

Office of Economic Policy Discussion Paper 99-01

The Development of Market Centers and Electronic Trading in Natural Gas Markets

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**Office of Economic Policy
Federal Energy Regulatory Commission**

June 1999

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Introduction

The decade of the 1990s has seen the significant development of market centers and the introduction of electronic gas trading in natural gas markets. The purpose of this paper is to discuss the growth and current status of market centers and electronic gas trading. Almost all market center development and all electronic trading activity has occurred since Order No 636.

Market centers are important to natural gas markets for several reasons. They facilitate gas trading and transportation, and they help provide the liquidity needed to make electronic gas trading a growing force in current-day natural gas markets. Market centers also reduce transactions costs by making it easier for buyers and sellers to do business with one another. Thus, market centers have supported and can continue to promote the Commission's goal of improved short-term and long-term gas markets. For a recent discussion of this goal, see the Commission's Notice of Proposed Rulemaking and Notice of Inquiry in Dockets RM98-10-000 and RM98-12-000, respectively.

The text of the paper is organized into separate sections on market centers and electronic gas trading. Following the text are Table 1 (listing the names and important features of individual market centers), Table 2 (identifying the pipelines associated with each market center), and Appendix A (a glossary of market center terms which lists and defines all of the services performed by market centers and other terms).

Market Centers

Order No. 636 is widely viewed as an important element in the development of market centers. The order not only promoted more competitive gas markets, which helped stimulate market center development, but also required that pipeline tariffs not inhibit market centers. As stated in the regulatory text of Order No. 636:

An interstate pipeline that offers transportation service ... may not include in its tariff any provision that inhibits the development of markets centers. [18 CFR § 284.8 (b) (4) and § 284.9 (b) (4)]

Before Order No. 636 was issued in April 1992, there were only five market centers in the United States and Canada. Today there are 38 operating market centers and 3 proposed centers expected to be operating within the next few years.^{1/} Box 1 shows the growth of market centers by year from 1991 through 1998. The number of market centers at least doubled in each of the two calendar years immediately following Order No. 636 and increased by more than 60 percent in 1995. Over the past three years, the number of market centers has been relatively stable.

^{1/} For purposes of this paper, almost any entity that refers to itself as a market center or market hub is considered as such.

Box 1. Number of Market Centers by Year

	1991	1992	1993	1994	1995	1996	1997	1998
Added		1	6	13	9	5	3	
Dropped					1		1	2
Year-End Total	5	6	12	25	33	38	40	38

To date, only four once-operational market centers are no longer active. Two of these centers were electronic trading points that were terminated because of low trading volume. The other two started operations as market centers, but now consider themselves to be only storage operators.

The names and selected features of current and proposed market centers are shown in Tables 1 and 2 (attached at the end of the text). One important feature of a market center is the services that are offered. These services can be characterized as either physical (those provided through a major physical facility, such as a section of pipeline or storage) or transactional (those performing an economic or informational function without using the physical facilities associated with physical services). Box 2 shows the most common services and the number of market centers offering them. A complete list of market center services and their definitions is shown in the attached glossary.

A significant number of market centers offer wheeling or transportation as hub services. Typically they provide these services using a header (relatively short section of pipe connecting all the pipelines associated with the center), part of a pipeline system, or an entire pipeline system. Box 3 shows that currently there is an even split among the type of facilities existing market centers use to provide wheeling or transportation services.

Figure 1 is a map showing the location of current and proposed market centers. Regional representation is as follows:

- Southern Producing areas 18

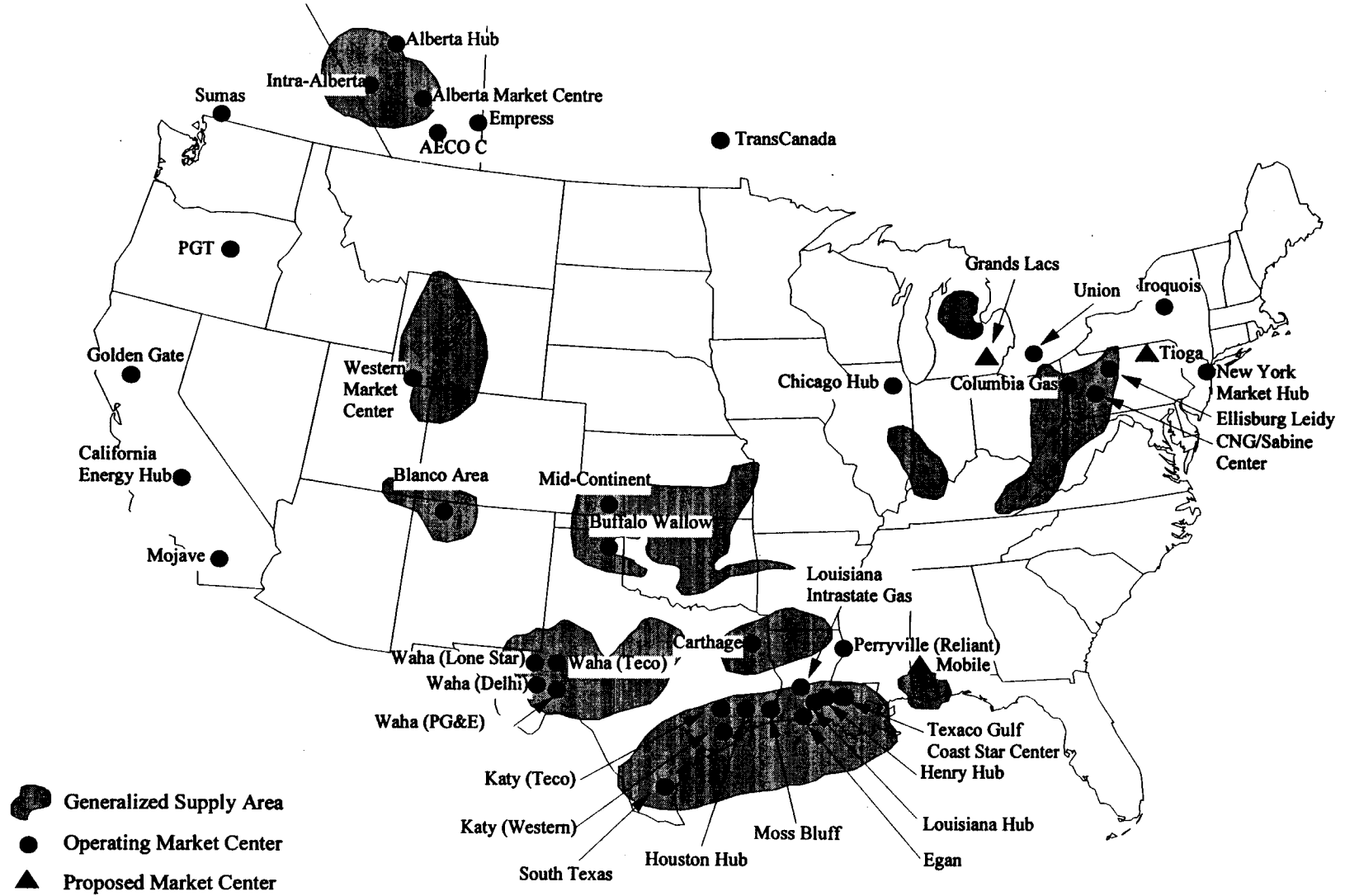
Box 2. Market Center Services

Physical Services	No.
Wheeling	29
Parking	23
Loaning	19
Gas Trading	16
Storage	13
Transactional Services	
Title Transfer	16
Electronic Gas Trading	13

Box 3. Transfer Facilities

Facility	No.
Header	10
Part of Pipeline Grid	10
Entire Pipeline Grid	10

Figure 1.
Current and Proposed Market Centers



- Canada 8
- Northeast 6
- West 4
- Midwest/Midcontinent 3
- Rocky Mountain 2.

Most of the operators of market centers shown in Table 1 are also the owners. In some cases, one entity operates or helps to operate more than one market center. These entities and the centers involved are as follows:

- Market Hub Partners, L.P., through various subsidiaries, currently operates two market centers (Egan and Moss Bluff) with high deliverability salt cavern storage facilities. Also, a third center (Tioga) is far enough along in planning and development to be included in Table 1 as a proposed market center. These three market center locations are shown separately on Figure 2.
- Sabine Pipeline Co. operates the Henry Hub, helps to operate the CNG/Sabine Center, and is a partner in the Alberta Hub (see Figure 3).
- Pacific Gas and Electric operates four market centers. These centers are Golden Gate, Katy (Teco), Waha (Teco), and Waha (PG&E) (see Figure 4).

Figure 2.
Market Centers Operated by Market Hub Partners

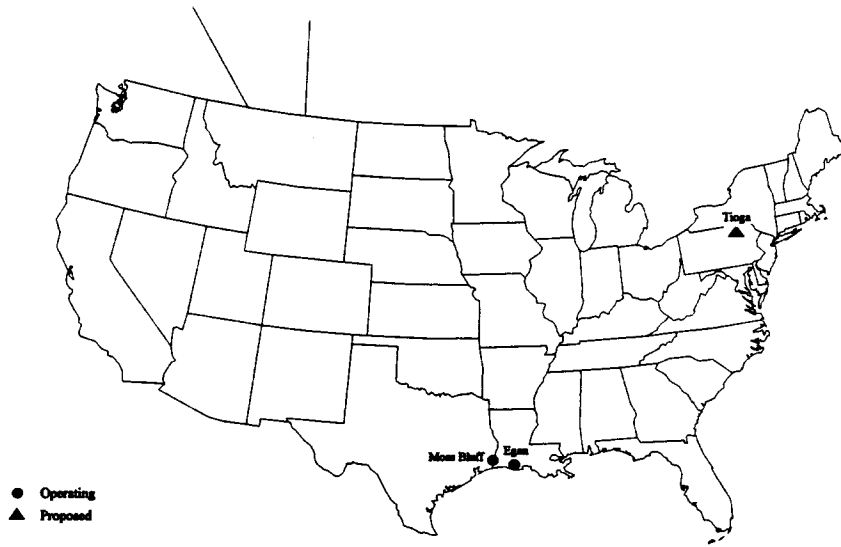


Figure 3.
Market Centers Operated by Sabine Pipeline Company

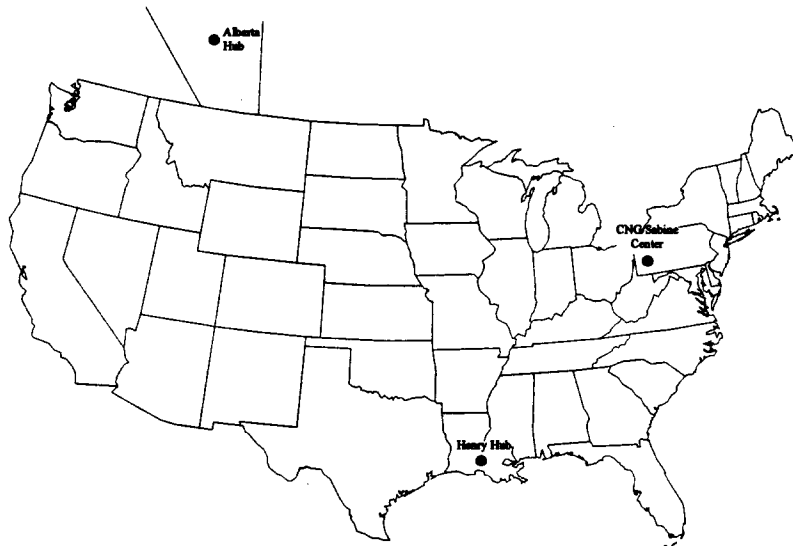


Figure 4.
Market Centers Operated by Pacific Gas & Electric Company



Electronic Gas Trading

Electronic gas trading is an important and rapidly growing service offered at several market centers and other trading points. At year-end 1998 three electronic gas trading systems were operating in North America: QuickTrade (operating in both the United States and Canada), Streamline (operating in the United States), and Natural Gas Exchange (operating in Canada). Data on the use of these trading systems are shown in Box 4. Figures 5-6 are maps showing the general location of major trading points for the three trading systems.

Box 4. Use Levels of Gas Trading Systems (1998 Year End)

Trading System	Trading Points	Subscribers	1998 Volume (Bcf)
Streamline (U.S.)	35	89 Trading 30 View Only	605
Natural Gas Exchange (Can.)	2	74 Trading 50 View Only	1307
QuickTrade			
U.S.	140	119 Trading 47 View Only	849
Canada	10	56 Trading 28 View Only	214

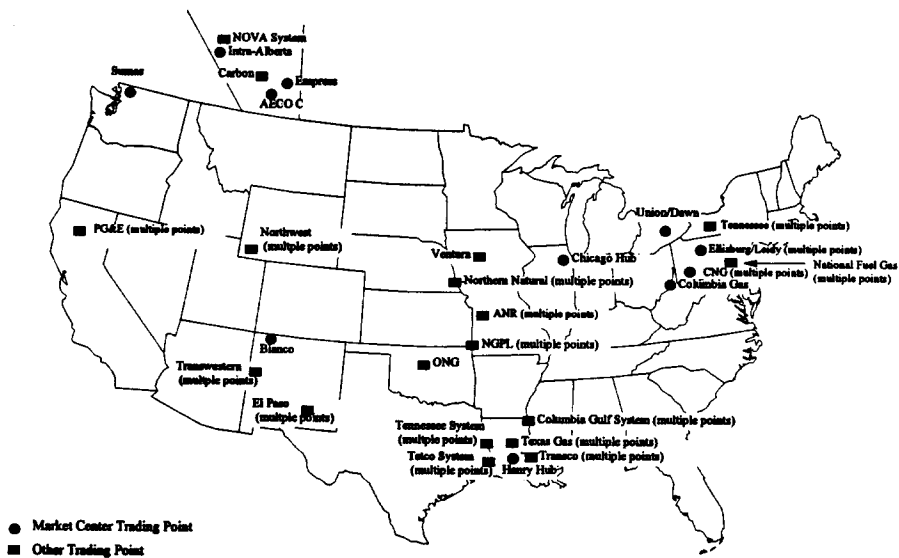
Electronic trading of gas began in 1994, and at one time at least six trading systems were operating. However, two of those systems merged and two others went out of business to bring the currently operating total to three. As can be seen in Box 5, initial trading volumes were very low, but volumes have increased dramatically since then.^{2/} Total 1998 gas trading on all three systems increased by over 50 percent compared with 1997, and each system experienced at least a 40-percent increase.

^{2/} QuickTrade did not operate in 1994 and 1995. Box 5 somewhat understates total trading volume for all trading systems for 1994-1996, because trading volumes for the systems no longer operating are unavailable.

Figure 5.
Streamline and Natural Gas Exchange: Market Center and Other Major Trading Points



Figure 6.
Quicktrade: Market Center and Other Major Trading Points



Box 5. Electronic Trading Volume on Existing Systems (Bcf)

Trading System	1994	1995	1996	1997	1998
Streamline (U.S.)	13	111	242	397	605
Nat. Gas Ex. (Can.)	20	56	405	893	1307
QuickTrade					
U.S.			77	499	849
Canada			81	116	214
Total	33	167	805	1905	2975

The big news for 1999 is that Streamline and QuickTrade have become one system – now called Altrade. In January, Altra Energy Technologies, parent of Streamline, announced that it had purchased QuickTrade, and the convergence of the two electronic trading platforms into one took place in May. Company officials state that the main reason for merging the two companies was to increase liquidity at major trading points. The new Altrade is now the only electronic gas trading vendor in the United States, but it will compete with Natural Gas Exchange in Canada.

Table 1. Current and Proposed Market Centers

Name/ Location	Transfer Facility^a	Physical Services^b	Transactional Services^c	No. of Pipelines	Operator^d
Southern Producing Areas					
Buffalo Wallow [TX-OK Panhandle]	Header	Wheeling Parking Balancing Peaking Storage		13	KN Interstate Gas Trans. Co. & Westar Transmission
Carthage [Northeast TX]	Header	Wheeling Compression Gas Trading	Title Transfer Elec. Gas Trading	14	Union Pacific Fuels, Inc.
Egan [Southern LA]	Header	Wheeling Storage Parking Loaning Balancing	Title Transfer	6	Egan Hub Partners
Henry Hub [Southeast LA]	Header	Wheeling Parking Loaning Balancing Compression Gas Trading	Title Transfer Information Administrative Elec. Gas Trading	14	Sabine Pipeline
Houston Hub [Southeast TX]	Header	Wheeling Storage Parking Loaning		5	El Paso Field Services
Katy (Teco) [Southeast TX]	Header	Wheeling Compression Processing		8	Pacific Gas & Electric - Teco, Inc.
Katy (Western) [Southeast TX]	Header	Wheeling Storage Balancing Parking Gas Trading	Title Transfer	11	Western Gas Resources Storage, Inc.
Louisiana Hub [Entire LRC Intrastate System located in Southern LA]	Entire Pipeline Grid	Wheeling Parking Loaning Transportation Storage Processing	Matching Gas Buyers and Sellers Risk Management	20	Enron Gas Services
Louisiana Intrastate Gas Market Center [Entire LIG Intrastate System located in LA]	Entire Pipeline Grid Header (P)	Wheeling Gas Trading Loaning Peaking Balancing Storage Parking	Risk Management	10+	Louisiana Intrastate Gas.

Table 1. Current and Proposed Market Centers

Name/ Location	Transfer Facility^a	Physical Services^b	Transactional Services^c	No. of Pipelines	Operator^d
Mobile [Southwest AL] <i>Proposed</i>	Header	Storage Wheeling Parking Loaning Peaking Balancing	Title Transfer	2	Bay Gas Storage
Moss Bluff [Southeast TX]	Header	Wheeling Compression Storage Parking Loaning Balancing	Title Transfer Information	7	Moss Bluff Hub Partners
Perryville Hub (Reliant) [Northeast LA]	Part of Pipeline Grid	Wheeling Storage		10	Reliant Energy Gas Trans. Co.
South Texas Hub [South Tx]	Part of Pipeline Grid	Wheeling TransTexas Gas Sales		13	TransTexas Transmission Corp.
Texaco Gulf Coast Star Center [Entire Bridgeline System located in Southern LA]	Entire Pipeline Grid and Part of Texaco Gathering System	Wheeling Transportation Storage Parking Loaning Processing Texaco Gas Sales	Risk Management	22	Texaco
Waha (Delhi)	Entire Pipeline Grid	Wheeling		9	Delhi Pipeline
Waha (Lone Star) [Southwest TX]	Header	Wheeling Compression		5	Lone Star Gas Co.
Waha (PG&E) [Southwest TX]	Part of Pipeline Grid	Wheeling Gas Trading	Elec. Gas Trading Risk Management	9	Pacific Gas & Electric Gas Transmission - Texas
Waha (Teco) [Southwest TX]	Header	Wheeling Compression Processing		4	Pacific Gas & Electric - Teco, Inc.
Midwest/Midcontinent					
Chicago Hub [Northeast & Western IL]	Part of Pipeline Grid	Wheeling Parking Loaning Gas Trading	Title Transfer Elec. Gas Trading	5	Nicor Gas & Enerchange
Grands Lacs [Southeast Michigan] <i>Proposed</i>	Part of Pipeline Grid	Wheeling Storage Parking		5	CMS Gas Transmission and Storage

Table 1. Current and Proposed Market Centers

Name/ Location	Transfer Facility^a	Physical Services^b	Transactional Services^c	No. of Pipelines	Operator^d
Mid Continent Market Center [Southwest & Central KS]	Part of Pipeline Grid	Wheeling Transportation Balancing Storage Parking Loaning	Title Transfer Administrative	8	Mid-Continent Market Center, Inc. & Gas Service
Northeast					
CNG/Sabine Center [Entire CNG system mostly located in OH, NY, PA, & WV]	Entire Pipeline Grid	Wheeling Parking	Title Transfer Information	10+	CNG Transmission Corp. & Sabine Pipeline Co.
Columbia Gas Market Center [Entire Columbia Gas system located in KY, MD, NY, OH, PA, VA, & WV]	Entire Pipeline Grid	Wheeling Parking Gas Loaning Gas Trading	Title Transfer Information Risk Management Elec. Gas Trading	11+	Columbia Energy Services
Ellisburg-Leidy Hub [Northwest PA]	Part of Pipeline Grid	Wheeling Parking Loaning Gas Trading	Title Transfer Elec. Gas Trading	6	National Fuel Gas Supply Corp.
Iroquois [Entire Iroquois system in NY]	Entire Pipeline Grid	Wheeling Parking Loaning Transportation		4+	Iroquois Gas Transmission System
New York Market Hub [Southeast NY/ Northeast NJ]	Parts of 3 Pipeline Grids	Wheeling Parking Loaning Gas Trading		4	Brooklyn Union
Tioga Gas Storage [Northern PA] <i>Proposed</i>	Header	Storage Wheeling Parking Balancing	Title Transfer	2	N.E. Hub Partners, LP

Table 1. Current and Proposed Market Centers

Name/ Location	Transfer Facility^a	Physical Services^b	Transactional Services^c	No. of Pipelines	Operator^d
Rocky Mountain Area					
Blanco Area [Northwest NM]	Header and Part of Pipeline Grid	Wheeling Processing Gas Trading	Title Transfer Information Elec. Gas Trading	5	Transwestern (Header) El Paso (Interconnects) QuickTrade (Elec. Trading)
Western Market Center [Southwest WY]	Header	Wheeling		6	Overland Trail
West					
California Energy Hub [Entire SoCal Gas System Located in Southern CA]	Entire Pipeline Grid	Wheeling Parking Loaning		6	Southern California Gas
Golden Gate [Entire PG&E system located in Northern CA]	Entire Pipeline Grid	Wheeling Parking Loaning		6	Pacific Gas & Electric
Mojave [Entire Mojave system located in Southern CA]	Transportation Not a Hub Service	Parking Loaning		4	Mojave Pipeline
PGT Hub [Entire PGT system located in ID, OR, and WA]	Transportation Not a Hub Service	Parking Loaning		4	Pacific Gas Transmission Co.
Canada					
AECO C Hub [Southern Alberta]	Part of NOVA Pipeline Grid	Storage Parking Loaning Transportation Gas Trading	Title Transfer Information Elec. Gas Trading	1	Alberta Energy Company
Alberta Hub [Central Alberta]	Transportation Not a Hub Service	Storage Parking Loaning Balancing Exchange	Title Transfer Risk Management	1	Sabine Hub Services
Alberta Market Centre [Southern Alberta]	Intersection of NOVA & Canadian Western	Storage Wheeling Parking Loaning	Title Transfer	2	ATCO Gas Services
Empress Hub [Southern Alberta]	Transportation Not a Hub Service	Gas Trading	Elec. Gas Trading	2	Western Gas Marketing

Table 1. Current and Proposed Market Centers

Name/ Location	Transfer Facility^a	Physical Services^b	Transactional Services^c	No. of Pipelines	Operator^d
Intra-Alberta Hub [NOVA System in Alberta & British Columbia]	Transportation Not a Hub Service	Gas Trading	Elec. Gas Trading	1	Natural Gas Exchange
Sumas [Part of Westcoast Pipeline just North of U.S.—Canadian border]	Transportation Not a Hub Service	Gas Trading	Elec Gas Trading	3	Westcoast Pipeline
TransCanada Pipeline [Southern Canada]	Entire Pipeline Grid	Parking Loaning Transportation	Title Transfer	14	TransCanada Pipelines, Ltd.
Union Gas Hub [Entire Union System located in Southern Ontario]	Entire Pipeline Grid	Wheeling Parking Loaning Transportation Storage Gas Trading	Title Transfer Elec. Gas Trading	6	Union Gas

^aTransfer facility is the type of transportation facilities used for wheeling or transportation. A header is one or more sections of pipe connecting all of the pipelines associated with the market center. A header is usually relatively short (e.g., ranging from a few hundred feet to several miles), but could be up to 100 miles or more. All transfers are made through the header (i.e., no transfers occur through displacement or exchange). In some cases a market center refers to its header facility as an interchange. Where there is no header, either all or part of the pipeline system of the market center is used to transfer gas from one pipeline to another.

^bPhysical services are those provided through a major physical facility, such as a header or storage, associated with the market center.

^cTransactional services perform an economic or informational function without using the physical facilities associated with physical services.

^dThe operator is the entity or entities that a customer contacts to purchase and use market center services and that is responsible for operating the center and performing various administrative functions. In some cases, more than one entity assumes these responsibilities.

Table 2. Pipelines Associated with Market Centers

AECO C HUB

NOVA

ALBERTA HUB

NOVA

ALBERTA MARKET CENTRE

NOVA

Canadian Western

BLANCO AREA

El Paso Natural Gas Co.
Public Service Gas Co. of New Mexico
Northwest Pipeline Co.
TransColorado Gas Transmission
Transwestern Pipeline Co.

BUFFALO WALLOW

ANR Pipeline Co.
Delhi Gas Transmission
KN Interstate Gas Transmission Co.
Koch Midstream
Natural Gas Pipeline Co. of America
Northern Natural Gas Co.
Oklahoma Natural Gas
Panhandle Eastern Pipe Line Co.
Reliant Energy Gas Transmission Co.
Transok, Inc.
Transwestern Pipeline Co.
Westar Transmission Co.
Williams Natural Gas Co.

CALIFORNIA ENERGY HUB

El Paso Natural Gas Co.
Kern River Gas Transmission Co.
Mojave Pipeline Co.
Pacific Gas and Electric
Southern California Gas Co.
Transwestern Pipeline Co.

CARTHAGE

Reliant Energy Gas Transmission Co.
Delhi Gas Transmission
Eastern Ltd Partnership
Exxon Gas Systems
Koch Gateway Pipeline Co.
Lone Star Gas Co.
Midcon/SONAT/Venture
Southern Natural Gas Co.
Tejas Gas
Tennessee Gas Pipeline Co.
Texas Eastern Transmission Corp.
Texas Gas Transmission Corp.
Texas Gas Gathering
PG&E Gas Transmission - Texas

CHICAGO HUB

ANR Pipeline Co.
Midwestern Gas Transmission Co.
Natural Gas Pipeline Co. of America
Northern Natural Pipeline Co.
Panhandle Eastern Pipe Line Co.

CNG/SABINE CENTER

Over 200 interconnections. Major pipelines are:

ANR Pipeline Co.
CNG Transmission Corp.
Columbia Gas Transmission Corp.
Iroquois Gas Transmission System
National Fuel Gas Supply Corp.
Panhandle Eastern Pipe Line Co.
Tennessee Gas Pipeline Co.
Texas Eastern Transmission Corp.
Transcontinental Gas Pipe Line Corp.
Trunkline Gas Co.

COLUMBIA GAS

ANR Pipeline Co.
Algonquin Gas Transmission Co.
CNG Transmission Corp.
Columbia Gas Transmission Corp.
Columbia Gulf Transmission Co.
Crossroads Pipeline Co.
Panhandle Eastern Pipe Line Co.
Tennessee Gas Pipeline Co.
Texas Eastern Transmission Corp.
Texas Gas Transmission Corp.
Transcontinental Gas Pipe Line Corp.

EGAN

ANR Pipeline Co.
Columbia Gulf Transmission Co.
Tennessee Gas Pipeline Co.
Texas Gas Transmission Corp.
Transcontinental Gas Pipe Line Corp.
Trunkline Gas Co.

ELLISBURG-LEIDY

Columbia Gas Transmission Corp.
CNG Transmission Corp.
National Fuel Gas Supply Corp.
Tennessee Gas Pipeline Co.
Texas Eastern Transmission Corp.
Transcontinental Gas Pipe Line Corp.

EMPRESS HUB

NOVA
TransCanada Pipelines Ltd.

GOLDEN GATE

El Paso Natural Gas Co.
Kern River Gas Transmission Co.
Pacific Gas and Electric Co.
Pacific Gas Transmission Co.
Southern California Gas Co.
Transwestern Pipeline Co.

GRANDS LACS

ANR Pipeline Co.
CMS Gas Transmission & Storage
Great Lakes Gas Transmission
Michcon
Southeastern Michigan Gas

HENRY HUB

Acadian Gas Pipeline System
Columbia Gulf Transmission Co.
Dow Intrastate
Equitable Resources
Koch Gateway Pipeline Co.
Louisiana Resources Co.
Natural Gas Pipeline Co. of America
Sabine Pipe Line Co. (Mainline)
Sea Robin Pipeline Co.
Southern Natural Gas Co.
Texaco Gathering System
Texas Gas Transmission Co.
Transcontinental Gas Pipe Line Corp.
Trunkline Gas Co.

HOUSTON HUB

Enercorp Gas Transmission
Koch Gateway Pipeline Co.
Natural Gas Pipeline Co. of America
Tennessee Gas Pipeline Co.
Trunkline Gas Co.

INTRA-ALBERTA HUB

NOVA

IROQUOIS

Major pipelines are:

Algonquin Gas Transmission Co.
CNG Transmission Corp.
Iroquois Gas Transmission Sys.
Tennessee Gas Pipeline Co.

KATY (Teco)

Dow Intrastate
Houston Pipeline
Lone Star Gas Co.
Midcon/TETA
Oasis Pipeline Co.
Southwestern
Tennessee Gas Pipeline Co.
Winnie Pipeline

KATY (Western)

Amoco Gas Co.
Dow-Tenngasco
Houston Pipeline Co.
Koch Gateway Pipeline Co.
Lone Star Gas Co.
Midcon Texas Pipeline
Natural Gas Pipeline Co. of America
Oasis Pipeline Co.
Tejas Gas Corp.
Tennessee Gas Pipeline Co.
Transcontinental Gas Pipeline Co.

LOUISIANA HUB

Acadian Gas Pipeline System
ANR Pipeline Co.
Bridgeline Gas Distribution Co.
Columbia Gulf Transmission Co.
Cypress
Dow Intrastate
Florida Gas
Henry Hub (Sabine)
Koch Gateway Pipeline Co.
Louisiana Gas System Inc.
Louisiana Intrastate Gas Corp.
Natural Gas Pipeline Co. of America
Sea Robin
Southern Natural Gas Co.
Stingray Pipeline Co.
Tennessee Gas Pipeline Co.
Texas Eastern Transmission Corp.
Texas Gas Transmission Co.
Transcontinental Gas Pipe Line Corp.
Trunkline

LOUISIANA INTRASTATE GAS

Numerous interconnections. Major pipelines are:

ANR Pipeline Co.
Columbia Gulf Transmission Co.
Florida Gas Transmission Co.
Louisiana Intrastate Gas Corp.
Koch Gateway Pipeline Co.
Natural Gas Pipeline Co. of America
Sabine Pipe Line Co.
Sea Robin Pipeline Co.
Transcontinental Gas Pipe Line Corp.
Tennessee Gas Pipeline Co.
Texas Eastern Transmission Corp.
Texas Gas Transmission Corp.
Trunkline Gas Co.

MID CONTINENT

ANR Pipeline Co.
Colorado Interstate Gas Co.
KN Energy, Inc.
Natural Gas Pipeline Co. of America
Northern Natural Pipeline Co.
Panhandle Eastern Pipe Line Co.
Western Resources, Inc.
Williams Natural Gas Co.

MOBILE

Florida Gas Transmission Co.
Koch Gateway Pipeline Co

MOJAVE

El Paso Natural Gas Co.
Mojave Pipeline Co.
Southern California Gas Co.
Transwestern Pipeline Co.

MOSS BLUFF

Channel Industries Gas
Houston Pipeline
Midcon Texas (UTTCO)
Natural Gas Pipeline Co. of America
Tejas Gas
Tejas Power
Texas Eastern Transmission Corp.

NEW YORK MARKET HUB

Iroquois Gas Transmission System
Tennessee Gas Pipeline Co.
Texas Eastern Transmission Corp.
Transcontinental Gas Pipe Line Corp.

PERRYVILLE (Reliant)

ANR Pipeline Co.
Columbia Gulf Transmission
Koch Gateway Pipeline Co.
Mississippi River Transmission Corp.
Reliant Energy Gas Transmission Co.
Southern Natural Gas Co.
Tennessee Gas Pipeline Co.
Texas Eastern Transmission Corp.
Texas Gas Transmission Corp.
Trunkline Gas Co.

PGT HUB

Alberta Natural Gas Co., Ltd.
Northwest Pipeline Corp.
Pacific Gas and Electric Co.
Pacific Gas Transmission Co.

SOUTH TEXAS HUB

Channel Industries Gas Co.
Florida Gas Transmission Co.
Houston Pipe Line Co.
Koch Gateway Pipeline Co.
Midcon
Natural Gas Pipeline Co. of America
Tennessee Gas Pipeline Co.
Tejas Power
Texas Eastern Transmission Corp.
Transcontinental Gas Pipe Line Corp.
TransTexas Transmission Corp.
Trunkline Gas Co.
Valero Transmission Co.

SUMAS

BC Gas Inc.
Northwest Pipeline Corp.
Westcoast Energy, Inc.

TEXACO GULF COAST STAR CENTER

Acadian Gas Pipeline System
ANR Pipeline
Bridgeline Gas Distribution Co.
Channel Industries Gas Co.
Columbia Gulf Transmission Co.
Cypress
Florida Gas Transmission Co.
Houston Pipe Line Co.
Koch Gateway Pipeline Co.
Louisiana Gas System Inc.
Louisiana Interstate Gas Corp.
Louisiana Resources Co.
Nechas Gas System
Olympic
Sabine Pipe Line Co.
Tejas Gas
Tennessee Gas Pipeline Co.
Texas Eastern Transmission Corp.
Texas Gas Transmission Corp.
Transcontinental Gas Pipe Line Corp.
Trunkline Gas Co.
Winnie Pipeline

TIOGA GAS STORAGE

CNG Transmission Corp.
Tennessee Gas Pipeline Co.

TRANSCANADA PIPELINE

Consolidated Natural Gas
Empire Pipeline
Foothills Pipeline Ltd.
Great Lakes Transmission
Iroquois Gas Transmission System
National Fuel Gas Supply Corp.
Niagara Gas Pipeline
Nova Gas Transmission Ltd.
Tennessee Gas Pipeline Co.
Texas Eastern Transmission Corp.
TransCanada Gas Pipelines Ltd.
Transgas Ltd.
Union Gas Ltd.
Viking Gas Transmission Co.

WESTERN MARKET CENTER

Colorado Interstate Gas Co.
Kern River Gas Transmission Co.
Northwest Pipeline Co.
Overland Trail
Overthrust Pipeline
Questar Pipeline Co.

UNION GAS HUB

ANR Pipeline Co.
Great Lakes Gas Transmission Co.
Michcon
Panhandle Eastern Pipe Line Co.
TransCanada Pipelines
Union Gas

WAHA (Delhi)

Delhi Pipeline
El Paso Natural Gas Co.
Lone Star Gas Co.
Natural Gas Pipeline Co. Of America
Northern Natural Gas Co.
Oasis Pipeline Co.
Red River Pipeline
Transwestern Pipeline Co.
PG&E Gas Transmission - Texas
Westar Pipeline

WAHA (Lone Star)

El Paso Natural Gas Co.
Lone Star Gas Co.
Northern Natural Gas Co.
PG&E Gas Transmission - Texas
Westar Pipeline

WAHA (PG&E)

Delhi Gas Transmission
El Paso Natural Gas Co.
Lone Star Gas Co.
Natural Gas Pipeline Co. of America
Northern Natural Gas Co.
Oasis Pipeline Co.
Transwestern Pipeline Co.
PG&E Gas Transmission - Texas
Westar Pipeline

WAHA (Teco)

Lone Star Gas Co.
Northern Natural Gas Co.
PG&E Gas Transmission - Texas.
Westar Pipeline

Appendix A: Glossary of Market Center Terms

Administrative Service: Assistance to shippers with the administrative aspects of gas transfers, such as nominations and confirmations.

Balancing Service: Either providing gas to or taking gas from a shipper, mainly for the purpose of avoiding imbalance penalties. May be done in a variety of ways, such as by sales, loans, or storage of gas by a market center operator; imbalance trading; or through operational balancing agreements with interconnected pipelines. Some market centers use the term differently—for example, to refer only to gas loans. For our purposes, if a market center provides balancing only through loans and/or parking, these services are listed separately and balancing is not listed.

Compression Service: The provision of compression as a separate service. If compression is bundled with transportation, it is not listed as a service.

Electronic Gas Trading Service: Trading systems that either electronically match buyers and sellers or facilitate direct negotiations for legally binding transactions. A market center or other transaction point serves as the location where gas is transferred from seller to buyer.

Gas Trading Service: The physical exchange/trading of gas at a market center. Includes gas traded via electronic trading as well as other means, such as phone and fax. Thus, gas trading is listed as a physical service for any market center that is a transaction point for electronic gas trading.

Gas Loaning Service: A short-term advance of gas to a shipper by a market center which is repaid in kind by the shipper a short time later. The service is referred to by various other names in the industry, such as advancing, drafting, reverse parking, balancing, and imbalance resolution.

Header: One or more sections of pipe connecting all of the pipelines associated with a market center. A header is usually relatively short (e.g., ranging from a few hundred feet to several miles), but could be up to 100 miles or more. All transfers are made through the header (i.e., no transfers occur through displacement or exchange). In some cases a market center refers to its header facility as an interchange.

Information Service: Information of various types, mostly provided electronically. This information includes, for example, specific information to a customer about its accounts, contracts, or transactions; real time information about gas flows, capacity availability, prices, and costs; advertisements for services that market center customers would like to sell; and general information about market prices.

Parking Service: A short-term transaction in which the market center holds the shipper's gas for redelivery at a later date. Parking often uses storage facilities, but may also be accomplished in other ways, such as by displacement or variations in line pack.

Peaking Service: Short-term (usually less than a day and perhaps hourly) sales of gas to meet unanticipated or difficult-to-plan-for increases in demand or shortages of gas experienced by the buyer.

Physical Service: A generic term for services provided through a major physical facility, such as a header or storage, associated with a market center.

Processing Service: The removal of liquefiable hydrocarbons and impurities from gas.

Risk Management Service: Services that relate to reducing the risk of price changes to gas buyers and sellers. Common examples are futures, options, and exchange of futures for physicals (EFPs).

Storage Service: Storage that is longer term than parking, such as seasonal storage.

Title Transfer Service: A service in which changes in ownership of a specific gas package are recorded by the market center. Title may transfer several times for some gas before it leaves the center. In some cases, the service may allow title to transfer where it otherwise could not. In other cases, the service is simply an accounting or documentation of title transfers that may be done electronically, by hard copy, or both. The service is sometimes referred to as title tracking or intra-hub transfer service.

Transactional Service: A generic term for services that perform an economic or informational function without using the physical facilities associated with physical services.

Transportation Service: Movement of gas from one point to another on a pipeline where either the receipt or delivery point is not an interconnected pipeline.

Wheeling Service: Transfer of gas from one interconnected pipeline to another through a header, by displacement (including exchanges), or by physical transfer over the transmission system of a market center pipeline. Sometimes called hub transfer, if done through a header.