



# HoustonBusiness

*A Perspective on the Houston Economy*

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## **Strong Growth, Fear Driving Energy Markets**

*The forces that drove energy prices include economic recovery, environmental regulation, fear of terrorist attacks, and antiterror countermeasures.*

*It was not the perfect storm, but a gathering of enough dark clouds to raise concern about the potential dangers ahead.*

**B**etween March 31 and May 31, the price of crude oil rose from approximately \$34 to \$41 per barrel, wholesale gasoline from \$1.04 to \$1.40 per gallon and natural gas from \$5.50 to \$6.50 per thousand cubic feet. Prices for crude oil and gasoline contracts on the New York Mercantile Exchange set records in late May and early June, if unadjusted for inflation. Even more remarkable, this run-up was achieved with no help from sweltering summer heat or winter blizzards. It occurred in the spring shoulder months, normally a time of slack demand.

The forces that drove energy prices are numerous—economic recovery, environmental regulation, fear of terrorist attacks, and antiterror countermeasures, among others. It was not the perfect storm, but a gathering of enough dark clouds to raise considerable concern about the potential dangers ahead.

Table 1 lists key issues often raised in discussing energy markets this spring, dividing them into separate (if highly interrelated) stories about crude oil, gasoline and natural gas. This article discusses these market drivers and puts each part of the energy puzzle into place.

### **World Economic Growth**

Instead of the seasonal decline expected this spring, oil demand rose sharply along with a resurgent world economy. Table 2 shows the growth rates forecast for 2004 by the International Monetary Fund. World output is expected to rise to a good (if not spectacular) 4.6 percent, with the United States and Asia leading the rebound. If the first quarter is any indication of what is to come, these estimates will prove to be conservative.

U.S. gross domestic product grew at a higher-than-expected 4.4 percent in the first quarter. With consumption and government spending remaining at high levels, the return of business investment meant the economy was finally hitting on all cylinders. Industrial production has now grown strongly for eight months.

**Table 1**  
**Factors Driving Energy Markets This Spring**

**Crude Oil**

**Demand**

- U.S. and global economic recovery
- Fear of terrorism and geopolitical crisis
- Red-hot U.S. gasoline market
- Low crude inventories add to urgency

**Supply**

- OPEC production decisions
- Scarce and expensive ships

**Gasoline**

**Demand**

- U.S. economic recovery
- Approaching driving season
- Fear of refinery disruptions
- Low gasoline inventories
- Average fuel economy

**Supply**

- High crude prices
- Clean Air Act

**Natural Gas**

**Demand**

- Improving industrial sector
- High crude prices preclude fuel switching
- Forecast of a hot summer

**Supply**

- Normal inventory refill
- Forecast of active hurricane season

The Chinese economy also pulled up ahead of schedule, with a 9.7 percent annual growth rate in the first quarter. In the last three years, China's industrial output has grown by 50 percent, and according to *The Economist*, "Last year it consumed 40 percent of the world's output of cement. It also accounted for one-third of the growth in global oil consumption [and] 90 percent of the growth in world steel demand."<sup>1</sup> Fear of overheating has led Chinese authorities to raise bank reserve requirements; impose administrative restrictions on investment in steel, aluminum and car production; restrict property lending; and slow or postpone a series of government megaprojects.

**Terrorism**

It may be surprising that an

act of terrorism—a disruption of supply—is listed as a driver of demand. However, in the very short run, fear of several new and emerging threats to oil supplies raised the specter of disruption and led to a surge in the demand for building emergency inventories. According to various estimates, fear has added \$5 to \$10 to the price of a barrel of crude in recent weeks.

Middle East violence has been a constant in world oil markets for decades. The concentration of oil supplies in a politically volatile region has long been a factor in the day-to-day movements of crude prices. Violence in Gaza this spring, for example, killed 90 Palestinians and 18 Israelis in one of the region's bloodiest months ever, and by itself would have kept markets nervous.

To this, add Iraq as an ongoing concern, with the pending establishment of a provisional government running into serious obstacles. The head of the Iraqi governing council was assassinated; private militias seized one city and only slowly gave up another to U.S. forces; and an attack cut the main pipeline into one of Iraq's two export oil terminals, reducing its capacity by one-third for a week.

Also capturing headlines were calls for urban guerrilla warfare in Saudi Arabia and attacks there that killed a number of foreign oil workers. One attack was at a petrochemical plant on the Red Sea, another against a residential compound at an oil complex. No oil facilities were damaged or Aramco employees killed, but the market saw these events as evidence of a significant new threat to the world's largest oil exporter.

Based on these attacks,

**Table 2**  
**Growth Forecasts for 2004**  
**(Percentage change in gross product)**

	World	U.S.	China	India
2001	2.4	1.1	7.5	4.0
2002	3.0	1.7	8.0	4.7
2003	3.9	2.1	9.1	7.4
2004	4.6	3.5	8.5	6.8

SOURCE: International Monetary Fund, *World Economic Outlook*, April 2004.

underwriters froze war-risk insurance rates for tankers loading in Saudi ports. Rates had peaked with the invasion of Iraq in March 2003, had fallen substantially and were scheduled to fall further. Although the Saudi rates amount to only pennies per barrel of crude and are one-tenth those for tankers loading in Iraq, they are the highest in the region outside of Iraq and northern Iran.

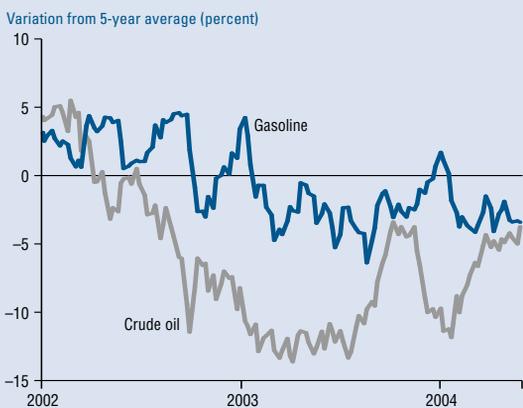
**Crude Oil Inventories**

Inventories are also normally considered a supply-side issue, but low inventory in the face of potential supply disruptions stimulated precautionary buying.

Crude oil inventories have been low in the United States since the general strike in Venezuela that took 4 million barrels off the market in December 2002 and January 2003. Figure 1 shows crude inventories compared with the average inventory held over the previous five years. Inventories in 2003 averaged 8.6 percent below the five-year average and were 10 to 15 percent below average through the first half of the year. The second quarter of this year, with the usual spring slowdown in demand expected, was widely seen as the first real chance to catch up. However, only half the gap between actual and normal inventories was closed, leaving inventories down by about 3.6 percent in early June.

Three hundred million barrels is sometimes regarded as

**Figure 1**  
**Crude Oil and Gasoline Inventories**



NOTE: Data are through May 2004.

SOURCE: Energy Information Administration, Department of Energy.

the point at which inventories return to normal, preventing major disruptions in the refinery system if routine breakdowns occur. Inventories did reach 300 million barrels by the end of May. However, given the strong seasonal and precautionary demand for crude, the inability to add more to inventory helped drive price higher this spring.

### OPEC Production Decisions

OPEC decisionmaking has played a crucial role in pushing crude oil prices over \$40 per barrel. OPEC members supply about 40 percent of the world's oil, they hold about 80 percent of the world's known oil reserves, and the organization is dedicated to "stability" in world oil markets. Each of the 11 members, except Iraq, is assigned a production quota, with the goal of holding enough oil off world markets to maintain price at a level that will maximize the cartel's long-run profits. In recent years, Saudi Arabia has taken about one-third of OPEC's revenue, with Iran, the United Arab Emirates, Nigeria and Venezuela each taking about 10 percent.

For the past several years, the cartel has adopted a target price range of \$22–\$28 for a

basket of OPEC crude oils, roughly equivalent to \$25–\$31 for West Texas Intermediate. The reason for establishing the range was to cut production when prices fell below the range and add crude to markets when the price moved above it. OPEC policy has proven much more sensitive to passing through the bottom of the range than the top.

OPEC's intense concern about low prices dates back to the organization's 1997 meeting in Jakarta, where it seriously overestimated oil needs, raising production just as Asia spiraled into financial crisis. The result of this miscalculation was crude prices that fell below \$10 per barrel in March 1998, their lowest level since the Arab oil embargo in 1973.

With memories of this disaster still fresh, OPEC decided on March 31 of this year to cut production by about 4 percent, or 2 million barrels per day, expecting the usual spring decline in demand. Instead, the cartel ran head-on into a surge in demand from a recovering world economy, and oil price rose quickly. Cheating by OPEC members quickly added back the 2 million barrels cut, but even that was not enough to cool the market. Initially, OPEC showed little concern about higher prices; the OPEC basket averaged \$31.88 the first five months of this year.

However, as terrorist threats fed the demand for rebuilding depleted inventories and price rose over \$40 per barrel, the Saudis began to worry that high crude prices threatened the world economy. They publicly proposed to ratify ongoing OPEC cheating and to add another 1.5 million barrels of their own.

They promised to produce up to their capacity limits—yet another 1.5 million barrels—if necessary to cool markets.

OPEC's June meeting seemed to reject the Saudi plan and to add only another 2 million barrels to the market, seemingly far short of Saudi promises. But what it really did was to ratify much of the ongoing cheating by adding to quotas and at the same time add another million barrels to the market in a less-than-transparent way.

Most cheaters were, in fact, constrained by capacity and could not add more oil. But Saudi Arabia was given an additional quota of 650,000 more barrels per day. It is likely that the UAE, Kuwait and Qatar could push the additional crude available to 1 million barrels per day with their higher quotas and some modest efficiencies. Additional tankers of crude from Saudi Arabia were already on the water in early June, and prices quickly retreated under \$40 per barrel following the OPEC announcement.

### Oil Tankers

The world economy's rapid growth has squeezed global shipping, including oil tankers. Both rates and backlogs are rising quickly. Stricter regulation has reduced work available for older, single-hulled vessels, and the cost of fleet replacement has driven industry consolidation. Shipyards are booked for several years, offering little near-term relief in capacity.

Antiterror measures have raised their own concerns about supply. On July 1, all ships entering U.S. ports must hold International Ship and Port Security (ISPS) certificates. Only 9 percent of the world's shipping fleet and 54 percent of port facilities held a certificate six weeks before the deadline. Even if a ship holds an

ISPS certificate, it can be turned away if it has called on an un-certified port. It is estimated that only 20 percent of the world's tankers hold certificates. A last-minute certification rush is expected, but it is unclear how much of the backlog can be cleared in 30 to 45 days. The United States is a vocal advocate of the ISPS process, and the Coast Guard will board ships at sea to inspect these certificates before ships are allowed to enter U.S. harbors.

### Gasoline Demand

Gasoline demand set records in April and May, and the drivers for this demand have much in common with strong demand for crude—a recovering economy, the approaching driving season, fear of disruptions to supply and efforts to restore low inventories. The higher demand for gasoline appears to be fed primarily by the economy, population growth and more vehicles on the road. Fleet fuel efficiency is unchanged.

Refiners have been producing full-out, trying to take advantage of record margins on every barrel of crude processed. With the refinery system stretched to the limit, the market has been subject to a price squeeze if any refinery or pipeline goes down. Refiners have been part of the strong demand for crude, trying to replenish low inventories in hopes of having adequate stocks on hand if crude deliveries are disrupted. Gasoline markets have been subject to their own threats, with Texas refineries and chemical plants warned of unspecified terrorist plans in March.

Gasoline inventories would normally build before the driving season begins, but instead they fell from January to mid-April. Although they began to build in May, Figure 1 shows

they made little progress relative to the five-year average inventory and, in fact, were 3 to 4 percent below normal and near five-year minimums for much of the month. Gasoline imports have consistently run at or near record levels, with high domestic prices giving European refiners plenty of incentive to deliver product to the United States.

### Fleet Average Fuel Economy

A popular villain in the public mind, as a contributor to higher gasoline prices, is diminished fuel efficiency, especially in the form of the sport utility vehicle. But the case for this is harder to make than most realize, at least as part of the current surge in gasoline demand.

Fleet average fuel economy is an adjustment for real-world driving conditions to fuel efficiency standards manufacturers must meet under the Corporate Average Fuel Economy (CAFE) program. Fleet average fuel efficiency peaked in 1987 at 22.1 miles per gallon and has since declined to 20.8 miles per gallon. Table 3 shows fuel-related characteristics of cars and light trucks since 1975.

Auto fuel economy has slowly increased since 1990 and that of light trucks has been constant. The downward trend in overall efficiency since 1990 is primarily due to a higher share of light truck sales (including SUVs), projected to hit 48 percent in 2004. Since 1997, however, total fleet fuel economy has remained constant at 20.6 to 20.9 miles per gallon, and 2004 is projected to fall within that range, with 20.8 miles per gallon. Any surge in gasoline demand is better attributed to an improving economy or terrorist threats that prompted people to choose autos over airplanes for vacation travel.

**Table 3**  
**Auto and Light Truck Characteristics**  
**for Three Model Years**  
**(Sales-weighted averages)**

	1975	1987	2004
Fuel economy (mpg)	13.1	22.1	20.8
Weight	4,060	3,220	4,066
Horsepower	137	118	208
Percentage of truck sales	19%	28%	48%

SOURCE: Environmental Protection Agency.

### Clean Air Act

The most important factors in higher gasoline prices have been strong demand and higher prices for crude oil feedstock. However, requirements imposed under the Clean Air Act Amendments of 1990 have raised doubts about the supply capabilities of the refinery system when strained to the limit, as it is now.

Reformulated fuels were introduced in 1995 and required in cities—like Houston—with the worst smog. Other areas were allowed to voluntarily opt into the program (four North Texas counties, for example). Reformulated fuels are most heavily used in Central and Southern California, Chicago, and in the Northeast corridor from Washington to Boston. The law requires that an oxygenate be added (2 percent by weight), with 87 percent of reformulated fuels using MTBE and the rest ethanol. About 30 percent of U.S. gasoline is reformulated.

States can opt out of the program by proposing their own cleaner formulations. A 1999 National Research Council report opened the door to these alternatives by suggesting that lower vapor pressure and lower sulfur could be more important in reducing smog than the oxygenates. The refinery industry has pressed for these “boutique” formulations, blended especially for different regions, as a means to reduce the use of oxygenates.

Boutique gasoline has become more important as

states have begun to ban MTBE because it can pollute water supplies. California began to phase out MTBE in 1999, and New York and Massachusetts both implement MTBE bans this year.

The problem posed by boutique gasoline is that it places significant demands on the gasoline delivery system. There is a winter to summer changeout of inventory between April and June from high- to low-vapor-pressure gasoline that taxes the system. The fuels require additional processing that reduces capacity during the peak summer season, and they limit flexibility and interchangeability of fuels between terminals and regions. Problems have been compounded this year by a new low-sulfur requirement of 120 parts per million.

No greenfield refineries have been built in the United States since 1976, and demand this year exceeds domestic capacity. Both the low-sulfur requirement and the boutique blends make it difficult or impossible for imports to substitute for U.S. capacity. Although overall U.S. gasoline imports have been high in recent months, California, the Northeast and Chicago continue to have significant problems in building inventory ahead of the coming summer.

## Natural Gas

Natural gas has been the best-behaved of fuels, with price rising from \$5.50 to \$6.50 per thousand cubic feet, primarily lifted by crude oil prices. Inventories have moved from a late winter surplus, if compared with the five-year average, to a small deficit (*Figure 2*). In recent weeks, however, inventories have refilled, right in line with expectations.

There is little indication that industrial customers are drop-

ping offline in response to \$6 gas prices. This is partly because strong industrial activity is allowing them to pass the higher prices on to their own clients. In the petrochemical industry, for example, virtually all plastic and synthetic rubber producers have raised prices at least once in the last few weeks. Further, there is little incentive for these gas customers to switch fuels, with the price of crude oil at \$40 per barrel. The rule of thumb for fair value for crude relative to natural gas is a price ratio of 6 to 1. Based on that standard, natural gas has been a bargain in recent weeks.

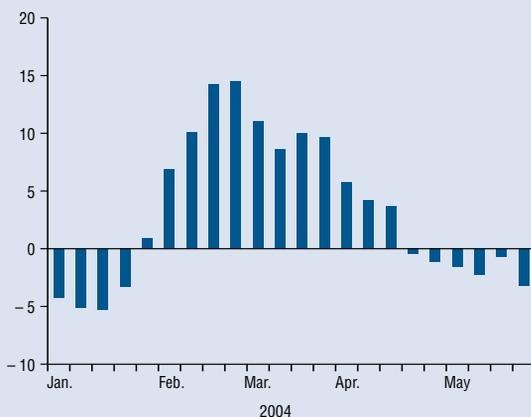
The weather is the only potential problem natural gas faces. A hot summer could slow storage injections for the coming winter by raising demand for electricity due to additional air-conditioning. May proved hotter than usual in the South, and the National Oceanic and Atmospheric Administration (NOAA) says there's a 30 percent chance this summer will be 10 percent hotter than normal.

A hurricane sweeping through the Gulf of Mexico would close platforms and could leave them damaged for extended periods. NOAA is forecasting above-average storm activity this year, with six to eight hurricanes, two to four of them with winds of 111 miles per hour or faster. There is a 40 percent chance of a hurricane landing on the Gulf Coast, higher than the 100-year average of 30 percent. These forecasts speed the building of inventory ahead of these storms, and they will cause gas prices to spike if they threaten the Gulf, the nation's primary gas-producing region.

**Figure 2**

### Summer Natural Gas Refill Is on Schedule

Variation from 5-year average (percent)



SOURCE: Energy Information Administration, Department of Energy.

## The Summer Ahead

As this was written, there were many signs the energy fever may have broken. Crude oil prices were back under \$40 per barrel, and both wholesale and retail gasoline prices were falling. Crude and gasoline inventories were filling, and gasoline imports were flooding into the United States.

However, there is still much reason for concern: the approaching June 30 transition of power in Iraq, preparations for a general strike in Nigeria, a likely presidential recall election in Venezuela, and such big terror targets this summer as the national political conventions and the Olympics. Middle East turmoil will remain a constant, of course. So we shouldn't unbatten the hatches yet; there is still plenty of potential for rough seas ahead.

—Robert W. Gilmer

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## Notes

<sup>1</sup> "The Great Fall of China," *The Economist*, May 13, 2004.

**T**he Houston economy turned upward late last summer and has been growing ever since. The index of coincident economic activity for Houston bottomed out in July, nonagricultural employment began to rise in August, and the unemployment rate held steady at 7 percent from September to November before beginning to decline.

In the first four months of 2004, nonagricultural employment grew at a 1.3 percent annual rate—promising 27,000 new jobs if this pace continues through the year—and unemployment fell to 6.3 percent. The latest reading of the Houston Purchasing Managers Index was 64.6 (with any reading above 50 indicating growth), which tied a 10-year high last reached in the economic and drilling boom of 1997.

### Retail and Auto Sales

Retailers have consistently reported solid sales since the start of the year. March and April were both excellent, but the first half of May slowed a bit. The pace seems to have picked back up since then.

Performance appears to be equally good among department, discount and furniture stores, as well as smaller retailers, with all meeting or exceeding their plans. The main concerns expressed involved sharply rising natural gas and electricity prices. A wary eye was also cast on assorted legislative proposals for a higher minimum wage, payroll taxes and taxes on newspaper inserts.

Auto sales were down 6.6

percent in April compared with a year earlier and down 11 percent year to date. As with most of Texas, Houston continues to lag the nation in auto sales.

### Real Estate

Houston's nascent recovery has yet to change the course of its real estate markets. Rising but still-low interest rates have not slowed housing markets. New and used home sales were up 20-plus percent from the same month last year. These sales continue to hurt apartments by pulling out renters, and new supply continues to come online, with more than 3,000 units already completed this year. Apartment occupancy and rents are still falling despite the mild upturn in job growth.

Office rents and occupancy also continue to fall. Industrial occupancy rates, in contrast, are now rising, and retail expansion is slowing, though it's still robust thanks to healthy consumer spending.

### Energy Markets and Drilling

Crude oil prices have rocketed to \$42 per barrel, driven by strong global growth and fear of disruptions to supplies. OPEC's decision to cut production in late March, in anticipation of a spring lull in demand, was a miscalculation that has been reversed. Natural gas prices have followed crude prices upward, going from \$5.50 to

\$6.50 per thousand cubic feet, with the recovery of the U.S. industrial sector an important driver for demand. With oil prices at \$42, there is no incentive for fuel switching, and so far there is no indication the high price of natural gas is forcing industrial plants offline.

Drillers and oil service companies have been surprised at the lack of response to higher energy prices, with only a marginal increase in gas-directed, land-based drilling in recent weeks. Offshore activity briefly improved, then fell back to levels near the trough of the last drilling downturn, in 2001.

### Chemicals and Refining

Chemical producers continue to report very strong demand, and most products have been able to pass through the cost increases imposed by natural gas feedstocks rising to \$6 per thousand cubic feet. Prices of virtually every plastic and synthetic rubber product have risen in the last 10 weeks, some two or three times.

Refiners are enjoying record profit margins per barrel and running full-out to take advantage of these profits. Gasoline inventories are low, domestic capacity limited and imports difficult to find because of U.S. environmental restrictions. The result has been retail gas prices topping \$2 per gallon in recent weeks.



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