mountain producers to accommodate their expanding area production and increase their presence in local energy markets and further extend their customer base in the midwest and eastern U.S. markets.

- While a major expansion of Canadian import capability is expected over the next several years, during 1997, only one of the interconnecting U.S. pipelines (Viking Gas Transmission Company) expanded its capacity; by 0.62 billion cubic feet per day. The TransCanada Pipeline system, however, increased its domestic deliverability by 0.12 billion cubic feet per day per day and upgraded several of its export points to the United States. The TransCanada export upgrades were primarily to alleviate some of its own limitations. Most of the U.S. pipelines were already capable of accepting the increased TransCanada export flows.

- In the Midwest, only three interstate pipeline projects were completed, accounting for 0.44 billion cubic feet per day of new capacity. These projects included the above mentioned Viking import project and the ANR Michigan Leg expansion which resolved a capacity bottleneck in the region. The remaining project provided increased deliverability (0.24 billion cubic feet per day) to customers in Minnesota and Wisconsin served by Northern Natural Gas Company.

- More pipeline expansion projects were completed in the northeastern U.S. than in any other part of North America. Twelve projects, accounting for 0.77 billion cubic feet per day of additional deliverability, were placed in-service. Almost all of the projects were to improve deliverability within local markets or to address bottlenecks which were limiting service in areas of growing demand. Texas Eastern Transmission Corporation accounted for three of the completed projects adding an additional 0.29 billion cubic feet per day to the area's network capability.

- Natural gas pipeline expansions completed in the Southeast improved deliverability within the region, primarily in North and South Carolina, Georgia and Alabama. About 0.44 billion cubic feet per day of additional capacity was added within the region. One system, Transcontinental Gas Pipeline Company, was involved in 3 of the 5 projects completed. In addition to increasing service off its in North Carolina mainline, completion of its Sunbelt project complimented the expansion of the regional South Carolina Pipeline system.

- Export capability to Mexico was increased for first time since 1992 with the completion of a new 0.25 billion cubic feet per day crossing at Calexico, California (Southern California Gas Company) and construction of the El Paso Energy Company's Samalayucca project, linking Texas supply sources with customers in Mexico's Chihuahua State, which was completed and became operational in December. The 45-mile, 0.21

[3] Energy Information Administration, *Natural Gas Monthly,* Natural Gas Pipeline and System Expansions, (DOE/EIA-0130(97/04) Washington, DC, April 1997), Table SR1.

billion cubic feet per day per day pipeline is the first pipeline located in Mexico owned in part by a U.S. company. A major customer of the project will be a 700 Megawatt combined-cycle electric generating plant located in Samalayucca, Mexico, which will begin operations in late 1998.

The amount of new capacity proposed for development by the end of 2000 is significant, and if fully implemented would represent a significant capacity increase over 1997 levels. Although it is unlikely that all proposed expansions will be completed, more proposals are surfacing each week.

Beyond what has already been proposed, there are areas of the country where additional pipeline expansion plans might develop in response to changing market profiles and the development of new supply sources. For instance, Gulf of Mexico deep-water development will continue over the next decade and with it could come additional complementary onshore expansions. In addition, the Cotton Valley Trend in east Texas, the expanding development in several major South Texas fields, and the continuing growth of coal-seam and other gas sources in Wyoming's Powder River area, as well as in several other Rocky Mountain production zones, will place pressure on local pipeline systems to expand their capabilities to reach nearby and distant markets.

The anticipated major increase in capacity from Canada to the midwestern United States has already spurred additional proposals for development of new pipelines and expansions of existing lines that would provide alternative capacity for transhipment of some of this gas to the U.S. Northeastern marketplace. Already several of the proposed Midwest-to-Northeast expansion projects are premised on the assumption that excess capacity into the Chicago, Illinois area could develop over the next several years as new (proposed Canadian source) pipelines are completed during the interim.

Table 8. Interstate Movements and Movements Across U.S. Borders of Natural Gas by State, 1997
(Million Cubic Feet)

State	State or Country From/To	Volume		
		Receipts/ Imports From	Deliveries/ Exports To	Net[a]
Alabama				
	Florida	28	488,747	-488,719
	Georgia	0	1,498,880	-1,498,880
	Mississippi	3,062,699	0	3,062,699
	South Carolina	0	[b]6	-6
	Tennessee	395	1,261,194	-1,260,799
	Total	**3,063,122**	**3,248,827**	**-185,706**
Alaska				
	Japan	0	[c]62,187	-62,187
	Total	**0**	**62,187**	**-62,187**
Arizona				
	California	0	813,065	-813,065
	Mexico	0	3,901	-3,901
	Nevada	0	31,386	-31,386
	New Mexico	969,669	0	969,669
	Total	**969,669**	**848,353**	**121,316**
Arkansas				
	Louisiana	2,007,259	185,631	1,821,628
	Mississippi	0	1,928,867	-1,928,867
	Missouri	5,437	681,275	-675,837
	Oklahoma	351,997	0	351,997
	Texas	507,425	3,500	503,925
	Total	**2,872,118**	**2,799,272**	**72,846**
California				
	Arizona	813,065	0	813,065
	Mexico	0	308	-308
	Nevada	229,779	0	229,779
	Oregon	628,284	0	628,284
	Total	**1,671,128**	**308**	**1,670,820**
Colorado				
	Kansas	0	103,952	-103,952
	Nebraska	188,153	0	188,153
	New Mexico	0	298,489	-298,489
	Oklahoma	9,754	57,339	-47,585
	Utah	105,763	18,291	87,472
	Wyoming	447,847	356,709	91,138
	Total	**751,517**	**834,780**	**-83,263**
Connecticut				
	Massachusetts	2,257	0	2,257
	New York	394,353	87,496	306,857
	Rhode Island	0	172,204	-172,204
	Total	**396,610**	**259,700**	**136,910**
Delaware				
	Maryland	0	3,405	-3,405
	Pennsylvania	47,619	0	47,619
	Total	**47,619**	**3,405**	**44,214**
District of Columbia				
	Maryland	10,879	0	10,879
	Virginia	24,265	0	24,265
	Total	**35,144**	**0**	**35,144**
Florida				
	Alabama	488,747	28	488,719

See footnotes at end of table.

Table 8. Interstate Movements and Movements Across U.S. Borders of Natural Gas by State, 1997 (Continued)

(Million Cubic Feet)

State	State or Country From/To	Volume		
		Receipts/ Imports From	Deliveries/ Exports To	Net[a]
	Georgia	14,407	0	14,407
	Total	**503,155**	**28**	**503,126**
Georgia				
	Alabama	1,498,880	0	1,498,880
	Florida	0	14,407	-14,407
	South Carolina	0	1,105,837	-1,105,837
	Tennessee	0	9,406	-9,406
	Total	**1,498,880**	**1,129,650**	**369,230**
Idaho				
	Canada	856,503	0	856,503
	Nevada	0	39,742	-39,742
	Oregon	144,868	0	144,868
	Utah	141	0	141
	Washington	0	867,820	-867,820
	Wyoming	0	43,314	-43,314
	Total	**1,001,512**	**950,876**	**50,636**
Illinois				
	Indiana	111,842	1,266,782	-1,154,940
	Iowa	906,321	29,138	877,183
	Kentucky	430,037	0	430,037
	Missouri	987,980	0	987,980
	Wisconsin	59,176	179,149	-119,973
	Total	**2,495,356**	**1,475,069**	**1,020,287**
Indiana				
	Illinois	1,266,782	111,842	1,154,940
	Kentucky	927,090	0	927,090
	Michigan	8,038	431,453	-423,414
	Ohio	53,819	1,085,258	-1,031,439
	Total	**2,255,729**	**1,628,553**	**627,176**
Iowa				
	Illinois	29,138	906,321	-877,183
	Minnesota	547,322	237,858	309,464
	Missouri	241,023	0	241,023
	Nebraska	618,269	0	618,269
	South Dakota	275	266	8
	Total	**1,436,026**	**1,144,445**	**291,581**
Kansas				
	Colorado	103,952	0	103,952
	Missouri	0	565,965	-565,965
	Nebraska	1,400	853,417	-852,017
	Oklahoma	1,096,277	30,511	1,065,765
	Total	**1,201,629**	**1,449,894**	**-248,265**
Kentucky				
	Illinois	0	430,037	-430,037
	Indiana	0	927,090	-927,090
	Ohio	6,325	1,267,992	-1,261,667
	Tennessee	3,570,228	0	3,570,228
	West Virginia	0	808,019	-808,019
	Total	**3,576,553**	**3,433,137**	**143,416**
Louisiana				
	Algeria	[c]28,066	0	28,066
	Arkansas	185,631	2,007,259	-1,821,628
	Australia	[c]2,530	0	2,530
	Mississippi	264	3,771,541	-3,771,277
	Texas	1,920,334	8,652	1,911,682
	Total	**2,136,825**	**5,787,452**	**-3,650,627**

See footnotes at end of table.

Table 8. Interstate Movements and Movements Across U.S. Borders of Natural Gas by State, 1997 (Continued)

(Million Cubic Feet)

State	State or Country From/To	Volume		
		Receipts/ Imports From	Deliveries/ Exports To	Net[a]
Maine				
	Massachusetts	[b]11	0	11
	New Hampshire	6,433	0	6,433
	Total	**6,444**	**0**	**6,444**
Maryland				
	Delaware	3,405	0	3,405
	District of Columbia	0	10,879	-10,879
	Pennsylvania	54,540	643,881	-589,342
	Virginia	874,829	26,257	848,572
	Total	**932,773**	**681,017**	**251,756**
Massachusetts				
	Algeria	[c]37,610	0	37,610
	Australia	[c]7,156	0	7,156
	Connecticut	0	2,257	-2,257
	Maine	0	[b]11	-11
	New Hampshire	0	19,585	-19,585
	New York	264,309	0	264,309
	Rhode Island	123,040	49,705	73,335
	United Arab Emirates	[c]2,417	0	2,417
	Total	**434,532**	**71,558**	**362,974**
Michigan				
	Canada	23,356	573,066	-549,710
	Indiana	431,453	8,038	423,414
	Ohio	289,270	4,295	284,975
	Wisconsin	731,905	133,994	597,910
	Total	**1,475,984**	**719,394**	**756,590**
Minnesota				
	Canada	950,706	0	950,706
	Iowa	237,858	547,322	-309,464
	North Dakota	0	9,984	-9,984
	South Dakota	611,095	0	611,095
	Wisconsin	1,006	872,001	-870,995
	Total	**1,800,665**	**1,429,306**	**371,358**
Mississippi				
	Alabama	0	3,062,699	-3,062,699
	Arkansas	1,928,867	0	1,928,867
	Louisiana	3,771,541	264	3,771,277
	Tennessee	1,059	2,597,695	-2,596,636
	Total	**5,701,467**	**5,660,658**	**40,809**
Missouri				
	Arkansas	681,275	5,437	675,837
	Illinois	0	987,980	-987,980
	Iowa	0	241,023	-241,023
	Kansas	565,965	0	565,965
	Nebraska	244,329	0	244,329
	Oklahoma	16,570	37	16,534
	Total	**1,508,139**	**1,234,476**	**273,663**
Montana				
	Canada	572,977	0	572,977
	North Dakota	9,285	586,353	-577,068
	South Dakota	0	1,260	-1,260
	Wyoming	9,769	309	9,459
	Total	**592,031**	**587,923**	**4,108**

See footnotes at end of table.

Table 8. Interstate Movements and Movements Across U.S. Borders of Natural Gas by State, 1997 (Continued)

(Million Cubic Feet)

State	State or Country From/To	Volume		
		Receipts/ Imports From	Deliveries/ Exports To	Net[a]
Nebraska				
	Colorado	0	188,153	-188,153
	Iowa	0	618,269	-618,269
	Kansas	853,417	1,400	852,017
	Missouri	0	244,329	-244,329
	South Dakota	0	12,951	-12,951
	Wyoming	229,312	0	229,312
	Total	**1,082,729**	**1,065,103**	**17,627**
Nevada				
	Arizona	31,386	0	31,386
	California	0	229,779	-229,779
	Idaho	39,742	0	39,742
	Utah	272,657	0	272,657
	Total	**343,785**	**229,779**	**114,006**
New Hampshire				
	Maine	0	6,433	-6,433
	Massachusetts	19,585	0	19,585
	Vermont	8,134	0	8,134
	Total	**27,720**	**6,433**	**21,287**
New Jersey				
	New York	0	706,829	-706,829
	Pennsylvania	1,274,307	0	1,274,307
	Total	**1,274,307**	**706,829**	**567,479**
New Mexico				
	Arizona	0	969,669	-969,669
	Colorado	298,489	0	298,489
	Texas	4,966	471,549	-466,583
	Total	**303,455**	**1,441,218**	**-1,137,763**
New York				
	Canada	656,332	0	656,332
	Connecticut	87,496	394,353	-306,857
	Massachusetts	0	264,309	-264,309
	New Jersey	706,829	0	706,829
	Pennsylvania	402,443	88,027	314,416
	Total	**1,853,100**	**746,689**	**1,106,411**
North Carolina				
	South Carolina	971,634	0	971,634
	Virginia	5,276	737,497	-732,221
	Total	**976,910**	**737,497**	**239,413**
North Dakota				
	Canada	7,672	0	7,672
	Minnesota	9,984	0	9,984
	Montana	586,353	9,285	577,068
	South Dakota	0	633,621	-633,621
	Total	**604,009**	**642,906**	**-38,897**
Ohio				
	Indiana	1,085,258	53,819	1,031,439
	Kentucky	1,267,992	6,325	1,261,667
	Michigan	4,295	289,270	-284,975
	Pennsylvania	692	515,754	-515,062
	West Virginia	304,341	970,643	-666,301
	Total	**2,662,578**	**1,835,811**	**826,767**

See footnotes at end of table.

Table 8. Interstate Movements and Movements Across U.S. Borders of Natural Gas by State, 1997 (Continued)

(Million Cubic Feet)

State	State or Country From/To	Volume		
		Receipts/ Imports From	Deliveries/ Exports To	Net[a]
Oklahoma				
	Arkansas	0	351,997	-351,997
	Colorado	57,339	9,754	47,585
	Kansas	30,511	1,096,277	-1,065,765
	Missouri	37	16,570	-16,534
	Texas	739,589	341,030	398,559
	Total	**827,475**	**1,815,627**	**-988,152**
Oregon				
	California	0	628,284	-628,284
	Idaho	0	144,868	-144,868
	Washington	954,325	0	954,325
	Total	**954,325**	**773,152**	**181,173**
Pennsylvania				
	Delaware	0	47,619	-47,619
	Maryland	643,881	54,540	589,342
	New Jersey	0	1,274,307	-1,274,307
	New York	88,027	402,443	-314,416
	Ohio	515,754	692	515,062
	West Virginia	1,229,874	9,049	1,220,825
	Total	**2,477,537**	**1,788,650**	**688,887**
Rhode Island				
	Connecticut	172,204	0	172,204
	Massachusetts	49,705	123,040	-73,335
	Total	**221,909**	**123,040**	**98,868**
South Carolina				
	Alabama	[b]6	0	6
	Georgia	1,105,837	0	1,105,837
	North Carolina	0	971,634	-971,634
	Total	**1,105,842**	**971,634**	**134,208**
South Dakota				
	Iowa	266	275	-8
	Minnesota	0	611,095	-611,095
	Montana	1,260	0	1,260
	Nebraska	12,951	0	12,951
	North Dakota	633,621	0	633,621
	Wyoming	0	241	-241
	Total	**648,098**	**611,611**	**36,487**
Tennessee				
	Alabama	1,261,194	395	1,260,799
	Georgia	9,406	0	9,406
	Kentucky	0	3,570,228	-3,570,228
	Mississippi	2,597,695	1,059	2,596,636
	Virginia	0	1	-1
	Total	**3,868,295**	**3,571,683**	**296,613**
Texas				
	Arkansas	3,500	507,425	-503,925
	Louisiana	8,652	1,920,334	-1,911,682
	Mexico	17,243	34,163	-16,920
	New Mexico	471,549	4,966	466,583
	Oklahoma	341,030	739,589	-398,559
	Total	**841,974**	**3,206,478**	**-2,364,504**
Utah				
	Colorado	18,291	105,763	-87,472
	Idaho	0	141	-141
	Nevada	0	272,657	-272,657

See footnotes at end of table.

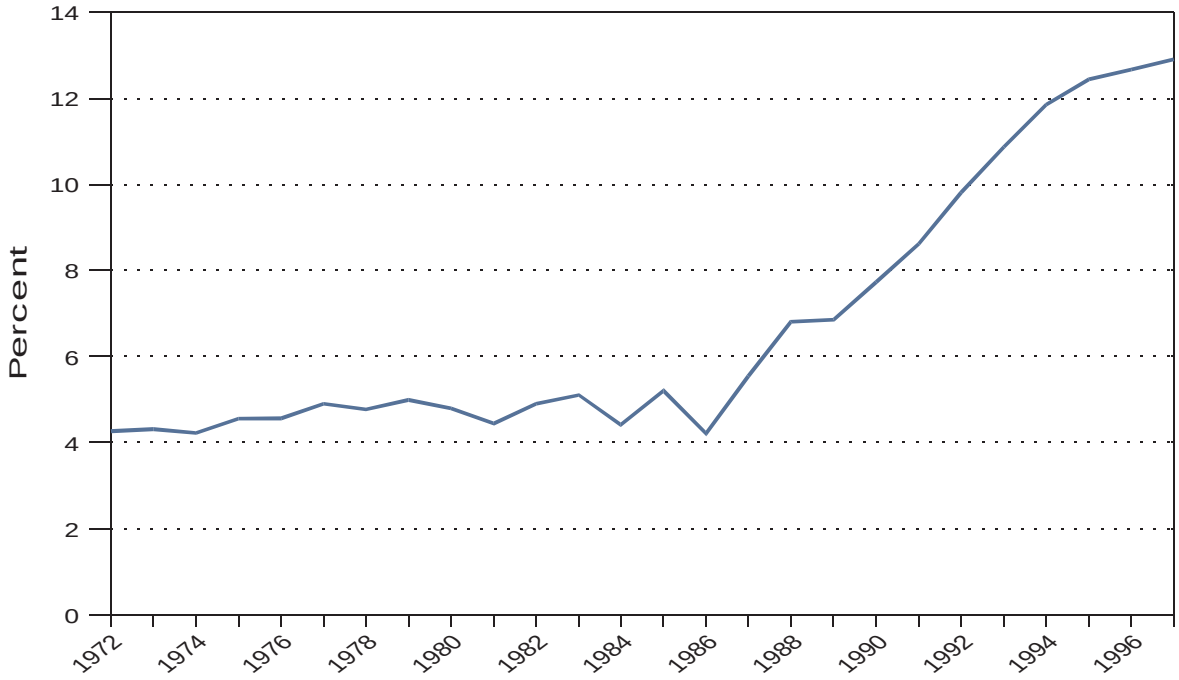
Table 8. Interstate Movements and Movements Across U.S. Borders of Natural Gas by State, 1997 (Continued)

(Million Cubic Feet)

State	State or Country From/To	Volume		
		Receipts/ Imports From	Deliveries/ Exports To	Net[a]
	Wyoming	425,028	116,348	308,680
	Total	**443,318**	**494,909**	**-51,590**
Vermont				
	Canada	19,343	0	19,343
	New Hampshire	0	8,134	-8,134
	Total	**19,343**	**8,134**	**11,209**
Virginia				
	District of Columbia	0	24,265	-24,265
	Maryland	26,257	874,829	-848,572
	North Carolina	737,497	5,276	732,221
	Tennessee	1	0	1
	West Virginia	356,306	2,464	353,842
	Total	**1,120,061**	**906,833**	**213,228**
Washington				
	Canada	360,261	0	360,261
	Idaho	867,820	0	867,820
	Oregon	0	954,325	-954,325
	Total	**1,228,081**	**954,325**	**273,756**
West Virginia				
	Kentucky	808,019	0	808,019
	Ohio	970,643	304,341	666,301
	Pennsylvania	9,049	1,229,874	-1,220,825
	Virginia	2,464	356,306	-353,842
	Total	**1,790,175**	**1,890,522**	**-100,347**
Wisconsin				
	Illinois	179,149	59,176	119,973
	Michigan	133,994	731,905	-597,910
	Minnesota	872,001	1,006	870,995
	Total	**1,185,145**	**792,086**	**393,058**
Wyoming				
	Colorado	356,709	447,847	-91,138
	Idaho	43,314	0	43,314
	Montana	309	9,769	-9,459
	Nebraska	0	229,312	-229,312
	South Dakota	241	0	241
	Utah	116,348	425,028	-308,680
	Total	**516,922**	**1,111,955**	**-595,034**
Total Natural Gas Movements		**64,741,721**	**61,873,174**	**2,868,547**
Movements Across U.S. Borders		[d]3,542,173	[e]673,625	2,868,547
U.S. Interstate Movements		61,199,549	61,199,549	0

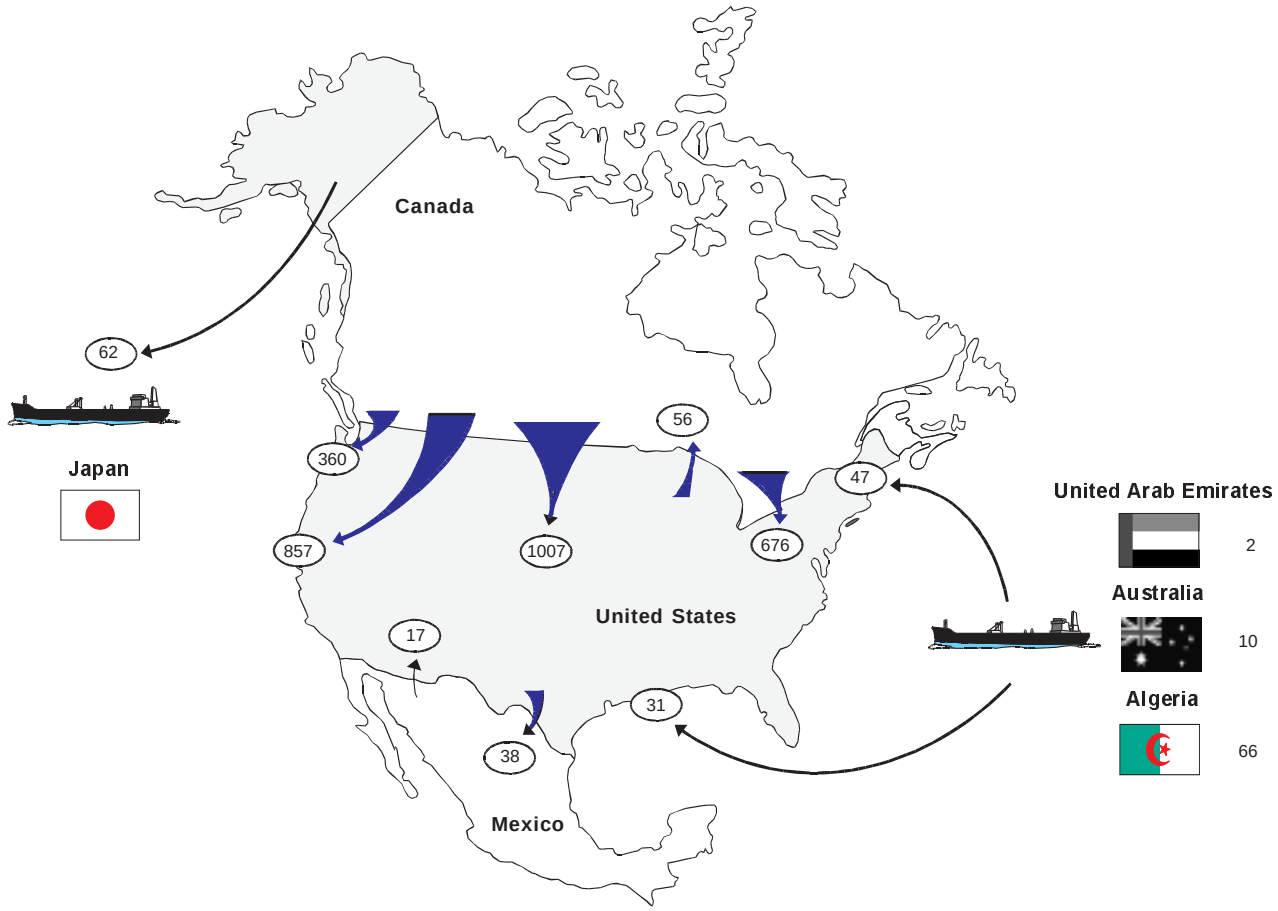
[a] Positive numbers denote net receipts; negative numbers denote net deliveries.
[b] Natural gas transported by truck either as liquefied natural gas (LNG) or compressed natural gas (CNG).
[c] LNG transported by ship.
[d] Volumes include 2,994,173 million cubic feet of imports from Mexico, Algeria, United Arab Emirates, Australia, and Canada, and 548,000 million cubic feet of intransit receipts from Canada.
[e] Volumes include 157,006 million cubic feet of exports to Japan, Mexico, and Canada, and 516,620 million cubic feet of intransit natural gas deliveries to Canada.
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."

Figure 7. Net Imports as a Percentage of Total Consumption of Natural Gas, 1972-1997



Sources: 1972-1975: Bureau of Mines, *Minerals Yearbook*, "Natural Gas" chapter. 1976-1978: Energy Information Administration (EIA), Energy Data Reports, *Natural Gas Annual*. 1979: EIA, *Natural Gas Production 1979*. 1980-1989: EIA, Form EIA-176, "Annual Report of Natural and Supplemental Gas Supply and Disposition"; Form EIA-759, "Monthly Power Plant Report"; and Form FPC-14, "Annual Report for Importers and Exporters of Natural Gas"; 1990: EIA, Form EIA-176, Form EIA-759, Form FPC-14, and Form EIA-64A, "Annual Report of the Origin of Natural Gas Liquids Production"; 1991-1994: EIA, Form EIA-176, Form EIA-759, Form FPC-14, Form EIA-64A, and Form EIA-627, "Annual Quantity and Value of Natural Gas Report"; 1995: EIA, Form EIA-176, Form EIA-759, Form EIA-64A, Form EIA-627, and Office of Fossil Energy, U.S. Department of Energy, Natural Gas Imports and Exports; 1996 and 1997: EIA, Form EIA-176, Form EIA-759, Form EIA-64A, Form EIA-895, "Monthly Quantity and Value of Natural Gas Report," and Office of Fossil Energy.

Figure 8. Flow of Natural Gas Imports and Exports, 1997
(Billion Cubic Feet)



Source: Office of Fossil Energy, U.S. Department of Energy, Natural Gas Imports and Exports.

Table 9. Summary of U.S. Natural Gas Imports and Exports, 1993-1997

	1993	1994	1995	1996	1997
Imports					
Volume (million cubic feet)					
Pipeline					
Canada	2,266,751	2,566,049	2,816,408	2,883,277	2,899,152
Mexico	1,678	7,013	6,722	13,862	17,243
Total Pipeline Imports	**2,268,429**	**2,573,061**	**2,823,130**	**2,897,138**	**2,916,394**
LNG					
Algeria	81,685	50,778	17,918	35,325	65,675
Australia	0	0	0	0	9,686
United Arab Emirates	0	0	0	4,949	2,417
Total LNG Imports	**81,685**	**50,778**	**17,918**	**40,274**	**77,778**
Total Imports	**2,350,115**	**2,623,839**	**2,841,048**	**2,937,413**	**2,994,173**
Average Price (dollars per thousand cubic feet)					
Pipeline					
Canada	2.02	1.86	1.48	1.96	2.15
Mexico	1.94	1.99	1.53	2.25	2.31
Total Pipeline Imports	**2.02**	**1.86**	**1.48**	**1.96**	**2.15**
LNG					
Algeria	2.20	2.28	2.30	2.70	2.67
Australia	—	—	—	—	2.92
United Arab Emirates	—	—	—	3.46	3.74
Total LNG Imports	**2.20**	**2.28**	**2.30**	**2.80**	**2.74**
Total Imports	**2.03**	**1.87**	**1.49**	**1.97**	**2.17**
Exports					
Volume (million cubic feet)					
Pipeline					
Canada	44,518	52,556	27,554	51,905	56,447
Mexico	39,676	46,500	61,283	33,840	38,372
Total Pipeline Exports	**84,195**	**99,057**	**88,836**	**85,745**	**94,818**
LNG					
Japan	55,989	62,682	65,283	67,648	62,187
Total Exports	**140,183**	**161,738**	**154,119**	**153,393**	**157,006**
Average Price (dollars per thousand cubic feet)					
Pipeline					
Canada	2.14	2.42	1.96	2.67	2.52
Mexico	2.02	1.68	1.50	2.11	2.46
Total Pipeline Exports	**2.08**	**2.08**	**1.64**	**2.45**	**2.49**
LNG					
Japan	3.34	3.18	3.41	3.65	3.83
Total Exports	**2.59**	**2.50**	**2.39**	**2.97**	**3.02**

— = Not applicable.
Notes: Totals may not equal sum of components due to independent rounding.

Sources: Energy Information Administration, Form FPC-14, "Annual Report for Importers and Exporters of Natural Gas" (1993 and 1994), and Office of Fossil Energy, U.S. Department of Energy, Natural Gas Imports and Exports (1995 through 1997).

Table 10. Additions to and Withdrawals from Gas Storage by State, 1997
(Million Cubic Feet)

State	Underground Storage			LNG Storage			Net Change in Storage
	Injections	Withdrawals	Net	Additions	Withdrawals	Net	
Alabama	2,022	1,860	162	960	535	425	587
Arkansas	6,665	6,915	-250	57	68	-11	-261
California	145,511	161,852	-16,340	51	109	-58	-16,398
Colorado	39,389	38,864	525	0	0	0	525
Connecticut	0	0	0	832	737	94	94
Delaware	0	0	0	112	121	-8	-8
Georgia	0	0	0	3,221	3,374	-153	-153
Idaho	0	0	0	868	836	32	32
Illinois	227,785	217,632	10,153	283	483	-200	9,952
Indiana	23,403	24,388	-984	2,520	1,867	653	-331
Iowa	61,132	54,877	6,255	2,134	1,893	241	6,496
Kansas	114,848	103,475	11,372	0	0	0	11,372
Kentucky	57,073	60,086	-3,013	0	0	0	-3,013
Louisiana	302,324	293,076	9,248	30,419	28,245	2,174	11,422
Maine	0	0	0	11	13	-2	-2
Maryland	15,510	14,966	544	1,439	252	1,186	1,730
Massachusetts	0	0	0	5,049	8,565	-3,517	-3,517
Michigan	424,651	421,264	3,388	0	0	0	3,388
Minnesota	1,417	1,044	373	1,686	1,715	-29	344
Mississippi	63,216	66,979	-3,763	0	0	0	-3,763
Missouri	5,081	4,629	453	0	0	0	453
Montana	18,219	30,181	-11,962	0	0	0	-11,962
Nebraska	6,659	5,069	1,590	505	383	122	1,712
Nevada	0	0	0	276	214	61	61
New Jersey	0	0	0	3,926	3,330	596	596
New Mexico	12,936	15,001	-2,065	0	0	0	-2,065
New York	67,135	67,438	-304	1,625	760	865	561
North Carolina	0	0	0	2,016	1,686	330	330
Ohio	200,327	192,991	7,336	0	0	0	7,336
Oklahoma	132,489	123,008	9,482	0	0	0	9,482
Oregon	6,259	4,943	1,316	889	841	48	1,364
Pennsylvania	312,787	341,168	-28,381	4,615	5,852	-1,237	-29,618
Rhode Island	0	0	0	1,056	1,533	-476	-476
South Carolina	0	0	0	6	461	-455	-455
Tennessee	0	0	0	1,875	2,416	-541	-541
Texas	312,254	322,289	-10,035	0	0	0	-10,035
Utah	42,803	35,231	7,571	0	0	0	7,571
Virginia	0	0	0	1,096	988	108	108
Washington	20,018	19,015	1,003	2,193	2,145	48	1,051
West Virginia	164,299	181,015	-16,716	0	0	0	-16,716
Wisconsin	0	0	0	143	92	51	51
Wyoming	14,080	14,989	-908	0	0	0	-908
Total	**2,800,294**	**2,824,245**	**-23,950**	**69,865**	**69,517**	**348**	**-23,603**

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

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

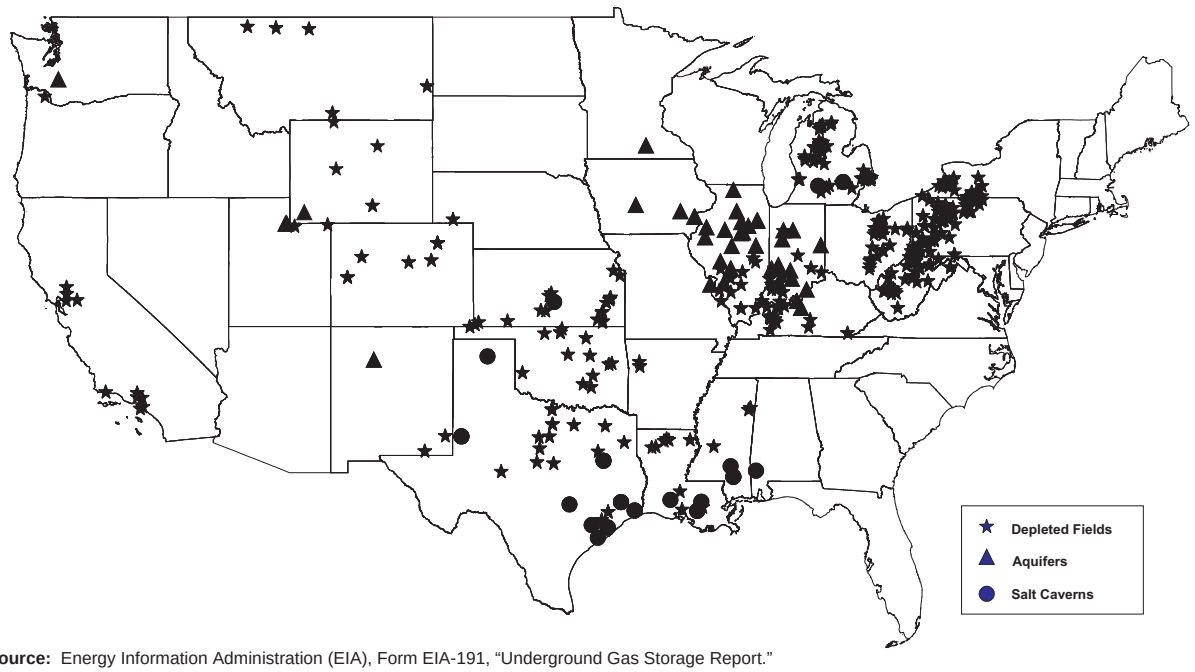
Table 11. Underground Natural Gas Storage Capacity by State, December 31, 1997
(Capacity in Billion Cubic Feet)

State	Interstate Companies		Intrastate Companies		Independent Companies		Total		
	Number of Active Fields	Capacity	Number of Active Fields	Capacity	Number of Active Fields	Capacity	Number of Active Fields	Capacity	Percent of U.S. Capacity
Alabama	0	0	1	3	0	0	1	3	0.04
Arkansas	0	0	3	32	0	0	3	32	0.38
California	0	0	10	396	0	0	10	396	4.76
Colorado	4	66	5	34	0	0	9	100	1.20
Illinois	7	326	24	639	0	0	31	966	11.59
Indiana	6	16	22	97	0	0	28	113	1.36
Iowa	10	408	0	0	0	0	10	408	4.90
Kansas	16	284	4	20	0	0	20	304	3.65
Kentucky	6	167	19	53	0	0	25	220	2.64
Louisiana	8	530	5	29	0	0	13	559	6.71
Maryland	1	62	0	0	0	0	1	62	0.74
Michigan	30	781	18	212	0	0	48	993	11.92
Minnesota	0	0	1	7	0	0	1	7	0.08
Mississippi	3	121	4	13	0	0	7	134	1.61
Missouri	0	0	1	31	0	0	1	31	0.38
Montana	1	287	4	56	0	0	5	343	4.11
Nebraska	1	39	0	0	0	0	1	39	0.47
New Mexico	1	69	2	28	0	0	3	97	1.16
New York	20	165	2	10	0	0	22	175	2.11
Ohio	15	390	8	183	0	0	23	573	6.88
Oklahoma	6	214	4	58	4	124	14	396	4.75
Oregon	0	0	2	12	0	0	2	12	0.14
Pennsylvania	34	624	18	38	7	23	59	685	8.22
Texas	10	240	23	441	1	3	34	684	8.21
Utah	3	122	0	0	0	0	3	122	1.46
Washington	1	37	0	0	0	0	1	37	0.45
West Virginia	26	693	0	0	10	41	36	734	8.81
Wyoming	3	76	4	30	0	0	7	106	1.27
Total	**212**	**5,720**	**184**	**2,421**	**22**	**191**	**418**	**8,332**	**100.00**

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

Source: Energy Information Administration (EIA), Form EIA-191, "Underground Gas Storage Report."

Figure 9. Locations of Existing Natural Gas Underground Storage Fields in the United States



Source: Energy Information Administration (EIA), Form EIA-191, "Underground Gas Storage Report."

Table 12. Supplemental Gas Supplies by State, 1997
(Million Cubic Feet)

State	Synthetic Natural Gas	Propane-Air	Refinery Gas	Biomass Gas	Other	Total
Alabama	0	21	0	0	0	21
Colorado	0	49	0	0	[a]6,265	6,314
Connecticut	14	22	0	0	0	37
Delaware	0	2	0	0	0	2
Georgia	0	14	0	0	0	14
Hawaii	2,617	0	0	0	0	2,617
Illinois	0	57	4,108	0	0	4,165
Indiana	0	625	0	0	[b]2,954	3,580
Iowa	0	137	0	0	0	137
Kentucky	0	24	0	0	0	24
Maine	0	31	0	0	0	31
Maryland	0	178	0	0	0	178
Massachusetts	0	147	0	0	0	147
Michigan	0	0	0	0	[c]22,238	22,238
Minnesota	0	172	0	0	0	172
Missouri	0	719	0	0	0	719
Nebraska	0	134	0	0	0	134
New Hampshire	0	102	0	0	0	102
New Jersey	0	15	5,638	811	0	6,464
New York	0	77	0	803	0	881
North Dakota	53,179	0	0	0	0	53,179
Ohio	0	333	0	1,090	0	1,423
Oregon	0	2	0	0	0	2
Pennsylvania	0	135	0	0	0	135
Rhode Island	0	18	0	0	0	18
South Carolina	0	10	0	0	0	10
South Dakota	0	30	0	0	0	30
Tennessee	0	19	0	0	0	19
Vermont	0	6	0	0	0	6
Virginia	0	350	0	0	0	350
Wisconsin	0	5	0	0	0	5
Total	**55,809**	**3,435**	**9,746**	**2,705**	**31,458**	**103,153**

[a] Air injection for Btu stabilization.
[b] Coke oven gas.
[c] Blast furnace gas.

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."