Status of Natural Gas Pipeline System Capacity Entering the 2000-2001 Heating Season

This special report looks at the capabilities of the national natural gas pipeline network in 2000 and provides an assessment of the current levels of available capacity to transport supplies from production areas to markets throughout the United States during the upcoming heating season. It also examines how completion of currently planned expansion projects and proposed new pipelines would affect the network.

During the summer and fall of 2000 natural gas prices reached record highs for a nonheating season period. The dramatic rise in prices resulted from an upsurge in natural gas demand, mainly from electric generation needs during a warmer-than-usual spring and summer. The increased demand has occurred while domestic production levels have continued to decrease over the past several years.[1] Low natural gas prices during 1998 and 1999 dampened exploration and development efforts and caused some lower producing wells to be shut in or abandoned. Natural gas pipeline capacity, on the other hand, has grown with end-use demand, and as sources of new supply have developed, new pipelines have been built to bring this gas to markets.[2] As the next heating season (November 1, 2000 through March 31, 2001) approaches, however, the ongoing question remains as to whether there is sufficient pipeline capacity to meet most possible contingencies. Last winter was warmer than normal on average, so a return to normal weather would add to system demand.

Overview

Generally speaking, as the nation enters the 2000-2001 heating season available natural gas pipeline capacity on the national grid appears adequate to meet most peak-day demands, assuming an average winter.[3] However, there are some points on the system where capacity-constraint and bottleneck problems could arise during severe weather periods, as incremental demand increases beyond local capabilities. Each of the several regions of the nation (Figure SR1) contains some area(s) where the potential exists for mainline transmission segments to experience capacity shortfalls during periods of extremely heavy demand. For example, on a regional basis:

- **The Northeast Region** has several local areas where deliverability problems could increase. In the New York City area, for instance, capacity constraint problems have occurred in recent years during unusual weather periods. Additionally, in the Boston, Massachusetts area, where pipeline capacity is already heavily utilized, demand has been growing and is expected to grow rapidly over the next several years, especially from developers of gas-fired power generation plants. Also, the Leidy area of north central Pennsylvania, where a number of major interstate natural gas pipelines interconnect, has the potential to become a constraint point for pipeline gas flowing to the East Coast, and particularly into the northern New Jersey, New York City area.

- **Portions of the Western Region,** notably the California market, are experiencing growing demand for natural gas for electrical generation, especially during very warm summer weather periods. Utilization levels on the major transmission pipelines serving the State have been well above 90 percent in recent months and could reach their limit if demand levels continue to increase. Service needs in the southern Nevada area continue to remain at a very high level, suggesting the need for system expansion in that area as well.

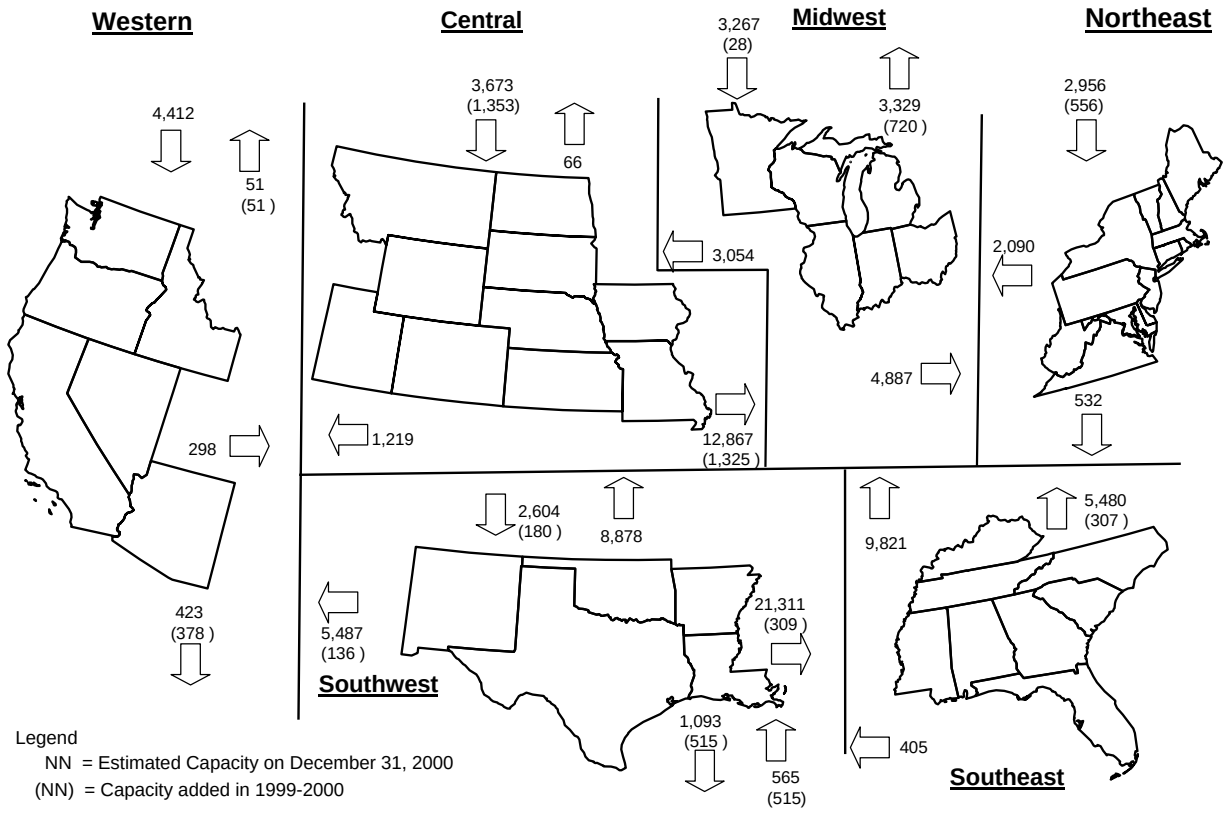
- **The Central Region** has a problem of excess production and limited receipt or exit capacity. Expanding coal-bed methane production in the region has outpaced the development of longhaul capacity to carry the gas to end-use markets. New gathering and header systems have been built this past year to move the gas from the field to the mainline, but not enough matching interstate pipeline capacity has been installed. Only in the past several months have proposals been made to

[1]See Energy Information Administration, *Natural Gas Monthly*, Table 7, September 1999, (Washington, DC, October 1999).

[2]In most areas in the United States, except for those near major natural gas production fields, major longhaul natural gas pipeline systems provide a link between suppliers and the regional pipeline network that directs the gas to the eventual consumer. The overall capacity of these trunklines usually reflects the needs of regional or market pipelines, which are sometimes other major interstate companies, but most often are local distribution companies.

[3]This discussion assumes that normal operations will be maintained on the national pipeline system during an average heating season.

Figure SR1. Estimated Region-to-Region Natural Gas Pipeline Capacity at the End of 2000
(Million Cubic Feet per Day)



Sources: Energy Information Administration (EIA), EIAGIS-NG Geographic Information System: Natural Gas Pipeline State Border Capacity Database as of September 2000; Natural Gas Proposed Pipeline Construction Database, as of September 2000, compiled from Federal Energy Regulatory Commission filings and various industry news sources.

expand the area's interstate systems. Capacity constraint problems exiting the production areas have resulted in the region having the lowest average natural gas spot prices in the nation.

- **In the Midwest Region**, completion of the Alliance Pipeline (1,325 million cubic feet per day) in the last quarter of 2000 could lead to some short-term excess capacity during the upcoming heating season. All of the new interstate gas transmission capacity that was to have been completed in 2000 and would transport a large portion of the new supplies to the Northeast Region will not be in place when Alliance is placed in service. As a result, markets within the region should have little or no problem with natural gas supplies. On the other hand, the numerous current proposals to expand natural gas transmission capacity to growing regional markets, such as the Milwaukee, Wisconsin metropolitan area, could reflect the possibility of localized capacity constraint situations developing if demand growth outpaces the implementation of these proposals.

- **The Southeast Region** has no immediate pipeline capacity limitation problems. Florida, North Carolina, and South Carolina experienced significant growth in natural gas demand over the past decade but sufficient additional pipeline capacity has been installed to match the increase in demand. During the early 1990's, North Carolina and South Carolina, in particular, experienced some interstate pipeline curtailments in service during extremely heavy demand periods that occurred not only in the local area but also downstream in Northeast regional markets. The addition of new pipeline capacity and the integration of sizeable liquefied natural gas (LNG) peaking facilities in North Carolina have lessened, although not eliminated, the possibility of this occurring again.

- **Within the Southwest Region** there are no apparent interstate capacity constraint problems, although some local bottleneck problems on gathering or intrastate systems in the region could limit service to the interstate system during severe weather periods. The growing market for natural

gas in the region's electric generation sector may bring about some localized service limitations in the near term, but the growth in natural gas pipeline capacity in the region is keeping pace with this growing demand. On the interstate pipeline network, which exports regional supplies to other parts of the nation, selected systems have upgraded to enhance operations and system integrity. But because competition from Canadian supplies in the Midwest in particular has lessened the growth in demand for Southwest supplies, and hence, pipeline capacity serving that region, there has not been a need for any major expansion over the past decade. Indeed, one natural gas pipeline, Trunkline Gas System, extending from Louisiana to Illinois, is in the process of converting a portion of its system to a natural gas liquids line.

Recent Expansion Activity

Through this year and last, at least 61 natural gas pipeline construction projects will have been completed and placed in service in the United States: 35 in 1999 (Figure SR2) and 29 in 2000 (Figure SR3). Of these, 21 are new pipelines (10 of which are 100 miles or greater in length), while 40 are expansions to existing systems (including new laterals). The cumulative new installed pipeline capacity represented by these projects amounts to more than 12.1 billion cubic feet per day (Bcf/d) of added pipeline capacity (Figure SR4). 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.[4] Sixteen of the projects added capacity that increased interregional transmission capability by 6.1 Bcf/d:4,381 million cubic feet per day (MMcf/d) within and into the United States, 771 MMcf/d into Canada, and 893 MMcf/d into Mexico (Figure SR1).

Major Growth in Import Capacity

Much of the 1999-2000 pipeline construction has focused upon expanding the deliverability of Canadian gas to the U.S. Midwest and Northeast (Table SR1). The Maritimes and Northeast Pipeline system, which began service in early 2000, transports gas from the Sable Island field in eastern offshore Canada to New England, and together with the Portland Natural Gas Pipeline system, in service in early 1999, increased pipeline capacity into the Northeast by 578 MMcf/d. That is more than the combined 1998 annual natural gas consumption of five of the six New England States (excluding Massachusetts). More impressively, in October 2000, the Alliance Pipeline, which will be capable of transporting up to 1,325 MMcf/d of natural gas from British Columbia, Canada, to Illinois, is expected to be placed in service. These projects alone represent a 15-percent increase in overall natural gas import capacity since 1998: a 58-percent increase into the Central Region (most of which is destined for the Midwest) and a 23-percent increase into the Northeast Region.

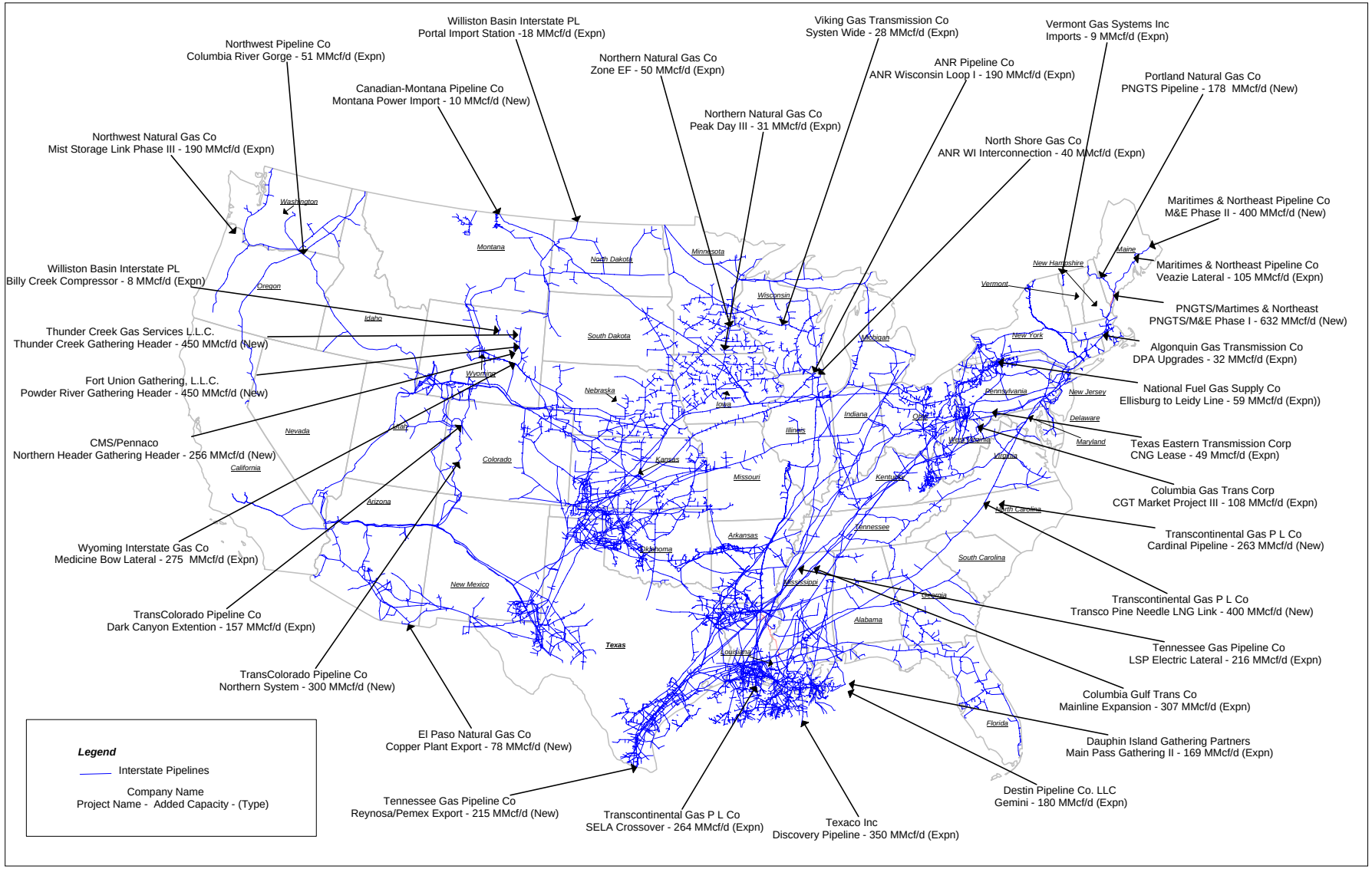
In conjunction with the Alliance pipeline, the new Vector Pipeline system (720 MMcf/d), is scheduled to become operational in late 2000 (Figure SR3). It will transport some of the Alliance Pipeline's supplies to eastern U.S. markets and back into Canada. Its route will go from the Chicago, Illinois area, eastward through the State of Michigan into Ontario, Canada, across Ontario to Lake Erie, and back into the United States. With an expansion of the Union Gas System of Ontario (Millennium West Project) and a Lake Erie crossing built by TransCanada Pipeline LTD (both 700 MMcf/d)), the postponed (until 2002) Millennium Pipeline Project (714 MMcf/d) sponsored by the Columbia Energy Group would then transport the gas across New York State to the New York City metropolitan area.

New Capacity To Support Coal-Bed Gas Development

Significant expansion also occurred in the Central Region as new pipeline capacity was installed in the Rocky Mountains area of northern Wyoming and southern Montana (the Powder River Basin, primarily). Three new major gathering (header) pipelines, with a total of 1,156 MMcf/d of capacity, were completed in late 1999-early 2000. Coal-bed methane gas wells are being brought on line rapidly, and new pipeline exit capacity is needed in the area. The Wyoming Interstate Pipeline Company, which is one of the principal transporters moving gas out of the area, increased its capacity by 36 percent (275 MMcf/d) in 2000 and has recently announced an additional 675 MMcf/d expansion slated for completion in 2001.

[4]The marketability of most proposed projects is tested through "open-season" exercises whereby potential customers have placed bids for future capacity on the proposed projects. The planned capacity of the projects usually reflects the results of these open seasons and indicates that, at least at the moment, local distribution companies and other major customers believe demand will grow sufficiently to support the incremental supplies destined for these markets. The FERC or other jurisdictional agencies will allow these projects to proceed only if sufficient binding commitments are entered into by future customers.

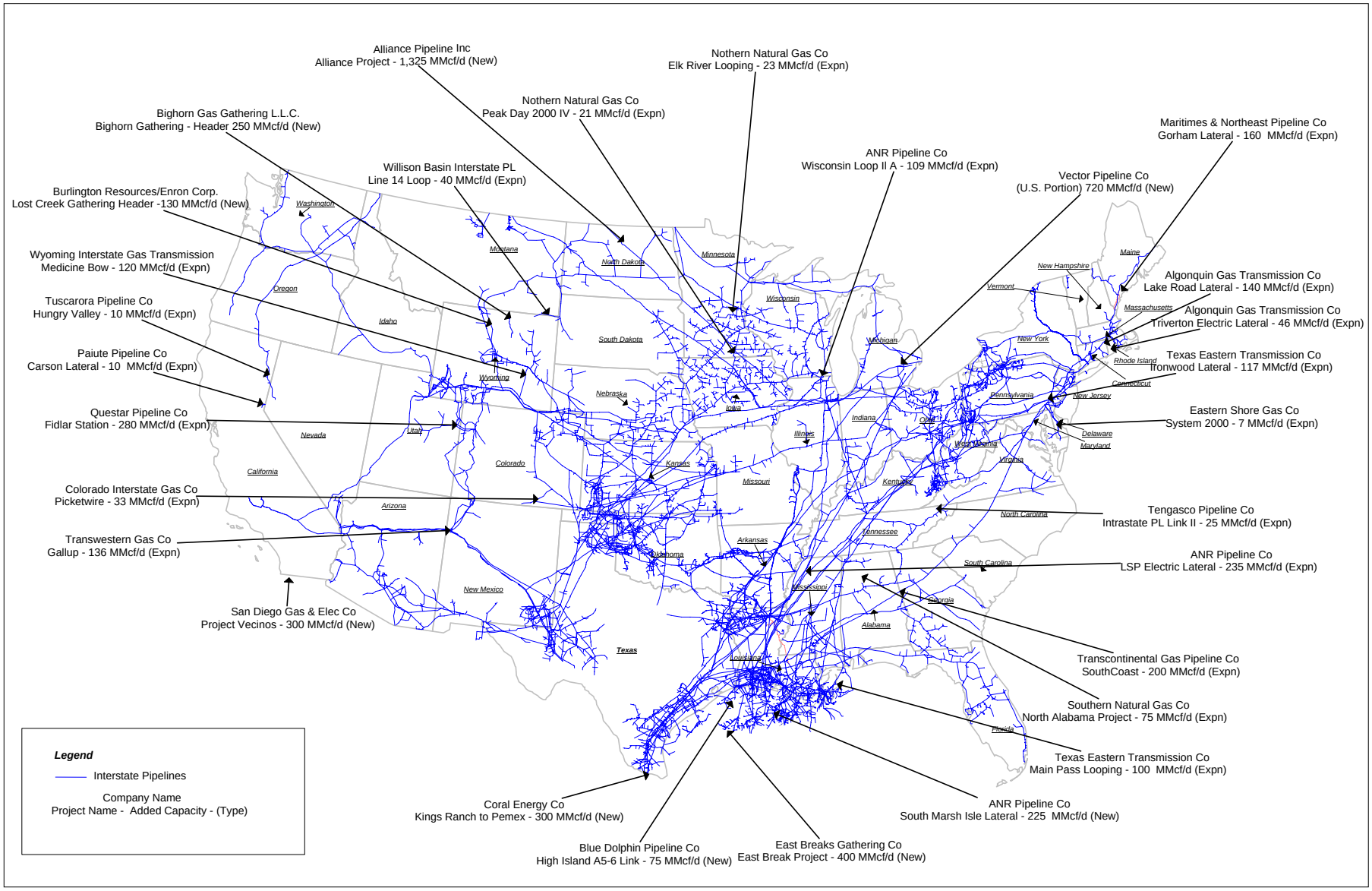
Figure SR2. U.S. Natural Gas Pipeline Projects Completed in 1999



Note: MMcf/d = Million cubic feet per day. Expn = Expansion.

Sources: Energy Information Administration (EIA), EIAGIS-NG Geographic Information System: Natural Gas Pipeline State Border Capacity Database as of September 2000; Natural Gas Proposed Pipeline Construction Database, as of September 2000, compiled from Federal Energy Regulatory Commission filings and various industry news sources.

Figure SR3. U.S. Natural Gas Pipeline Projects Completed, or Scheduled for Completion, in 2000



Note: MMcf/d = Million cubic feet per day. Expn = Expansion.

Sources: Energy Information Administration (EIA), EIAGIS-NG Geographic Information System: Natural Gas Pipeline State Border Capacity Database as of September 2000; Natural Gas Proposed Pipeline Construction Database, as of September 2000, compiled from Federal Energy Regulatory Commission filings and various industry news sources.

Also in the region, although not directly connected to Powder River Basin supplies, is the Transcolorado Pipeline system, completed in late 1999. This system extends from the Piceance Basin of northwestern Colorado through the San Juan Basin in southern Colorado/northern New Mexico to interconnections with El Paso Natural Gas Company and Transwestern Pipeline Company, allowing shippers to move up to 300 MMcf/d to California markets.

Improvements in Northeast Deliverability

More pipeline expansion projects were completed in the Northeast Region in 1999-2000 than in any other part of the United States, with 14 projects placed in service, accounting for 2.0 Bcf/d of additional deliverability. (This level of capacity increase was exceeded only in the Southwest Region.) Many of the projects improved deliverability within the local marketplace or addressed some bottlenecks that were limiting service in specific areas. However, the recent postponement of the Tennessee Gas Pipeline Company's Zone 6 expansion, which was to help improve available pipeline capacity between new delivery points off the PNGTS/Maritimes & Northeast system (in Massachusetts) and market areas in Connecticut and New York State, will leave a deficiency of 288 MMcf/d that was unanticipated for the upcoming heating season. Moreover, several other projects, which were also originally proposed for completion in 2000 and would have helped to meet the growing demand in the region, have been postponed for several years.

Intraregional Growth in the Southeast

The nine natural gas pipeline expansions completed in the Southeast Region in 1999-2000 were mainly to improve deliverability within the region, primarily in North and South Carolina, Georgia, and Alabama. About 1.9 Bcf/d of additional capacity was added in the region, which included enhancement of the Columbia Gulf Transmission system (307 MMcf/d) and completion of several Transcontinental Gas Pipeline system projects that totaled 863 MMcf/d of added system capacity. The Transcontinental projects included completion of the Cardinal intrastate pipeline and Pine Needle LNG link in North Carolina, and the Southcoast expansion of Transcontinental's mainline in Alabama and Georgia.

Minimal Growth in the Western Region

The least amount of pipeline development in 1999-2000 occurred in the Western Region with the completion of only five projects totaling 397 MMcf/d of new capacity within the region. This is not surprising since interstate capacity within and into the region increased significantly, by 52 percent, between 1990 and 1996 as access to Canadian supplies increased sharply and San Juan Basin suppliers gained greater access to California markets for natural gas.[5] There are indications, nonetheless, that the region will be needing additional pipeline capacity in the near future (see next section).

Support for Offshore Development

After several consecutive years of extensive development, installation of additional offshore Gulf of Mexico pipeline capacity decreased significantly in 1999-2000. In 1997 and 1998, for instance, 14 natural gas pipeline projects were completed that added a total of 6.4 Bcf/d of new pipeline capacity in the Gulf, most of which represented large capacity pipelines connecting onshore facilities with developing offshore sites, particularly in the deepwater areas of the Gulf. Still, during 1999-2000 eight significant projects were completed, adding 1.8 Bcf/d to the area's pipeline capacity. The majority (six) of these projects were built primarily to improve gathering operations and to link new and expanding producing platforms located in the Gulf with recently completed offshore mainlines directed to onshore facilities.

Export Capacity to Mexico

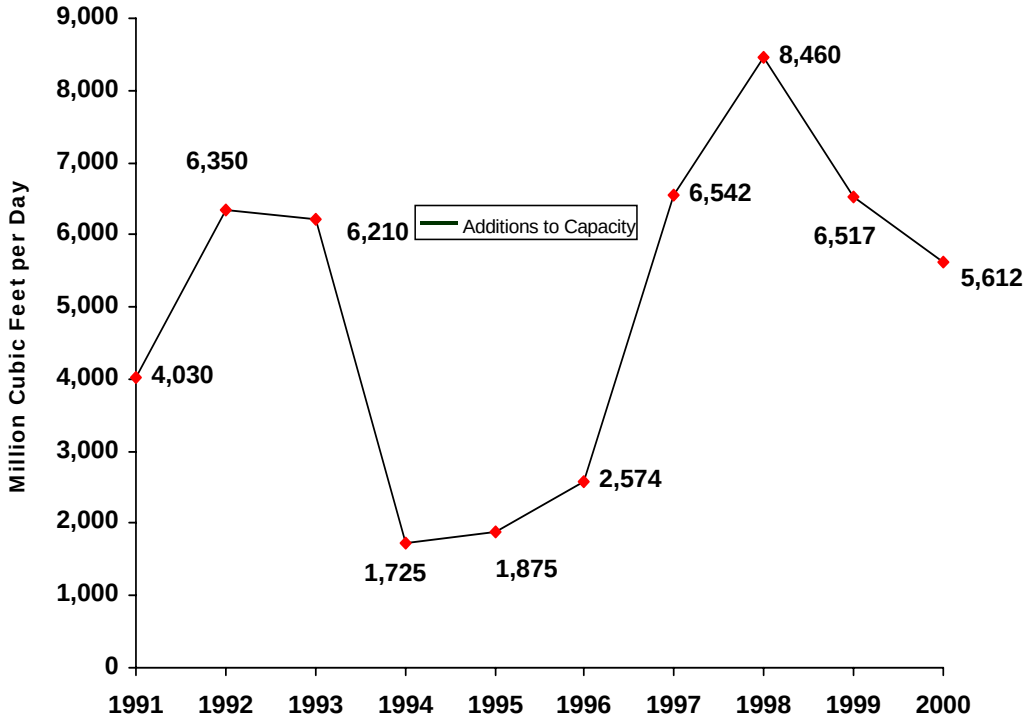
Natural gas export capacity to Mexico also increased during the period. Several projects, which improved pipeline export capacity to Mexico by 893 MMcf/d, were completed in 1999-2000. These projects accounted for the largest amount of new export capacity installed during the decade. Two of the projects, Tennessee Gas Pipeline Company's Reynosa/Monterrey project and Corel Energy Company's Kings Ranch/Pemex project, as bidirectional lines, also increased import capacity to the United States for the first time since the early 1980's (Figure SR1). The impetus for most of the increased export capacity has been to support mostly industrial and power generation customers located in the border area. By the end of 2000, export capacity to Mexico will stand at 2.1 Bcf/d.

Major Capital Investments in Capacity

By the close of 2000, an estimated $4.6 billion will have been spent on new pipeline and system expansions since January 1999 (Figure SR5). Of that, expenditures on new pipeline development and major extensions/laterals to existing systems will have

[5]See Energy Information Administration, *Natural Gas 1998: Issues and Trends*, DOE/EIA-0560 (98) Chapter 5 (Washington, DC, June 1999).

Figure SR4. Major Additions to U.S. Natural Gas Pipeline Capacity, 1991-2000



Sources: Energy Information Administration (EIA), EIAGIS-NG Geographic Information System: Natural Gas Pipeline State Border Capacity Database as of September 2000; Natural Gas Proposed Pipeline Construction Database, as of September 2000, compiled from Federal Energy Regulatory Commission filings and various industry news sources.

accounted for more than 70 percent of total expenditures, while expansions (loopings, added compression) to existing systems will account for the rest. In 1999, the largest level of expenditure was for projects terminating in the Northeast Region, $1.1 billion, while in 2000, projects terminating in the Midwest accounted for the largest share of expenditures, $1.8 billion.

Indeed, the largest portion of expenditures for pipeline development/expansions in 2000 will come from the big ticket Alliance Pipeline ($1.3 billion U.S. portion) development. The recent postponement until 2002 of several large Northeast projects has brought the original estimate of expenditures in 2000 down substantially. As a point of reference, at the beginning of 1999 the estimated expenditure figure for pipeline expansions during that year alone approximated $4 billion. But, because of several postponements and cancellations, by the end of the year only an estimated $2.2 billion was actually expended.[6]

Addressing Near-Term Pipeline Capacity Needs

The addition of new pipeline capacity during 1999 and 2000 improved the deliverability of the national natural gas pipeline network and, for the most part, helped minimize the possibility of service constraints occurring on the grid during this winter season. Nonetheless, additional capacity will be needed in the next few years to meet the increasing gas demand in many local areas, particularly in the Northeast, and to handle unexpected disruptions, especially during peak demand periods.

Capacity Tight in Some Areas of Northeast

For instance, while existing pipeline capacity in many parts of the Northeast Region is adequate to meet current demand and, indeed, in some areas (on some pipeline systems) is underutilized on average, during

[6]While 35 major pipeline development project were completed in 1999, adding about 6.6 billion cubic feet per day to national daily pipeline deliverability, the number fell significantly from the 49 completed in 1998 (when 8.5 Bcf/d of new capacity was installed). Of the 52 projects originally scheduled or proposed (by the end of 1998) for completion in 1999, 12 were postponed or delayed until 2000, 3 were put on-hold, and 4 canceled during 1999. Two additional projects were proposed, approved, and completed in 1999 under FERC blanket certificate authorization.

Table SR1. Interregional Pipeline Capacity, 1998 & Estimated 2000, Proposed 2001-2002, and 1999 Average Flows

Receiving Region	Sending Region	Capacity (MMcf/d)			Potential New Capacity Levels				Average Flow (MMcf/d)	Usage Rate On Active Systems [1] (percent)
					2001		2002			
		1998	Estimated 2000	Percent Difference	End of Year	To be Added	End of Year	To be Added	1999	1999
Canada	Central	66	66	0	66	0	66	0	--	--
	Midwest	2,638	3,329	26	3,329	0	3,329	0	1,456	60
	Western	0	51	--	241	190	241	0	--	--
Total into Region		2,704	3,446	27	3,636	190	3,636	0	1,456	60
Mexico	Southwest	1,090	1,605	47	1,605	0	1,645	40	187	19
	Western	70	448	540	553	130	553	0	22	15
Total into Region		1,160	2,053	77	2,158	130	2,198	40	209	14
Central	Canada	2,320	3,673	58	3,673	0	3,673	0	2,221	95
	Midwest	3,054	3,054	0	3,054	0	3,054	0	2,105	89
	Southwest	8,878	8,878	0	8,878	0	8,878	0	4,097	49
	Western	298	298	0	298	0	298	0	86	29
Total into Region		14,550	15,904	21	15,904	0	15,904	0	8,509	65
Midwest	Canada	3,238	3,267	1	3,267	0	3,267	0	2,849	87
	Central	11,542	12,867	11	13,062	195	13,062	0	7,750	67
	Northeast	2,090	2,090	0	2,090	0	2,090	0	657	32
	Southeast	9,821	9,821	0	9,566	-255	9,566	0	6,088	62
Total into Region		26,691	28,045	5	27,985	-60	27,985	0	17,344	65
Northeast	Canada	2,431	2,956	23	4,070	1,114	4,290	220	2,158	83
	Midwest	4,887	4,887	0	4,887	0	5,887	1,000	3,290	76
	Southeast	5,173	5,480	6	5,480	0	5,710	230	4,045	74
Total into Region		12,491	13,323	7	14,437	1,114	15,887	1,450	9,493	77
Southeast	Northeast	532	532	0	532	0	532	0	13	35
	Southwest	21,002	21,311	1	21,056	-255	21,286	230	14,251	67
Total into Region		21,534	21,844	1	21,589	-255	21,819	230	14,264	67
Southwest	Central	2,424	2,604	7	2,604	0	2,604	0	1,240	54
	Mexico	350	565	61	565	0	565	0	149	43
	Southeast	405	405	0	405	0	405	0	16	23
Total into Region		3,179	3,574	12	3,574	0	3,574	0	1,405	52
Western	Canada	4,412	4,412	0	4,552	140	4,552	0	3,331	78
	Central	1,219	1,219	0	1,219	0	1,469	250	762	98
	Southwest	5,351	5,487	3	5,567	80	5,567	0	2,949	55
Total into Region		10,982	11,118	1	11,338	220	11,588	250	7,043	68
Total Within Lower 48 States		**89,427**	**93,808**	**5**	**94,827**	**1,019**	**96,757**	**1,930**	**59,638**	**66**

[1]Usage Rate shown may not equal the average daily flows divided by capacity because in some cases no throughput volumes were reported for known border crossings. This capacity was not included in the computation of usage rate.

MMcf/d = Million cubic feet per day. -- = Not applicable.

Note: Capacity decrease of 255 Mmcf/d in 2001 reflects the probable conversion of one of three parallel (looped) natural gas lines on the Trunkline Gas Company system to a refined petroleum products line.

Sources: Energy Information Administration (EIA). **Pipeline Capacity:** EIAGIS-NG Geographic Information System, Natural Gas Pipeline State Border Capacity Database as of September 2000. **Average Flow:** *Natural Gas Annual 1999*. **Usage Rate:** Office of Oil and Gas, derived from Pipeline Capacity and Average Flow.

peak periods most service providers are heavily, if not fully, utilized. Potential capacity problems lie in several specific areas. For example, in the New York City area, natural gas pipeline capacity appears to be less than is necessary to meet peak demands and several constraint points have developed in recent years. Proposals to relieve these problems have been put forth but their possible implementation is several years away. For instance, the Cross Bay Pipeline, a joint project between Duke Energy Corporation and The Williams Companies (Transcontinental Gas Pipeline Company), would increase natural gas pipeline capacity into New York City and Long Island by 125 MMcf/d (currently about 650 MMcf/d is available). Only recently filed with the Federal Energy Regulatory Commission (FERC), its proposed earliest in-service date is 2002.

Resolution of the local problem also will necessitate an increase in interstate pipeline capacity feeding into the New York City vicinity, through expansions along existing routes or installation of a new pipeline route(s). The Independence (1,000 MMcf/d), Millennium (714 MMcf/d), and a proposed expansion of the Iroquois Pipeline System (Eastchester expansion, 160 MMcf/d) should provide the additional capacity by 2002, but incremental growth in demand also might be met by less extensive expansions on the existing portions of the Transcontinental Gas Pipeline and Texas Eastern Pipeline systems serving the region.

Similarly, and related to circumstances in the New York city area, the Leidy area of north central Pennsylvania (a major hub with numerous interconnections among major interstate natural gas pipelines) could become a potential constraint point for pipeline gas flowing to the East Coast, particularly the northern New Jersey, New York City area. Current pipeline capacity in the area appears sufficient, but growing demand for gas trading and transport capacity probably will require some expansion of existing pipelines in the area.[7] The Independence Pipeline and Transco's Market-link projects both include significant development of capacity in the area, while Tennessee Gas Pipeline and National Fuel Gas Supply companies have also indicated tentative plans to expand segments of their respective systems in the area.

The Boston metropolitan complex is another growing capacity constraint area. Demand in the area, especially from developers of gas-fired power generation plants, has been growing and is expected to grow more rapidly over the decade. Currently, most of the gas flowing on the recently completed PNGTS/Maritimes & Northeast pipeline system from Canada to Massachusetts,[8] about 580 MMcf/d, flows through to southern New England[9] where it interconnects with the Tennessee Gas Pipeline system. The delayed Tennessee Eastern Express project will expand the area's compression and systems capabilities by 288 MMcf/d on June 1, 2001. Completion of this project should help alleviate some of the marginal capacity constraint problems that have developed along this route in recent years.

Further in the future, in the same area, the Algonquin Pipeline Company (Duke Energy) has proposed its HubLine, which would be capable of bringing up to 600 MMcf/d to the Boston area from interconnections with a proposed extension (M&NE Phase III project) of the Maritimes & Northeast Pipeline Company system. Although its original planned service date was announced as being 2000-2001 that is an unlikely possibility at this time. The M&NE extension is not scheduled to be completed before late 2002. The HubLine would serve several proposed new power plants in the Boston area and also provide expanded service to existing power plants in the region.

More Exit Capacity for the Central Region

Meanwhile, the Central Region, specifically the Rocky Mountains area, suffers from a lack of receipt or pipeline exit capacity at expanding production areas rather than a lack of deliverability. Rising production levels in Wyoming's Powder River area, as well as in several other Rocky Mountain production zones, are placing pressure on local pipeline systems and regional interstate pipelines to expand their capabilities to move more gas to nearby and distant markets.

In 1999-2000, while several major natural gas gathering system projects were completed in the basin, only 755 MMcf/d more interstate capacity was installed. As a consequence, load factors on local interconnecting interstate pipelines are increasing which, in turn, is stimulating proposals to expand downstream systems and to develop several new pipelines in the region. For instance, the Trailblazer Pipeline System, which connects with Wyoming Interstate Pipeline in northeast Colorado, has recently announced plans to increase its mainline capacity by as much as 300 MMcf/d by 2002 (currently 605 MMcf/d) to accommodate the increase in demand for regional capacity.

Colorado Interstate Gas Company and Williams Gas Pipeline-Central have announced that they each plan to develop new (though similar) pipeline routes from supply interconnections in northeast Colorado to interconnections with affiliated and other interstate systems in southwestern Kansas. These links would serve the growing local natural gas market and provide alternative interstate routes to the Midwestern

[7]Major segments of the Columbia Gas Transmission Company, CNG Transmission Company, National Fuel Gas Supply Corporation, Tennessee Gas Pipeline Company, Texas Eastern Transmission Company, and Transcontinental Gas Pipeline Company systems traverse the Leidy, Pennsylvania area.

[8]The jointly owned PNGTS/Maritimes & Northeast pipeline runs from Wells, Maine, to Dacut, Massachusetts, where it delivers most of its current gas flow. The PNGTS/M&E pipeline receives its gas from the Portland Natural Gas Transmission Pipeline (178 MMcf/d) and the Maritimes & Northeast Pipeline (400 MMcf/d). The former imports western Canadian gas via TransCanada and TransQuebec & Maritimes pipeline systems at the New Hampshire border, while the latter imports Sable Island natural gas from its Canadian partner at the Maine/New Brunswick border.

[9]Several planned gas-fired power generation plants in Maine that were to be served by the new capacity entering the state have yet to be built.

marketplace.[10] Customers in the Midwest and East comprise a ready market for the relatively low-price gas of the Rocky Mountains area.

Western Region is Geared for Expansion

A significant portion of Rocky Mountain natural gas supplies (Colorado, Wyoming, and Utah) is also shipped to the enhanced oil recovery (EOR) markets in southern California and to end-use markets in the Las Vegas area in Nevada. Due to the large demand in these markets, the primary transporter on this route, the Kern River Gas Transmission Company pipeline, is very heavily utilized throughout the year. Still, there is growing interest in directing some of the expanding Powder River Basin production to the California / Nevada marketplace as well. There has not been any significant expansion on any of the several pipeline systems that transport natural gas from the Rocky Mountains area and the Permian (Texas) and San Juan basins (Colorado and New Mexico) into the Western states since 1993.[11] But there are signs that during peak-demand periods additional pipeline capacity will soon be needed to handle growing demand swings for natural gas in the region.

Reacting to market indicators, Kern River Gas Transmission Company has proposed a system expansion of 122 MMcf / d from Wyoming to California for 2002 and is testing market demand (through open-season exercises) for a further expansion of 380 MMcf / d in 2003. It is also studying the feasibility of building an extension to its system, which now ends in Kern County, California, to the city of Long Beach, California. Currently underway is the development of an additional natural gas pipeline to serve the region, the 90 MMcf / d Questar Pipeline Company Southern Trails (converted oil) pipeline system from the San Juan Basin area to the Los Angeles, California, market.[12] It is scheduled for completion in 2001.

The need for improved capability may not rest entirely on the interstate pipeline system. For instance, although the physical capabilities of the delivery point at El Paso Natural Gas's Ehrenberg, Arizona (southern system) station could permit 1,410 MMcf / d to be delivered, the Southern California Gas Company (SoCal) system is capable of receiving only 1,210 MMcf / d. Expansion of the SoCal system, and perhaps the Pacific Gas & Electric system that receives supplies in southern California, may also be necessary if California's natural gas markets continue to grow.

Midwest Capacity Meets Current Needs

In contrast, in the Midwest Region, there are not any major bottlenecks or capacity constraint points currently observable. In fact, since 1990, the level of pipeline capacity into the region has increased by 16 percent, a percentage growth exceeded only by that into the Northeast. While natural gas consumption has grown steadily during the past decade, new pipeline construction has kept pace in the region. Indeed, during the past several years the completion of several major projects (for example, Northern Border's 700 MMcf / d expansion completed in 1998 and Viking Gas Transmission's 90 MMcf / d in 1998-99) has kept supply and demand in the region relatively in balance (some would argue that a small capacity surplus already exists in some areas of the region). However, while the region will see a major installment of new service this year with the completion of the Alliance Pipeline, the Northern Border system expansion from Iowa to Illinois (195 Mmcf / d) and extension of its service territory into Indiana (545 MMcf / d), has been delayed till 2001.

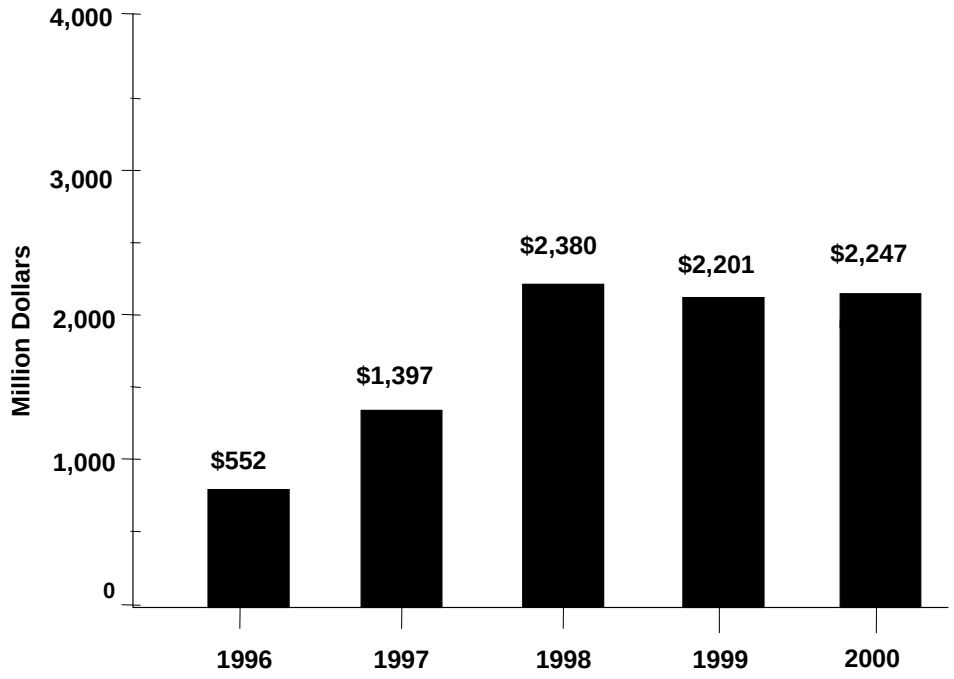
The growth in natural gas consumption in the region, for the most part, has been met by an increase in capacity and gas imported from Canada. These pipeline routes have experienced very high capacity usage levels (90+ percent) year round, while the interstate pipelines transporting gas from the Southwest Region experienced a decline in usage during the first two-thirds of the decade. In the past several years, however, because of an increased demand for natural gas and a narrowing of price differences between U.S. and Canadian natural gas prices, lines from the Southwest

[10]The Colorado Interstate Gas COCO project would consist of a 400 mile, 500 MMcf / d pipeline, while the Williams' Frontier pipeline project would be 320 miles long and capable of carrying 526 MMcf / d. Both projects could be completed in 2003.

[11]Except for the interstate Mojave and Kern River Gas Transmission systems, which primarily serve the cogeneration / power plant and enhanced oil recovery (EOR) markets in southern California, most gas pipeline transportation service within California is dominated by Pacific Gas and Electric Company and Southern California Gas Company, two of the largest local distribution companies (LDCs) in the nation. The two companies play dual roles as local distributors for their core customers and open-access transporters for major shippers, such as industrial users and electric utilities, within their respective service territories. They also serve as intrastate pipelines with interconnections to the other LDCs serving the state. Southern California Gas Company provides distribution service in southern California, including transport of supplies to San Diego Gas & Electric Company and Southwest Gas Company, a major LDC in the area. Pacific Gas and Electric claims northern California as its service territory but acts also as a vehicle to move some Canadian gas supplies to southern California.

[12]Also, the El Paso Company, which delivers West Texas and San Juan Basin natural gas to the Arizona / California market, has recently filed with FERC for approval of a plan to convert and integrate an unused oil pipeline into its existing southern system. While the project will enhance the system's overall integrity and efficiency, it entails no increase in capacity.

Figure SR5. Natural Gas Pipeline Construction Expenditures, 1996-2000 (Estimated)



Note: Only the cost of the U.S. portion of the Alliance Pipeline and the Vector Pipeline Projects were included in the total expenditures for 2000. Including the Canadian portion of these projects would increase expenditures by $1.6 billion.

Sources: Energy Information Administration (EIA), EIAGIS-NG Geographic Information System: Natural Gas Pipeline State Border Capacity Database as of September 2000; Natural Gas Proposed Pipeline Construction Database, as of September 2000. compiled from Federal Energy Regulatory Commission filings and various industry news sources.

are once again becoming more heavily utilized. Still, on routes into the Midwest region, there appears to be available capacity and these lines are not expected to be capacity constrained in any measure over the next several years.

The currently planned new capacity from Canada into the Midwest could possibly exceed the projected natural gas needs of the region. Indeed, several projects have been proposed that would ship up to 1,450 MMcf/d of the natural gas coming into the Midwest (or the equivalent of about 77 percent of the proposed level of new capacity into the region) to the Northeastern United States and/or (Ontario) Canada. Part of this 1,450 MMcf/d export capacity will be supported by expected increases in flows (and some capacity expansions) from pipeline routes currently delivering gas from the U.S. Southwest (Natural Gas Pipeline Company of America, Panhandle Eastern Pipeline Company, ANR Pipeline Company, Midwestern Gas Transmission Company and Trunkline Gas Company). In the Midwest Region, the emphasis currently is upon proposals to transship and/or redistribute the nearly 800 billion cubic feet (Bcf) of natural gas a year that could flow on the additional pipeline capacity now directed into the northern Illinois area by the Northern Border Pipeline system extension (1998) and the new Alliance Pipeline system (2000). For instance, currently there are at least five proposals to move some of the new pipeline supplies to the southern Wisconsin (Milwaukee area).[13]

[13]The Horizon (370 MMcf/d), Guardian (730 MMcf/d), Lake Michigan (up to 1,400 MMcf/d), and ANR Wisconsin Loop (270 MMcf/d) are the major proposals currently approved or awaiting regulatory review. At this point in time it is uncertain how many of these proposals will actually be implemented. Not all will be. The cumulative capacity represented in these proposals total about 125 percent more gas supplies than will be available on the new pipelines supplying the region.

Outlook

Absent an extremely cold upcoming heating season and other unforeseen situations (see box), the nation's natural gas interstate pipeline infrastructure appears more than adequate to meet the differing regional market demand requirements that are likely to be placed upon it. Over the past decade, a number of new pipelines have been built to access new production areas and new markets, and a large number of existing pipelines have been expanded to increase the level of service to an expanding customer base.

By the end of 2000 interregional natural gas pipeline capacity will have grown by 27 percent (20 Bcf/d) since 1990, with 5 percent of the additions installed since 1998 (Table SR1). At least half of that new capacity was built to accommodate shifts in supply sources. Indeed, except during periods of very extreme weather conditions, or disruptions caused by isolated pipeline outages, there has not been any sustained disruptions of the network since the mid 1970's.

Beyond what has already been proposed to be built, new pipeline development can be expected where new supply sources are being tapped, such as deep-water development in the Gulf of Mexico and expanding growth in coal-bed methane production in several areas of the country. In addition, since almost all of the many planned new electric power plants throughout the country are slated to be gas-fired, new lines and additional capacity will have to be developed to accommodate these as well. All of this potential need provides a favorable outlook for new natural gas pipeline development over the near term. And, based upon past experience, there is no reason to believe that the U.S. natural gas pipeline industry will not be capable of financing and installing the additional infrastructure needed to accommodate the anticipated growth.

Possibility Becoming Reality - Unanticipated Outages

An example of how quickly a balanced situation can be reversed occurred on August 19, 2000, when an explosion disrupted service on the southern portion of the El Paso Natural Gas Company system. Three lines (two 30-inch and one 26-inch pipeline) at the Pecos River crossing, located in the southeast corner of New Mexico, were placed out of commission when one of the 30-inch lines blew and the other two lines were shut down because of peripheral damage. As a result, 1.2 Bcf/d, out of a normal 2.0 Bcf/d (or about 6 percent of the total natural gas pipeline capacity entering Arizona and California) of natural gas flowing along El Paso's southern route to its Arizona and California markets, was significantly affected for several weeks (Two months after the incident the most severely affected pipeline segment had yet to be replaced. Nevertheless, flow levels at the site are reported running at about 85 percent of previous levels). The loss was a major shock to supplies of natural gas in the Western Region, particularly in California, Arizona, and New Mexico.

The reaction to this problem demonstrated the potential capability of the network to respond to supply disruptions with transportation adjustments and routing alternatives to accommodate a sudden drop in supply from any single source. With the disruption to flow along one segment of the El Paso system, gas prices in southern California soared at least temporarily, but a combination of market adjustments avoided widespread shortages. The system relied on alternative transportation, gas from storage, or other non-natural-gas remedies such as switching to other fuels to supplement the loss of natural gas supplies.

For instance, during the disruption, a portion of incremental supplies for customers in the southern portion of California came from storage facilities located in northern California in the San Francisco area. These facilities, with interconnections to the PG&E system (three of the five facilities are owned by PG&E), were used to increase supplies to the local area, displacing supplies that normally would flow on the southern PG&E system that receives gas from Transwestern and El Paso pipeline systems at the southern California border. Access to storage supplies in southern California and western New Mexico also helped mitigate the situation.

Although there is no guarantee that the network and supply system will always be capable of meeting requirements under all scenarios, it does suggest a resiliency in the system, at least in the short term, to deal with major disruptions.