BFX Natural Gas Futures Contract

Product Booklet

Multi-Asset trading one market

Bahrain Financial Exchange سوق البحرين المالى

The Bahrain Financial Exchange (BFX) is a pioneering international financial exchange based in the Kingdom of Bahrain and internationally accessible to trade cash, derivatives, structured products and Shariah-compliant financial instruments. The BFX has set up the BFX Clearing and Depository Corporation (BCDC) to clear and settle the financial instruments traded by the members of the BFX. The BFX and the BCDC are licensed and regulated by the Central Bank of Bahrain (CBB).

The Exchange is a wholly owned initiative of Financial Technologies Group (FT Group), which currently owns one of the world's largest networks of 10 exchanges connecting fast-growing economies of Africa, Middle East, India and South East Asia.

Bait Al Bursa is an Islamic finance division of the BFX, exclusively offering electronic exchange traded Islamic financial instruments. Bait Al Bursa signifies the 'Home of Exchanges', and represents the BFX's vision of providing a single venue for all the exchange traded business in the Islamic finance sector.

The BFX Training Institute (BFX-TI) is an internationally accredited training institute operating under the BFX providing world class conventional and Islamic financial training and development courses.

Significance of Natural Gas in the Global Economy

Introduction

Natural Gas is a mixture of hydrocarbon gases. It is constituted mainly of methane, along with other gases such as ethane, propane, butane and pentane. It is a major source of global energy requirements and is the third largest contributor towards fulfilling the energy requirements of the world.

Fossil fuels contribute to over 88% of the global energy consumption requirements, out of which, crude oil has a share of over 37%, the other major fossil fuels being Natural Gas (27.69%) and Coal (20.07%). Other sources of energy account for the remaining 14.72% by Nuclear energy, hydroelectricity and renewable. Natural Gas is a colorless and odorless in nature and is highly combustible. It can be transported through pipelines or liquefied and transported by ship.

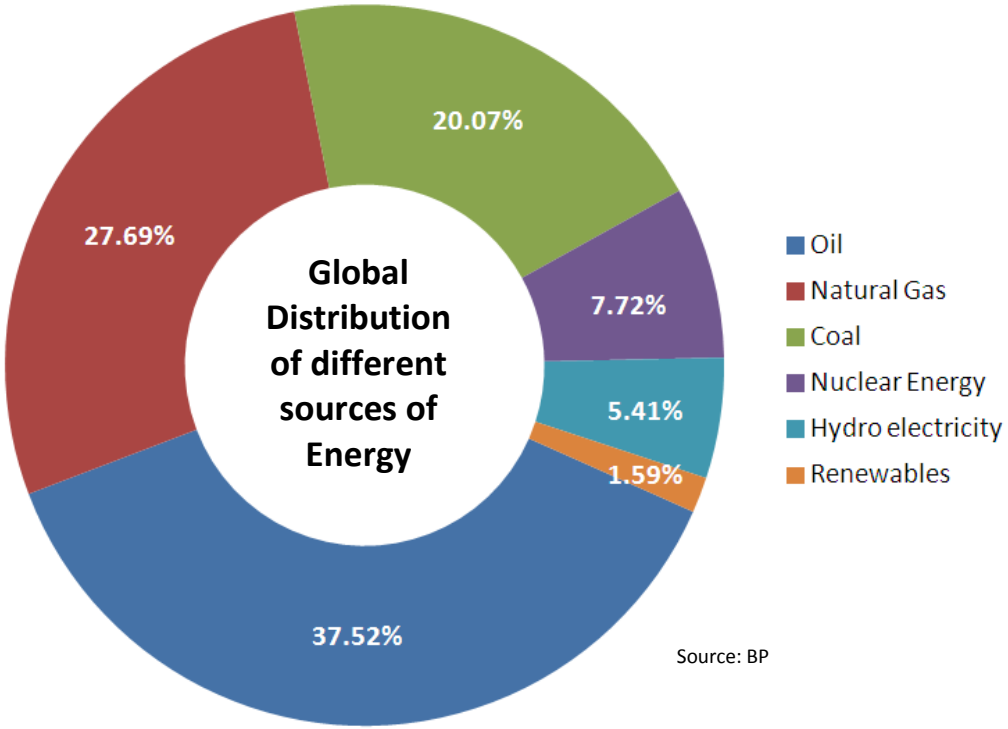
Uses of Natural Gas

Natural Gas is widely used in power generation (30.63%) and to heat residential (20.47%) and commercial premises (13.21%). Natural Gas is also used in the manufacturing sector (27.40%) as an important source of energy. Other uses include mining, drilling operations, heaters, dehydrators and natural gas processing plants. Natural Gas is also consumed in the process of its distribution through pipelines. It is used in the form of Compressed Natural Gas for powering vehicles.

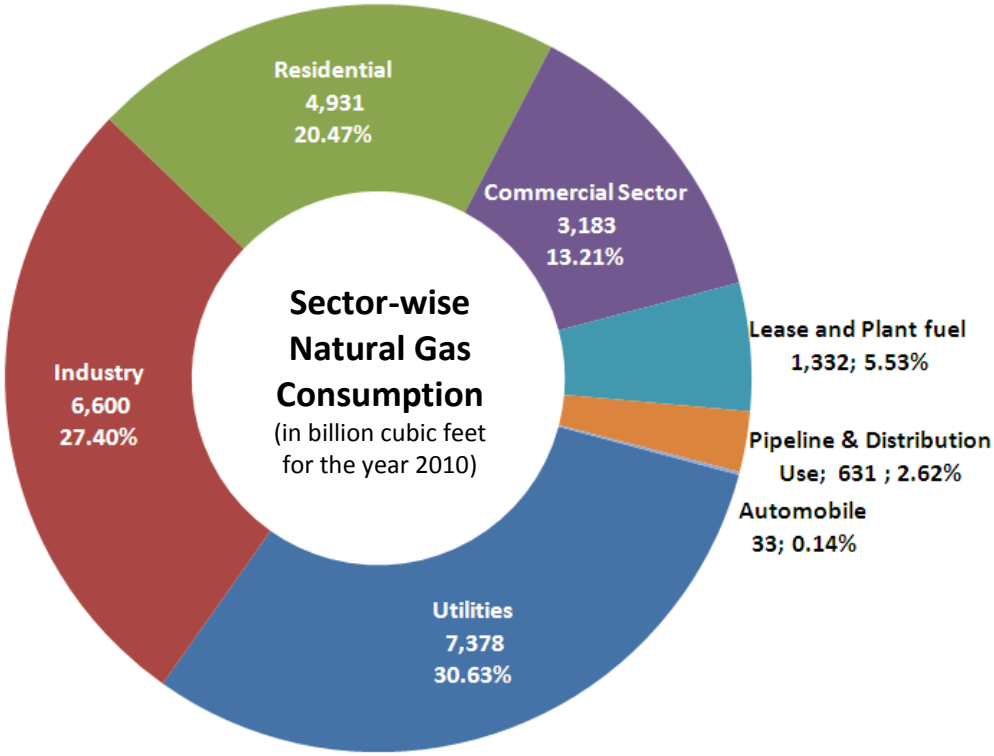
US is the largest producer and consumer of Natural Gas in the world. In the year 2010, over 24 trillion cubic feet (683.40 billion cubic metres) of Natural Gas was consumed in the US across various industry segments. The total global consumption of Natural Gas was 3.17 trillion cubic metres.

Natural Gas Consumption in the US: Sector-wise

Usage	Description
Utilities	Power Generation.
Industry	Manufacturing establishments.
Residential	Heating, cooking, air-conditioning and other household uses.
Commercial Sector	Non-manufacturing establishments.
Lease and Plant fuel	Gas used in well, field, and lease operations, such as drilling operations, heaters, dehydrators, field compressors and natural gas processing plants.
Pipeline & Distribution	Gas consumed in operation of pipelines, compressors.
Automobile	Compressed Natural Gas used in vehicles as fuel.

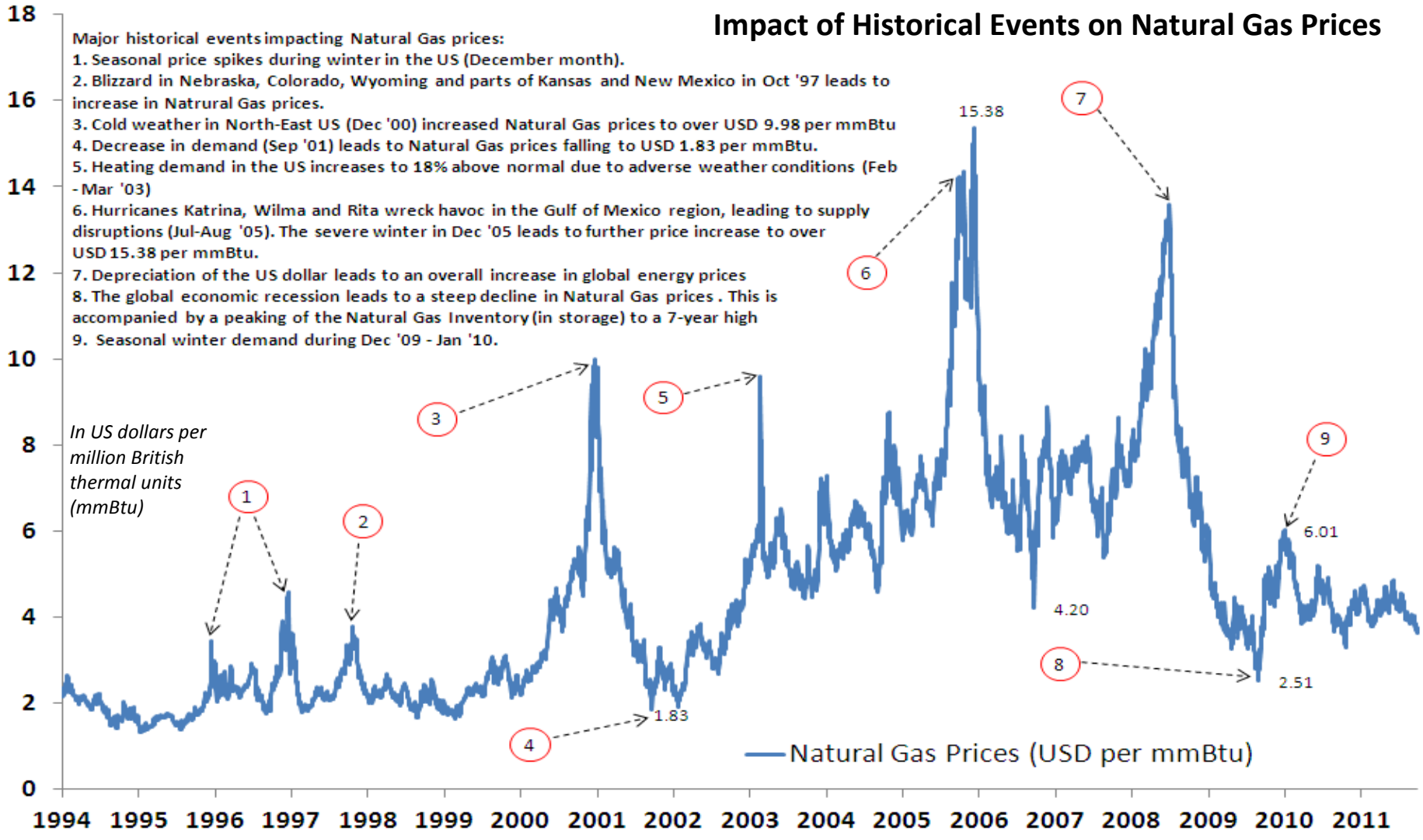


Source: BP



Historical Price Trends: Natural Gas

Natural Gas prices are impacted by seasonal variations in demand. Natural Gas consumption usually increases during winter season when demand for heating (in residential and commercial establishments) peaks. This usually leads to the depletion in Natural Gas inventory, accompanied by an increase in Natural Gas prices. This may be observed in the above price chart when severe winter conditions have led to increase in Natural Gas prices. Natural Gas prices peaked at USD 15.38 per mmBtu during Jul - Aug 2005, largely due to supply disruption in the Gulf of Mexico, as a result of the Hurricanes Katrina, Wilma and Rita. When the crude oil prices increased to over USD 147 per barrel as a result of a depreciation of the US dollar coupled with increasing demand, natural gas prices increased to over USD 14 per mmBtu, before the global economic recession resulted in a decrease in natural gas prices to as low as USD 2.51 per mmBtu by 2009. The supply of Natural Gas gradually increased, resulting in inventory levels peaking at a seven year-high, thus keeping a cap on Natural Gas prices at USD 6.01 per mmBtu by 2009-10. As on Oct 4, 2011, Natural gas prices are trading at USD 3.596 per mmBtu, down from the high of USD 4.983 per mmBtu (June 9, 2011). The impending winter season in 2011-12 is expected to increase the demand for Natural Gas once again.

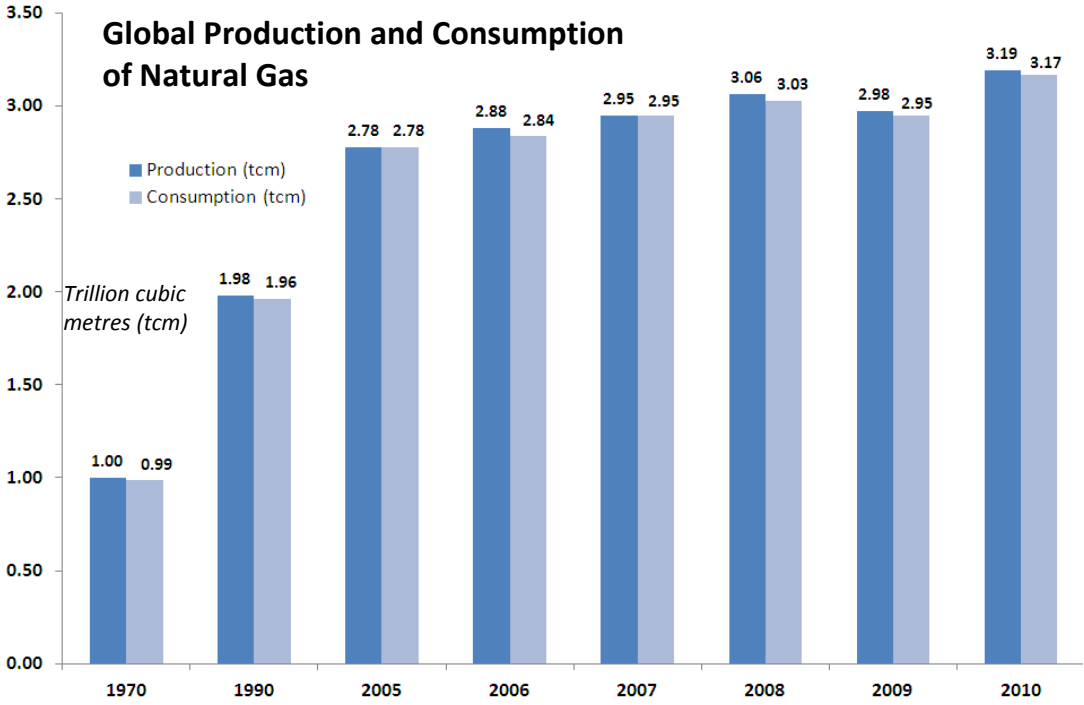


Natural Gas Production and Consumption

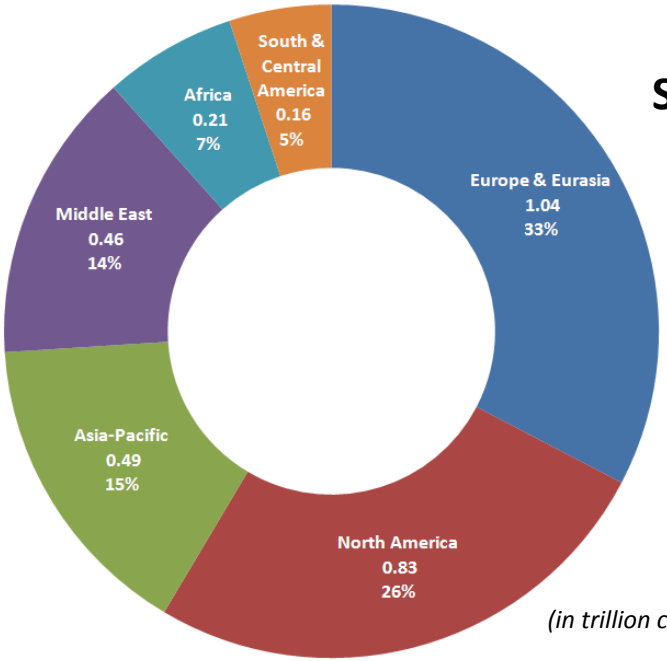
Global Natural Gas production has increased to over 3.19 trillion cubic metres (*tcm*) in the year 2010, from the levels of 1 tcm in 1970 and 1.98 tcm in 1990. The US (611 billion cubic metres or *bcm*) and Russian Federation (589 *bcm*) are the largest producers of Natural Gas in the world. The other major producers of Natural Gas are Canada (159.80 *bcm*), Iran (138.50 *bcm*), Qatar (116.70 *bcm*) among other countries.

Europe, Eurasia and North America accounted for 59% of the total global production. Middle-East produces 0.46 trillion cubic metres, which is 14% of the total world production. Iran is the largest producer of Natural Gas (138.50 *bcm* in 2010) in the Middle-East region. This is followed by Qatar with a production of 116.70 *bcm* during the same period. Other major producers of Natural Gas in the Middle-East include Saudi Arabia (83.90 *bcm*) and UAE (51 *bcm*).

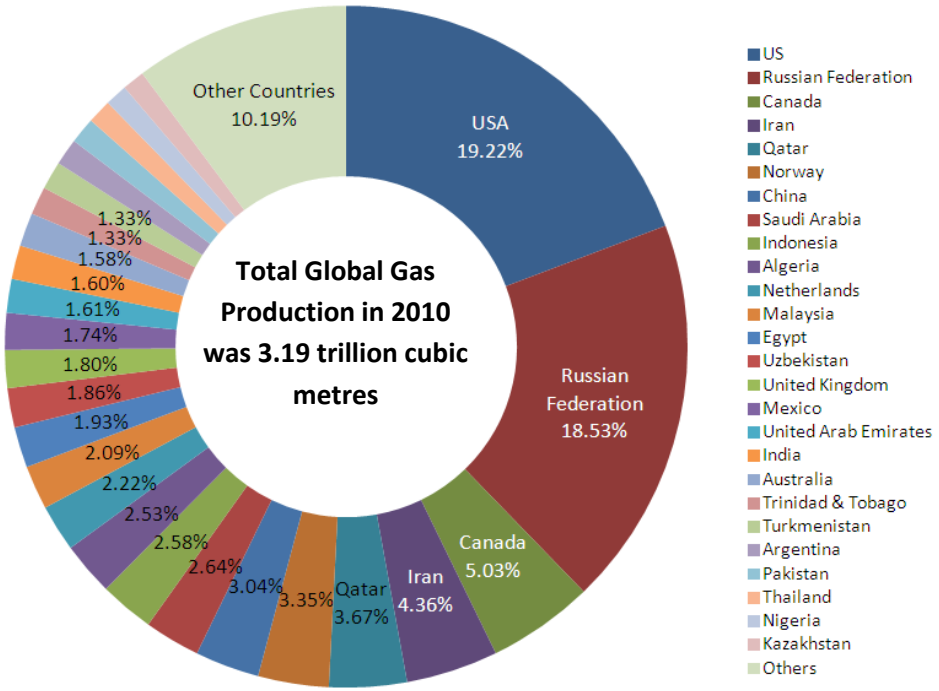
Bahrain produced 13.10 *bcm* in the year 2010. This was due to the increasing number of power stations and soaring gas consumption at Bahrain's biggest plants, particularly BAPCO (Crude oil refinery) and Gulf Petrochemicals Industries Company. The local demand for gas has also increased. The Electricity and Water Authority (EWA) and other power generation plants account for 34% of the total gas consumption in Bahrain. 17% of the gas produced is injected back into depleted oilfields. The Al Hidd Power Plant and the EWA account for 16.80% and 12% of the consumption respectively, followed by BAPCO with 10.40%. The remaining 8.60% is distributed among Bahrain-based industrial plants.



Share of Natural Gas Production in 2010



(in trillion cubic metres)



Natural Gas Production and Consumption (Contd…)

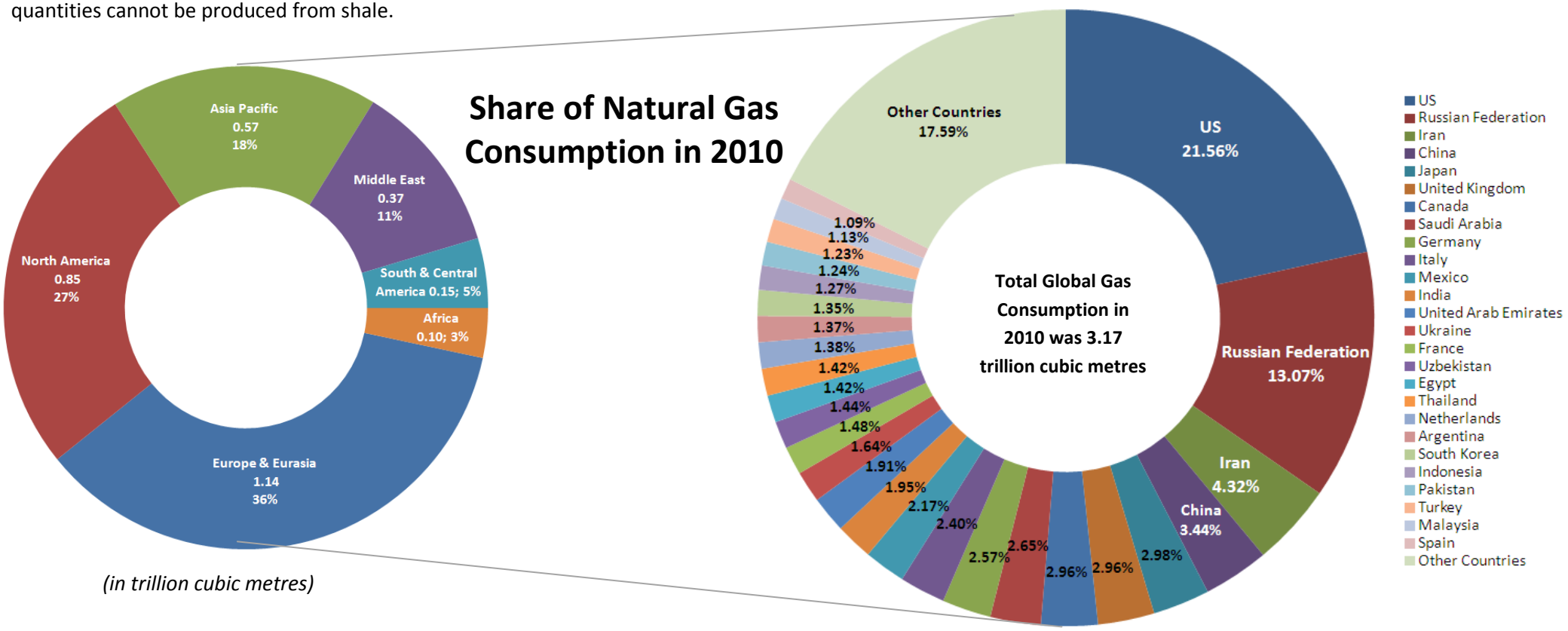
Shale Gas Production

Shale gas has become an important source for the production of natural gas in the last decade and is considered as the most important innovation in energy markets. The breakthrough in this technology was due to the invention of the horizontal drill and high volume hydraulic fracturing. Shale gas refers to natural gas that is trapped within shale formations. In terms of its chemical makeup, shale gas is typically a dry gas primarily composed of methane. Shales are fine-grained sedimentary rocks that can be rich sources of petroleum and natural gas. Over the past decade, the combination of horizontal drilling and hydraulic fracturing has allowed access to large volumes of shale gas that were previously uneconomical to produce. Hydraulic fracturing (also called "fracking" or "hydrofracking") is a technique in which water, chemicals, and sand are pumped into the well to unlock the hydrocarbons trapped in shale formations by opening cracks (fractures) in the rock and allowing natural gas to flow from the shale into the well. When used in conjunction with horizontal drilling, hydraulic fracturing enables gas producers to extract shale gas at reasonable cost. Without these techniques, natural gas does not flow to the well rapidly, and commercial quantities cannot be produced from shale.

Consumption Trends

The demand for natural gas from the US markets increased from 432 bcm in 1965 to over 683 bcm in 2010 (accounting for 21.56% of the global demand). Other countries that have a large consumer demand for natural gas are the Russian Federation (13.07%), Iran, China, Japan and Saudi Arabia (2.63%). The consumption trends leaves surplus gas availability in Russia, Norway, Qatar, Canada, which have become the largest exporters of gas in the world. On the other hand, the deficit faced by countries such as US, Japan, Germany, Italy and United Kingdom have made these countries the largest importers of gas.

The middle-east region's demand for natural gas was 365.40 bcm in the year 2010. Iran's consumption has almost quadrupled from 35.20 bcm (in 1995) to over 136.90 bcm (2010) and is the largest consumer of Natural Gas in the Middle-East. Saudi Arabia (83.90 bcm) and UAE (60.50 bcm) are the second and third largest consumers in the region.



(in trillion cubic metres)

Global Natural Gas Reserves

Global Reserves

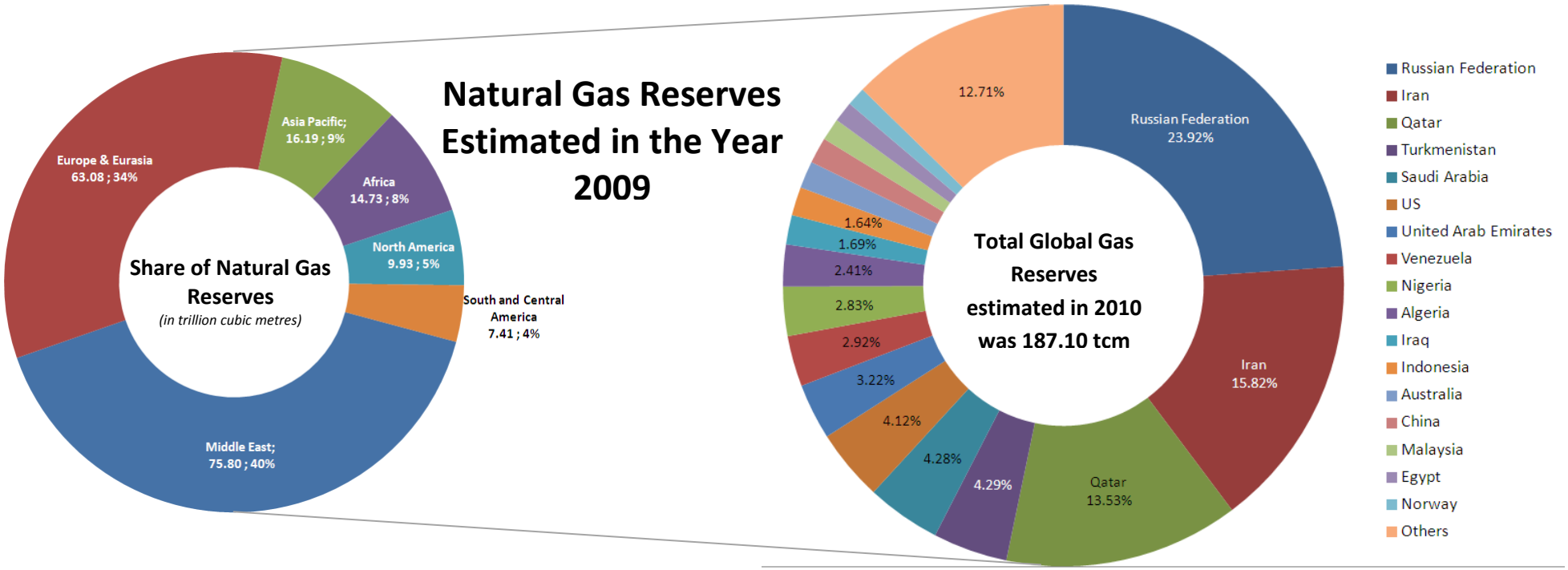
Even though the Middle-East region accounts only for 14% of the global gas production, it has the world's largest reserves of Natural Gas (of 75.80 tcm), (accounting for over 40% of the global reserves). Iran (29.61 tcm), Qatar (25.32 tcm), Saudi Arabia (8.02 tcm) and UAE (6.02 tcm) are the countries with the most reserves of Natural Gas.

The Russian Federation has the world's largest gas reserves at 44.76 tcm. The production of natural gas from shale formations in the United States is estimated to meet its energy requirements for the next 100 years. The global gas reserves are estimated to be approximately 187.10 trillion cubic metres. At the current production of 3.10 trillion cubic metres, gas reserves are expected to last for another 60 years. Nevertheless, the proven gas reserves have increased from 125.70 tcm in 1990 to the current estimated levels, indicating the possibility of further increase in proven reserves and more sophisticated production techniques.

Global Natural Gas Reserves: Company-wise

Company	Natural Gas Reserves
National Iranian Oil Company (Iran)	29.61
Qatar General Petroleum Corporation (Qatar)	25.47
Saudi Arabian Oil Company (Saudi Arabia)	7.45
Abu Dhabi National Oil Company (UAE)	5.62
Nigerian National Petroleum Corp. (Nigeria)	5.25
Petroleos de Venezuela.S.A. (Venezuela)	4.98
OAO Gazprom (Russia)	4.85
Sonatrach (Algeria)	4.50
Iraq National Oil Company (Iraq)	3.40
Petronas (Malaysia)	2.32
PetroChina Co. Ltd. (China)	1.79
Kuwait Petroleum Corporation (Kuwait)	1.78
Egyptian General Petroleum Corp. (Egypt)	1.66
National Oil Company (Libya)	1.54
Royal Dutch/Shell (Netherlands)	1.39
BP Corporation (United Kingdom)	1.14
ExxonMobil Corporation (United States)	0.98
Petroleum Development Oman LLC (Oman)	0.85
OAO Rosneft (Russia)	0.82
Total (France)	0.75
Chevron Corporation (United States)	0.74
Pertamina (Indonesia)	0.58
ConocoPhillips (United States)	0.54
Statoil (Norway)	0.51
ENI (Italy)	0.51

2009 year estimates.



Natural Gas Exports and Imports

Russian Federation has a large surplus of natural gas and has emerged as the largest exporter of natural gas (199.85 bcm) in the world during 2010. The other major exporters of natural gas are Norway (100.59 bcm), Qatar (94.90 bcm), Canada (92.40 bcm) among other countries (kindly refer table).

US, Japan, Germany, Italy, UK, France and South Korea are the largest importers of Natural Gas in the world. The consumption trends in the developed markets have increased the volume of Natural Gas trade significantly over the last few decades.

National Iranian Oil Company, Qatar Petro, Saudi Aramco and Abu Dhabi National Oil Company hold over 36% of the global gas reserves. This is indicative of the potential as well as the need for hedging against the volatility in Natural Gas prices. Producers need protection against decrease in Natural Gas prices (from increasing production and surplus reserves). Alternatively, consumers need protection against potential increase in Natural Gas prices due to seasonal demand trends.

Major Natural Gas Exporters in 2010

Country	Natural Gas Exports
Russian Fed	199.85
Norway	100.59
Qatar	94.90
Canada	92.40
Algeria	55.79
Netherlands	53.33
Indonesia	41.25
Malaysia	31.99
U.S.	31.98
Australia	25.36
Nigeria	24.02
Tobago	20.38
Turkmenistan	19.73
United Kingdom	15.65
Egypt	15.17
Germany	14.76
Uzbekistan	13.56
Kazakhstan	11.95
Bolivia	11.65
Oman	11.49
Libya	9.75
Brunei	8.83
Myanmar	8.81
Iran	8.42
UAE	7.90

(billion cubic metres)

Major Natural Gas Importers in 2010

Country	Natural Gas Exports
United States	105.48
Japan	93.48
Germany	92.82
Italy	75.34
United Kingdom	53.63
France	48.89
South Korea	44.44
Turkey	36.68
Spain	36.40
Ukraine	33.03
Russian Federation	32.67
Belgium	24.56
Canada	22.91
Belarus	19.52
United Arab Emirates	17.41
Netherlands	16.97
China	16.35
Mexico	15.15
Taiwan	14.90
Brazil	12.60
India	12.15
Czech Republic	11.54
Poland	10.15
Thailand	8.81
Singapore	8.40

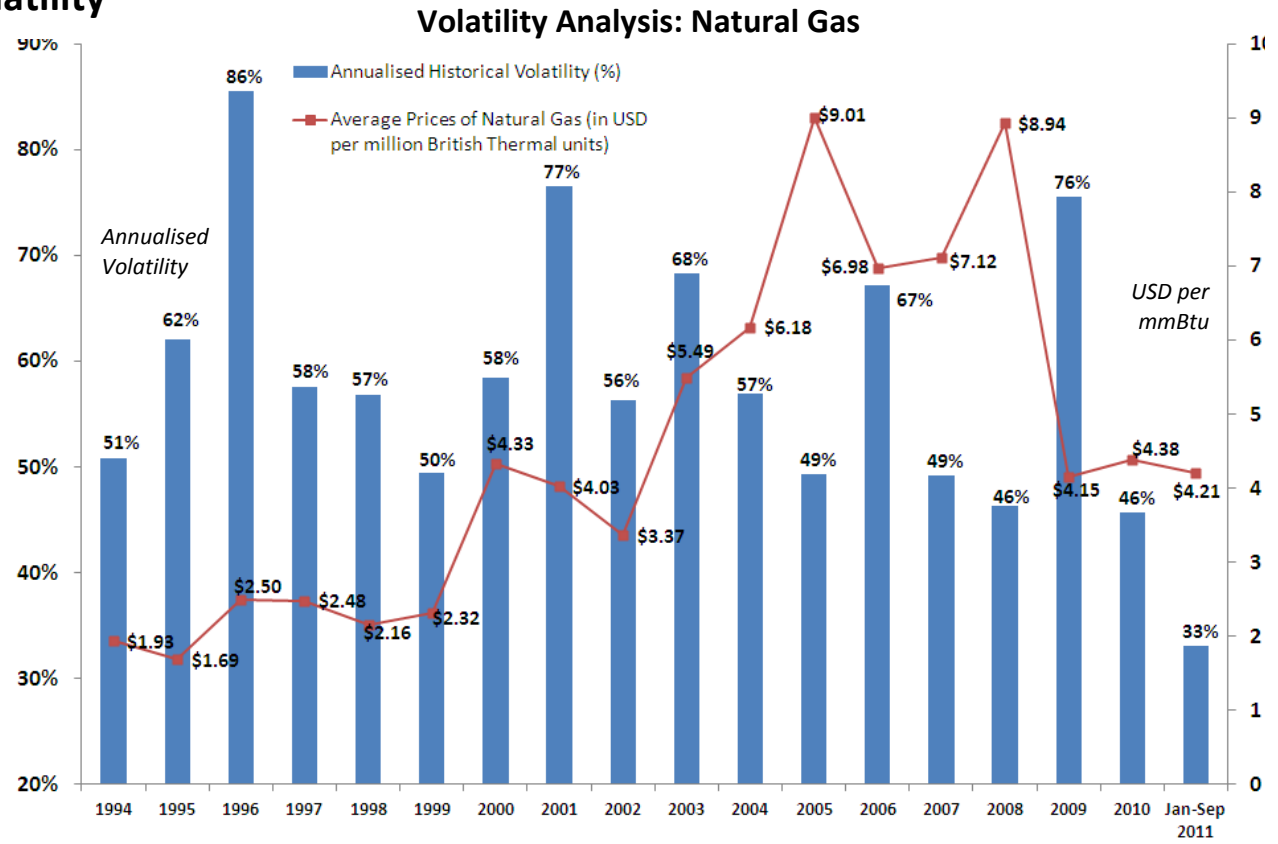
(billion cubic metres)

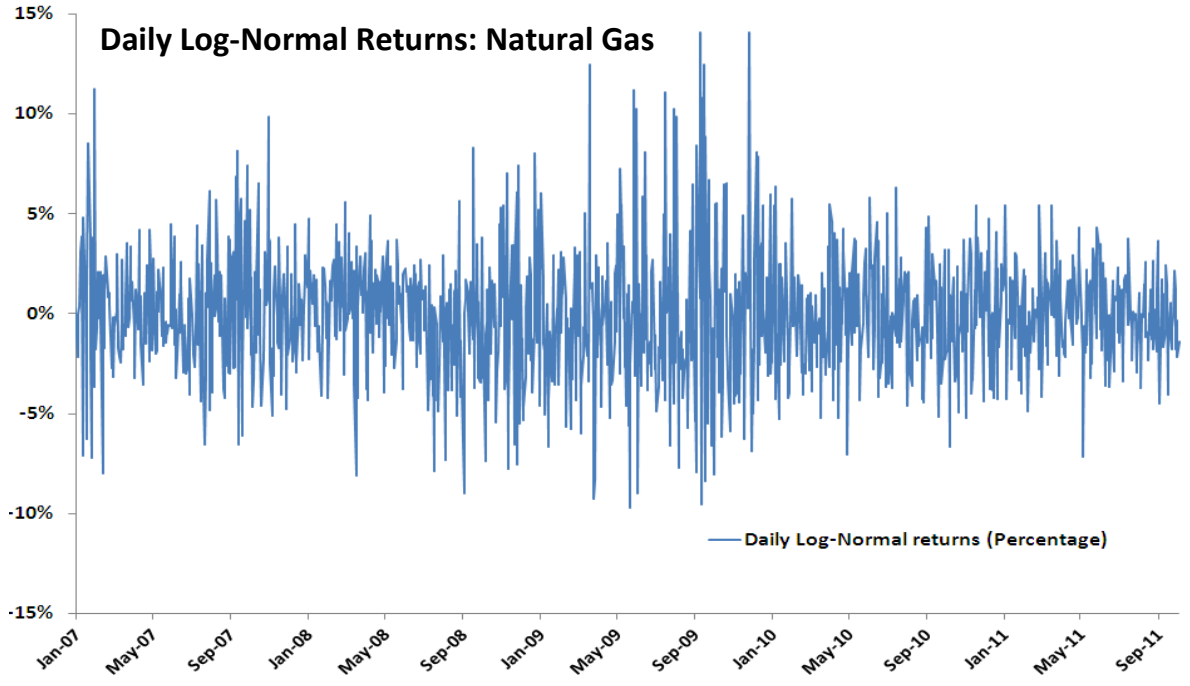
Need for Risk Management against Price Volatility

Annualised Historical Volatility of Natural Gas prices increased to more than 50% in the calendar years, 2006 and 2009. The hurricane activity in the year 2005 led to the peaking of Natural Gas prices, with average prices increasing to over USD 9 per mmBtu. The increase in gas consumption and more recently the global economic crisis led to substantial increase in risk for consumers.

In the year 2010 and up to Sep 2011, the price volatility in has decreased substantially, owing to the increasing gas production. The gas inventory is also at an all time high, leading to lower Natural Gas prices.

The increase in proven reserves of Natural Gas as well as the Shale production methods is expected to keep a check on the volatility in Natural Gas prices. Nevertheless, seasonal variation in demand as well as any threat of supply disruption is expected to increase volatility, thereby, increasing the risk for consumers. Producers may also mitigate the risk of a warmer winter or decrease in prices due to increase in global production levels.





Analysis of Price Drivers: Natural Gas

Price Drivers

- Supply disruptions due to Hurricanes
- Severity of Weather (Cold Winters and Hot Summers)
- Demand for electricity
- Economic growth
- Impact of crude oil prices
- Change in Inventory Levels
- Improved Production Techniques (Shale Gas production, etc.)

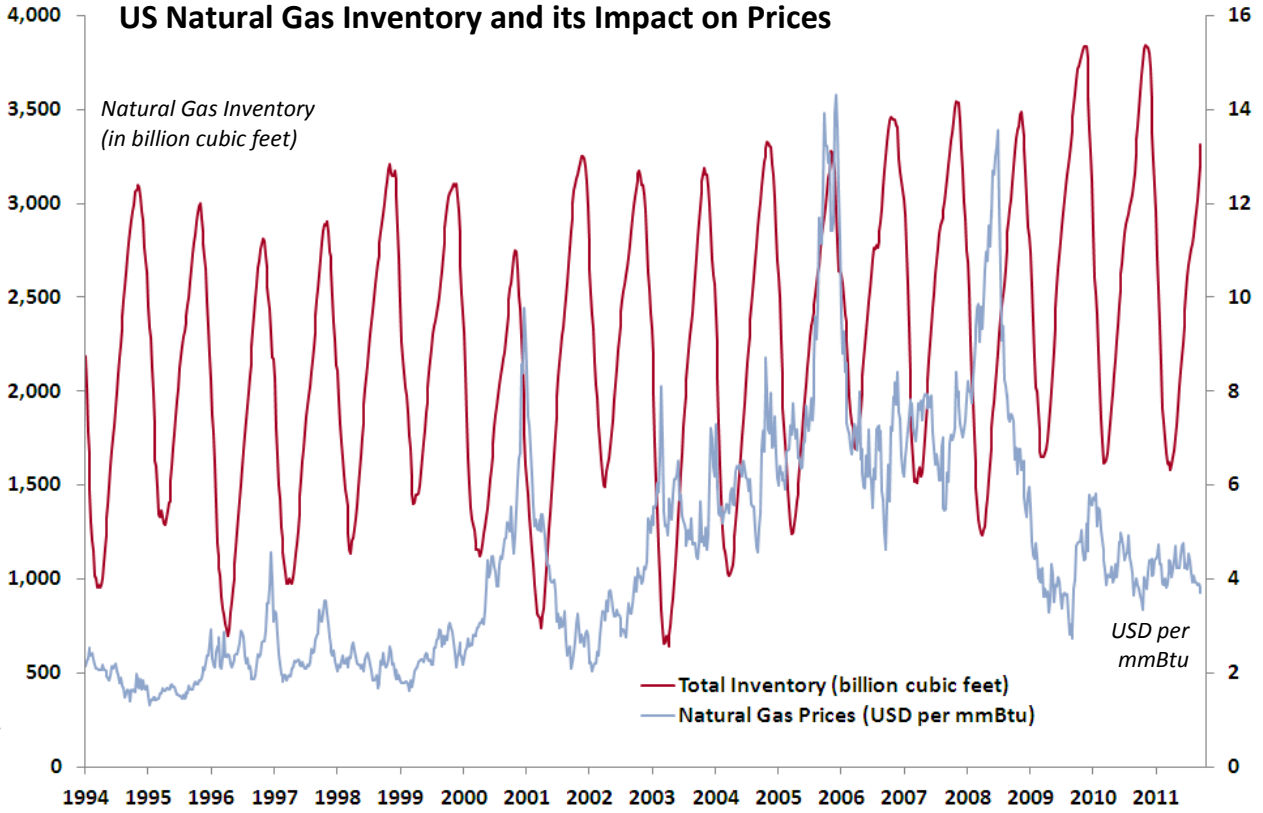
Hurricanes and Weather Activity

Supply disruption due to hurricane activity in the United States adversely affects crude oil and natural gas supplies, leading to a collective increase in energy prices. Hurricanes Katrina, Wilma and Rita that struck the Gulf of Mexico in the US during the year 2005 led to a significant increase in Natural Gas prices (to over USD 14 per mmBtu). This was followed by a period of relatively low activity of hurricanes that impact energy prices.

The peak period during the summer and winter seasons usually results in higher demand for electricity. This in turn leads to increase in the utilization of natural gas for generating electricity.

Global Economic Growth

The pace of the global economic growth impacts the consumption trends of natural gas. For example, increasing demand for automobile and housing results in a higher demand for aluminium. This usually results in increasing demand for natural gas. This is because aluminium smelting is dependent on abundant supply of low-cost electricity, usually produced by using natural gas.



Natural Gas Inventory and Impact on Prices

The US Natural Gas inventory increased to an all time high of over 3,840 billion cubic feet in the year 2009 and 2010. This has placed a cap on Natural Gas prices during this period. The development of a more sophisticated production technique for sourcing gas from shale in the US has resulted in increasing inventory during the past two years.

As may be observed in the above illustration, Natural Gas inventory follows seasonal demand trends. During winter season, the drawdown from the Natural Gas reserves increases substantially. The inventory is once again supplemented during the non-winter months, when the demand decreases.

The US Natural Gas inventory data is released by the “US Department of Energy”, every Thursday of the week. The increase or decrease in the Natural Gas inventory levels has a significant impact on the Natural Gas prices.

Risk Management using BFX Natural Gas Futures

Hedging against Commodity Price Risk

Volatility in Natural Gas prices has increased the risk for both producers and consumers of this energy commodity. Consumers are impacted due to increase in Natural Gas prices during winter months due to higher demand. Producers are exposed to the risk of decreasing natural gas prices due to increase in natural gas inventory levels and lower demand during specific periods of the year. Producers and Consumers may utilize the BFX Natural Gas futures contracts for mitigating business risk.

Hedging is the mechanism by which the loss in one market (cash market) is off-set by the profit in another market (the futures market). Natural Gas cash prices are positively correlated with the futures contract prices based on the cost-of-carry principle. Arbitrageurs who leverage on the difference in the Natural Gas prices across different markets (between the cash, futures, forwards, options and swaps) aid in establishing equilibrium to the Natural Gas prices across different markets. Thus, the hedger who is exposed to a risk of volatile Natural Gas prices can either buy or sell BFX NG futures contracts to off-set the potential loss in the cash markets, depending on his exposure. The hedger can effectively lock-in to the price of Natural Gas at which he is long or short in the cash market.

BFX is launching the Natural Gas futures contract with a contract size of 2,500 mmBtu (million British thermal units). This shall facilitate the participation of market participants such as Aluminium producers, power generation companies and other utility service providers, industrial manufacturers and other consumers of Natural Gas who would like to mitigate risk against volatility in the Natural Gas prices, apart from Investors wishing to diversify their portfolio risk. Let us analyze the mechanism for hedging using the Natural Gas futures contracts.

Risk Management for Consumer of Natural Gas

A consumer who wants to buy Natural Gas in a month's time for investment purpose is exposed to the risk of increasing Natural Gas prices. Let us analyze this example further. Assume that the current cash market price of Natural Gas is USD 3.750 per mmBtu. If this price increases to 4.105 per mmBtu in a month's time, then the investor would be required to pay more for purchase of Natural Gas on a later date. Thus, the consumer can buy the BFX Natural Gas futures contracts to hedge against the risk of increase in Natural Gas prices. If the Natural Gas cash prices increase, then the futures contract prices would also correspondingly increase resulting in a profit in the futures that off-sets the loss in the cash market. If the Natural Gas cash prices decrease, then the futures contract prices would also correspondingly decrease resulting in a loss in the futures that is off-set by a profit in the cash market.

Risk Management for a Producer of Natural Gas

A Natural Gas producer estimates a potential sale of 1 million mmBtu of Natural Gas in a month's time. The prevailing cash market price of Natural Gas is USD 3.754 per mmBtu. It is expected that due to a warmer winter and increasing Natural Gas inventory, the Natural Gas prices are expected to decrease. Thus, the Natural Gas producer may hedge his risk of decreasing Natural Gas prices by selling the BFX Natural Gas futures contracts.

Hedge Strategy by a Natural Gas Producer: Hypothetical Example

Date	Cash Market	Futures Market
Dec 20, 2011	NG Cash Price is USD 3.754 per mmBtu. Risk of decrease in NG cash prices after one month	NG Feb 2012 Futures Contract Price is at USD 3.821 per mmBtu. **SELL** 400 lots of BFX NG Feb '12 Futures Contracts
Jan 15, 2012	NG Cash Price is USD 3.275 per mmBtu. **SELL** 1 million mmBtu of NG in the cash market	NG Feb 2012 Futures Contract Price is at USD 3.304 per mmBtu **BUY** 400 lots BFX NG Feb '12 Futures Contracts
PROFIT / (LOSS) per Contract	Notional Loss of USD 0.479 per mmBtu	Actual profit of USD 0.517 per mmBtu

In the above strategy, it may be observed that when the Natural Gas cash market prices decrease from USD 3.754 per mmBtu (Dec 20, 2011) to USD 3.275 per mmBtu (Jan 15, 2012), the BFX NG Feb '12 futures contract prices also decreases to USD 3.304 per mmBtu (from USD 3.821 per mmBtu on Dec 20, 2011). The futures contract prices are dependent on the prevailing cash price and the cost of carry for the duration until the maturity of the futures contract. If this were any different, then the arbitrage forces in the market would ensure equilibrium in the price differential between the cash market and the futures markets. Thus, the profit in the futures market off-sets the loss in the cash market. If the NG prices increase, then the loss in the futures hedge position would be offset by a corresponding profit in the cash market.

The hedge strategy needs to consider the hedge ratio (*estimation of the number of futures contracts to hedge based on volatility and correlation between different assets*) between the BFX Natural Gas futures and the Natural Gas exposure in the cash market. The *Basis risk,* which is the uncertainty in the difference between the cash and futures prices remaining the same, also needs to be tracked. The hedging strategy may either be static (to lock-in to the prices for the duration of the hedge period) or dynamic (where the hedge position may be entered into and exited based on market conditions).

Spread Trading using BFX Natural Gas Futures Contract

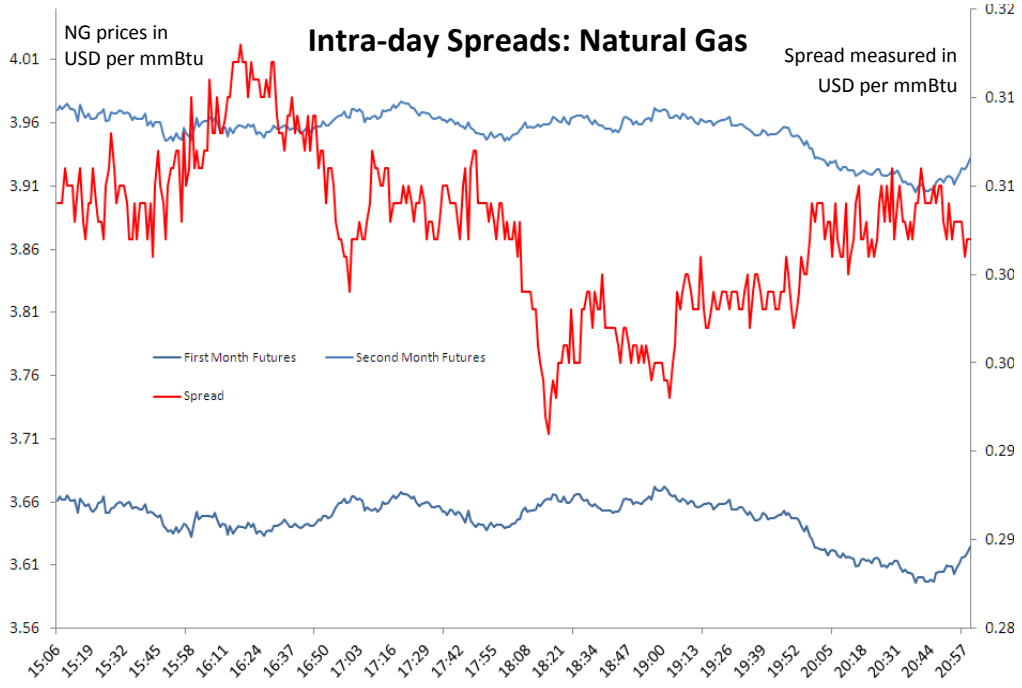
Spread Trading Strategies

Spreads refer to the difference between two different futures contract prices. The spread between different futures contracts is usually not a constant over a period of time. Spread volatility may differ on an intra-day basis or even over a period of few days, months or years (as is illustrated in the spread graphs below). In order to benefit from spreads, opposite positions (buy and sell) may be taken in two different Natural Gas futures contracts (say for e.g., the Feb and Apr contracts), depending on whether the market is in Contango (normal) or backwardation (inverted). This would involve either buying or selling a spread, based on the volatility of spread from its average.

Hypothetical Example: Spread Trading Strategy

Date	BFX Natural Gas Futures Contract Price (USD per troy ounce)		Spread	Positions
	Feb 2012	Mar 2012		
Dec 20, 2011	3.758	3.875	0.117	**Sell 100 lots** of Mar 2012 futures contract **Buy 100 lots** of Feb 2012 futures contract
Dec 22, 2011	3.577	3.602	0.025	**Buy 100 lots** of Mar 2012 futures contract **Sell 100 lots** of Feb 2012 futures contract
Profit / Loss	0.181 (Loss)	0.273 (Profit)	**0.092**	Profit in the Spread Position is calculated as: USD 0.092 per mmBtu x 100 lots x 2,500 mmBtu = **USD 23,000**

When opposite positions are taken in two futures contracts of the same underlying commodity across different expiry months, it is commonly referred to as a "Calendar Spread". For example, in a Contango (normal) market, buying the near-month futures contract and simultaneously selling the far-month futures contract of Natural Gas in the expectation of a decrease in the spread differential.



Let us analyse the above example. A trader takes positions on the BFX Natural Gas futures contracts in anticipation that the price difference between the March and Feb 2012 futures contracts would decrease. On Dec 20, the trader observes that the spread between the Mar and Feb 2012 contract is USD 0.117 per mmBtu and that the futures contracts are in Contango (normal market, where the far month contract price is greater than the near month contract price). Thus, he sells the far month futures contract (Mar 2012) and buys the near month futures contract (Feb 2012). On Dec 22, the spread between the futures contract has decreased to USD 0.025 per mmBtu. The trader unwinds (squares-off) his positions by buying the Mar 2012 contract and selling the Feb 2012 contract. Thus, the trader makes a loss of USD 0.181 per mmBtu in the Feb 2012 contract that is off-set by a profit of USD 0.273 per mmBtu in the Mar 2012 contract. The net profit in the entire transaction is USD 230 per lot traded (USD 0.092 per mmBtu x 2,500 mmBtu) or USD 23,000 for trading 100 lots. In the event that the trader expects the spread to increase, then opposite positions need to be taken (i.e. buy Mar 2012 contract and sell the Feb 2012 contract). Also, if the futures contracts are in backwardation, then the positions are reversed.

Benefits of Calendar Spread Positions

Spread positions have relatively lower risk than an outright (naked) long or short futures position. This is because the long position in one contract is off-set by the short position in the corresponding futures contract for the same underlying asset, i.e. Natural Gas. The high correlation between two futures contract prices of the same underlying asset ensures a natural protection against extreme losses from high volatility swings, as in the case of a naked long or short position. Due to the inherent nature of the long and short positions off-setting the profits and losses with each other, BFX provides a 75% benefit on the margin requirement for calendar spread positions.

*Contract Specification**

BFX Natural Gas Futures Product Specification*

Symbol	BFXNG
Description	BFX Natural Gas Futures Contract
Contract Months	Monthly maturity
Trading Period	Monday through Friday
Trading Session	08:30 - 21:30 Bahrain Time (AST or GMT + 3) adjusted for Daylight Saving Time
Contract (Lot) Size	2,500 mmBtu (million British thermal units)
Quotation	US dollars and cents per mmBtu
Tick size	USD 0.001 per mmBtu (USD 2.50 per contract)
Settlement Methodology	Cash Settlement
Final Settlement Price	International reference prices based on equivalent Natural Gas futures contracts on the New York Markets

**Please refer to the exchange circulars for the detailed product specification.*

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