

Derivatives and Risk Management in the Petroleum, Natural Gas, and Electricity Industries

Table 6. Average Transmission Charges from Henry Hub and Their Standard Deviations

Location	Average Transmission Charge (Dollars per Thousand Cubic Feet)	Standard Deviation	Standard Deviation / Average Transmission Charge
American Natural Resources Pipeline Co. – SE Transmission Pool . . .	0.06	0.03201	0.51
Columbia Gulf Transmission Co. – Onshore Pool	0.03	0.02787	0.87
El Paso – Keystone Pool	0.15	0.11119	0.75
Natural Gas Pipeline Co. of America – Louisiana Pool	0.05	0.03136	0.59
Tennessee Gas Pipeline Co. – Zone L, 500 Leg Pool	0.07	0.04366	0.67
Tennessee Gas Pipeline Co. – Zone L, 800 Leg Pool	0.09	0.04617	0.54
Texas Eastern – East LA	0.05	0.04053	0.84
Texas Eastern – West LA	0.07	0.04134	0.61
Texas Gas Transmission Corp. – Zone SL \$FT Pool	0.02	0.02429	1.03
Transcontinental Gas Pipeline Corp. – Station 65	-0.02	0.05230	-2.22
Trunkline Gas Company – East Louisiana Pool	0.09	0.05269	0.57
Waha Hub – West Texas	0.10	0.09210	0.90

Source: Energy Information Administration, computed from data on the IntercontinentalExchange web site, www.intcx.com.

Table 7. Petroleum and Natural Gas Price Risks and Risk Management Strategies

Participants	Price Risks	Risk Management Strategies and Derivative Instruments Employed
Oil Producers	Low crude oil price	Sell crude oil future or buy put option
Petroleum Refiners	High crude oil price	Buy crude oil future or call option
	Low product price	Sell product future or swap contract, buy put option
	Thin profit margin	Buy crack spread
Storage Operators	High purchase price or low sale price	Buy or sell calendar spread
Large Consumers		
Local Distribution Companies (Natural Gas)	Unstable prices, wholesale prices higher than retail	Buy future or call option, buy basis contract
Power Plants (Natural Gas)	Thin profit margin	Buy spark spread
Airlines and Shippers	High fuel price	Buy swap contract

Source: Energy Information Administration.

Table 8. Summary Statistics for Exchange-Traded Petroleum and Natural Gas Futures Contracts

Exchange	Commodity	Point of Delivery	Contract Size	Futures	Date Begun	2001 Annual Volume (Contracts)	2002 Estimated Volume on April 17, 2002 (Contracts)
NYMEX	Heating Oil	New York Harbor	42,000 Gallons	18 Months	11/14/1978	9,264,472	31,831
NYMEX	Natural Gas	Henry Hub, LA	10,000 Million Btu	72 Months	04/03/1990	16,468,355	105,522
NYMEX	Light Sweet Crude Oil	Cushing, TX	1,000 Barrels	30 Months + 5 Long	03/30/1983	37,530,568	240,823
NYMEX	Unleaded Gasoline	New York Harbor	42,000 Gallons	12 Months	12/03/1984	10,427,500	43,854
NYMEX	Propane	Mont Belvieu, TX	42,000 Gallons	15 Months	08/21/1987	10,566	6
KCBOT	Western Natural Gas	Permian Hub, West Texas	10,000 Million Btu	18 Months	08/01/1995	0	0

Source: New York Mercantile Exchange (NYMEX) and Kansas City Board of Trade (KCBOT).

Table 9. Summary Statistics for Exchange-Traded Petroleum and Natural Gas Options Contracts

Exchange	Commodity	Options	Date Begun	2001 Annual Volume (Contracts)	2002 Estimated Volume on April 17, 2002 (Contracts)
NYMEX	Heating Oil	18 Months	06/26/1987	704,972	2,034
NYMEX	Natural Gas	12 Months + 20 Long	10/02/1992	5,974,240	39,660
NYMEX	Light Sweet Crude Oil	12 Months + 3 Long	11/14/1986	7,726,076	65,688
NYMEX	Unleaded Gasoline	12 Months	03/13/1989	1,040,030	5,674
KCBOT	Western Natural Gas	18 Months	08/01/1995	0	0

Source: New York Mercantile Exchange (NYMEX) and Kansas City Board of Trade (KCBOT).

Table 10. NYMEX Light Sweet Crude Oil Contract Specifications

Trading Unit	1,000 U.S. Barrels (42,000 gallons).
Trading Hours	Open outcry trading conducted between 10 am till 2:30 pm. NYMEX ACCESS@ on Mon-Thu begins at 3:15 pm and concludes 9 am the following day. Sunday ACCESS begins at 7 pm (all times are New York).
Trading Months	30 consecutive months plus long-dated futures initially listed 36, 48, 60, 72, and 84 months prior to delivery. Additionally, calendar strips can be executed (during open outcry trading hours) at an average differential to the previous day's settlement prices for periods of 2 to 30 consecutive months in a single transaction.
Price Quotation	Dollars and cents per barrel.
Minimum Price Fluctuation	\$0.01 per barrel (i.e., \$10 per contract).
Maximum Daily Price Fluctuation	Initially \$3.00 per barrel for all but the first two months, rising to \$6.00 per barrel if the previous settlement price of any back month is at the \$3.00 limit. If \$7.50 per barrel movement in either of the two front months, then the limit for all months becomes \$7.50 per barrel in the direction of the price movement.
Last Trading Day	Trading stops at close of business on the 3rd business day prior to the 25th calendar day of the month preceding the delivery month. If 25th is a non-business, then trading stops on 3rd business day prior to last business day preceding the 25th.
Delivery	FOB seller's facility, Cushing, OK, at any pipeline or storage facility with access to pipeline, by in-tank transfer, in-line transfer, book-out, inter-facility transfer.
Delivery Period	Deliveries are rateable over the course of the month and must be initiated on or after the first calendar day and completed by the last calendar day of the delivery month.
Alternative Delivery Procedure	Available to buyers and sellers matched by the Exchange after termination of spot month contract. If buyer and seller agree to the contract specifications, they may proceed and must notify the Exchange.
Exchange of Futures for Physicals (EFP)	Commercial buyer or seller may exchange a futures position for a physical position by notifying the Exchange. EFPs may be used to initiate or liquidate a futures position.
Deliverable Grades	Specific domestic crudes with 0.42% sulfur or less, and not less than 37 degree API gravity nor more than 42 degree API gravity; including WTI, Low Sweet Mix, NM Sweet, North TX Sweet, OK Sweet, South TX Sweet. Specific foreign crudes not less than 34 degree API nor more than 42 degree API; including Brent, Forties, and Osenberg Blend for which the seller will receive a 30 cent per barrel discount; Bonny Light and Cusiana (a 15 cent premium); and Qua Iboe (a 5 cent premium).
Inspection	Will be conducted according to pipeline practices. Buyer or seller may appoint an inspector and the requesting party will cover the cost and notify the other party.
Position Limits	20,000 contracts for all months combined, but not to exceed 1,000 in the last 3 days of trading in the spot month or 10,000 in any one month.
Margin Requirements	Margins are required for open futures positions.

Source: New York Mercantile Exchange (NYMEX), web site www.nymex.com.

Table 11. Moody's Bond Ratings for the Top 20 Natural Gas Marketers, 2000-2002

Company	2002		2001		2000	
	Date	Rating	Date	Rating	Date	Rating
1 Enron	NR	NR	03 DEC 2001	Ca	23 MAR 2000	Baa1
2 Reliant Energy	NR	NR	27 APR 2001	Baa2	20 MAR 2000	Baa1
3 American Energy Power	19 APR 2002	Review For Downgrade	24 APR 2001	Baa1	15 JUN 2000	Baa2
4 Duke Energy	NR	NR	21 SEP 2001	A2	NR	NR
5 Mirant	NR	NR	19 DEC 2001	Ba1	16 OCT 2000	Baa2
6 BP Energy (tied)	NR	NR	NR	NR	NR	NR
6 Aquila (tied)	20 MAY 2002	Review For Downgrade	NR	NR	13 DEC 2000	Baa3
8 Dynergy	25 APR 2002	Review For Downgrade	14 DEC 2001	Baa3	26 OCT 2000	Baa2
9 Sempra	22 APR 2002	Review For Downgrade	25 JUN 2001	A2	17 FEB 2000	A2
10 Coral	27 MAR 2002	A1	NR	NR	14 AUG 2000	A1
11 El Paso	29 MAY 2002	Baa2	12 DEC 2001	Baa2	31 JAN 2000	Baa2
12 Conoco (tied)	NR	NR	16 JUL 2001	Baa1	21 FEB 2001	A3
12 Entergy-Koch (tied)	NR	NR	19 JUL 2001	A3	NR	NR
14 Texaco	NR	NR	10 OCT 2001	A2	NR	NR
15 Dominion Resources	NR	NR	24 OCT 2001	Baa1	24 AUG 2000	Baa1
16 Williams	7 JUN 2002	Baa3	19 DEC 2001	Baa2	NR	NR
17 Exxon Mobil (tied)	NR	NR	NR	NR	NR	NR
17 Anadarko (tied)	30 JAN 2002	Baa1	24 JUL 2001	Baa1	17 JUL 2000	Baa1
19 Oneok (tied)	NR	NR	03 DEC 2001	Review For Downgrade	14 FEB 2000	A2
19 TXU (tied)	NR	NR	30 MAR 2001	Aaa	13 MAR 2000	Baa3

Rating Definitions: Aaa, Issuers rated Aaa offer exceptional security; Aa, Issuers rated Aa offer excellent financial security; A, Issuers rated A offer good financial security; Baa, Issuers rated Baa offer adequate financial security; Ba, Issuers rated Ba offer questionable financial security; B, Issuers rated B offer poor financial security; Caa, Issuers rated Caa offer very poor financial security; Ca, Issuers rated Ca offer extremely poor financial security; C, Issuers rated C are the lowest-rated class of entity; NR, No Rating.

Note: Moody's applies numerical modifiers 1, 2, and 3 in each generic rating category from Aa to Caa. The modifier 1 indicates that the issuer is in the higher end of its letter rating category; the modifier 2 indicates a mid-range ranking; the modifier 3 indicates that the issuer is in the lower end of the letter ranking category.

Source: Web site www.moody's.com (June 26, 2002).

Table 12. Use of Derivatives by Large Energy Marketing Firms, 2002
(Million Dollars)

Company	Derivative Assets	Derivative Liabilities	Total Assets	Derivative Assets as a Fraction of Total Assets
Reliant	2,058	1,840	5,989	0.344
American Electric Power	10,942	10,494	53,350	0.205
Duke Energy	5,443	3,731	19,478	0.279
Mirant	4,703	2,033	22,754	0.207
BP Energy	NR	NR	105,050	NR
Aquala	1,261	1,503	11,948	0.106
Dynergy	6,336	10,739	19,659	0.322
Sempra	2,575	1,793	15,156	0.170
El Paso	692	214	19,066	0.036
Conoco	221	NR	27,904	0.008
Entergy	2,089	1,982	25,910	0.081
Texaco	NR	NR	18,327	NR
Dominion Resources	1,856	1,408	34,369	0.054
Williams	10,724	8,462	38,906	0.276
ExxonMobil	NR	NR	26,461	NR
Anadarko	105	207	16,771	0.006
Oneok	1,063	873	7,441	0.143
Texus Utilities	2,447	2,049	42,275	0.058
Aquila	1,261	1,503	11,948	0.106
PG&E	807	711	19,554	0.041
Exelon	NR	NR	26,461	NR
Allegheny	NR	NR	NR	NR
Constellation Energy	2,218	1,800	14,078	0.158
Calpirie	1,328	1,448	21,309	0.062
CMS Marketing	885	733	17,102	0.052
Edison Mission	68	193	10,730	0.006
First Energy	NR	NR	37,351	NR

NR = Not reported as a line item on the company's balance sheet.

Source: Securities and Exchange Commission Form 10K filings, web site www.sec.com (June 26, 2002).