

Changes in U.S. Natural Gas Transportation Infrastructure in 2004

This report looks at the level of growth that occurred within the U.S. natural gas transportation network during 2004. In addition, it includes a discussion and an analysis of recent gas pipeline development activities and an examination of additional projects proposed for completion over the next several years. 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.

Expansion of the U.S. natural gas transmission network slowed in 2004, both in terms of added transportation capacity and new pipeline mileage. Only about 1,450 miles of pipeline and 7.7 billion cubic feet per day (Bcf/d) of natural gas pipeline capacity were added to the national gas transmission grid during 2004 compared with 2,243 miles and 10.4 Bcf/d of capacity in 2003 (Table 1).¹ The amount of incremental capacity in 2004 was the least since 1999 when only 6.5 Bcf/d was added.

During 2004, at least 41 natural gas pipeline projects, of varying sizes, were completed in 32 States and the Gulf of Mexico (Figure 1, Table 2). Of those, 16 were expansions on existing pipeline systems or segments. The other 25 included 16 system extensions or laterals associated with existing pipelines, 8 new pipeline systems, and 1 oil pipeline conversion. Expenditures for natural gas pipeline development amounted to less than \$2.2 billion in 2004, well below the \$3.6 billion spent in 2003 and the \$4.4 billion spent in 2002.²

But 2004 appears to have been a temporary low in the development cycle for the natural gas pipeline grid, which has grown significantly over the past decade. The current inventory of proposed pipeline projects indicates that capacity additions will increase again in 2005, although fewer miles of new pipe will be installed than in 2004. Beyond 2005, however, proposed capacity additions in 2006-07 could result in record additions in those years (Figure 2), as numerous projects are planned in conjunction with proposed U.S. liquefied natural gas (LNG) facilities.

Highlights

While the number of pipeline projects completed in 2004 was about 20 percent less than in 2003, there were several major developments in 2004 worthy of note. For instance:

¹ In this review, project costs, capacity volumes, and mileage are based upon figures quoted in application filings with the Federal Energy Regulatory Commission (FERC) or State agencies, or cited in company press releases or trade press sources. Because these figures may be revised and/or adjusted as a project progresses, any volumes/mileage/costs cited herein may not agree with those in the approval certification or upon project completion.

² See Energy Information Administration, *U.S. Natural Gas Pipeline and Underground Storage Expansions in 2003* (September 2004), http://www.eia.doe.gov/pub/oil_gas/natural_gas/feature_articles/2004/Pipestor04/ngstorpipe04.htm

- **Six new pipeline systems were placed in operation in the deepwater Gulf of Mexico, accounting for 1,800 million cubic feet per day (MMcf/d) of new transportation capacity** (Table 2). Built to support natural gas transportation from several large new production fields that came on line during the year, these systems accounted for 66 percent of the total new capacity in the Southwest region and 23 percent of the U.S. total.
- **The Cheyenne Plains Pipeline, a 560-MMcf/d extension of the Colorado Interstate Gas system, was placed in operation in December 2004.** Designed to provide natural gas transportation from the Cheyenne Hub in northeast Colorado to interconnections with the Northern Natural Gas Company and Natural Gas Pipeline Company of America systems in southwest Kansas, Cheyenne Plains is the latest in a series of realized and proposed pipelines seeking to provide shippers of expanding Wyoming/Colorado production greater access to Midwestern markets.
- **A 320-MMcf/d expansion of the southern leg of the El Paso Natural Gas pipeline system was completed in May 2004,** which increased service to the growing Arizona power market and deliveries to the North Baja Pipeline. This expansion was accomplished by adding five new, and expanding four existing, compressor stations located on the south system's Line 2000 (converted from an oil pipeline in late 2002).
- **Several new non-interstate pipelines were installed in Texas in 2004 to increase transportation services between the growing East Texas production fields and interstate and non-interstate pipeline interconnections within the State.** Energy Transfer Company's 500-MMcf/d Bossier Pipeline now provides greater transportation services between the Fort Worth Basin and the Katy area of East Texas, while Kinder Morgan's 170-MMcf/d Rancho Pipeline, increased service to the Austin, Texas, area.

Table 1. Recent and Proposed Regional Natural Gas Pipeline Additions and Expansions

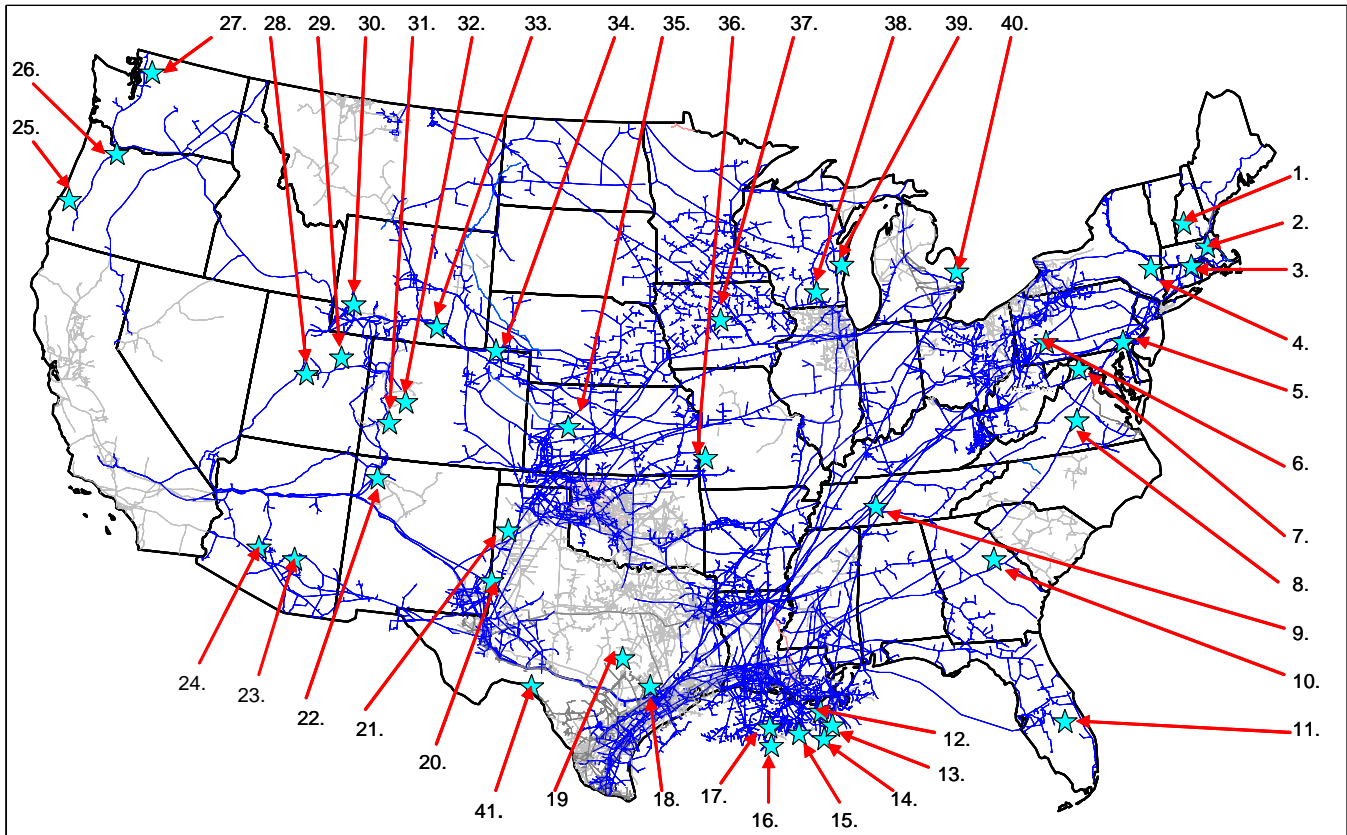
Region (in or to)	Number of Projects					Added Capacity (MMcf/d)					Added Mileage					Costs (\$Millions)				
	Actual		Proposed ¹			Actual		Proposed ¹			Actual		Proposed ¹			Actual		Proposed ¹		
	2003	2004	2005	2006	2007	2003	2004	2005	2006	2007	2003	2004	2005	2006	2007	2003	2004	2005	2006	2007
Central	12	10	6	5	8	1,162	1,424	1,977	2,235	2,443	409	489	253	399	426	182	550	391	595	333
Midwest	4	3	6	3	1	651	1,063	599	380	500	129	51	51	35	0	132	90	103	51	30
Northeast	8	8	5	10	8	1,318	837	620	2,402	2,396	82	116	22	595	207	346	543	74	1,038	599
Southeast	9	3	2	3	10	1,532	545	425	380	6,197	463	58	113	36	343	905	136	240	34	428
Southwest	6	11	13	14	5	2,480	2,744	4,357	7,076	6,600	264	568	447	716	200	266	465	539	955	338
Western	6	5	1	1	4	2,368	1,023	502	1,500	2,820	885	168	88	35	1,061	1,693	342	31	50	1,429
Mexico/Canada	4	1	0	2	0	912	25	0	1,000	0	11	9	0	35	0	41	2	0	2	0
U.S. Total	49	41	33	38	36	10,423	7,661	8,480	14,973	20,956	2,243	1,459	974	1,851	2,237	3,565	2,128	1,378	2,725	3,157

¹ Only projects that were approved or under regulatory review prior to January 1, 2005, and which have a proposed completion date in 2005 are included under Proposed 2005. Projects that have yet to be filed for regulatory review but which have a proposed completion date in 2006 or 2007 are included under Proposed for those years. MMcf/d = million cubic feet per day.

Notes: Excludes projects on hold as of December 2004. In the table, a project that crosses interregional boundaries is included in the region in which it terminates. Offshore Gulf of Mexico projects are included in the Southwest region. Totals for the year 2004 may not agree with those in Table 2 due to independent rounding.

Source: Energy Information Administration, Office of Oil and Gas, Natural Gas Pipeline Construction Database.

Figure 1. Locations of Natural Gas Pipeline Construction Projects Completed in 2004
(Map keyed to Table 2)



Source: Energy Information Administration, Office of Oil and Gas, Natural Gas Pipeline Construction Database.

Table 2. Natural Gas Pipeline Construction Projects Completed in 2004, by Terminating Region
(Map Key references Figure 1)

Ending Region & State	Begins in State -- Region	Map Key	Pipeline/Project Name	FERC Docket Number	Type of Project	In Service Date	Estimated Cost (\$Millions)	Miles	Additional Capacity (MMcf/d)	
Northeast										
NH	NH	Northeast	1	KeySpan's Concord-Tilton Expansion	Non-interstate	Extension ¹	10-Nov-04	3.9	7	50
MA	MA	Northeast	2	Algonquin's Everett Alternative Project	CP04-67	Compression ²	01-Oct-04	11.5	0	60
CT	CT	Northeast	3	Yankee Gas' NEGASCO Interconnect	CP04-2	Lateral ³	01-Nov-04	5.0	9	5
NY	ON	Canada	4	Iroquois' Eastchester Marine Expansion	CP00-232	Extension⁴	05-Feb-04	334.0	37	230
DE	PA	Northeast	5	Eastern Shore Gas' 2003-5 Expansion Phase 2	CP03-80	Looping ⁵	14-Dec-04	2.9	3	5
PA	PA	Northeast	6	Texas Eastern Transmission's Dominion Expansion	CP03-43	Looping	01-Nov-04	82.9	35	217
VA	WV	Northeast	7	Dominion's Mid-Atlantic Expansion	CP03-41	Compression	01-Nov-04	78.0	0	217
VA	AL	Southeast	8	Transcontinental Gas' Momentum Phase II	CP01-388	Looping⁴	01-Feb-04	24.8	26	53
							Subtotal	542.9	116	837
Southeast										
TN	MS	Southeast	9	Texas Eastern Transmission's M-1 2004 Expansion	CP02-381	Looping ⁴	01-Nov-04	27.0	7	57
GA	AL	Southeast	10	Southern Natural Gas' South System Expansion II	CP02-1	Looping ⁴	01-May-04	95.6	46	138
FL	FL	Southeast	11	Gulfstream's Martin Expansion	CP04-9	Extension	01-Dec-04	13.6	5	350
							Subtotal	136.2	58	545
Southwest										
GM	GM	Offshore	12	Tarantula Gathering Pipeline	Non-interstate	New System	01-Apr-04	3.0	1	75
GM	GM	Offshore	13	FrontRunner Gathering Pipeline	Non-interstate	New System	01-Dec-04	40.0	15	100
GM	GM	Offshore	14	Anaconda Gathering System	Non-interstate	New System	01-Nov-04	68.0	75	400
GM	GM	Offshore	15	Cleopatra Gathering System Phase 1	Non-interstate	New System	15-Dec-04	163.0	94	500
GM	GM	Offshore	16	Magnolia Gathering System	Non-interstate	New System	01-Oct-04	47.0	50	275
GM	GM	Offshore	17	GulfTerra Phoenix System	Non-interstate	New System	01-Apr-04	66.0	76	450
TX	TX	Southwest	18	Energy Transfer Bossier Pipeline	Non-interstate	New System	01-May-04	40.0	78	500
TX	TX	Southwest	19	Kinder Morgan Rancho Pipeline	Non-interstate	Conversion	13-Jul-04	30.0	177	170
NM	NM	Southwest	20	Pinnacle "Hobbs" Lateral Expansion	CP03-323	Looping	01-Apr-04	0.6	2	124
TX	NM	Southwest	21	Transwestern Gas' Rewheel Project	CP05-04	Compression	19-Nov-04	0.3	0	10
NM	CO	Central	22	El Paso Natural Gas' Bondad Expansion	CP03-57	Compression	01-Apr-04	7.3	0	140
							Subtotal	465.1	568	2,744
Western										
AZ	AZ	Western	23	Salt River Group's (SRG) Santan Lateral	Non-interstate	Lateral	01-Aug-04	31.0	36	200
CA	TX	Southwest	24	El Paso Natural Gas' Power-Up Expansion	CP03-1	Compression	01-May-04	173.0	0	320
OR	OR	Western	25	Coos Bay Project	Non-interstate	New System	31-Dec-04	28.0	72	70
OR	OR	Western	26	South Mist Storage Link Phase V	Non-interstate	Lateral	01-Nov-04	85.7	50	320
WA	WA	Western	27	Northwest Pipeline's Everett Delta Lateral	CP01-49	Lateral	01-Nov-04	24.6	9	113
							Subtotal	342.3	168	1,023
Central										
UT	UT	Central	28	Questar's Tap Line (JTL) 113 Expansion	CP04-335	Lateral	10-Dec-04	15.6	13	190
UT	UT	Central	29	Wolf Point Pipeline	Non-interstate	Lateral	01-Nov-04	8.0	13	100
WY	WY	Central	30	Jonah Phase III Expansion	Non-interstate	Compression	1-May-04	10.0	0	100
NM	CO	Central	31	TransColorado's 2004 Expansion	CP04-12	Compression	01-Sep-04	33.0	0	125
CO	CO	Central	32	Rocky Mountain Pipeline's Montrose Extension	Non-interstate	Extension	24-Jun-04	20.0	58	14
WY	WY	Central	33	Wyoming Interstate Gas' Echo Springs Line	CP04-90	Lateral	01-Nov-04	11.6	5	110
NE	CO	Central	34	Kinder Morgan's Huntsman Expansion	CP03-39	Compression	01-Jun-04	26.7	1	62
KS	CO	Central	35	Colorado Interstate Gas' Cheyenne Plains Pipeline	CP03-302	Extension	01-Dec-04	410.0	380	560
MO	KS	Central	36	Southern Star Central' Southwest Missouri Expansion	CP02-416	Looping	01-Oct-04	10.5	16	67
IA	IA	Central	37	Northern Natural Gas' Pleasant Hill Project	CP04-28	Lateral	01-Nov-04	4.1	3	96
							Subtotal	549.4	489	1,424
Midwest										
WI	WI	Midwest	38	ANR Pipeline's WestLeg Expansion	CP02-434	Looping	01-Oct-04	42.1	33	220
WI	WI	Midwest	39	We Energy's Port Washington Lateral	Non-interstate	Lateral	6-Dec-04	46.0	17	143
MI	MI	Midwest	40	Columbus 3 Storage Pipelines	Non-interstate	Laterals	01-Nov-04	2.0	2	700
							Subtotal	90.1	51	1,063
Mexico										
MX	TX	Southwest	41	West Texas Gas' Acuna Export Crossing	CP02-97	Lateral	14-Oct-04	1.5	9	25
							Subtotal	1.5	9	25
							Total	2,127.5	1,459	7,661

¹ An extension refers to the building of a new section of pipeline to a service area beyond the original termination point of the transmission system.

² A compression-only project may consist of placing additional compressor units at an existing station, the upgrading of existing units, or adding one or more new compressor stations to an existing system.

³ A lateral refers to a new pipeline segment built to interconnect a new customer to a local major pipeline or to a local distribution company (LDC) mainline.

⁴ Also Included an increase in compression.

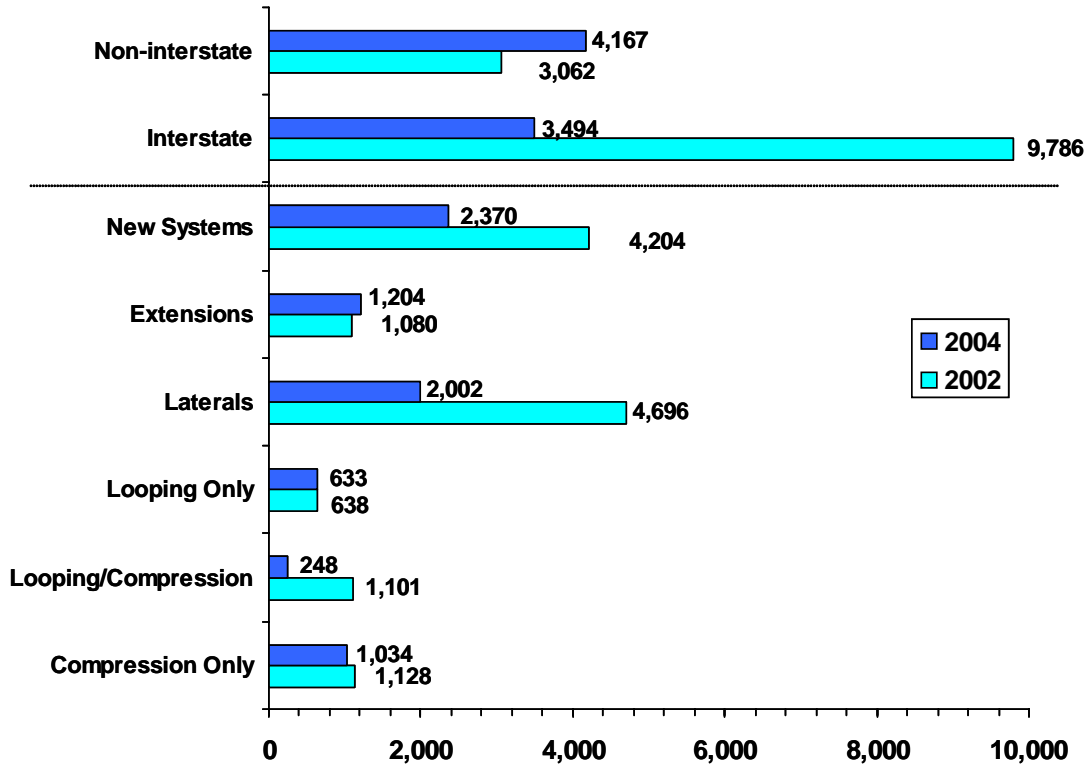
⁵ Looping refers to the installation of another segment of pipeline parallel to an existing pipeline segment and is used as a means of quickly increasing overall pipeline capacity and/or increasing line-packing (temporary storage) on a pipeline system.

MMcf/d = million cubic feet per day.

Notes: Interregional projects are in **bold print**. Excludes projects on hold as of December 2004. In the table, a project that crosses interregional boundaries is included in the region in which it terminates. Offshore projects are included in the Southwest region. NEGASCO = New England Gas Company. GM = Gulf of Mexico. Totals may not agree with those in Table 1 due to independent rounding.

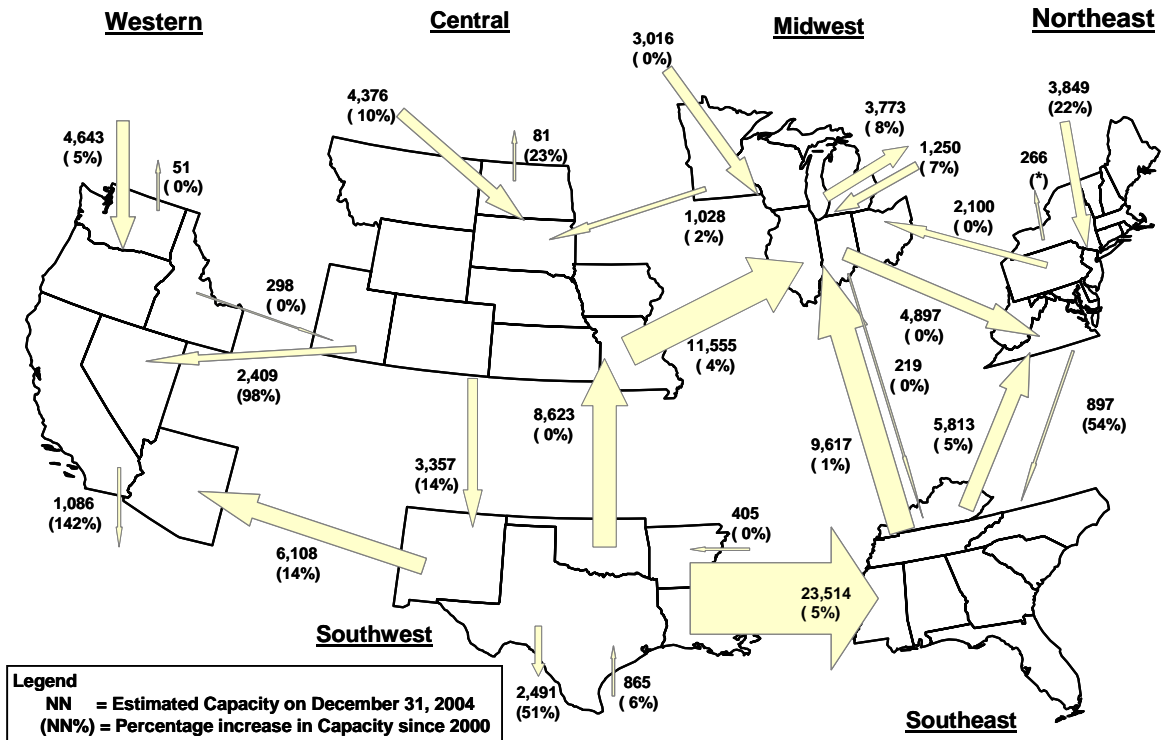
Source: Energy Information Administration: Gas Transportation Information System, Natural Gas Pipeline Construction Database.

Figure 4. Capacity Additions, by Type of Project, 2004 versus 2002
(Volumes in million cubic feet per day)



Source: Energy Information Administration, Office of Oil and Gas, Natural Gas Pipeline Construction Database.

Figure 5. Region-to-Region Natural Gas Pipeline Capacity, 2004



* Export capacity was not in place in 2000

Source: Energy Information Administration, Gas Transportation Information System, Natural Gas Pipeline Capacity Database

When comparisons are made between 2004 and the record year of 2002, the change is more pronounced (Figure 4). In 2002, capacity additions were predominantly on the interstate network, while in 2004 they were primarily to non-interstate pipeline systems. In 2004, for example, non-interstate capacity additions accounted for 54 percent of total capacity added, while in 2002 they were the minority, at only 24 percent.

The number and size of capacity additions from the installation of new laterals also decreased significantly. Capacity additions in this category fell from 37 percent of the total in 2002 to 26 percent in 2004. A key reason for this decline has been the decrease in the number of new gas-fired power plants currently coming on line. In 2002, the number of laterals built to serve these plants was 17, while in 2003, the number was 7, and in 2004, only 4.

Interregional Developments

Only 5 of the 41 natural gas pipeline projects completed in 2004 crossed regional boundaries (Table 2), the smallest number in 5 years. Additions to interregional capacity in 2004 totaled 768 MMcf/d overall, a decrease of 73 percent from the 2003 level of 2,898 MMcf/d. Much of the growth (about 60 percent) was confined to interstate pipeline systems transporting natural gas from or into the Southwest region.

The only non-Southwest related increases to interregional capacity occurred with the completion of Transcontinental Gas Pipeline's Momentum Project between the Southeast and Northeast regions and Iroquois Gas Transmission's Eastchester Marine Expansion project, which extended that system into Long Island, New York (from Connecticut), for the first time. The 230-MMcf/d Eastchester project also required the expansion of several compressor stations in upper New York State and an increase of overall deliverability from an interconnection with TransCanada Pipeline Ltd at the Canadian border.

Interregional pipeline capacity has increased significantly since 2000, especially along specific transportation routes. For example, the Kern River Transmission system expansion in 2003 and the Northwest Pipeline's Rockies Expansion project in the same year, almost doubled the existing capacity between the Central and the Western regions (Figure 5). While not as dramatic, expansions to the Transwestern Gas, El Paso Natural Gas, and TransColorado Transmission systems during the same period increased capacity between the Central and Southwest, and Southwest to Western regions, by 14 percent each.

The natural gas transportation route with the most capacity, the Southwest-to-Southeast region corridor, has also realized a proportionally large 5-percent increase since 2000, which

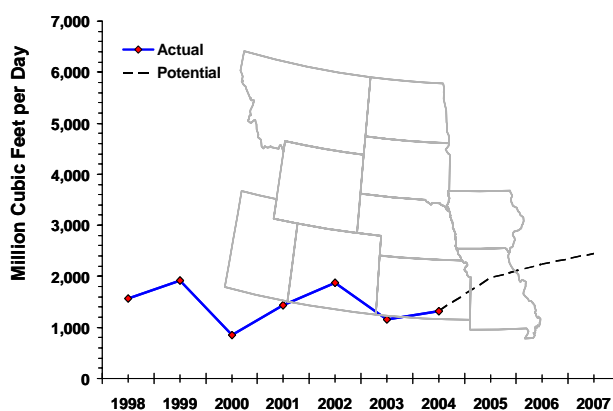
was the largest absolute volume expansion during the period. Several of the major interstate pipelines, such as Transcontinental Gas Pipeline, Florida Gas Transmission, and Southern Natural Gas, contributed to this increase.

Regional Review

Central Region

The continuing development of coalbed and conventional natural gas resources in Wyoming and Colorado contributed to the completion of 8 of the 10 projects placed in service in the Central region in 2004 and accounted for 89 percent, or 1,261 MMcf/d, of the new pipeline capacity installed in the region (Table 2). This development expansion, begun in the late 1990s, is also the basis for several large-scale pipeline projects proposed for installation over the next several years. These projects, if constructed, would account for more new capacity being added in the region in 2006 and 2007 than any time since 1999 (Figure 6).

Figure 6. Central Region Gas Pipeline Capacity Additions, 1998-2007



Source: Energy Information Administration, Office of Oil and Gas, Natural Gas Pipeline Construction Database.

In 2004, with the exception of the Colorado Interstate Gas Company's Cheyenne Plains Pipeline extension from northeast Colorado to southwest Kansas, the pipeline expansions that were completed were relatively short-distance lateral or looping projects designed to improve production field take-away capacity (WIG's Echo Springs line) or extend local market service (NNG's Pleasant Hill project).

Completion of three of the projects increased production take-away capacity in two of Wyoming's natural gas basins: Powder River in the east and Green River in the west. On the other hand, completion of TransColorado Gas Transmission's expansion improved the capability to deliver more natural gas from the San Juan Basin in southern Colorado to the El

Paso Natural Gas and Transwestern Gas systems in New Mexico for subsequent delivery to Arizona and California.

Completion of Colorado Interstate Gas Company's Cheyenne Plains Pipeline provided a 380-mile extension from the Cheyenne Hub in northeast Colorado to interconnections with Northern Natural Gas Company and Natural Gas Pipeline Company of America systems in southwest Kansas. The project added 560 MMcf/d of new capacity, with expansion to 730 MMcf/d scheduled by the end of 2005.

The Cheyenne Plains Pipeline is the only project completed, so far, of several proposals designed to provide Central region shippers with alternative access routes to Midwest markets. The other proposals (Northern Border Pipeline's Bison project, Kinder Morgan's Advantage Pipeline, and Enbridge Pipelines' Beacon Pipeline) have been postponed either because of environmental issues with their planned routes or a lack of firm market demand.

Before the Cheyenne Plains project, almost all Wyoming/northern Colorado production reaching the Midwest was transported via either the Trailblazer system or KM Interstate Gas Company's Pony Express Pipeline system to interconnections with Midwest-bound interstate pipelines in eastern Kansas.

While take-away capacity from the Wyoming production basins appears in balance with current demands, an increase in natural gas production activities in the Piceance Basin of western Colorado has shifted pipeline development interest to that area of the Rocky Mountains. A major portion of the proposed new capacity in the area reflects this trend.

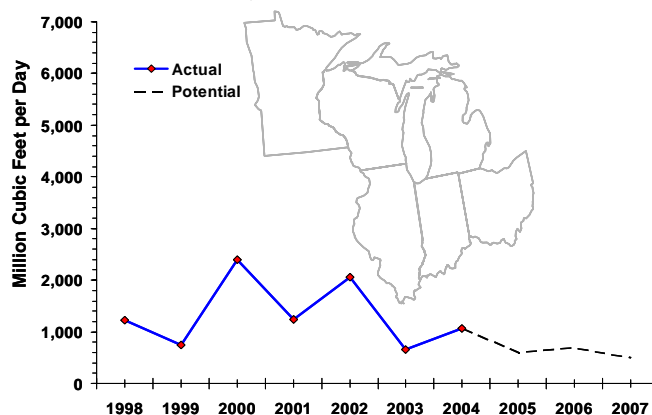
EnCana Ltd's proposed Entrega Gas Pipeline, for instance, would add 750 MMcf/d of new pipeline capacity from the Piceance Basin to the Cheyenne Hub in northeastern Colorado by the close of 2006, and, with added compression, another 750 MMcf/d in 2007. Also for 2006, Wyoming Interstate Pipeline has proposed its own 350-MMcf/d "Piceance Line," while TransColorado Gas Transmission has proposed an expansion of its system capability to move up to 300 MMcf/d northward (rather than south) to interconnect with one or more of these projects. The Questar Kanda/Coleman extension would add another 400 MMcf/d along approximately the same route in 2007.

Although it is unlikely that all of the proposed 2.6 Bcf/d of capacity directed to the Cheyenne Hub will be built as scheduled, it is relatively certain that a sizeable amount of new pipeline capacity will reach it by 2007, thus necessitating a corresponding need to increase capacity directed toward the Midwest.

Midwest

In 2004, three pipeline projects were completed in the Midwest region, accounting for only 1,063 MMcf/d of new capacity and 51 miles of added pipeline. This was the third lowest annual increase in capacity in the region since 1998 (Figure 7). The only interstate project was ANR Pipeline Company's WestLeg expansion, which increased ANR's system capacity by 220 MMcf/d in southern Wisconsin (Table 2).

Figure 7. Midwest Region Gas Pipeline Capacity Additions, 1998-2007



Source: Energy Information Administration, Office of Oil and Gas, Natural Gas Pipeline Construction Database.

The largest project was the dual bidirectional 700 MMcf/d laterals associated with the development of the new Columbus 3 storage facility, which increased the service options for shippers on several pipelines located in eastern Michigan. The other non-interstate project, the We Energy's Port Washington lateral, was installed to supply up to 143 MMcf/d to the newly retrofitted Port Washington Generating station located in southern Wisconsin. Two new 545-Megawatt gas-fired combustion turbine-generators went into operation at the Port Washington site in early 2005.

The level of potential pipeline expansion in the region is expected to remain at relatively low levels between 2005 and 2007 (Figure 7). Based on current proposals (May 2005), potential capacity expansions in the region are expected to be less in 2005 through 2007 than in 2003. Although relatively small in size, the planned expansions of existing pipeline systems in 2005-07 would improve the interstate network at several strategic points. The ANR Pipeline Company, for instance, has proposed several expansions along its routes serving growing markets in Wisconsin and northern Illinois, the largest being a 150-MMcf/d expansion in 2006. All told, ANR could increase its system capacity in the Midwest by close to 400 MMcf/d by the end of 2006.

The largest potential contributor to increased pipeline capacity in the region could be Vector Pipeline Company's

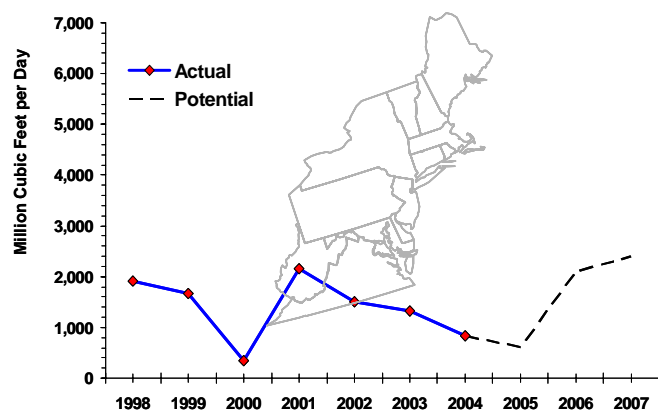
245-MMcf/d planned system expansion between Chicago, Illinois, and Ontario, Canada, in 2007. This expansion would increase Vector Pipeline's system capacity by one-quarter, providing greater movement of natural gas from the Chicago Hub to the Dawn Hub in Ontario. Vector cited enhanced storage opportunities in the region and growing demand for transportation services on the TransCanada PipeLine and other systems in Ontario, especially to meet potential development of more gas-fired power generation within the province.

On a smaller scale, Northern Border Pipeline Company has proposed to increase the capacity on the portion of its system between Iowa and Indiana by 130 MMcf/d in 2006, expanding the extension of its system built in 2001.

Northeast

Eight pipeline expansions were completed in the Northeast region in 2004, but they accounted for only 837 MMcf/d of additional capacity and 116 miles of new pipeline in the region (Table 1). This was the lowest level of natural gas pipeline expansion in the region since 2000, when only 345 MMcf/d (five projects) of capacity was added in the region. However, it appears that in the short term, at least, expansion activity could increase substantially in 2006 and 2007 (Figure 8), even if several marginal projects are not completed as proposed.

Figure 8. Northeast Region Gas Pipeline Capacity Additions, 1998-2007



Source: Energy Information Administration, Office of Oil and Gas, Natural Gas Pipeline Construction Database.

All but one of the projects completed in 2004 were interstate-related, with the largest in capacity being that of the Iroquois Gas Transmission Company's Eastchester Marine Expansion, 230 MMcf/d (Table 2). The Eastchester expansion included the extension of the Iroquois system into Long Island, New York, the addition of new compressor stations at Dover and Boonville, New York, and an increase in import capacity at the Canadian border. The Eastchester extension, in part, will

provide needed pipeline capacity to several new gas-fired power plants built in the Bronx, New York City, and Long Island, New York.

Two related projects, the Dominion Transmission Company's Mid-Atlantic Expansion, which increased transportation capacity on its system from West Virginia to Virginia via Pennsylvania, and the Texas Eastern Transmission Company's Dominion Expansion project, were completed in 2004. The latter project was a 217-MMcf/d expansion of a segment of Texas Eastern's system within southern Pennsylvania that was subsequently leased by Dominion to link the West Virginia and Virginia portions of its transportation system in the Mid-Atlantic region.

Pipeline expansions in the Northeast region in 2004 served primarily to improve service within the region itself. The only project that involved an increase in long-haul system capacity was the completion of the final phase of Transcontinental Gas Pipeline Company's 53-MMcf/d Momentum project. Since 1999, Transcontinental has increased capacity on its system, from Louisiana to Virginia, by almost 850 MMcf/d, or by about one-third.

The relatively low level of pipeline expansions in the Northeast in 2004 is likely to continue into 2005, but 2006 and 2007 could produce a major upswing in pipeline capacity additions into and within the region (Figure 8). Eighteen projects, totaling as much as 4.8 Bcf/d of new capacity, have been announced, submitted for regulatory review, or approved for development over the 2006-07 period. Although it is far from certain that several of these projects, especially those that have yet to be filed with the Federal Energy Regulatory Commission (FERC), will actually be completed by 2007, the majority of these projects probably will be completed, albeit some may be downsized to reflect an ever-changing marketplace.

The Millennium Pipeline (525 MMcf/d) project, for example, was first proposed in 1986 for completion in 1990, but was revamped in 2003 to reflect a shorter two-phase project design. The revised project design and milestones were put forward with the hope that at least a portion would be approved and built at a quickened pace. While it is now proposed for the first phase to be completed by the end of 2006, the project has yet to be approved by FERC in its revised form. The second phase is currently on hold until 2008 or later owing to increased competition and a changed market in the New York City metropolitan area.

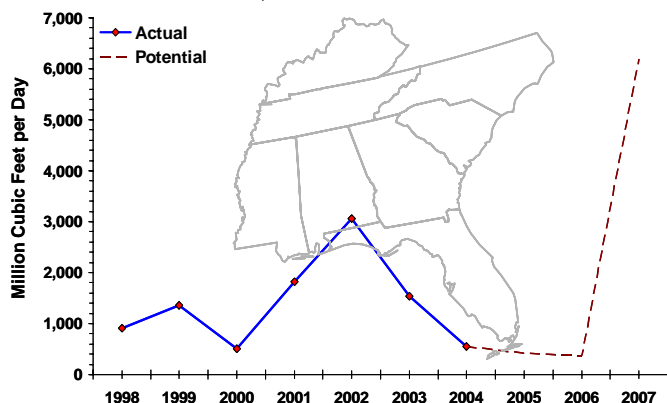
Southeast

Natural gas pipeline capacity expansion in the Southeast region in 2004 was the smallest of all six regions, only 545 MMcf/d (Table 2). While that was the lowest level of expansion in the region since 2000, over the next two years the decline should continue (Figure 9). Not until 2007 will

the region see a substantial increase in new pipeline capacity additions.

The growth spike in 2007 is dependent, however, on the successful implementation of several proposed conventional storage sites, at least three LNG import facilities in the region, and the continued development of new regional gas-fired power generation, especially in Florida.

Figure 9. Southeast Region Gas Pipeline Capacity Additions, 1998-2007



Source: Energy Information Administration, Office of Oil and Gas, Natural Gas Pipeline Construction Database.

For example, one of the three projects completed in 2004, Texas Eastern Transmission Company’s M-1 Line expansion, was originally proposed as a single 192-MMcf/d capacity project, but owing to a decrease in demand in its target market, it was divided into two phases. The second phase is currently scheduled for installation in 2007, that is, if demand grows sufficiently in the meantime.

An extension of the Gulfstream pipeline system, which first went into service in 2002, was originally scheduled for the following year, 2003, and would have extended the system to the southeast, to Palm Beach, Martin, and St. Lucie counties. However, because of delays in building several proposed gas-fired power plants in these areas, the extension was separated into three phases. In 2004, the first phase, the 5-mile Martin interconnect line was completed, and on February 1, 2005, a 110-mile, 175-MMcf/d extension to Florida Power and Light Company’s Martin (county) power plant near Florida’s east coast was placed in service. The 350-MMcf/d Martin interconnect will also deliver natural gas to the third phase of the project, extensions to St Lucie and Palm Beach counties, currently scheduled for 2007.

Also completed in 2004 was the final phase of Southern Natural Gas Company’s (SONAT) South System expansion, originally proposed as one project to be completed in 2002. But owing to shifts in natural gas demand in the various markets encompassed by the project, it was divided into five separate phases, covering discrete expansions in Louisiana,

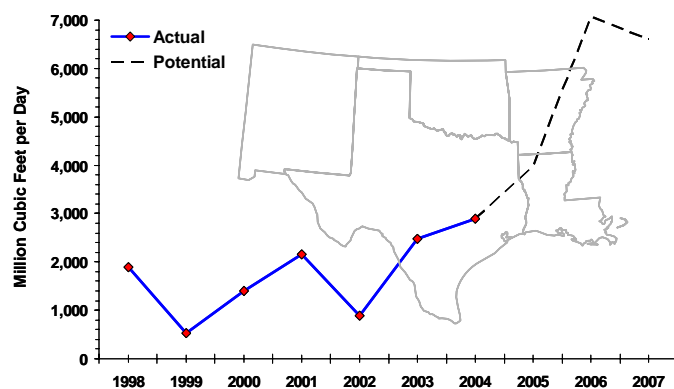
Mississippi, Alabama, and Georgia. These five phases increased overall capacity on the southern portion of the SONAT system by 760 MMcf/d over the 3 years. A 33-MMcf/d expansion on its North System was completed in 2003.

Currently (May 2005) 15 projects are on the books, which could potentially add 7.0 Bcf/d of new pipeline capacity in the region between 2005 and 2007, 89 percent of it in 2007 (Figure 9). However, it is unlikely that all will be constructed. About one-third of this new capacity would come from only two pipeline projects, which would transport natural gas from proposed LNG import facilities to interconnections with regional pipelines. Another 22 percent represents capacity on new laterals in association with five proposed underground storage facilities, several of which may face an uncertain future.

Southwest and Gulf of Mexico

Pipeline development in 2004 in the Southwest region was dominated by activities associated with deepwater natural gas development in the Gulf of Mexico (Table 2). Six offshore deepwater projects added 311 miles of pipeline and 1.8 Bcf/d to capacity in the Gulf. None transports natural gas directly onshore, but rather they all have interconnections with existing systems, such as the Destin and Nautilus pipelines, that transport natural gas onshore.

Figure 10. Southwest Region Gas Pipeline Capacity Additions, 1998-2007



Source: Energy Information Administration, Office of Oil and Gas, Natural Gas Pipeline Construction Database.

Only 5 of the 11 projects completed in the region were onshore. The largest in capacity, 500 MMcf/d, was the Energy Transfer Company’s Bossier Pipeline, which extends from the Barnett Shale/Bossier Sands formations in the Fort Worth Basin of north Texas to the Katy Hub in east Texas. Also completed was the Kinder Morgan Rancho Pipeline (170 MMcf/d), a converted oil pipeline directed into the Austin, Texas, area, which increased transportation capabilities from the Fort Worth Basin.

Expanding natural gas exploration and development activities in the Fort Worth Basin has led to a greater need for natural gas pipeline take-away capacity and more access to interconnections with the interstate network, in addition to serving non-interstate markets. Indeed, four additional new pipelines and/or expansion projects, accounting for almost 1.2 Bcf/d of capacity, have been proposed for installation in the area over the next two years (2005-06).

Between 2005 and 2007, potentially as much as 18.0 Bcf/d of new natural gas pipeline capacity could be built in the Southwest region (Figure 10). That is more than double the potential of any other region in the country. One of the principal reasons for this is that most of the new LNG import facilities proposed for development in the United States are sited in the Southwest region, along the coast of Texas and Louisiana. In fact, all but one of the five pipeline projects in the current Southwest pipeline projects inventory for 2007 are directly associated with a proposed LNG facility (about 4.6 Bcf/d).

Only three pipeline transmission systems have announced plans to expand their systems in the region in anticipation of the new LNG capacity that will come on line with the installation of these new LNG facilities. They are: Trunkline Gas Company's North Texas expansion (400 MMcf/d) and Kinder Morgan's proposed development of two new pipelines between Texas and Louisiana, the 23-mile Carthage Line (700 MMcf/d) and 77-mile KM LNG Pipeline (1,000 MMcf/d), all slated for 2007. Though none is directly associated with any particular LNG facility, they are the first proposed expansions of the interstate pipeline system that cite the anticipated installation of LNG import terminals along the Texas Gulf Coast as a key reason for their expansion.

Nine offshore Gulf of Mexico pipeline projects have been scheduled for 2005-06. These projects amount to 3,180 MMcf/d of combined capacity, or about 29 percent of the total capacity additions proposed for installation in the region over the 2-year period. New offshore systems include Enterprise Products Partners LP's Constitution Gathering Pipeline (200 MMcf/d) and its Independence Trails Offshore Line (850 MMcf/d), both linked to new deepwater production scheduled to come on line in 2006. Also supporting expanding deepwater development is the completion of the second phase (375 MMcf/d) of the 115-mile Cleopatra Gathering System, which was initially placed in service in 2004 (Table 2).

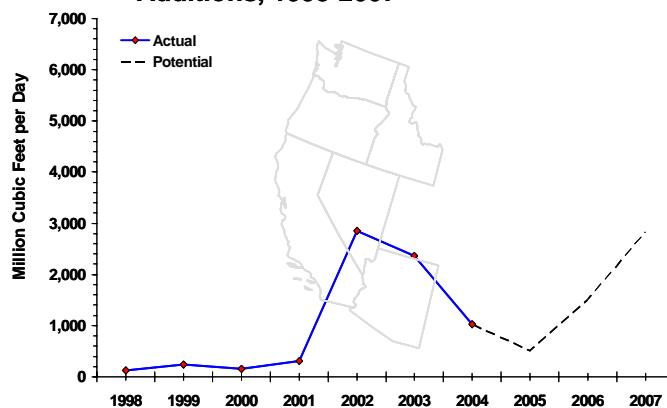
Western

In 2004, five pipeline projects were completed in the Western region, accounting for only 1,023 MMcf/d of new capacity and 168 miles of pipeline (Table 2). Only two of the projects were directly associated with the interstate pipeline system, El Paso Natural Gas' Power-up (320 MMcf/d) expansion of

its southern system and the installation of the 113-MMcf/d Everett Delta Lateral on the Northwest Pipeline Company's system in Washington State.

Yet, 2005 is expected to see even less expansion activity in the region than in 2004 (Figure 11). Only one project, the El Paso Natural Gas Company's Line 1903 (oil line) Conversion in southern California is in the current inventory of proposals. Since it has yet to be approved by FERC (as of May 2005), it is quite probable that it too may not be completed this year.

Figure 11. Western Region Gas Pipeline Capacity Additions, 1998-2007



Source: Energy Information Administration, Office of Oil and Gas, Natural Gas Pipeline Construction Database.

Of the three non-interstate projects completed in 2004, the Coos Bay System completion is notable because it marked the first time that natural gas was made available in the area. Although it was first scheduled for completion in 2001, despite some prolonged delays, the pipeline was finally completed and became operational in late 2004. The new pipeline delivers up to 70 MMcf/d to Coos County from supplies received from the Northwest Pipeline system. In early 2005, a proposal to build an LNG import facility (Jordon Cove Energy Project) in Coos Bay was put forward. The proposed facility, which would target a gas-fired power plant to be built in the area, also would be able to provide additional supplies to the Coos Bay system as needed. The import facility is scheduled for completion in 2007.

The completion of the South Mist Storage Link project in Oregon marked the last phase in the extension and expansion of the Northwest Natural Gas System to increase its capability to provide storage services to natural gas shippers using the Northwest Pipeline system. Completion also permitted Northwest Natural Gas to extend service to several new communities in the Portland area of Oregon.

The El Paso Natural Gas Power-up expansion provided its southern system with an increased capability to deliver supplies to the California border, and specifically for its customers using the North Baja Pipeline route to ship their

natural gas to northwest Mexico. In addition, the expansion supported an interconnection with the 36-mile SRG Santan Lateral that was also completed in 2004. The Santan lateral will be supplying up to 200 MMcf/d to the 825-Megawatt gas-fired expansion of the Santan power plant located in Gilbert, Arizona.

Based on the current inventory (May 2005) of proposed pipeline projects in the Western region, only one pipeline project would be completed in 2005 and one in 2006. Although four pipeline projects are currently proposed for completion in 2007, at least one has been postponed in the past and may be again. Moreover, several of the proposed pipeline projects are associated with, and depend upon, the eventual installation of several proposed LNG import facilities in the region in 2006 and 2007. Consequently, the potential level of pipeline capacity additions in the Western region over the next several years will probably be on the low side.

Among the projects expected to be completed in the region is the Pacific Texas Pipeline Corporation's Picacho Pipeline, although perhaps not by its currently planned date in late 2007. The Picacho Pipeline, which would traverse the southern tier of the region and is designed to increase transportation capacity from the Permian Basin of Texas and the San Juan Basin in New Mexico to California/Arizona markets, was originally proposed for completion by the end of 2004. However, shipper interest was slow in developing, especially since two similar pipeline projects, the E3 Pipeline and Kinder Morgan's Silver Canyon Pipeline, were also proposed for development in the region. But now both competing projects are on hold because of failure to develop adequate market interest. The Picacho Pipeline proposal has been pre-filed (National Environmental Policy Act (NEPA)) with FERC, but the project's design has yet to be formally submitted for regulatory review. Therefore, slippage to 2008 or later could occur.

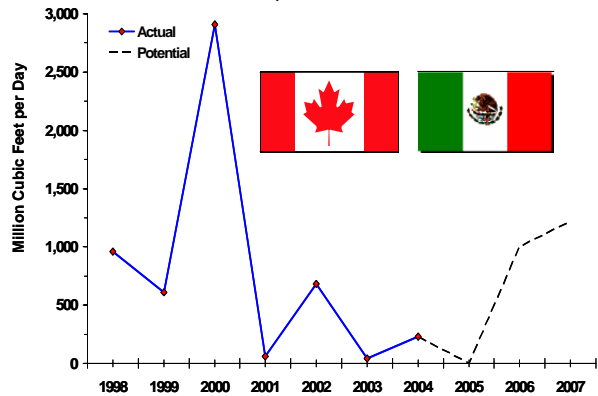
In the northern tier of the region, additions of new capacity will come primarily from the installation of several new laterals and compression additions.

Import/Export Pipeline Capacity

Growth in natural gas pipeline import and export capacity between the United States and Canada or Mexico slowed substantially in 2004. Only one import expansion project was completed in 2004 and new natural gas pipeline export capacity was confined to one small localized point that was built between Texas and Mexico (Table 2). While above its 2003 level, the 2004 import capacity addition was far below that of 2000. It was also the third lowest level since 1998 (Figure 12). Additions to export capacity in 2004 were the lowest in the period since 1998 (Figure 13).

On the import side, the Iroquois Eastchester Marine expansion, which was designed primarily to provide up to 230 MMcf/d of additional pipeline transportation services to gas-fired power generators on Long Island, New York, necessitated the expansion of the pipeline's import capabilities at the Canadian border as well. Since 2000, additions to pipeline import capacity from Canada to the United States have diminished significantly.

Figure 12. Natural Gas Pipeline Import Capacity Additions from Canada/Mexico, 1998-2007



Source: Energy Information Administration, Office of Oil and Gas, Natural Gas Pipeline Construction Database.

Growth in natural gas pipeline export capacity was limited to completion of the West Texas Gas Company's 25-MMcf/d Acuna Crossing located between Val Verde County Texas and Coahuila State in Mexico, which is designed to supply the needs of the Mexican natural gas distribution companies in the immediate border area.

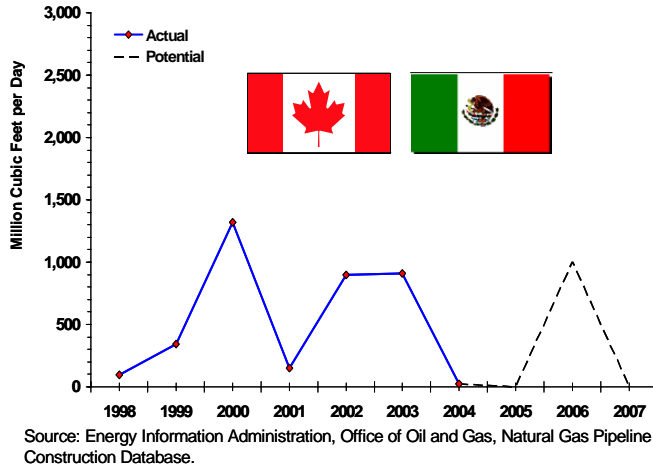
To date (May 2005), there are five cross-border projects that have been proposed for implementation through 2007, three from Canada and two bidirectional pipelines between Texas and Mexico. Several additional projects, totaling about 1 Bcf/d of capacity, had been proposed for implementation during the period, but were subsequently placed on hold or canceled, primarily because demand in northern Mexico did not develop as quickly as anticipated.

Several of the current proposals to expand import/export capacity face potential difficulties that may jeopardize their realization. For instance, the 120-MMcf/d Sumas Energy 2 Pipeline project may be postponed beyond 2007 if there are further delays in constructing the gas-fired power plant that it is designed to service. Originally proposed for completion in 2001, the Sumas Energy 2 plant has been rescheduled several times as a result of shifts in local market demand and/or delays in the plant permitting process.

Another project that faces an uncertain future is the El Paso Energy Blue Atlantic subsea pipeline project, currently on hold. The 750-mile, 36-inch diameter pipeline, which was designed to transport up to 1 Bcf/d from Nova Scotia,

Canada, to the New York State coastline, was originally scheduled for installation in 2005. However, it was first postponed in October 2002 owing to exploration/development delays at its source, the Scotian Basin in waters offshore eastern Canada. A NEPA pre-filing with FERC was withdrawn in 2003, although its sponsors still claim it might be completed by the close of the decade.

Figure 13. Natural Gas Pipeline Export Capacity Additions to Canada/Mexico, 1998-2007



Also citing delays in exploration and development within the Scotian Basin and studies indicating that reserves in the basin may not be as high as originally estimated, the Maritimes & Northeast Pipeline Company (M&N) canceled a project that would have almost doubled its capacity of 440 MMcf/d by the end of 2004. Subsequently, M&N, whose route extends from the Sable Island area of the Scotian Basin to New England, revised the proposal to focus upon adding capacity systemwide to address the need to transport supplies from several proposed LNG import facilities to be located in Canada. As much as 1 Bcf/d could be added to the M&N system by late 2007 if this marketing effort is successful.

Proposed additions to pipeline export capacity, on the other hand, are limited to the proposed installation of two 500-MMcf/d bidirectional pipeline crossings between Texas and Mexico in 2006. The Tidelands Oil and Gas Company has proposed to build the two pipelines, each partly in Texas and partly in Mexico, to transport natural gas between its planned 1-Bcf/d Terranova Oriente Pipeline in Mexico and interconnections in the United States. These interconnections would include links to a gas processing plant and several pipeline systems located in south Texas near the border.

Observations and Outlook

While the amount of incremental pipeline capacity added in 2004 was the least since 2000, the current inventory of new project proposals indicates that a major growth in new pipeline capacity can be anticipated. In fact, perhaps as much

as 44.4 Bcf/d of pipeline capacity could be added to the national network between 2005 and 2007 based upon current proposals (Figure 2).

One of the major factors underpinning this upswing is the development of new LNG import facilities along the Gulf coast of Texas, Louisiana, and Mississippi, and the new laterals needed to transport these imports to interconnections with the existing pipeline network.⁴ A second key factor is the increasing demand for additional take-away capacity from the Unita/Piceance Basin of Colorado/Utah and the transportation of that natural gas to markets in the Midwest and Western regions.

For the period 2005 through 2007, six pipeline (lateral) projects in association with proposed new LNG import facilities along the Gulf coast have already been announced, with several already before FERC for regulatory review. Two expansions of existing LNG import facilities have also been proposed: one to upgrade pipeline segments now serving Trunkline Gas' Lake Charles facility and the other the Excelerate Energy LLC's Louisiana Energy Bridge facility.⁵

Since most of these LNG import facilities have been designed to regasify volumes on a large scale, 1,000 MMcf/d to 2,500 MMcf/d or greater, the pipeline laterals built to transport their output to interconnections with the existing pipeline grid are also designed for similar load capacities. Indeed, the six new, and two expansion, laterals that have been proposed for completion through 2007 total 10.3 Bcf/d in capacity.⁶

While proposed capacity additions for LNG import related projects make up a large portion of potential capacity growth in the Southwest region through 2007, the major portion of potential capacity additions in the Central region revolve around the building of new pipelines out of the Unita/Piceance Basin of western Colorado/eastern Utah and expansion of pipelines exiting Wyoming's growing production fields. Indeed, more than 6.7 Bcf/d of new pipeline capacity has been proposed that would increase exit capacity from the region between 2005 and 2007. About 56 percent of this new capacity would be directed toward access to Midwest markets while 30 percent would go toward Western markets (California, Nevada and Arizona). Only about 14 percent would serve markets within the Central region itself.

⁴As of May 2005, 35 proposals for new LNG import facilities, to be built in the lower 48 States between 2006 and 2010, have been announced. Although the largest number, 18, would be located in the Southwest region along the Gulf coast of Texas and Louisiana, 7 would be located in the Northeast region, 8 in the Western region, and 2 in the Southeast region.

⁵Excelerate Energy LLC's 690-MMcf/d facility, located 116 miles off the coast of Louisiana in 298 feet of water, was opened in early 2005.

⁶Several of the proposed LNG import site proposals include more than one lateral exiting the proposed import facility. In such cases the total shown here includes the pipeline exit capacity volume for each lateral.

Overall, 107 pipeline projects have been proposed for development between 2005 and 2007 (as of May 2005), accounting for more than 44 Bcf/d of potential capacity and about 5,000 miles of installed pipeline. To date, 36 have been approved by regulating authorities and have begun, or are permitted to begin, construction. Seven projects scheduled for early 2005 have already been completed. Twenty-five are still only in the planning, or post-open season stage, while 39 have been submitted to regulatory authorities for review. Six of these have been submitted to FERC under the NEPA pre-filing process.

As stated earlier, much of the new capacity proposed for installation over the near-term is associated with the anticipated large-scale development of LNG import facilities and the need for new interconnecting laterals. However, only a limited amount of new pipeline capacity has been proposed on those portions of the interstate and non-interstate pipeline grid to which these LNG developers indicate they will be transporting their supplies.⁷ To date, only three interstate pipeline companies have announced plans to expand a part of their system to accommodate a portion of this new supply source.

One reason for this hesitation may be that unused capacity may exist, or is expected to become available, on those pipeline routes that shippers of these potential LNG gas supplies expect to use to market their product. Thus, pipeline operators in the region may not see the immediate need to expand. For instance, the Louisiana Energy Bridge terminal will be using the Sea Robin pipeline to transport its natural gas onshore. Sea Robin, which had an average annual load factor of only about 30 percent in 2003 (35 percent on its peak day),⁸ apparently has enough unused capacity to handle the additional load without a planned expansion.

Yet it is very unlikely that all the incremental pipeline capacity needed by these proposed LNG facilities can be accommodated on the existing pipeline infrastructure. Obviously, additional expansions of the mainline natural gas transportation network also will be needed. Most likely, as more LNG projects receive regulatory approval, interstate pipeline companies will begin sponsoring open-season exercises that have LNG shippers as their target group. Consequently, it will not be surprising to see more interstate pipeline expansion proposals related to LNG development on the Gulf coast over the next year or two.

⁷Platts *Gas Daily*, "LNG Importers Face Supply, Pipeline Constraints," March 8, 2005.

⁸Federal Energy Regulatory Commission (FERC) Form 2, "Annual Report of Major Natural Gas Companies" 2003 submission by Sea Robin Pipeline Company, p. 518.