

## Global LNG Retainer Service

In recent years, LNG has grown to become a significant component of the energy landscape, linking once-distinct gas markets around the world and starting the process of unifying the global gas marketplace. LNG shipments are breaking the tradition of rigid, long-term commitments in order to become profit-seeking on a short-term (often monthly) basis.

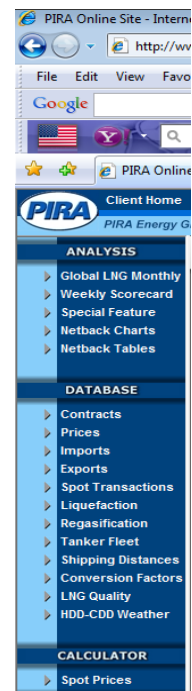
This growth in flexibility generates benefits throughout the energy industry: high-value end-users gain from the added supply, suppliers gain revenue from a resource that might have been flared or left underground, and governments earn royalties and tax revenue while adding jobs. At the same time, the opening up of gas and electricity markets in the U.S., Europe and Asia has added significant market sensitivity to many end-users, making them willing to pay very high prices for an LNG shipment. The volatility of these deregulated market prices signals a need for price-sensitive supply, which LNG is capable of providing.

At the same time that downstream values for LNG are rising, the cost of providing the LNG is dropping. Upstream technology has lowered the cost of developing gas reserves, particularly in offshore locations. Liquefaction costs have been dropping at the same time due to the rapid expansion of larger trains at existing facilities. Private and national oil and gas companies are looking at their gas reserves as a source of revenue — rather than as a burden to be flared, re-injected or otherwise disposed. The combination of end-markets willing to pay for flexibility and suppliers who are better able to provide that flexibility leads to profitable opportunities around the world.

### Analyzing the Fundamentals of LNG Markets

LNG is evolving into a global, market-driven commodity, linking gas markets around the world, much like crude oil did 50 years ago. This evolution to a market-based model creates a need for a more short-term, detailed, fundamentals-driven analysis of LNG, which also keeps an eye on the longer-term balances. With each LNG cargo worth millions of dollars in the spot market, energy market participants need an ongoing service like PIRA's Global LNG more than ever.

**PIRA's Global LNG Retainer Service applies rigorous fundamentals analysis to worldwide LNG markets, integrating extensive work done through our retainer services in oil and gas. It treats this commodity as a market, where prices and competition with other fuels matter from month to month and year to year and where economics dictate where the incremental cargo should go. We cover both the traditional — and financially essential — contract flows of LNG as well as market-responsive spot trade.** In the LNG market, we see increasing use of flexible delivery in term contracts, as well as frequent spot shipments supplementing the traditional fixed trade routes. PIRA's highly regarded research of world energy fundamentals is the foundation of our LNG analysis.



Global LNG  
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PIRA fills the analytical gap in understanding these dynamic relationships. By looking at the fundamentals of energy markets in the Far East, Europe and U.S., PIRA identifies marketing opportunities for LNG suppliers and enables end-users to diversify supplies beyond traditional (i.e. pipeline) gas sources.

### Components of the Global LNG Retainer:

#### Global LNG Fundamentals Scorecard

The weekly write-up provides short-term analysis of fundamental changes in the LNG market. PIRA takes the latest data on supply, demand, and inventory from around the world and offers clients insight into how these developments will affect prices in the near term. The scorecard helps clients build up a short-term story in between releases of PIRA's *Global LNG Monthly*, which complements the weekly scorecard by providing a 6- to 18-month view of where markets are heading.

#### Global LNG Monthly Report

Consists of a summary page, fundamentals and a featured report section:

- Fundamentals** – describes developments in the supply, demand and transportation of LNG around the world. Market areas in the Far East, Europe and North America are discussed in the context of how LNG will affect, or will be affected by, changes at the regional level. Supply developments are covered in the Pacific Rim, Middle East, Mediterranean and Atlantic basins. Shipping developments are covered in this section as well. Prices for gas and oil are discussed, as well as opportunities for spot market trading of LNG through existing trade routes or through arbitrage. The bulk of PIRA's view of the short-term LNG market (next 12 months) is presented in this section.
- Supplementing the monthly report is a series of numerical tables in Excel format** – displays PIRA's forecast for gas prices around the world and netback calculations forecast through end-year. These tables provide the statistical underpinning for the written report and show the most up-to-date, market-sensitive data, which are also available in the online database.

**Global LNG Monthly**  
September 21, 2010

**Global LNG Monthly**

**Report Highlights**

**Asia**  
**Asian Generation** – A hotter than normal summer that charged up gas demand to extraordinary levels in the midst of a pronounced supply glut provided Asian buyers with a rare opportunity to set their own spot prices. Not all fared well.  
**Breaking the Gas Ceiling** – Japanese August gas consumption in power generation hit an all time high, as did temperatures in central Japan, yet it occurred within the confines of steadily increasing nuclear power generation that has boxed in gas demand growth over the year and that is expected to do so through 2011.  
**India Bows Out, Takes a Bow** – A massive downward revision to 2Q Indian import levels put the country back on the slow train for capturing spot LNG cargoes, but domestic outages from mid July have put it back on the spot buying stage this summer, and flattening KG D-6 Y/Y production growth could keep it there in 4Q and 2011.

**Europe**  
**Push Towards Europe** – More and more LNG is flowing into Europe and the upward momentum is unlikely to stop despite high storage levels and deteriorating demand growth. With Qatar and Nigeria producing sizably more LNG now than earlier this year, the volumes are appearing in Spain, the U.K., and everywhere in between.  
**Russian Cuts and LNG** – Seasonal Russian gas production is increasing, but the exports are not, as buyer flexibility continues to lean towards spot gas. Russian cuts and Norwegian maintenance have made more room for LNG imports, but after Sept. ends, N.W. Europe may be a little more crowded.

**Americas**  
**Re-Export Cottage Industry** – About the only role that U.S. LNG import terminals are playing now is as a temporary resting place for cargoes

**Optimizing Up of LNG Purchases from Nigeria**

Country	Volume	Price	Netback	Change
USA	1.0	1.00	1.00	0.00
Europe	1.0	1.00	1.00	0.00
Asia	1.0	1.00	1.00	0.00

before they move only other locations such as Korea or South America. The U.S. has plenty of storage capacity for other markets to use on a seasonal basis in the years to come.

**U.S. Imports to Stay at Contractual Minimums** – Henry Hub prices remain too low to attract other than the occasional spot cargo and imports remain at mainly contractual levels to Elba Island and Everett. It is hard to build a case for much more LNG coming in beyond re-export cargoes and commissioning cargoes for new terminals such as Exxon's Sabine Pass.

**Suppliers**  
**U.S. Terminal Facilit** – Cheniere secures DOE permission to liquefy and export domestic gas supplies from U.S. Gulf, but only to a very limited number of countries, few of which are likely to import LNG. A broader license for all countries has also been requested.

**Netbacks and Balances**  
**"Contract Plus, Please"** – Qatar and Russia are selling LNG to contract holders at well above contract levels, which is making it harder to assess Asian spot LNG prices. Cargoes from non-contracted sellers are rising in price even as Atlantic Basin prices are dropping, but the volume being sold is moving down thanks to the "contract plus" sales. Premiums on spot prices for Atlantic Basin cargoes continue to rise despite NBP itself faltering.

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## Global LNG Special Features

In addition to the regular monthly *Global LNG Monthly* report and wealth of statistical data, the LNG service provides frequent in-depth analysis of a particular aspect of the global gas market. Clients benefit from long-term forecasts combined with short-term insights, which integrate macroeconomic analysis with energy market fundamentals.

## PIRA Online

An LNG-specific database provides encyclopedic information on existing LNG contracts, liquefaction facilities, import terminals, and tankers. The service also tracks daily sendout at US and key European terminals. Along with delivering comprehensive data, PIRA forecasts near-term supply/demand balances as well as shows how the balances will evolve over a longer time-frame. Information is updated on a regular basis and includes long-term gas price projections for North America, Europe, and Asia.

The data includes tables that aggregate more detailed information on the basis of company, country, and region. These tables include:

(\$ per MMBtu)	Henry Hub	Appalachia	New Eng.	NW Europe Spot	Med. Europe Contract	Japan
1995	1.72	1.79	N/A	-	2.38	5.71
1996	2.77	3.07	3.37	-	2.74	5.83
1997	2.58	2.75	3.00	1.82	2.64	4.90
1998	2.46	2.26	2.36	1.99	2.44	4.34
1999	2.27	2.42	2.48	1.65	1.86	4.14
2000	3.88	4.08	4.24	2.60	2.91	5.72
2001	4.26	4.52	4.95	3.20	3.67	5.63
2002	3.22	3.41	3.68	2.70	3.21	5.28
2003	5.38	5.80	6.31	3.55	4.06	5.73
2004	6.19	6.44	7.22	4.58	4.30	6.13
2005	7.74	8.09	7.50	6.61	6.46	7.26
2006	8.02	-	-	6.75	6.32	6.44
2007	7.37	-	-	4.75	5.37	5.88
2008	6.00	-	-	5.11	5.66	5.61
2009	6.20	-	-	5.76	5.75	5.73
2010	7.10	7.45	7.75	5.83	5.83	5.83
2011	7.10	-	-	5.64	5.64	6.03
2012	7.10	-	-	5.78	5.78	6.24
2013	7.20	-	-	5.91	5.91	6.46
2014	7.20	-	-	6.02	6.02	6.67
2015	7.20	7.55	7.85	6.12	6.12	6.89

**Global LNG Long-Term Prices Table**

- **Contracts:** Deal-by-deal contracts between 1990 and 2025.
- **Spot Transactions:** Point-to-point transactions from 1996 to the present.
- **Long-Term Prices:** PIRA's long-term annual price forecasts through 2020.
- **Short-Term Netbacks:** Quarterly netbacks forecast 9-12 months forward.

Country	Location	Ownership	Start Year	Status	Send Out Capacity			
					MMT/Y	BCM/Y	mmcf/d	BCF
Belgium	Zeebrugge	Fluixys:Distrigas, Tractebel 2.1 Bcm/yr	1990	In operation	3.60	4.97	480	5.5
Belgium	Zeebrugge Expansion	Fluixys: Qatar Petroleum 4.1 Bcm/yr	2007	Planned,1Q07	3.00	4.14	400	
China	Shenzhen (Guangdong)	CNOOC	2006	Under construction,4Q06 start-up	3.00	4.14	400	
Dominican Rep.	Andres	AES Corp	2003	In operation	1.80	2.48	240	2.5
France	Fos-sur-mer	Gaz de France	1972	In operation, 2008 expansion	4.44	6.13	593	3.2
France	Montoir de Bretagne	Gaz de France	1980	In operation	8.34	11.51	1,113	7.6
Greece	Revithoussa	DEPA	1999	In operation	1.97	2.72	263	2.8
Greece	Revithoussa Expansion	DEPA	2006	Planned for 4Q06	3.41	4.70	454	3.4
India	Dahej	Petronet	2004	In operation	5.00	6.90	667	
India	Hazira	Shell 74%, Total 26%	2005	In operation	2.50	3.45	334	
Italy	Panigaglia La Spezia	Snam	1971	In operation	2.50	3.45	334	2.1
Japan	Negishi	Tokyo Gas/Tepeco	1969	In operation	11.30	15.59	1,508	25.0
Japan	Senboku I	Osaka Gas	1972	In operation	2.30	3.17	307	3.8
Japan	Himeji LNG	Kansai Electric Power	1979	In operation	8.00	11.04	1,068	11.0
Japan	Nihonkai LNG Niigata	Tohoku EI.Nihonkai LNG	1984	In operation	8.40	11.59	1,121	15.2
Japan	Oita	Kyushu Electric	1990	In operation	4.60	6.35	614	9.7
Japan	Fukuoka	Saibu Gas	1993	In operation	0.80	1.10	107	1.5
Japan	Hatsukaichi	Hiroshima Gas	1996	In operation	0.53	0.73	71	3.6
Japan	Kagoshima	Nippon Gas	1996	In operation	0.13	0.18	17	0.8
Japan	Senboku II	Osaka Gas	1977	In operation	11.80	16.28	1,575	33.6
Japan	Shin-Minato Works	Gas Bureau, Sendai	1997	In operation	0.27	0.37	36	1.7

**Current Regasification Capacity Data by Country**



## PIRA Online (Continued)

- **Imports:** Historic and projected imports from 1970 through 2025, including monthly and daily imports by destination and, in some cases, by source.
- **Exports:** History and projected exports from 1970 through 2025.
- **Liquefaction:** Historical annual data and forecast additions through 2025, by country, by company and by equity share. Includes liquids production.
- **Regasification:** Comprehensive list of existing and proposed regasification capacity by country. Includes send-out, storage capacity, expansions through 2025, with monthly status updates.
- **Tanker Fleet:** Detailed information on the existing global LNG tanker fleet, by country, by trade route, by company and by equity share. Includes the current order book and options list.
- **Shipping Distances:** Matrix of over 1,000 distances on existing and future LNG routes.
- **Gas Quality and Conversion Factors.**
- **LNG Assets by Equity:** Breakdown shows which companies own and operate liquefaction and regasification facilities and ships.
- **HDD-CDD Weather:** Comprehensive spreadsheet of HDD-CDD weather by major states or provinces within North America, Europe, Asia-Pacific and South Africa.
- **Historical Prices:** historical cargo-by-cargo prices for U.S. markets and historical average monthly prices for Japan, Korea, and Taiwan broken out by country of origin.
- **Weather-impact maps** for Baltic and Black seas.
- **Temperature maps** for U.S., Europe, the former Soviet Union, and East Asia.

## The LNG Spot Price Calculator

PIRA has recently enhanced the Global LNG Service with the launch of the newly improved LNG Spot Price Calculator. The Calculator, accessed from PIRA Online’s Global LNG Portal, is an interactive tool that provides an indicative and lowest competitive price for markets where indigenous/transparent gas prices do not exist and where other benchmark prices are commonly — but inadequately — used as references. With the Calculator, users can:

- Calculate the breakeven price for any destination in the world relative to Henry Hub or NBP
- Customize tanker size, charter rates and forward gas prices
- Choose multiple destinations for purposes of comparison
- Get a jump on future arbitrage opportunities along the forward curve over the next 1-2 years

		Basis Points		
(\$/MMBtu)	Henry Hub	NBP	Europe Oil Indexed	Asian Oil Indexed
<b>Market Price</b>	4.08	4.29	6.68	7.91
<b>Netback to Ras Laffan-Qatar</b>	1.84	2.59	5.63	6.78
<b>Voyage Cost to Benchmark</b>	2.24	1.70	1.04	1.13
<b>Price Equivalent to Market Price at Basis Point</b>				
China (Guangdong)	2.76	3.51	6.55	7.70
India (Dahej)	2.20	2.94	5.99	7.14
Spain (Barcelona)	2.88	3.63	6.68	7.82
<b>Differential to Basis Point</b>				
China (Guangdong)	1.32	0.78	0.12	0.21
India (Dahej)	1.88	1.34	0.68	0.77
Spain (Barcelona)	1.20	0.66	0.00	0.09

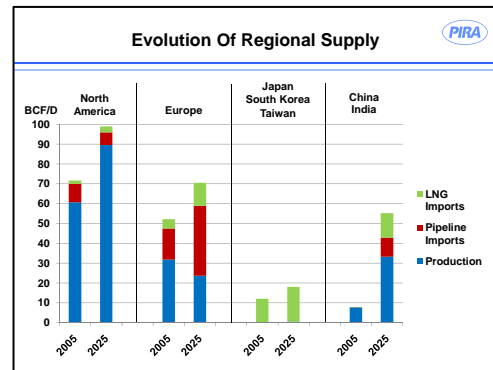


# GLOBAL LNG

## PIRA ENERGY GROUP RETAINER CLIENT SERVICES

### Global Gas Database

This dynamic database captures long-term demand, supply, pipeline shipments and LNG imports and exports at a country and regional level, providing a comprehensive and balanced global picture of natural gas. The gas demand outlook uses PIRA's Global Energy Demand Model, which calculates the total energy requirements for each of the four primary energy consuming sectors and determines which fuels are likely to meet those requirements.



### The Energy Price Portal

A key online feature of the Global LNG Service is the Energy Price Portal, which allows **quick access to short- and long-term natural gas price forecasts, all retrieved at the individual user's discretion.**

Users of PIRA's Energy Price Portal benefit from quick and easy access to PIRA's latest price forecasts, the ability to create and store custom price spreads using the Price Equation Manager and options to view data in 16 different currencies or in different units.

The Energy Price Portal also features **PIRA's Equation Manager, a specially designed utility that allows users to define, analyze and store up to 100 custom price spreads** in the form of multi-variable equations that use PIRA's forecast prices.

With the Equation Manager, for example, **users can store individual configurations and use these spread relationships as a predictive tool** in forecasting price developments.

In a matter of seconds, users can create and export large data sets in Excel, CSV, and PDF formats as well as have click-of-the-mouse charting capabilities. The Portal's forecast horizons include both short-term (monthly averages to December 2010) and long-term (annual averages to 2025).

Date	Belgium Average	Dutch Gas at German Border	France (1 MMCM per Year: 50% Load: Firm)	Italian Average	NBP Monthly Index	Custom Spread
Jan-10	10.10	11.12	9.87	9.78	5.07	45.94
Feb-10	10.63	10.98	10.26	10.29	5.77	47.93
Mar-10	11.06	11.04	10.25	10.78	5.19	48.33
Apr-10	11.37	11.26	9.52	11.26		43.41
May-10	11.71	11.36	9.05	11.69		43.81
Jun-10	11.91	11.67	8.97	12.06		44.61
Jul-10	12.14	11.88	9.27	12.27		45.56
Aug-10	12.29	12.14	9.59	12.53		46.55
Sep-10	12.38	12.28	9.82	12.70		47.18
Oct-10	12.56	12.63	10.01	12.97		48.16
Nov-10	12.71	13.03	10.25	13.21		49.20
Dec-10	12.79	13.22	10.48	13.36		49.86
Jan-11	12.87	13.72	10.99	13.56		51.14
Feb-11	12.94	13.57	11.09	13.72		51.33
Mar-11	13.01	13.53	11.05	13.93		51.52
Apr-11	13.10	13.43	10.37	14.14		51.03
May-11	13.20	13.43	9.95	14.31		50.89
Jun-11	13.29	13.43	9.35	14.43		50.49
Jul-11	13.34	13.43	9.21	14.56		50.54
Aug-11	13.33	13.43	9.10	14.66		50.52
Sep-11	13.35	13.43	9.29	14.73		50.80
Oct-11	13.36	13.43	9.57	14.76		51.12
Nov-11	13.36	13.43	10.19	14.74		51.72
Dec-11	13.36	13.43	10.82	14.75		52.37

PIRA's Price Equation Manager



LNG prices contained in the Energy Price Portal are listed below:

## ASIA (64)

Asia Weighted Average Contract	CIF Japan LNG {Equat. Gun.}	CIF Korea LNG {Qatar}
Asia Weighted Average Spot	CIF Japan LNG {Indonesia}	CIF Korea LNG {Russia}
CIF China LNG {Abu Dhabi}	CIF Japan LNG {Malaysia}	CIF Korea LNG {Trinidad}
CIF China LNG {Australia}	CIF Japan LNG {Nigeria}	CIF Korea LNG {Yemen}
CIF China LNG {Egypt}	CIF Japan LNG {Oman}	CIF Korea LNG Weighted Avg. Contract
CIF China LNG {Equat. Gun.}	CIF Japan LNG {Qatar}	CIF Korea LNG Weighted Avg. Spot
CIF China LNG {Indonesia}	CIF Japan LNG {Russia}	CIF Taiwan LNG {Abu Dhabi}
CIF China LNG {Malaysia}	CIF Japan LNG {Trinidad}	CIF Taiwan LNG {Australia}
CIF China LNG {Nigeria}	CIF Japan LNG {Yemen}	CIF Taiwan LNG {Egypt}
CIF China LNG {Qatar}	CIF Japan LNG Weighted Avg. Contract	CIF Taiwan LNG {Equat. Gun.}
CIF China LNG {Russia}	CIF Japan LNG Weighted Avg. Spot	CIF Taiwan LNG {Indonesia}
CIF China LNG {Trinidad}	CIF Korea LNG {Abu Dhabi}	CIF Taiwan LNG {Malaysia}
CIF China LNG {Yemen}	CIF Korea LNG {Australia}	CIF Taiwan LNG {Nigeria}
CIF China LNG Weighted Avg. Contract	CIF Korea LNG {Brunei}	CIF Taiwan LNG {Norway}
CIF China LNG Weighted Avg. Spot	CIF Korea LNG {Egypt}	CIF Taiwan LNG {Oman}
CIF India LNG Weighted Avg Contract	CIF Korea LNG {Equat. Gun.}	CIF Taiwan LNG {Qatar}
CIF Japan LNG {Abu Dhabi}	CIF Korea LNG {Indonesia}	CIF Taiwan LNG {Russia}
CIF Japan LNG {Alaska}	CIF Korea LNG {Malaysia}	CIF Taiwan LNG {Trinidad}
CIF Japan LNG {Algeria}	CIF Korea LNG {Nigeria}	CIF Taiwan LNG Weighted Avg. Contract
CIF Japan LNG {Australia}	CIF Korea LNG {Norway}	CIF Taiwan LNG Weighted Avg. Spot
CIF Japan LNG {Brunei}	CIF Korea LNG {Oman}	
CIF Japan LNG {Egypt}	CIF Korea LNG {Peru}	

## ATLANTIC BASIN (3)

European Contract
European Spot {NBP}
North America Spot {Nymex}

## **Access to PIRA Staff**

One-on-one interaction between our clients and our energy analysts is one of the cornerstones of PIRA Energy Group's services. As such, PIRA also provides access to the LNG Group so clients can discuss particular issues that are relevant to their individual company.



## Who Can Benefit from Global LNG?

Historical data, timely analysis of market developments, and price forecasts are critical needs for informed decision-making. Many types of companies can benefit from a deeper understanding of the global market for LNG and the factors guiding spot trade that change from month to month, including:

**LNG Buyers.** Global LNG helps end-users to make decisions on how, where, and when to secure swing gas supply, improving supply flexibility and diversifying supply sources. Even if you are not a direct buyer of LNG, gas markets such as Henry Hub, Continental Europe, or the Far East will be increasingly impacted by larger and larger swathes of LNG headed to the highest bidder. For a rising number of players, buying or hedging an entire cargo (or a portion of one) is a new tactical option.

**LNG Sellers.** This service helps marketers to capture the highest netbacks and anticipate marketing opportunities before the window opens — and act before it closes.

**Financial Institutions and Investors.** This service provides insight into the profitability of LNG-related infrastructure investments and the potential limits to growth in the gas sector. Global LNG not only provides short-term analysis, it also provides updates on supply/demand balances up to decades ahead, a crucial facet for companies engaged in financing multi-million dollar tankers or billion-dollar terminals. The service also includes a comprehensive breakdown of LNG assets by company to give a better understanding of which companies own and operate liquefaction and regasification facilities and ships, enabling investors to evaluate a company's exposure to LNG assets now and in the decade to come.

**Brokers, Traders and Pipelines.** Global LNG helps to identify swings in LNG deliveries on the upside and the downside, thus determining the need for pipeline-based alternatives.

## Fees

Existing PIRA Retainer Clients may subscribe to Global LNG under discounted terms, which are determined by the scope of their current license. For prices, please contact your PIRA account executive.



## The Global LNG Group:

**Ira Joseph (Executive Director, International Gas)** manages PIRA's European Energy Service, which includes distinct service on European Natural Gas (ENG) and European Electricity (EES). In 2001, Ira co-authored PIRA Energy's multi-client study on Atlantic Basin LNG markets and recently completed a study on prospects for LNG in the Balkan and Central European gas markets. Ira joined PIRA in 1999 after working at Energy Intelligence Group for over a decade, as Senior Editor of *Petroleum Intelligence Weekly* and Editor-in-Chief of *World Gas Intelligence*. He has authored several books on crude oil marketing and natural gas, including versions of EIG's *International Crude Oil Market Handbook* and *World Gas Handbook*, as well as several articles on natural gas swaps and gas marketing strategy. Ira holds an M.A. in international economics from Johns Hopkins School of Advanced International Studies and a B.A. from the University of Michigan.

**Harvey Harmon (Senior Director, North American Natural Gas & Global LNG)** has over 25 years experience in the energy industry. Before joining PIRA, he was Director of Natural Gas Import/Export Activities and Senior LNG Policy Advisor at the U.S. DOE. He joined the Global LNG unit of El Paso in 2001 and was responsible for competitor and market analysis. He has consulted for Shell Gas & Power on LNG issues. His experience includes numerous regional and national analyses of natural gas demand, pipeline capacity, and transport, with emphasis on competition at various citygates. Mr. Harmon holds a M.S. in ocean engineering from the University of Wisconsin and an M.B.A from the University of Texas.

**Madeline Jowdy (Director, International Gas)** came to PIRA after working at Energy Intelligence Group (EIG) as the LNG and tankers correspondent for *World Gas Intelligence* and *Natural Gas Week*. She has authored several books on crude oil marketing and natural gas, including versions of EIG's *Top 100 Oil Companies* and *World Gas Handbook*, as well as studies on the Atlantic Basin LNG trade and shipping. Madeline holds a degree in economics and international relations from American University. She completed a master's program in Middle East Studies at Georgetown's School of Foreign Service.

**Mickey Kwong (Director, International Gas)** is responsible for analyzing Global LNG market fundamentals including demand, production, and imports and contributes to all of the Group's reports. From 1998 to 2006, he was an LNG/natural gas consultant at Poten & Partners, where he advised clients from Asia, Europe and the Americas on pricing, demand, and price risk management. Mickey has a BBA in Finance from Baruch College.

**Dr. Mark Schwartz (President / Managing Director, Scenario Planning Group)** was formerly Chief Economist of ExxonMobil where he was responsible for developing the company's long-range economic and energy outlook. Dr. Schwartz designed and managed the implementation of the energy modeling system and database that allowed ExxonMobil to develop their base-case global energy outlook as well as alternative cases to capture the impact of changes in price, economic growth, environmental policy and other critical assumptions. Prior to this position, Mark spent five years in Exxon's International Gas Marketing Company, where he developed the Asian gas supply/demand balance and led several multi-company studies of China's gas pipeline and LNG options. During his 25 years at Exxon he also had assignments in Upstream Planning, Treasurers, and Corporate Planning functions. He holds a PhD in economics from the University of Pennsylvania.