## **Northeast Natural Gas Regions**



### Overview:

### **Market Description**

Natural gas use is increasingly important to the Northeast. Though traditionally the Northeast has been a winter peaking region, increased reliance on natural-gas fired generation has evened out annual gas use. Increased dual requirements for natural gas as a space heat fuel and utilization of gas-fired plants has imposed greater challenges on the Northeast, compared to other regions, in aligning commercial and operating conditions between the gas and power industries. The Northeast has little indigenous production (mainly in the Appalachian basin) and none in New England. The Northeast relies upon conventional and LNG storage to meet peak-day gas needs. Despite increased gas use for power generation, pipeline utilization remains highly seasonal; major regional pipelines often operate at high load factors during the winter resulting in basis differentials to upstream liquid trading points that may greatly exceed firm transportation tariff levels. LNG plays a critical role in the overall supply mix and accounts for up to 30 percent of peak-day gas needs in New England. Market participants in the Northeast can draw upon the nation's most extensive portfolio of dual, gas-oil fired power plants to flexibly respond to market price and load changes.

## Geography

**States covered:** Connecticut, Delaware Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, West Virginia, and Vermont.

## **Major Trading Hubs**

Algonquin Citygates, Columbia Gas Appalachia, Texas Eastern M3, Transco Zone 6 NY, and, Transco Zone 6 Non-NY.

## **Storage**

**State Capacity:** New York, Pennsylvania, and West Virginia accounted for 100 percent of total conventional storage capacity in the Northeast in 2005. New England has no conventional storage capacity, but it has about 18.4 Bcf of LNG storage capacity – 3.4 Bcf at the Everett terminal and the remainder at satellite storage locations throughout New England. New York and New Jersey add about 3.2 Bcf and 3.7 Bcf of LNG related storage capacity, respectively.

Aquifer Capacity: 0%

Depleted Field Capacity: 99%

Salt Cavern: 1%

Total Capacity: Northeast has 18 percent of total US storage capacity.

Major Storage Pipelines and Capacity:

Columbia System: 246 Bcf

Dominion: 290 Bcf National Fuels: 69 Bcf

## **Demand by Sector** (2005):

Residential: 38%Commercial: 21%Industrial: 33%

**State:** New York, New Jersey, and Pennsylvania make up 68 percent of total Northeast demand and about 12 percent of total U.S. demand.

**Northeast Total:** 3.5 Tcf annually ( or 9.9 Bcfd) which makes up 18 percent of total U.S. daily demand.

Consumer Total: 14.4 million, which is approximately 21 percent of total consumers in the U.S.

**Key Consuming States:** New York, New Jersey, and Pennsylvania make up 71 percent of total consumers in the Northeast and about 15 percent of total consumers in the U.S.

**Residential Consumers: 91%** 

#### **Production**

**State:** Northeast gas production concentrated in Pennsylvania and West Virginia; together they account for 87 percent of total Northeast production. Nationally, however, these supplies equal about 2 percent of total U.S. production.

**Total:** Total Northeast production equals 0.4 Bcfd; it makes up 2 percent of total U.S. daily production.

**Yearly Change:** Northeast regional gas production in 2005 declined about 4 percent from 2004; much of this decline is attributable to declines in Pennsylvania production which declined 15 percent.

#### **Prices**

Transco Zone 6 NY	2005	2006
Average Price	\$10.03	\$7.36
Average Basis	\$1.17	\$0.63
Highest Daily Price	\$28.12	\$10.75
Lowest Daily Price	\$6.24	\$3.93

## **Pipeline Flows**

Average Daily Northwest Deliveries to the Midwest: 6.9 Bcfd (2005) 6.6 Bcfd (2006)

**Major Pipelines:** Transco, Texas Eastern and Columbia carry a significant amount of gas from the Gulf coast to the Northeast.

Average Daily Midwest Deliveries to the Northeast: 1.6 Bcfd (2005) 1.6 Bcfd (2006)

**Major Pipelines:** Columbia, Texas Eastern and Dominion move gas from the Midwest to the Northeast.

## **Imports and Exports**

### **Average Daily Imports from Canada into the Northeast:**

2005: 2.8 Bcfd

2006: 2.7 Bcfd

**Major Importers:** Maritimes and Northeast pipeline, Tennessee Gas Pipeline and Iroquois Gas Transmission System flow the majority of the gas from Canada to the Northeast. Together, they represent the following percentages of pipeline gas imports:

2005: 83%

2006: 85%

### **Average Daily LNG Send out:**

2005: 0.3 Bcfd

2006: 0.3 Bcfd

Note: Represents daily receipts from Everett to Tennessee and Algonquin. Excluding volumes delivered via truck, consumed at Mystic or other distribution.

## **Focal Points**

**Gas Imports Decline:** Based on analysis of available capacity data from pipelines, northeast gas imports from Canada declined 5.8 percent in 2006, falling to 2.5 Bcfd from 2.6 Bcfd. Several factors accounted for declining net imports, including high gas storage levels in the United States, increased regional gas production from the Appalachian Basin, improvements in post-hurricane supplies from the Gulf of Mexico, mild weather in the United States, and structural demand growth in Canada.

**Mid-Atlantic Capacity:** The LNG facility at Cove Point, Md., boosted pipeline capacity by 433 MMcfd in April 2005 by adding compressors on the Dominion Cove Point East project. Transcontinental Gas Pipe Line Corp. added 150 MMcfd of capacity to its system in New Jersey via looping.

**Production Rises:** Pipeline information indicates that Appalachian natural gas production grew 13 percent in 2006, to 1,055 MMcfd from 934 MMcfd.

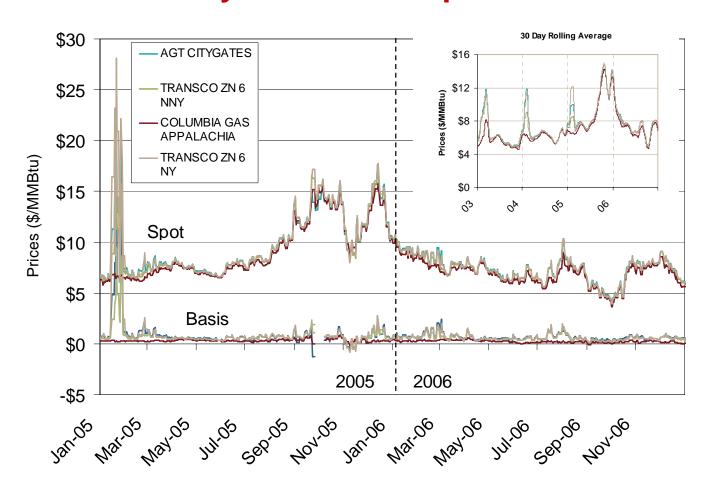
**Northeast Gas Market: Hub Prices** 

# **Yearly Average of DA Hub Prices**

## Annual Average Day Ahead Prices (\$/MMBtu)

	2005	2006	5-Years
Algonquin citygates	\$9.75	\$7.40	\$6.87
Transco Z6 NY	\$10.04	\$7.36	\$6.90
Transco Z6 non-NY	\$9.63	\$7.30	\$6.71
Columbia-Appalachia	\$9.18	\$6.97	\$6.30

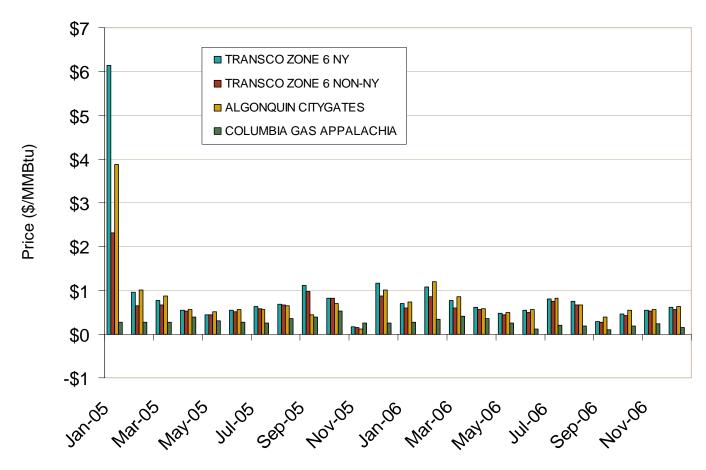
## Northeastern Day-ahead Hub Spot Prices and Basis



Source: Derived from Platts data.

**Northeast Natural Gas Market: Prices and Basis** 

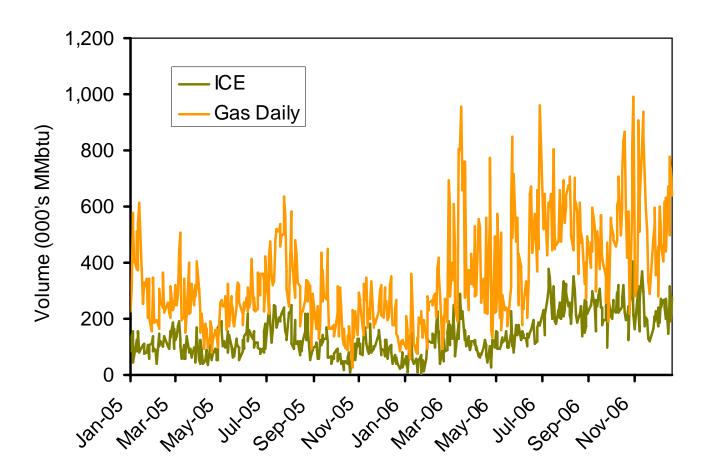
# Northeastern Monthly Average Basis Value to Henry Hub



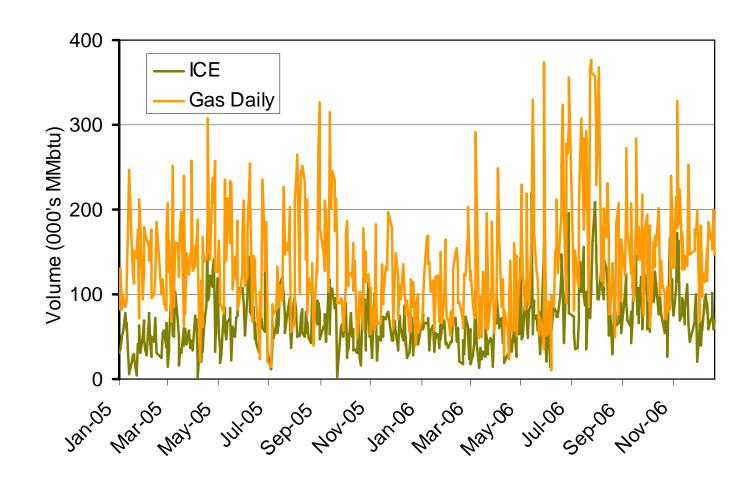
Source: Derived from Platts data.

**Northeast Natural Gas Market: Reported Volumes** 

# Reported Published and Traded Daily Spot Volumes: Transco Zone 6

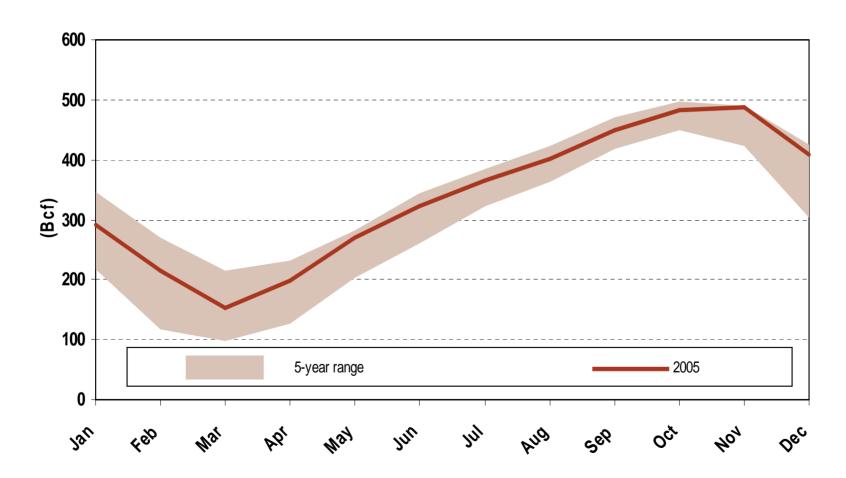


# Reported Published and Traded Daily Spot Volumes: Algonquin



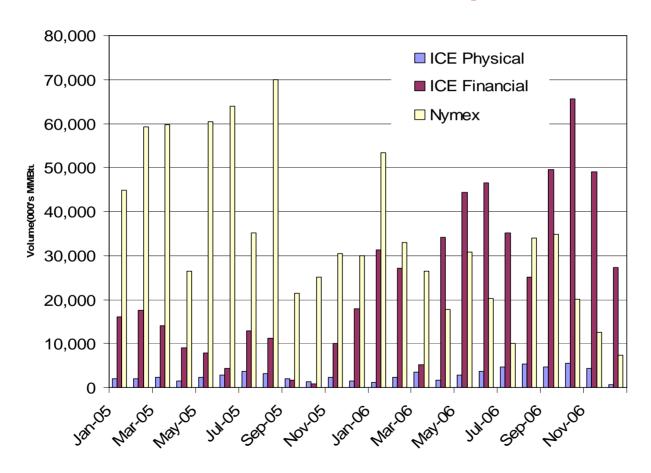
## **Northeast Gas Market: Storage Inventory**

# **Northeast Regional Storage Inventory Levels**



## **Northeast Natural Gas Market: Financial Market Volumes**

## **Transco Zone-6 Forward Swaps and Volumes**



Source: Derived from ICE and Nymex data. Monthly estimates of market trading volumes for swaps and other forward market transactions include all transactions, regardless of term, traded for a given month and hub, and summarized and expressed in MMBtu.

## **Northeast Gas Market: Infrastructure**

# **Pipeline Projects**

Pipeline Projects						
Company	Project Name	Capacity	Capital Cost	Status	Year	From-To
		(MMcf/d)	(Millions)+		Certificated	State
Columbia Gas Transmission Corporation	Hardy Storage Project	172	\$62.2	Under Construction	2005	MD-WV
Eastern Shore Natural Gas Company	Eastern Shore	15	\$9.0	In-Service 09/05 & 11/05	2005	PA-DE
Eastern Shore Natural Gas Company	Eastern Shore	7	\$18.0	In-Service 09/05 & 11/05	2005	PA-DE
Tennessee Gas Pipeline Company	Tewksbury-Andover Lateral	25	\$7.7	In-Service 10/05	2005	MA-MA
Transcontinental Gas Pipeline Corp.	Central New Jersey Expansion	105	\$13.0	In-Service 11/05	2005	NJ-NJ
Algonquin Gas Transmission	Cape Cod Project	28	\$16.0	Approved	2006	MA-MA
Dominion Transmission, Inc.		700	\$242.1	Approved	2006	NY-WV
Domionion Transmission, LLC		800	\$159.8	Approved	2006	MD-MD
Eastern Shore Natural Gas Company	2006-2008 System Expansion	47	\$33.6	Phase I In - Service 10/06	2006	PA-DE
Tennessee Gas Pieplien Company	Norteast ConneXion	136	\$110.0	Approved	2006	MA-PA
Tennessee Gas Pipeline Company	Essex-Middlesex Lateral	82	\$38.1	Approved	2006	MA-MA
Transcontinental Gas Pipeline Corp.	Leidy to Long Island Expansion	100	\$121.3	Approved	2006	NY-PA
Total		2,217	\$830.8			

<sup>+</sup> Capital cost figures are estimates.

## **Northeast Gas Market: Infrastructure**

# **Storage Projects**

Storage Projects							
Company	Project Name	Capacity (Bcf)	Deliverability (MMcf/d)	Capital Cost (Millions)+	Status	Year Certificated	State
Dominion Transmission, Inc.	Northeast Storage Project	9.4	163	\$64.8	In-Service 04/06	2005	NY, PA, WV
Hardy Gas Storage, LLC	Hardy Storage	12.4	176	\$62.2	Under Construction	2005	WV
Central NY Oil and Gas Co, LLP	Stagecoach Phase II Expansion	13	0	N/A	Under Construction	2006	NY-PA
Tennessee Gas/National Fuel	Northeast ConneXion NY-NJ	0	114	\$39.10	Under Construction	2006	PA-NJ
Texas Eastern Transmission, LP	Accident Storage Enhancement	3	0	\$20.50	Under Construction	2006	MD
Total		37.8	453	\$186.6			

<sup>&#</sup>x27;+ Capital cost figures are estimates.

## **Northeast Gas Market: Infrastructure**

# **LNG Projects**

LNG Projects						
Company	Project Name	Capacity Send-out		Status	Year	State
		(Bcf)	(Bcf/d)		Certificated	
Weaver's Cove Energy/Hess LNG	Weaver's Cove (Fall River, MA)	4.4	8.0	Approved	2005	MA
Dominion Cove Point LNG, LP	Cove Point Expansion	6.8	0.8	Under Construction	2006	MD
Total		11.2	1.6			

## **Northeast Natural Gas Market: Consumers**

# **Consumer by Market Segment (2005)**

					% of	% of
Sector	Residential	Commercial	Industrial	State Total	US	Region
Connecticut	475,221	52,572	3,437	531,230	1%	4%
District of Columbia	141,012	10,381	0	151,393	0%	1%
Delaware	137,115	12,070	179	149,364	0%	1%
Maine	18,633	8,178	69	26,880	0%	0%
Maryland	1,024,955	73,780	1,325	1,100,060	2%	8%
Massachusetts	1,297,508	120,167	12,019	1,429,694	2%	10%
New Hampshire	94,473	16,266	397	111,136	0%	1%
New Jersey	2,540,283	226,007	8,500	2,774,790	4%	19%
New York	4,229,396	378,889	2,925	4,611,210	7%	32%
Pennsylvania	2,600,574	233,132	5,576	2,839,282	4%	20%
Rhode Island	224,320	23,082	223	247,625	0%	2%
Vermont	33,015	4,781	41	37,837	0%	0%
West Virginia	374,301	36,535	145	410,981	1%	3%
Regional Total	13,190,806	1,195,840	34,836	14,421,482	21%	100%
Total US	63,573,466	5,196,428	205,217	68,975,111		
% of US	21%	23%	17%	21%		
% of Region	91%	8%	0%	100%		

## **Northeast Natural Gas Market: Demand**

# **Natural Gas Demand by State (2005)**

				Vehicle	Electric	Other		% of	% of
Sector	Residential	Commerical	Industrial	Fuel	Power	Fuel	<b>State Total</b>	US	Region
Connecticut	44,522	35,756	20,469	224	63,896	3,327	168,194	1%	5%
Delaware	10,339	8,383	15,257	68	12,875	40	46,962	0%	1%
District of Columbia	13,853	17,683	0	111	0	487	32,134	0%	1%
Maine	1,149	4,792	2,662	0	48,647	585	57,835	0%	2%
Maryland	85,768	69,718	23,772	281	20,478	2,173	202,190	1%	6%
Massachusetts	118,617	56,665	47,774	188	152,429	1,810	377,483	2%	10%
New Hampshire	7,793	9,844	6,889	1	45,926	22	70,475	0%	2%
New Jersey	231,065	169,857	74,857	448	125,098	1,234	602,559	3%	17%
New York	388,202	377,788	76,001	1,385	304,059	11,153	1,158,588	5%	32%
Pennsylvania	245,099	144,971	184,712	633	80,640	35,493	691,548	3%	19%
Rhode Island	19,088	11,043	5,892	59	43,912	695	80,689	0%	2%
Vermont	3,088	2,610	2,628	1	32	14	8,373	0%	0%
West Virginia	29,795	25,084	33,263	328	2,287	26,702	117,459	1%	3%
Regional Total	1,198,378	934,194	494,176	3,727	900,279	83,735	3,614,489	16%	100%
US Total	4,806,136	3,101,526	6,745,835	22,265	5,869,145	1,696,296	22,401,203		
% of US	25%	30%	7%	17%	15%	5%	16%		
% of Region	33%	26%	14%	0%	25%	2%	100%		

Source: Derived from Energy Information Administration data.

## **Northeast Natural Gas Market: Production**

## **Natural Gas Production by State**

Northeast Dry			Yearly	2005 % of	% of
Production	2004	2005	Change	Region	US
Maryland	34	46	35%	0%	0%
New York	46,050	55,180	20%	13%	0%
<b>Pennsylvania</b>	196,583	167,801	-15%	39%	1%
West Virginia	189,561	209,239	10%	48%	1%
Regional Total	432,228	432,266	0%	100%	2%
US Total	18,757,477	18,074,237	-4%		
% of US	2%	2%			

## **Northeast Natural Gas Market: Storage and Reserves**

## **Natural Gas Storage by Field Type (2005)**

						Depleted					
	Salt Dome	Salt Dome		<b>Aquifers</b>	Depleted	<b>Fields</b>	<b>Total</b>	Total	%of US	%of	<b>Dry Proved</b>
Field Type	<b>Fields</b>	Capacity	<b>Aquifers</b>	Capacity	<b>Fields</b>	Capacity	<b>Fields</b>	Capacity	Capacity	Region	Reserves
New York	1	2,000	0	0	22	202,000	23	205,000	2%	14%	349,000
Pennsylvania	0	0	0	0	49	749,000	49	749,000	9%	51%	2,782,000
West Virginia	0	0	0	0	31	512,000	31	512,000	6%	35%	4,459,000
Northeast Total	1	2,000	0	0	102	1,463,000	103	1,466,000	18%		7,590,000
US Total	30	250,532	44	1,350,689	320	6,667,222	394	8,268,443			204,385,000
%of US	3%	1%	0%	0%	32%	22%	26%	18%			4%
% of Region	1%	0.1%	0%	0%	99%						

Source: Derived Energy Information Administration data.

Updated January 12, 2007

Note: Capacity units are measured in Millions of Cubic Feet.