



National Regulatory  
Research Institute

# **The Natural Gas Industry at a Glance**

## **Tutorial**

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# The Natural Gas Industry at a Glance: Tutorial<sup>1</sup>

## I. Some basic facts about natural gas

- A. Natural gas is a fossil fuel composed mostly of methane. It also contains other hydrocarbons (e.g., ethane and butane) and impurities. Natural gas is found in sedimentary rock formations, often alongside petroleum deposits.
- B. Natural gas comprises about 25 percent of the total energy consumed in the United States.
- C. Natural gas is used for a variety of reasons: to heat homes and water, cook food, produce electricity, provide heat for industrial processes, fuel vehicles, and as a raw material to manufacture such products as fertilizer, plastics, and petrochemicals.
- D. Over 50 percent of the homes in the U.S. use natural gas as the main heating fuel.
- E. Industrial customers are the largest user of gas (consuming about 35 percent of the total), but gas consumption for electricity generation has grown most rapidly since the early 1990s.
- F. End users in the U.S. spend about \$200 billion per year on natural gas.
- G. Natural gas burns more cleanly than the other fossil fuels, i.e., coal and oil. Many energy experts, including environmentalists, view natural gas as a “bridge fuel” between the present carbon-based economy and a future economy highly reliant on renewable energy and energy efficiency.
- H. The production of natural gas in the U.S. occurs in different geographical locations, including the Gulf of Mexico, the Rockies, and the Southwest. Texas is by far the largest natural-gas-producing state in the U.S.
- I. Imports of gas comprise about 15 percent of the gas consumed in the U.S. These imports originate primarily in Canada and increasingly come from countries exporting liquefied natural gas (LNG) to markets around the world.

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<sup>1</sup> This tutorial can be found online at [http://www.nrri.org/pubs/gas/NRRI\\_nat\\_gas\\_industry\\_tutorial\\_may09-06.pdf](http://www.nrri.org/pubs/gas/NRRI_nat_gas_industry_tutorial_may09-06.pdf)

## II. The natural gas industry: functions, structure, and transactions

### A. Industry functions and structure

1. The industry has four major segments:
  - a. Production
  - b. Pipeline transportation
  - c. Local distribution
  - d. Storage
2. Since around 1980, the natural gas sector has undergone monumental changes. Prior to that time, the industry operated under tight regulatory controls. This control extended from the wellhead function to local distribution, with interstate pipelines acting as both the major seller and buyer of natural gas.
3. Although not immune from transitional problems, the transformation of the natural gas sector over the past thirty years has encountered fewer difficulties and challenges than either the electricity or the telecommunications industries.
4. The revamped natural gas sector had its genesis in 1978 with the passage of the Natural Gas Policy Act, which mandated the partial, gradual abolition of price controls on wellhead gas.
5. The market pressures from a liberalized wellhead market led to major FERC actions resulting in, most notably, nondiscriminatory open access by shippers to the interstate pipeline system.
6. The salient features of the U.S. natural gas sector follow. These features have evolved over time in response to technological, economic, and political forces.
  - a. *Production*
    - (1) The production of natural gas comes from wells drilled into underground reservoirs of porous rock. After being withdrawn from a well, the gas usually contains liquid hydrocarbons and nonhydrocarbon gases.
    - (2) The gas is then transported on gathering lines (low-pressure, small-diameter facilities) to processing facilities, which remove the liquid hydrocarbon content and other

impurities to produce “dry” gas suitable for long-distance pipeline transportation.

- (3) Natural gas production was price regulated from the 1950s to the 1970s, after which time Congress gradually repealed price regulation on the premise that the market for production was competitive. The U.S. presently has over 400,000 active gas wells and close to 7,000 gas producers scattered across the country.
- (4) Domestic gas production increasingly comes from unconventional sources, namely tight gas sands, coal bed methane, and shale gas. Unconventional gas supplies presently comprise over one-third of the total gas produced in the country

b. *Pipeline transportation*

- (1) The second major function of the natural gas industry is pipeline transportation. Interstate pipelines carry most of the gas from gas fields to market areas.
- (2) The Federal Energy Regulatory Commission (FERC) has jurisdiction over these pipelines, whose services involve interstate commerce. It has jurisdiction over the rates, as well as the terms and conditions, of interstate pipelines because of the predominant situation of inadequate competition.
- (3) The lower 48 states have about 300,000 miles of gas pipelines.
- (4) Unlike other energy sources, transporting gas by alternate modes of transportation, such as by truck or by water, is generally either not feasible or not economical.
- (5) Individual pipelines control their operations, unlike the centralized control of transmission facilities in some regional electricity markets.
- (6) The physics of gas transportation avoids some of the problems with electricity transmission that require more formalized coordination of individual systems within a network. Because gas cannot flow instantaneously from supply regions and storage fields to market areas, however, transportation customers must make arrangements (i.e., nominations) in advance to ensure the deliverability of gas at required times, pressures, and locations.

- (7) Interstate pipelines fall under contract carriage requirements where owners must offer available capacity to interested shippers. Contract carriage, which initiated in the mid-1980s, was a precursor to the opening up of competition in wholesale gas markets.
- (8) Since FERC Order 636 in 1992, holders of firm pipeline capacity can resell their unused capacity to other parties in what is called a capacity release market.
  - (a) The holders post the available capacity, in most instances, on an Electronic Bulletin Board (EBB) operated by interstate pipelines.
  - (b) Major sellers of unused pipeline capacity are local gas utilities, who purchase sufficient capacity to meet peak demands. Capacity is consequently available for sale during non-peak periods. These utilities charge their customers for the full cost of all contracted capacity, and then credit their customers with revenues earned from selling released capacity.
- (9) In addition to long-distance pipeline transportation, intrastate pipelines transport gas within a state's boundaries.
  - (a) They connect gas producers either to local markets or to the interstate pipeline system.
  - (b) About 30 percent of the total pipeline miles in the U.S. represent intrastate pipelines, with Texas having more intrastate pipeline miles than any other state.
  - (c) State public utility commissions have jurisdiction over intrastate pipelines.
  - (d) In some instances, an intrastate pipeline falls within the category of a "Hinshaw" pipeline. This pipeline, although receiving gas from interstate pipelines, is exempt under the Natural Gas Act from FERC jurisdiction because the gas it delivers is consumed only within the state in which it operates.

c. *Local distribution*

- (1) Local gas transportation, commonly referred to as distribution service, moves natural gas from the “city gate” (i.e., the point of interconnection between the interstate pipeline system and the local distribution system) to the end users of gas. These end users include homes, businesses, industrial facilities, and electric generating plants.
- (2) Local distribution service is a natural monopoly service; that is, a single company serves a local area, with the company usually protected from competition by state law. Most local gas distributors therefore have exclusive rights to distribute gas in a designated geographic area.
- (3) State public utility commissions regulate local distribution.
- (4) The distribution network includes low-pressure distribution lines, and measurement and pressure regulators.
- (5) Local distribution involves transporting gas from delivery points along interstate and intrastate pipelines through small-diameter distribution pipes. Compared with interstate and intrastate pipelines, local distributors serve a much greater number of customers at a much lower throughput per customer.
- (6) Local distribution utilities provide both bundled sales service and unbundled (also known as stand-alone) transportation service.
  - (a) In bundled service, the local utility buys and resells to retail customers both the gas commodity and interstate transportation.
  - (b) Stand-alone service is the provision of unbundled physical distribution service to customers—usually large customers but sometimes residential and commercial customers also—who buy the gas commodity from marketers or others and then hire the local gas distributor to transport the gas to the site of consumption.

- (7) A major activity of local distribution companies is to acquire gas and deliver it to the city gate.
- (a) Prior to FERC Order 636 (1992), retail gas utilities procured much of their city-gate supplies from the interstate pipelines under long-term contracts for the gas commodity, transportation, and off-system storage services.
  - (b) Order 636 caused gas utilities to procure more of their gas supplies separately from transportation service.
  - (c) Consequently, since 1992, gas utilities have played a greater role in managing their gas procurement practices.
  - (d) Gas purchasing practices contain two distinct components. The first component involves the utility procuring gas and transportation at a reasonable price to meet expected peak-day, peak-month, and seasonal demands. The second component, which has received more attention since 2000 when wholesale gas prices began to rise to a new plateau, involves managing price volatility with financial derivatives, stored gas, and forward contracts.
- (8) A major function of distribution companies is to price the services they provide to retail customers. State commissions regulate these prices, generally on the basis of cost of service where a utility has the opportunity to receive adequate revenues to cover its costs, including a fair rate of return.

d. *Storage*

- (1) Storage facilities serving both wholesale and retail markets (which number around 400 in the U.S.) perform valuable functions by:
- (a) Reducing the magnitude of short-term price volatility
  - (b) Assisting marketers, pipelines, and gas utilities to better manage the price and availability of gas year-around

- (c) Creating arbitrage opportunities for market participants
- (2) Storage facilities include salt caverns and depleted gas fields (i.e., underground storage), and above-ground LNG tanks.
- (3) Many pipelines own and operate storage facilities, which perform multiple functions. The pipelines can use their storage for load balancing and system supply management; they also can lease storage capacity to other industry participants, such as marketers, local gas utilities, and large gas users.
- (4) FERC regulates the sale of storage service in interstate commerce.
- (5) Similarly to interstate pipelines, wholesale storage facilities have open access requirements, which include owners making capacity available to interested parties at the regulated or market rate.
- (6) Distribution companies also operate storage facilities, as well as lease storage capacity from pipelines and other owners.
- (7) State commissions regulate the on-system storage activities carried out by utilities, which rely on storage to:
  - (a) Provide valuable peaking capability during the winter months; many utilities, for example, rely on stored gas to meet a large portion (for some utilities, half or more) of customer demand on winter's coldest days.
  - (b) Reduce the need for higher-cost annual firm pipeline transportation.
  - (c) Provide access to normally lower-cost summer gas supplies.
  - (d) Overall, operate more efficiently and reliably.

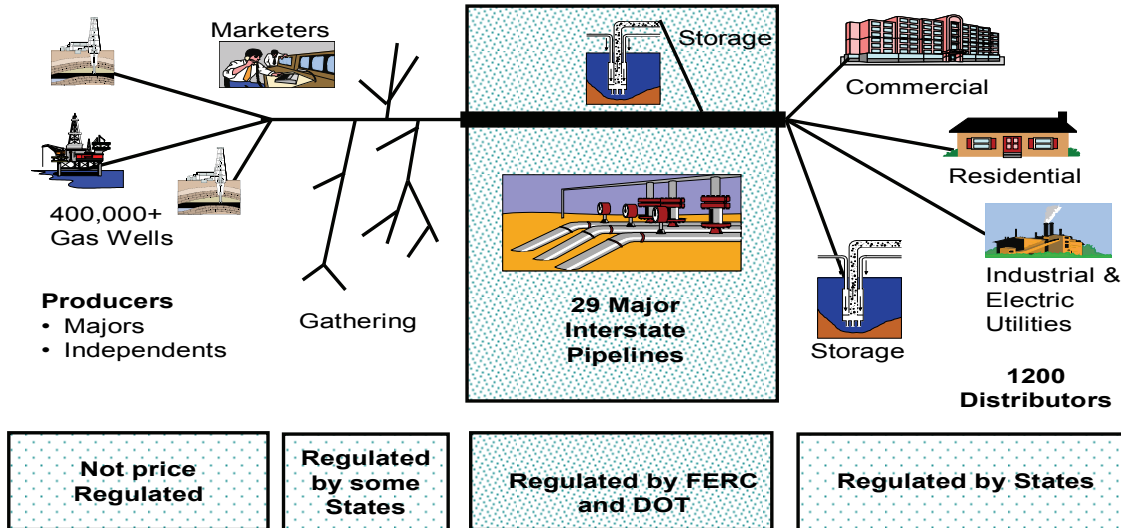
## **B. Transactions**

1. Spot market and long-term contracting
  - a. Well-developed day-ahead and monthly spot markets for natural gas have thrived since the early 1990s. These markets have low transaction costs, but are highly volatile and unpredictable. The spot market for natural gas is a highly integrated one, especially between the eastern and central regions.
  - b. Starting in the early 1980s, with the inception of the restructuring of the natural gas sector from a tightly regulated industry to a more market-oriented one, trading arrangements have become much more short-term and flexible in both price and terms and conditions. This feature prevails throughout the natural gas sector, from gas procurement, gas storage, and retail transactions to capacity contracting for pipeline services.
  - c. The primary force behind this broad reshaping of trading arrangements lies with simple economics:
    - (1) Retail consumers (all large consumers, such as industrial firms and power generators and some residential and commercial consumers) today have more choice in suppliers, and gas utilities face more uncertainty over future prices and their load requirements.
    - (2) As gas utilities downsize the bundled-sales-service side of their business, they will invariably have less demand for long-term pipeline capacity.
    - (3) Competitive pressures in the industry have made long-term commitments (now defined in the industry as longer than one year) a more expensive proposition for gas utilities as well as other shippers by increasing risk.
2. Hedging activities
  - a. A robust futures and over-the-counter financial derivatives market for gas has existed since the early 1990s. Several gas utilities use futures contracts, options, and other financial derivatives to hedge their physical gas purchases.
  - b. Since 2000, both gas distributors and state public utility commissions have recognized the importance of financial derivatives in managing price risk. These derivatives reflect the natural outgrowth of the well-developed gas spot markets to stimulate hedging activities.

- c. Most industry experts consider natural gas to be a commodity whose price exhibits high volatility and close correlation with fluctuations in consumption and production. The spot price of gas, for example, depends on factors such as production cost, storage levels, economic conditions, weather, pipeline capacity, financial speculative activity, and random shocks (e.g., events in the Middle East affecting oil prices).
- 3. Market hubs
  - a. Several pipelines interconnect at market centers, usually referred to as “hubs.”
  - b. Hubs serve to lower transaction costs by facilitating commercial transactions between buyers and sellers at pipeline interconnections, storage areas, and major market areas.
  - c. Hubs, which number about twenty-eight scattered across the country, provide different services, including pipeline interconnection service and electronic information that eases gas trading.
- 4. The role of marketers
  - a. Independent and affiliated marketers play an important intermediary role in providing services to the different market players.
  - b. Marketers are entities that purchase and resell gas in either the wholesale or retail market. Some marketers participate only locally or regionally, while others have a national presence.
  - c. Marketers frequently package gas commodity and pipeline transportation to deliver gas to the city gate.
  - d. Marketers may own pipeline-capacity rights or purchase rights in the secondary (i.e., capacity release) market.
  - e. Some marketers act as asset managers to large customers and gas utilities. Asset managers, for example, package and sell the excess storage and pipeline capacity of a gas utility.
- 5. Retail competition
  - a. Distribution utilities in almost all states provide open access (i.e., local transportation-only service) to large retail customers and, in nineteen states and the District of Columbia, to small customers.

- (1) These customers shop for gas supply among retail marketers.
  - (2) Under these transactions, physical distribution remains a monopoly service, but the retail sale of gas in these states operates in a more competitive market, with the local distributor almost always the default supplier.
- b. Almost all large customers in the U.S., since about twenty years ago, buy only transportation service from the local gas utility.
  - c. 54 percent of residential customers in the U.S. are eligible to choose their gas-commodity supplier. As of December 2008, 4.7 million residential customers, or 13.5 percent of eligible residential customers, chose a non-utility provider (e.g., energy marketer).

## Structure of the U.S. Natural Gas Sector



### **III. Jurisdiction over the natural gas industry**

#### **A. Background**

1. As a result of industry restructuring that began thirty years ago, direct regulation of the natural gas industry today applies mostly to pipeline transportation, storage, and local distribution. For these functions, regulation by FERC or state public utility commissions consists of price setting, rules for access to the delivery facilities, and approval for the siting and construction of new delivery facilities.
2. The rationale for tight regulation of these functions is their natural monopoly feature.
3. Other market functions, such as gas production and the marketing of gas services, are free of direct (e.g., price) regulation. These functions may have some regulatory oversight, however. Marketers affiliated with regulated utilities, for example, may be subject to standards-of-conduct rules.

#### **B. FERC**

1. The current mission of FERC is to “ensure the adequate supply of natural gas at reasonable prices.”
2. FERC’s major duties include:
  - a. Regulating pipeline, storage, and liquefied natural gas facility construction
  - b. Regulating natural gas transportation, including setting rates, in interstate commerce
  - c. Issuing certificates of public convenience and necessity for interstate pipelines and storage facilities
  - d. Setting rates for interstate and wholesale storage services
3. The Natural Gas Act (NGA) requires FERC to set “just and reasonable” rates:
  - a. FERC generally applies the principles of cost-of-service ratemaking in setting pipeline rates.
  - b. FERC uses a straight-fixed variable rate design, wherein a reservation charge recovers a pipeline’s fixed costs, with the variable costs recovered through a usage charge.

4. FERC has enumerated five major principles underlying its actions and policies:
  - a. Commodity and other competitive goods and services are best left unregulated.
  - b. Interstate gas pipelines have monopoly features that warrant their regulation.
  - c. Pipeline services must operate without undue discrimination and preference.
  - d. The development of new supply sources and infrastructure is important to ensure adequate gas supplies at reasonable prices.
  - e. Regulation is a balancing act, trying to harmonize the different interests of stakeholders.

**C. Safety regulation**

1. The U.S. Department of Transportation (DOT) is responsible for enforcing regulations pertaining to pipeline safety.
2. Federal pipeline safety regulations have the objectives of:
  - a. Assuring safety in the design, construction, inspection, testing, operation, and maintenance of pipeline facilities and in the siting, construction, operation, and maintenance of LNG facilities
  - b. Setting out parameters for administering the pipeline safety program
3. State agencies partner with DOT to comply with pipeline safety regulations:
  - a. The states are responsible for intrastate pipelines, assuming that their safety programs receive federal certification or they enter into an agreement with DOT.
  - b. While federal pipeline statutes provide for exclusive federal authority to regulate the safety of interstate pipelines, DOT may authorize a state to act as its agent to inspect interstate pipelines. DOT, however, retains for itself responsibility for enforcement of the regulations.

- c. The federal/state partnership has helped to assure nationwide uniformity of the implementation of the pipeline safety program. The states must enforce at least the federal regulations; many states presently have regulations that are more stringent than federal regulations.

**D. State regulation**

1. State commissions play an important role in regulating the natural gas sector:
  - a. Although the marketplace determines the price of commodity gas and FERC sets rates for interstate pipelines and wholesale storage service, state commissions approve the cost of gas purchased by gas utilities in addition to the distribution-related costs of gas utilities.
  - b. State commissions also regulate intrastate pipelines and some gathering facilities.
2. For all states (except for Hawaii), the utility recovers its purchased gas costs through some automatic adjustment mechanism:
  - a. In most states, the utility passes through dollar-for-dollar purchased gas costs.
  - b. These costs include the cost of the gas commodity, pipeline transportation, and wholesale storage services, subject to a prudence review.
3. The non-gas portion of rates—often referred to as the “base rate”—recovers those costs related to investment in, and operation of, the distribution system:
  - a. This base rate usually consists of a two-part tariff, a monthly customer charge, and a volumetric charge. The customer charge recovers the direct cost of serving a customer, including the cost for meters, meter reading, billing and collection, servicing an account, call centers, and other costs independent of gas usage. The volumetric charge recovers the remaining non-gas costs of a utility. It includes both operating costs and capital costs not recovered in the customer charge.
  - b. A state commission sets the base rate in a formal rate proceeding (e.g., a “rate case”).

- c. For those customers taking only transportation service from the local utility, a state commission regulates the price of that service as well.
4. State commissions also approve the construction of distribution facilities and intrastate pipelines, which include main distribution lines and service lines, metering systems, and storage facilities located within a utility's service area:
  - a. State commissions issue certificates of convenience and necessity in sanctioning new or replacement facilities.
  - b. Commissions review the economics of and need for these facilities before issuing a certificate.
5. As part of their legal obligations, state commissions require that gas utilities provide reliable and safe service. They may require, for example, that a utility replace some of its existing pipes to comply with safety standards or construct new service lines to accommodate new customers.
6. State commissions also involve themselves with social issues:
  - a. These issues include the affordability of gas service to low-income households and energy conservation by customers.
  - b. Some commissions have taken an active role by requiring gas utilities to finance and administer energy conservation initiatives and to offer eligible low-income households discounted rates for gas service.

## **IV. Current natural gas issues**

### **A. The effect of financial speculation on natural gas prices**

1. Over the last several years, a dramatic increase in financial speculation on commodities such as natural gas has occurred.
2. There is evidence of excessive speculation leading to a bubble-like situation.
3. Strong political pressure exists for tighter and more comprehensive federal regulation of financial derivatives.
4. States have expressed concern over excessive speculation causing unnecessary price volatility and extremely high prices.

### **B. LDC hedging: dealing with price volatility**

1. Purchasing of futures contracts and other financial derivatives by utilities, in addition to traditional hedges such as storage and long-term contracts
2. How much are consumers willing to pay for more price stability?
3. How much should a utility spend on hedging, and how much should it hedge?
4. Utility incentives to hedge
5. Prudence criteria and regulatory pre-approval commitment
6. An essential component of gas portfolio management

### **C. The need for new gas supplies to meet growing demand—potential sources:**

1. LNG
2. Alaskan gas
3. Unconventional gas including shale gas
4. Gas in the Outer Continental Shelf (OCS)

### **D. The effect of greenhouse gas legislation on the natural gas sector**

1. Potential for significant effect on the demand for natural gas
2. Consequent effect on natural gas prices for all customers

3. Natural gas as a bridge fuel until the large-scale development of renewable energy, clean coal technologies, and new nuclear power

**E. Infrastructure development**

1. LNG terminals, storage facilities, pipelines
2. The role of long-term contracting in project financing
3. State commission policy on long-term contracting

**F. Energy efficiency**

1. Rationale for the promotion of utility-funded energy conservation initiatives
2. Utility incentives to promote energy efficiency
3. The role of utilities
4. Commission evaluation (*ex post* and *ex ante*) of energy efficiency initiatives
5. Getting the “most bang for the buck”

**G. Fuel switching by retail customers**

1. Energy efficiency, energy costs, and environmental effects of customers switching from electricity to natural gas for space heating, water heating, cooking, and clothes drying
2. The role of regulators—should they do anything?
3. Factors of fuel-choice decisions by retail customers
4. Evidence of market failures and how best to mitigate them when detected

**H. Retail ratemaking**

1. Problems with traditional rate designs
2. Changed ratemaking objectives and their priorities
3. Evaluation of new mechanisms (e.g., cost riders, conservation tariffs, straight fixed-variable rate design) in terms of advancing regulatory objectives (e.g., promotion of energy efficiency, revenue stability)

## **Appendix A: Liquefied Natural Gas (LNG)**

### What is LNG?

1. LNG is gas cooled to below -261 degrees Fahrenheit, where it changes into a liquid state that can be stored as a boiling liquid in insulated tanks.
2. LNG is transported at atmospheric pressure in specially built ships.
3. At the destination point, LNG is unloaded from ships to receiving terminals; these terminals store and regasify LNG for distribution to pipelines, marketers, and end-use consumers.
4. The traditional LNG project is often described as a “supply chain” with four major links: (1) gas field development, (2) the liquefaction process, (3) tanker transportation, and (4) the receipt/regasification terminal.
5. Each stage of the chain is capital-intensive, with investments typically front-loaded—revenues do not flow until the completion of the project (most of the capital expenditures are for field development and liquefaction).
6. Unlike most conventional gas sources, LNG projects are international ventures, subject to the laws and regulations of other countries.
7. Currently, LNG arrives in the U.S from Trinidad and Tobago (~75%), Qatar, Algeria, Nigeria, and Oman.
8. The U.S. presently has six onshore and two offshore LNG regasification terminals; these terminals have a total capacity of about 11.5 Bcf per day.
9. Several additional LNG projects are being proposed (about 13)—but it is expected that most of these will not be built.

### The prospects for LNG

1. Over the last few years, the natural gas industry has acknowledged that conventional gas supplies are not likely to keep pace with growing demand—it is expected that tight gas supplies will hold prices up once the present recession ends.
2. One caution is that the U.S. is competing with other countries for LNG and may not always have LNG available when needed.

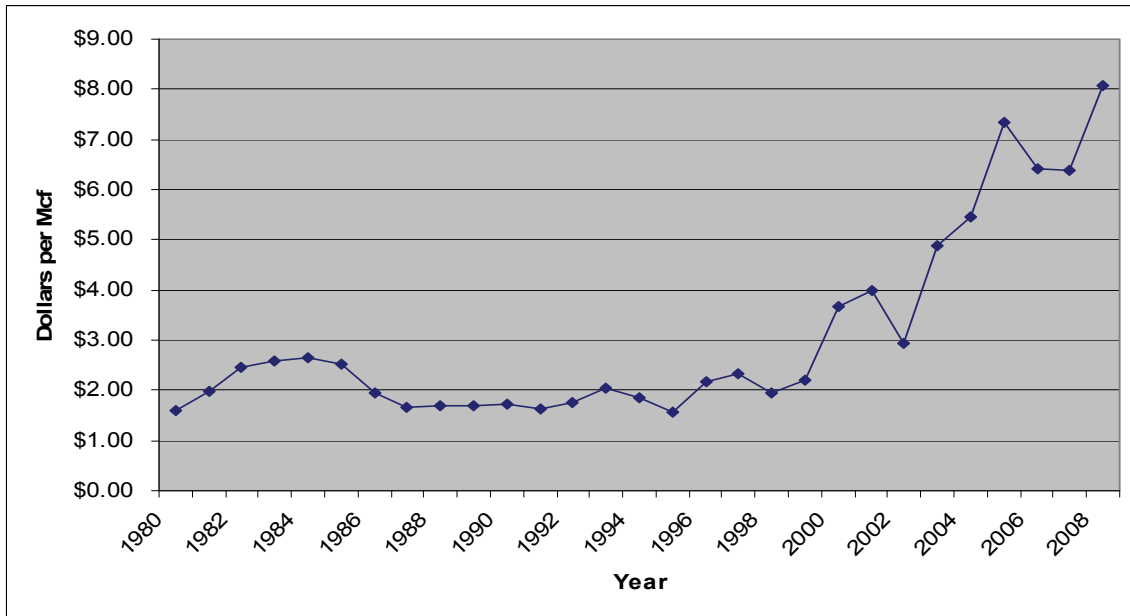
## **Appendix B: Market Developments in the Natural Gas Sector (as of April 2009)**

1. The average price of wholesale natural gas in 2008 was over 26 percent higher than it was in 2007.
2. For 2009, natural gas prices should be noticeably lower than in 2008.
3. Since early last summer, natural gas prices have fallen from around \$14 per Mcf to less than \$4 per Mcf.
4. The sharply lower prices are attributable to a number of factors, including the severe economy-wide recession and increased domestic production from shale gas.
5. A gas surplus may keep prices down (in the \$3-\$4 range) through the recession.
6. LNG imports are projected to increase sharply this year as well as next year, due to a combination of increased worldwide liquefaction capacity and depressed LNG demand in Asia and Europe.
7. In 2007, U.S. gas reserves reached a 30-year high.
8. Over the past year, drilling activity has fallen sharply, mainly because of low prices and cash-flow problems
9. As of early April, working gas in underground storage was 35 percent above last year's level at the same time, and 23 percent above the historical five-year level.
10. Many new storage facilities have been built in the last five years, partially as a hedge against volatile price swings.
11. Domestic gas production is expected to remain constant over the next two years.
12. Shale gas will help to assure sufficient U.S. gas supplies over the next few years, assuming gas prices don't fall too low.
13. Growing gas supplies in the future will come from LNG imports and unconventional domestic production, namely coalbed methane, tight sandstones, and shale gas.
14. Natural gas prices in the short term are extremely sensitive to various factors, making price projections highly vulnerable to error (even by highly paid hedge fund managers):

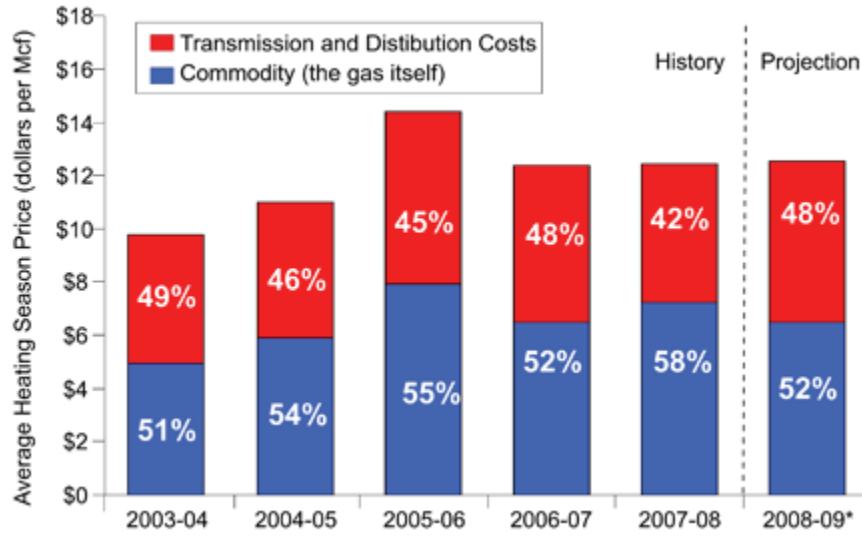
- a. Storage levels
  - b. Weather
  - c. Gas production
  - d. Oil prices
  - e. General economic conditions
  - f. Regional pipeline capacity (e.g., bottleneck event)
  - g. Possibly financial speculation in natural gas
15. Consumers seem to have responded, especially over the past two to three years, to higher gas prices by cutting back on usage. (Since 1980, gas usage per household, normalized for weather, has fallen by 32 percent.)
16. Robust investments have occurred in new pipeline capacity, dampened recently by the credit crisis.

## Appendix C: Graphs, Statistics, and Supplemental Information

### Wellhead natural gas prices, 1980-2008



## Composition of natural gas prices paid by residential consumers during the heating season (source: EIA)

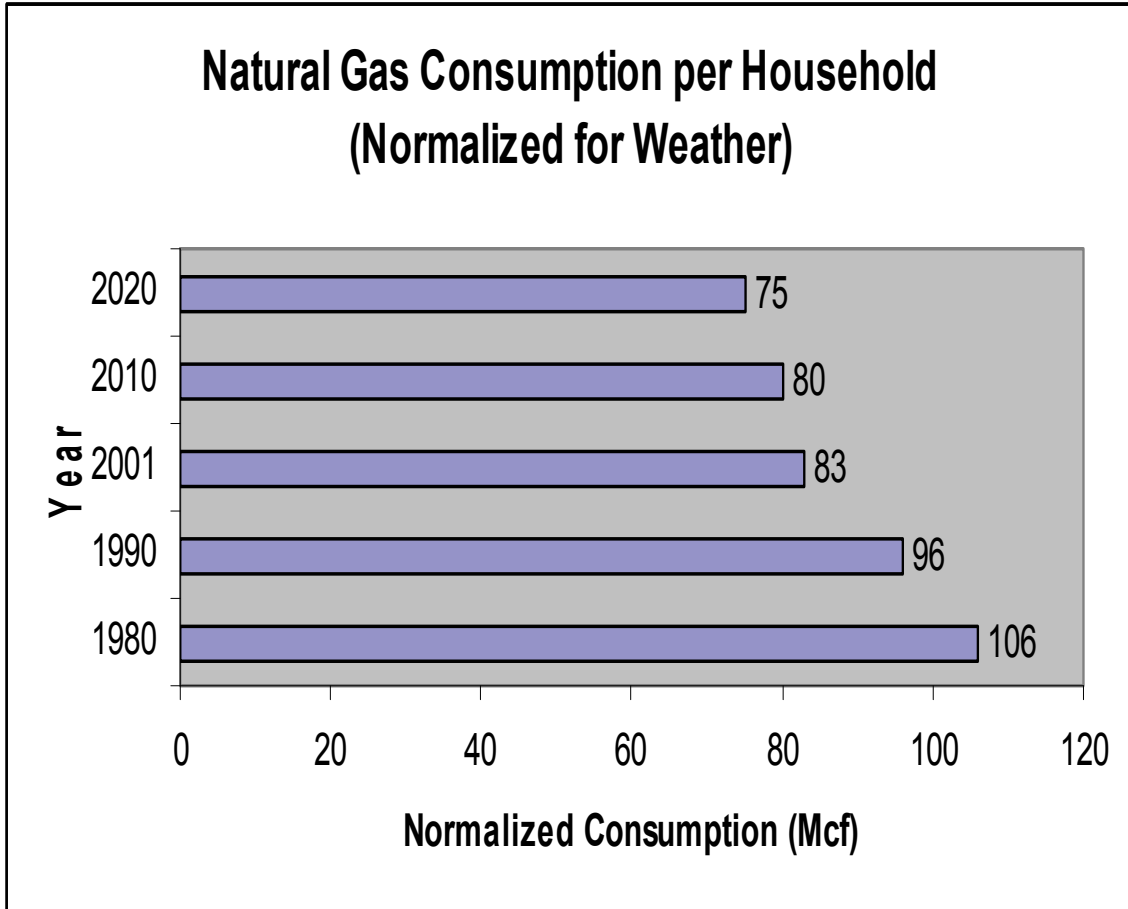


**Total natural gas expenditures, 1998-2007 (in billions of nominal dollars)**

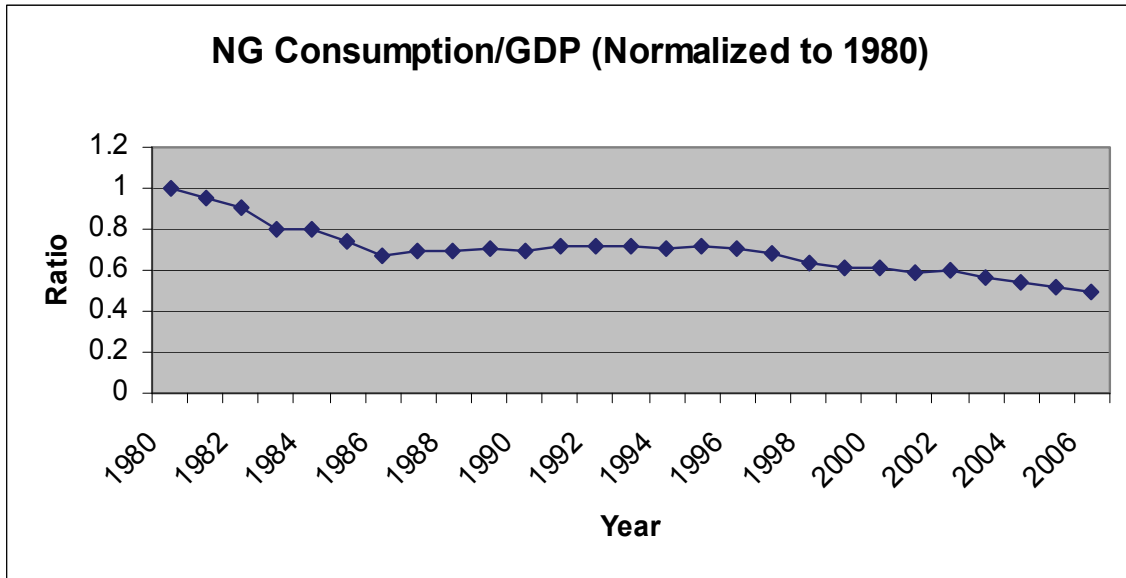
<b>Year</b>	<b>Total Natural Gas Expenditures*</b>
1998	\$84.41
1999	85.68
2000	118.80
2001	134.47
2002	110.46
2003	146.38
2004	164.84
2005	204.70
2006	190.06
2007	196.65

\* For residential, commercial, industrial, and electric power customers

**Declining gas consumption per household since 1980: a problem for gas utilities? (source: AGA)**



## Declining share of natural gas relative to economic activity, 1980-2007



**Poor households spend a much higher share of their incomes on energy than other households (source: Bureau of Labor Statistics, 2004)**

<b>Income</b>	<b>Energy Costs*</b>	<b>% of Budget</b>
< \$5K	\$1,460	28%+
\$5K-9.99K	\$1,554	15-31%
\$10K-14.99K	\$1,954	13-20%
\$15K-19.99K	\$2,215	11-15%
\$20K-29.99K	\$2,556	9-13%
\$30K-39.99K	\$2,905	7-10%
\$40K-49.99K	\$3,231	6-8%
\$50K-69.99K	\$3,689	5-7%
>\$70K	\$4,645	≤7%

\* Annual spending on gasoline, motor oil, and natural gas.

## **EIA's Short-Term Projections (as of April 2009)**

1. *Average wellhead price*: \$3.82 per Mcf in 2009, and \$5.02 in 2010 (the 2008 price was \$8.08)
2. *Consumer prices*: residential prices projected to decrease by almost 16% in 2009
3. *Consumption*: demand projected to decline by 1.8% in 2009 (with the industrial sector decreasing the most) with little change in 2010
4. *Supply*:
  - a. As of early April, working gas in storage 35% above the level at the same time last year, and 23% above the 5-year average
  - b. Domestic dry gas production fairly constant in both 2009 and 2010
  - c. LNG imports projected to increase by 35% in 2009 and then by an additional 12% in 2010

## **Highlights of EIA's Annual Energy Outlook (AEO) 2009 (Reference Case)**

1. Natural gas prices are projected to increase over time with the development of more expensive gas supply to meet demand.
2. Total natural gas consumption in the U.S. is projected to range between 22.5 and 23.4 trillion cubic feet through 2020 before increasing gradually to 24.4 trillion cubic feet in 2030, which is 1.7 Tcf (or 7.4%) more than projected last year in AEO2008.
3. Domestic gas production is projected to increase, given growth in demand and prices.
4. Gas-fired facilities are projected to provide over one-half of the new power generation capacity through 2030 – far more than any other energy source.
5. Imported gas supplies are sharply reduced as domestic supplies grow; compared to two years ago, projected LNG imports are significantly down (the future direction of the global LNG market is a key uncertainty, as price and the availability of LNG in the U.S. market is uncertain because of many new international players entering LNG markets and strong competition for available supply).
6. The U.S. is projected to go from being a net pipeline importer of gas to being a net exporter by 2030; major reasons include Alberta's resource depletion and Canada's growing domestic demand for gas.
7. U.S. net imports of natural gas are projected to decrease from 16% of supply in 2007 to 3% in 2030.
8. Unconventional production (e.g., shale gas) is projected to meet most of the gas demand growth and to offset the decline in conventional production and imports.
9. Alaskan gas pipeline is expected to be completed in 2020. ("Project planning appears to be progressing on schedule, and the economics continue to be favorable.")