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Highlights

Highlights of GAO-05-1047T, a testimony to the Senate Committee on Commerce, Science, and Transportation

ENERGY MARKETS

Gasoline Price Trends

Why GAO Did This Study

Soaring retail gasoline prices have garnered extensive media attention and generated considerable public anxiety in recent months, particularly in the aftermath of Hurricane Katrina. Prices in many areas hit by the hurricane saw retail gasoline prices increase to over $3.00 per gallon, and in one reported case to almost $6.00 per gallon, with some gasoline stations running out of gasoline entirely.

The availability of relatively inexpensive gasoline over past decades has helped foster economic growth and prosperity in the United States, so large price increases, especially if sustained over a long period, pose long-term challenges to the economy and consumers.

This testimony, as requested, addresses factors that help explain how gasoline prices are determined and what key factors will likely influence trends in future gasoline prices.

What GAO Found

Crude oil prices and gasoline prices are inherently linked, because crude oil is the primary raw material from which gasoline and other petroleum products are produced. In the past year, crude oil prices have risen significantly—from August 31, 2004 to August 31, 2005, the price of West Texas Intermediate crude oil, a benchmark for international oil prices, rose by almost $27 per barrel, an increase of almost 64 percent. Over about the same period, average retail prices for regular gasoline rose nationally from $1.87 to $2.61 per gallon, an increase of about 40 percent. Major upward and downward movements of crude oil prices are generally mirrored by movements in the same direction by gasoline prices. However, based on recent events, at least in the short term, this historical trend has not held, and retail prices have risen faster than crude oil prices.

While crude oil is a fundamental determinant of gasoline prices, a number of other factors also play a role in determining how gasoline prices vary across different locations and over time. For example, refinery capacity in the United States has, in recent years, not expanded at the same pace as demand for gasoline and other petroleum products. During the same period we have imported larger and larger volumes of gasoline from Europe, Canada, and other countries. Further, the American Petroleum Institute has recently reported that U.S. average refinery capacity utilization has increased to 92 percent. As a result, domestic refineries have little room to expand production in the event of a temporary supply shortfall.

Gasoline prices may also be affected by unexpected refinery outages or accidents that significantly disrupt the delivery of gasoline supply. Most recently, Hurricane Katrina hit the Gulf Coast, doing tremendous damage to homes, businesses, and physical infrastructure, including roads; electricity transmission lines; and oil producing, refining, and pipeline facilities. Because the Gulf Coast refining region is a net exporter of petroleum products to all other regions of the country, retail gasoline prices in many parts of the nation rose dramatically. Average retail gasoline prices increased 45 cents per gallon between August 29 and September 5. The average price for a gallon of regular gasoline on September 5 was $3.07, the highest nominal price ever.

Future gasoline prices will reflect the world supply and demand balance. Globally, if demand for oil and petroleum products continues to rise, supply will need to keep pace. The challenge is to boost supply and reduce demand. We need to choose wisely and we need to act soon.

www.gao.gov/cgi-bin/getrpt?GAO-05-1047T.

To view the full product, including the scope and methodology, click on the link above. For more information, contact Jims Wells, (202) 512-3841 or wellsj@gao.gov.

Mr. Chairman and Members of the Committee:

I am pleased to participate in the Committee's hearing to discuss current gasoline prices and the factors that will likely influence trends in those prices. Soaring retail gasoline prices have garnered extensive media attention and generated considerable public anxiety in recent months, particularly in the aftermath of Hurricane Katrina. Prices in many areas hit by the hurricane saw retail gasoline prices increase to over $3.00 per gallon, and in one reported case to almost $6.00 per gallon, with some gasoline stations running out of gasoline entirely. In addition, retail gasoline prices have shot up in many areas of the country that were not directly affected by the hurricane. It was not uncommon to see pump prices rise not just daily, but multiple times in the same day. Overall, gasoline prices have been significantly higher this year than last, costing American consumers considerably. According to the Department of Energy's Energy Information Administration (EIA), nationally, each additional ten cents per gallon of gasoline adds about $14 billion to America's annual gasoline bill.

The availability of relatively inexpensive gasoline over past decades has helped foster economic growth and prosperity in the United States. However, large price increases, especially if sustained over a long period, pose long-term challenges to the economy and consumers. Importantly, some recent analyses suggest that gasoline prices may stay at today's relatively high level or even increase significantly in the future. In contrast, others suggest that prices may fall as oil companies invest in more crude oil producing capacity and as consumers respond to higher prices by adopting more energy-efficient practices. Regardless of what happens in the future, the impact of gasoline prices is felt in virtually every sector of the U.S. economy and when prices increase sharply, as they have in recent months, consumers feel it immediately and are reminded every time they fill up their tanks.

It is therefore essential to understand the market for gasoline. In this context, you asked us to discuss (1) how gasoline prices are determined and (2) what key factors will likely influence trends in future gasoline prices?

To respond to your questions, we relied heavily on the gasoline primer, "Motor Fuels: Understanding the Factors That Influence the Retail Price of

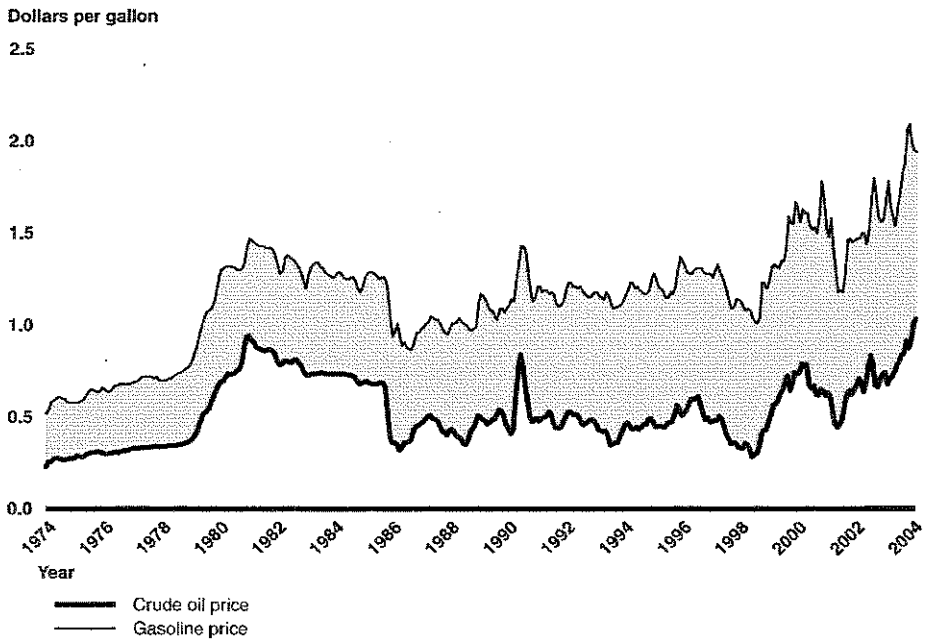
Gasoline,"[1] and 17 other GAO products on gasoline prices and other aspects of the petroleum products industry. (See Related GAO Products at the end of this testimony.) We also collected updated data from a number of sources that we deemed reliable. This work was performed in accordance with generally accepted government auditing standards.

In summary, our work has shown:

- Crude oil prices and gasoline prices are inherently linked, because crude oil is the primary raw material from which gasoline and other petroleum products are produced. In the past year, crude oil prices have risen significantly—from August 31, 2004 to August 31, 2005, the price of West Texas Intermediate crude oil, a benchmark for international oil prices, rose by almost $27 per barrel, an increase of almost 64 percent. Over about the same period, average retail prices for regular gasoline rose nationally from $1.87 to $2.61 per gallon, an increase of about 40 percent. Explanations for the large increase in crude oil and gasoline prices include the rapid growth in world demand for crude oil and petroleum products, particularly in China and the rest of Asia; instability in the Persian Gulf region (the source of a large proportion of the world's oil reserves); and actions by the Organization of Petroleum Exporting Countries (OPEC) to restrict the production of crude oil and thereby increase its price on the world market. Figure one illustrates the relationship between crude oil and gasoline prices over the past three decades. The figure shows that major upward and downward movements of crude oil prices are generally mirrored by movements in the same direction by gasoline prices. However, based on recent events, at least in the short term, this historical trend has not held, and retail prices have risen faster than crude oil prices.

[1]GAO, *Motor Fuels: Understanding the Factors That Influence the Retail Price of Gasoline*, GAO-05-525SP (Washington, D.C.: May 2, 2005).

Figure 1: Gasoline and Crude Oil Prices—1974-2004 (Not adjusted for inflation)



Source: GAO analysis of Energy Information Administration, Department of Energy, Monthly Energy Review, Monthly Refiner Acquisition Cost of Crude Oil, Composite and Bureau of Labor Statistics, Monthly Motor Gasoline Prices, U.S. City Averages, Regular Gasoline.

- While the price and availability of crude oil is a fundamental determinant of gasoline prices, a number of other factors also play a role in determining how gasoline prices vary across different locations and over time. For example, refinery capacity in the United States has not expanded at the same pace as demand for gasoline and other petroleum products in recent years. During the same period the United States has imported larger and larger volumes of gasoline from Europe, Canada, and other countries. The American Petroleum Institute has recently reported that U.S. average refinery capacity utilization has increased to 92 percent. As a result, domestic refineries have little room to expand production in the event of a temporary supply shortfall. Further, the fact that imported gasoline comes from farther away than domestically produced gasoline means that when supply disruptions occur in the United States, it might take longer to get replacement gasoline than if we had excess refining capacity in the United States, and this could cause gasoline prices to rise and stay high until these new supplies can reach the market.

- Gasoline inventories maintained by refiners or marketers of gasoline can also have an impact on prices. As with trends in a number of other

industries, the petroleum products industry has seen a general downward trend in the level of gasoline inventories in the United States. Lower levels of inventories may cause prices to be more volatile because when a supply disruption occurs, there are fewer stocks of readily available gasoline to draw from, putting upward pressure on prices. Regulatory factors also play a role. For example, in order to meet national air quality standards under the Clean Air Act, as amended, many states have adopted the use of special gasoline blends—so-called "Boutique Fuels." Many experts have concluded that the proliferation of these special gasoline blends has caused gasoline prices to rise and/or become more volatile, especially in regions such as California that use unique blends of gasoline, because the fuels have increased the complexity and costs associated with supplying gasoline to all the different markets. Finally, the structure of the gasoline market can play a role in determining prices. For example, we recently reported that some mergers of oil companies during the 1990s led to reduced competition among gasoline suppliers and may have been responsible for an increase in gasoline prices by as much as 2 cents per gallon on average, with boutique fuels increasing from between 1 to 7 cents per gallon.

- Gasoline prices may also be affected by unexpected refinery outages or accidents that significantly disrupt the delivery of gasoline supply. Most recently, Hurricane Katrina hit the Gulf Coast, doing tremendous damage to homes, businesses, and physical infrastructure, including roads; electricity transmission lines; and oil producing, refining, and pipeline facilities. The DOE reported on August 31, 2005 that as many as 2.3 million customers were without electricity in Louisiana, Mississippi, Alabama, Florida, and Georgia. The DOE further reported that 21 refineries in affected states were either shut down or operating at reduced capacity in the aftermath of the hurricane. This amounted to a reduction of over 10 percent of the nation's total refining capacity. Two petroleum product pipelines that serve the Midwest and East Coast from Gulf Coast refineries were also out. In addition, the Minerals Management Service in the Department of the Interior reported that as of September 1, 2005, over 90 percent of crude oil production in the Gulf of Mexico was out of operation. Because the Gulf Coast refining region is a net exporter of petroleum products to all other regions of the country, retail gasoline prices in many parts of the nation rose dramatically. Average retail gasoline prices increased 45 cents per gallon between August 29 and September 5. The average price for a gallon of regular gasoline on September 5 was $3.07, the highest nominal price ever. In addition, gasoline stations faced large increases in wholesale gasoline prices, and some even reported running out of gasoline. The spot price for wholesale gasoline delivered to New York Harbor rose by about $0.78 per gallon

between August 26 and August 30. Gasoline supply is recovering in the wake of the storm, however, and prices have begun to decrease. Between September 5 and September 12, average gasoline prices decreased 11 cents to $2.96 per gallon. Gasoline production increased dramatically over this time, rising by more than 400,000 barrels per day as most of the refineries shut down after the storm resumed production. Until production, refining, and pipeline facilities are fully operating at normal levels, prices are expected to continue to be higher in affected areas. Coming as this has on the heels of a period of high crude oil prices and a tight balance worldwide between petroleum demand and supply, the effects of the hurricane illustrate the volatility of gasoline prices given the vulnerability of the gasoline infrastructure to natural or other disruptions.

- Future gasoline prices will reflect the world supply and demand balance. If demand for oil and petroleum products continues to rise as it has in past years, then oil supply will have to expand significantly to keep up. The EIA projects that world demand for crude oil will rise by at least 25 percent by the year 2025. However, world surplus crude oil production capacity—the amount by which oil production can be increased in the short run without installing more drilling equipment or developing new oil fields—is currently very small. Moreover, many of the world's known and easily accessible crude oil deposits have already been developed and many of these are experiencing declining volumes as the fields become depleted. Other new sources may be more expensive to develop. For example, there are large stores of crude oil in tar sands and oil shale, or potentially beneath deep water in the ocean, but these sources are more costly to extract and process than many of the sources of oil that we have already tapped. If developing, extracting, and refining new sources of crude oil are more costly than extracting and refining oil from existing fields, crude oil and petroleum product prices likely will rise to make these activities economically feasible. If, on the other hand, technological innovations improve the ability to extract and process oil, this will increase the available future supply and may ease pressure on petroleum product prices.

- Although demand for crude oil is projected to increase, it could fall below current expectations if consumers choose more energy efficient products or otherwise conserve more energy. Such a reduction in demand could lead to lower-than-expected future prices. For example, in response to high gasoline prices in the United States, in the 1980s many consumers chose to switch to smaller or more fuel-efficient vehicles, which reduced demand for gasoline. Environmental issues could also have an impact on world crude oil and petroleum product prices. For example, international efforts to reduce greenhouse emissions could cause reductions in demand

for crude oil and petroleum products as more fuel-efficient processes are adopted or as cleaner sources of energy are developed. Additional factors that will likely influence future oil and gasoline prices include geopolitical issues, such as the stability of the Middle East; the valuation of the U.S. dollar in world currency markets; and the pace of development of alternative energy supplies, such as hydrogen fuel cell technology.

Background

In 2004, the United States consumed about 20.5 million barrels per day of crude oil accounting for roughly 25 percent of world oil production. A great deal of the crude oil consumed in this country goes into production of gasoline and, as a nation, we use about 45 percent of all gasoline produced in the world.[2] Products made from crude oil—petroleum products, including gasoline—have been instrumental in the development of our modern lifestyle. In particular, gasoline, diesel, and jet fuel have provided the nation with affordable fuel for automobiles, trucks, airplanes and other forms of public and goods transportation. Together, these fuels account for over 98 percent of the U.S. transportation sector's fuel consumption. In addition, petroleum products are used as raw materials in manufacturing and industry; for heating homes and businesses; and, in small amounts, for generating electric power. Gasoline use alone constitutes about 44 percent of our consumption of petroleum products in the United States, so when gasoline prices rise, as they have in recent months, the effects are felt throughout the country, increasing the costs of producing and delivering basic retail goods and making it more expensive to commute to work. It is often the case that prices of other petroleum products also increase at the same time and for the same reasons that gasoline prices rise. For example, today's high gasoline prices are mirrored by high jet fuel prices, creating financial pressure on airline companies, some of which are currently in the midst of economic difficulties. Gasoline prices vary a great deal over time. For example, in the period January 1, 1995 through August 29, 2005, the national average price for a gallon of regular grade gasoline has been as low as $1.10 and as high as $2.80 without adjusting for inflation.

[2]The large percentage of total world gasoline production consumed by the United States, in part, reflects the fact that diesel is a commonly used fuel for cars in Europe, while automobiles in the United States primarily run on gasoline. If all motor vehicle fuels were accounted for, the United States' share of these fuels would be smaller than its share of gasoline. However, we do not have the data to present this more comprehensive measure.

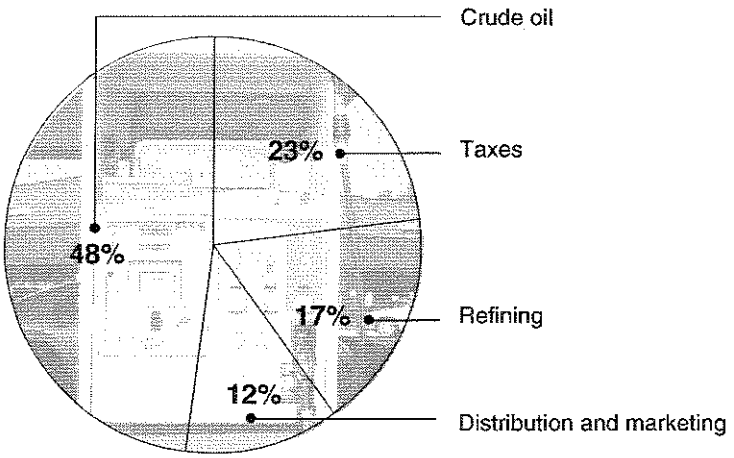
The future path of gasoline prices is difficult to predict, but it is clear that the use of petroleum products worldwide is going to increase for the near term and maybe beyond. Some analysts have predicted much higher crude oil prices—and as a result, higher prices for petroleum products—while others expect prices to moderate as producers respond to high prices by producing more crude oil and consumers respond by conserving more, and investing in more energy-efficient cars and other products. In either case, the price of gasoline will continue to be an important factor affecting the household budgets of individual Americans for the foreseeable future and therefore, it is important to understand how prices are determined so that consumers can make wise choices.

Gasoline Prices Are Determined by the Price of Crude Oil and a Number of Other Factors

Crude oil prices directly affect the price of gasoline, because crude oil is the primary raw material from which gasoline is produced. For example, according to our analysis of EIA data, in 2004 crude oil accounted for about 48 percent of the price of a gallon of gasoline on average in the United States. When crude oil prices rise, as they have over the past year, refiners find their cost of producing gasoline also rises, and in general, these higher costs are passed on to consumers in the form of higher gasoline prices at the pump. However, based on recent events, at least in the short term, this historical trend has not held, and retail prices have risen faster than crude oil prices. Figure 2 illustrates the importance of crude oil in the price of gasoline. The figure also shows that taxes, refining, and distribution and marketing also play important roles.[3]

[3]The latter two categories, refining and distribution and marketing, includes costs associated with these activities as well as profits. The figure is a snapshot of how much each component contributes to the price of a gallon of gasoline, and how the relative proportions attributable to each component vary over time as crude oil prices and other factors change.

Figure 2: Elements in the Price of a Gallon of Gasoline (Average for 2004)



Sources: GAO analysis of EIA data; GAO (photo).

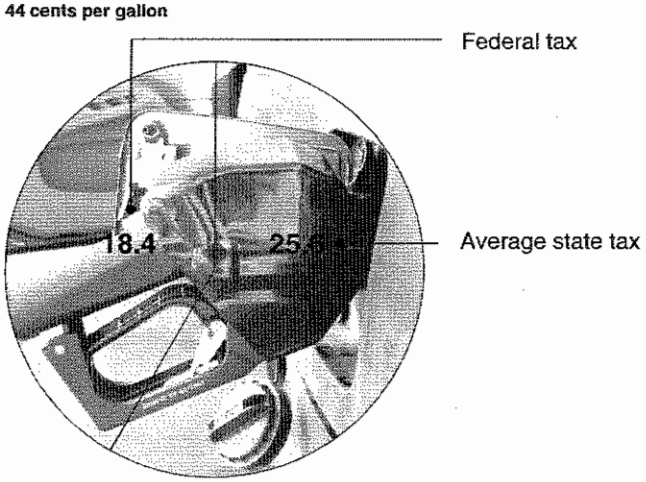
Because crude oil is the primary raw material used in the production of gasoline, understanding what determines gasoline prices requires examining how crude oil prices are set. Overall, the price of crude oil is determined by the balance between world demand and supply. A major cause of rising crude oil prices in recent months has been rapid growth in world demand, without a similar growth in available supplies. In particular, the economy of China has grown rapidly in recent years, leading to increases in their demand for crude oil. In contrast, oil production capacity has grown more slowly, leading to a reduction in surplus capacity—the amount of crude oil that is left in the ground, but could be extracted on short notice in the event of a supply shortfall. EIA has stated that the world's surplus crude oil production capacity has fallen to about one million barrels per day, or just over one percent of the world's current daily consumption, making the balance between world demand and supply of crude oil very tight. This tight balance between world crude oil demand and supply means that any significant supply disruptions will likely cause prices to rise. Such a disruption occurred in Nigeria in October 2004, when a workers' strike in Nigeria's oil sector forced world crude oil prices to record highs. (Nigeria is the world's seventh largest oil producer, supplying an average 2.5 million barrels per day in 2004.)

Another important factor affecting crude oil prices is the behavior of the Organization of Petroleum Exporting Countries (OPEC)—members of which include Algeria, Indonesia, Iran, Iraq, Kuwait, Libya, Nigeria, Qatar,

Saudi Arabia, United Arab Emirates, and Venezuela. OPEC members produce almost 40 percent of the world's crude oil and control almost 70 percent of the world's proven oil reserves. In the recent past and on numerous other occasions, OPEC members have collectively agreed to restrict the production of crude oil in order to increase world prices.

Turning now to the price of gasoline seen at the pump, it is important to discuss the role of taxes. In the United States, on average, taxes accounted for 23 percent of what consumers paid for a gallon of gasoline in 2004, according to EIA's data. This percentage includes estimated federal and average state taxes totaling 44 cents per gallon (see figure 3).[4] Federal taxes accounted for 18.4 cents of this total, while state taxes averaged 25.6 cents per gallon, although taxes vary among states.

Figure 3: Estimated Federal and Average State Gasoline Taxes per Gallon (2004)

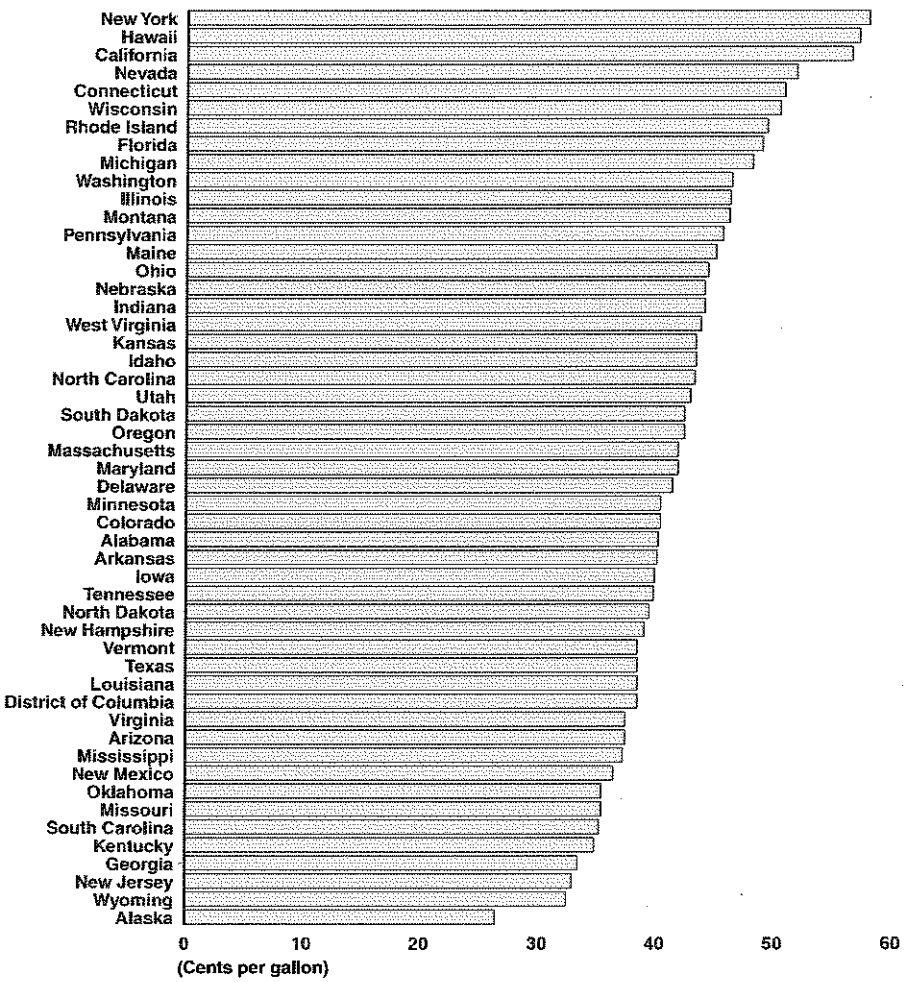


Sources: GAO analysis of API data; GAO (photo).

[4]EIA uses tax data from the American Petroleum Institute (API) for its tax analysis. According to API, these data include applicable state sales taxes, gross receipts taxes, and other applicable fees but largely exclude local taxes, which may average about 2 cents per gallon nationwide.

Differences in gasoline taxes across states help explain why gasoline prices vary from place to place in the United States. In addition to federal taxes that apply across the board, states and, in some cases, local jurisdictions also impose taxes and other fees on gasoline that add to the price. Figure 4 shows total state and federal gasoline taxes for each of the 50 states and the District of Columbia, as of November 2004. New York, Hawaii, and California have the highest total gasoline taxes, while Alaska, Wyoming, and New Jersey have the lowest. While differences in taxes affect the price of gasoline, there is no consistent relationship between high taxes and high prices. For example, on March 7, 2005, gasoline cost $1.91 per gallon in North Carolina and $1.98 per gallon in Alaska, even though the taxes paid in North Carolina were almost 17 cents per gallon higher.

Figure 4: Motor Gasoline Taxes as of November 2004



Source: GAO analysis of API data.

Note: According to API, these tax data include applicable state sales taxes, gross receipts taxes, and other applicable fees but largely exclude local taxes, which may average about 2 cents per gallon nationwide.

In addition to the cost of crude oil, taxes, refining, and distribution and marketing costs, gasoline prices are influenced by a variety of other factors. These include refining capacity constraints, low inventories,

unexpected refinery or pipeline outages, environmental and other regulations, and mergers and market power in the oil industry.

First, domestic refining capacity has not kept pace with growing demand for gasoline. As demand has grown faster than domestic refining capacity, the United States has imported larger and larger volumes of gasoline and other petroleum products from refiners in Europe, Canada, and other countries. EIA officials told us that, in general, this increase in imports has reflected the availability of gasoline from foreign sources at lower cost than could be achieved by building and operating additional refining capacity in the United States. However, the American Petroleum Institute (API) has recently reported that capacity utilization has been high in the U.S. refinery sector. Refining capacity has typically averaged over 90 percent, and has recently increased to 92 percent—much higher than the rate in many other industries that API reports as more typically operating at around 80 percent of capacity. As a result, domestic refineries have little room to expand production in the event of a temporary supply shortfall. Furthermore, the fact that imported gasoline comes from farther away than domestically produced gasoline means that when supply disruptions occur in the United States, it might take longer to get replacement gasoline than if we had excess refining capacity in the United States, and this could cause gasoline prices to rise and stay high until these new supplies can reach the market.

Second, the level of gasoline inventories can also play an important role in determining gasoline prices over time because inventories represent the most accessible and available source of supply in the event of a production shortfall or increase in demand. Similar to trends in other industries, the level of gasoline inventories has been falling for a number of years. In part, this reflects a trend in business to more closely balance production with demand in order to reduce the cost of holding large reserves. However, reduced inventories may contribute to increased price volatility, because when unexpected supply disruptions or increases in demand occur, there are lower stocks of readily available gasoline upon which to draw. This puts upward pressure on gasoline prices until new supplies can be refined and delivered domestically, or imported from abroad.

Third, gasoline prices may be affected by unexpected refinery outages or accidents that significantly disrupt the delivery of gasoline supply. Most recently, Hurricane Katrina hit the Gulf Coast, doing tremendous damage to homes, businesses, and physical infrastructure, including roads; electricity transmission lines; and oil producing, refining, and pipeline

facilities. The DOE reported on August 31, 2005 that as many as 2.3 million customers were without electricity in Louisiana, Mississippi, Alabama, Florida, and Georgia. The DOE further reported that 21 refineries in affected states were either shut down or operating at reduced capacity in the aftermath of the hurricane. The refining capacity of the shutdown refineries alone is equivalent to over 10 percent of the nation's total refining capacity. Two petroleum product pipelines that serve the Midwest and East Coast from Gulf Coast refineries were also out. The Minerals Management Service of the Department of the Interior reported that as of September 1, 2005, over 90 percent of crude oil production in the Gulf of Mexico was out of operation. Because the Gulf Coast refining region is a net exporter of petroleum products to all other regions of the country, retail gasoline prices in many parts of the nation have risen dramatically, with news reports that many locations have seen prices over $3.00 per gallon, and in one reported case to almost $6.00 per gallon. In addition, many gasoline stations have reported running out of stocks and have faced large increases in wholesale gasoline prices—the spot price for wholesale gasoline delivered to New York Harbor rose by about $0.78 per gallon between August 26 and August 30. Until production, refining, and pipeline facilities are back up and running at normal levels, prices are expected to continue to be higher in affected areas. Coming as this has on the heels of a period of high crude oil prices and a tight balance worldwide between petroleum demand and supply, the effects of the hurricane illustrate the volatility of gasoline prices given the vulnerability of the gasoline infrastructure to natural or other disruptions. Such disruptions also have the potential to adversely affect the economy. For example, in 2004, the International Energy Agency reported that a $10 increase in the world price of crude oil would lead to at least a one half percent reduction in world GDP – equivalent to $255 billion – in the year following the price increase. The effects on individual countries would vary depending on whether or not they are net oil importers and on the level of energy intensity of their economies.

Fourth, regulatory steps to reduce air pollution have also influenced gasoline markets and consequently have increased gasoline prices. For example, since the 1990 amendments to the Clean Air Act, the use of various blends of cleaner-burning gasoline—so-called "boutique fuels—has grown as states have adopted the use of such fuels to meet national air quality standards. The use of these special blends has provided environmental and health benefits by reducing emissions of a number of pollutants. However, the proliferation of these special gasoline blends has also put stress on the gasoline supply infrastructure and has led to increased price volatility because areas that use special blends cannot as

easily find suitable replacement gasoline in the event of a local supply disruption.[5]

Finally, we recently reported that industry mergers increased market concentration and in some cases caused higher wholesale gasoline prices in the United States from the mid-1990s through 2000.[6] Overall, the report found that the mergers led to price increases averaging about 2 cents per gallon on average. For conventional gasoline, the predominant type used in the country, the change in the wholesale price, due to specific mergers, ranged from a decrease of about 1 cent per gallon—due to efficiency gains associated with the merger—to an increase of about 5 cents per gallon—attributed to increased market power after the merger. For special blends of gasoline, wholesale prices increased by from between 1 and 7 cents per gallon, depending on location.

Future Oil and Gasoline Prices Will Reflect Supply/Demand Balance, but Technological Change and Conservation Will Also Play a Role

Looking into the future, daunting challenges lie ahead in finding, developing, and providing sufficient quantities of oil to meet projected global demand. For example, according to EIA, world oil demand is expected to grow to nearly 103 million barrels per day in 2025 under low growth assumptions, and may reach as high as 142 million barrels per day in 2025—increases of between 25 and 71 percent from the 2004 consumption level of 83 million barrels per day. Looking further ahead, the rapid pace of economic growth in China and India, two of the world's most populous and fastest growing countries, may lead to a rapid increase in their demand for crude oil and petroleum products. While current consumption of oil by China and India is far below that of the United States, it is projected to grow at a far more rapid rate. Specifically, EIA's medium-growth projections estimate that oil consumption for China and India will each grow by about 4 percent annually through 2025, while consumption in the United States is projected to grow at an annual rate of 1.5 percent over the same period.

[5]For more details see GAO, *Gasoline Markets: Special Gasoline Blends Reduce Emissions and Improve Air Quality, but Complicate Supply and Contribute to Higher Prices*, GAO-05-421 (Washington, D.C.: *June 17, 2005*).

[6]GAO, *Energy Markets: Effects of Mergers and Market Concentration in the U.S. Petroleum Industry*, GAO-04-96 (Washington, D.C.: *May 17, 2004*).

To meet the rising demand for gasoline and other petroleum products, new oil deposits will likely be developed and new production facilities built. Currently, many of the world's known and easily accessible crude oil deposits have already been developed, and many of these are experiencing declining volumes as fields become depleted. For example, the existing oil fields in California and Alaska have long since reached their peak production, necessitating an increasing volume of imported crude oil to West Coast refineries. Developing new oil deposits may be more costly than in the past, which could put upward pressure on crude oil prices and the prices of petroleum products derived from it. For example, some large potential new sources, such as oil shales, tar sands, and deep-water oil wells, require different and more costly extraction methods than are typically needed to extract oil from existing fields. In addition, the remaining oil in the ground may be heavier and more difficult to refine, necessitating investment in additional refinery processes to make gasoline and other petroleum products out of this oil. If developing, extracting, and refining new sources of crude oil are more costly than extracting and refining oil from existing fields, crude oil and petroleum product prices likely will rise to make these activities economically feasible.

On the other hand, technological advances in oil exploration, extraction, and refining could mitigate future price increases. In the past, advances in seismic technology significantly improved the ability of oil exploration companies to map oil deposits, while improvements in drilling technology have enabled oil companies to drill in multiple directions from a single platform. Together, these advances have enabled companies to identify and extract oil more efficiently, essentially increasing the supply of oil. Further, refining advances over the years have also enabled U.S. refiners to increase the yield of gasoline from a given barrel of oil—while the total volume of petroleum products has remained relatively constant, refiners have been able to get a greater proportion of the more valuable components, such as gasoline, out of each barrel, thereby increasing the supply of these components. Similar technological improvements in the future that lower costs or increase supply of crude oil or refined products would likely lead to lower prices for such commodities.

Innovations that reduce the costs of alternative sources of energy could also reduce the demand for crude oil and petroleum products, and thereby ease price pressures. For example, hydrogen is the simplest element and most plentiful gas in the universe and when used in fuel cells produce almost no pollution. In addition, hydrogen fuel cell cars are expected to be roughly three times more fuel-efficient than cars powered by typical

internal combustion engines. Currently, enormous technical problems stand in the way of converting America's fleet of automobiles from gasoline to hydrogen, including how to produce, store, and distribute the flammable gas safely and efficiently, and how to build hydrogen cars that people can afford and will want to buy. However, there are federal and state initiatives under way as well as many private efforts to solve these technical problems, and if they can be solved in an economical way in the future, the implications for gasoline use could be profound.

Greater conservation or improved fuel efficiency could also reduce future demand for crude oil and petroleum products, thereby leading to lower prices. The amount of oil and petroleum products we will consume in the future is, ultimately, a matter of choice. Reducing our consumption of gasoline by driving smaller, more fuel-efficient cars—as occurred in the 1980s in response to high gasoline prices—would reduce future demand for gasoline and put downward pressure on prices. For example, the National Academies of Science recently reported that if fuel-efficiency standards for cars and light trucks had been raised by an additional 15 percent in 2000, gasoline consumption in the year 2015 would be 10 billion gallons lower than it is expected to be under current standards. The Congress established fuel economy standards for passenger cars and light trucks in 1975 with the passage of the Energy Policy and Conservation Act. While these standards have led to increased fuel efficiency for cars and light trucks, in recent years, the switch to light trucks has eroded gains in the overall fuel efficiency of the fleet of American passenger vehicles. Future reductions in demand for gasoline could be achieved if either fuel efficiency standards for cars and light trucks are increased, or if consumers switch to driving smaller or more fuel-efficient cars.

The effect of future environmental regulations and international initiatives on oil and petroleum products prices is uncertain. On one hand, regulations that increase the cost or otherwise limit the building of refining and storage capacity may put pressure on prices in some localities. For example, the California Energy Commission told us the lack of storage capacity for imported crude oil and petroleum products may be a severe problem in the future, potentially leading to supply disruptions and price volatility. Alternatively, international efforts to reduce the generation of greenhouse gas emissions could cause reductions in the demand for crude oil and petroleum products through the development and use of more fuel-efficient processes and as cleaner, lower-emissions fuels are developed and used.

Moreover, geopolitical factors will likely continue to have an impact on the price of crude oil and petroleum product in the future. Because crude oil is a global commodity, the price we pay for it can be affected by any events that may affect world demand or supply. For example, Venezuela—which produces around 2.6 million barrels of crude oil per day, and which supplies about 12 percent of total U.S. oil imports—is currently experiencing considerable social, economic, and political difficulties that have, in the past, impacted oil production. Finally, instability in the Middle East, and particularly the Persian Gulf, has in the past, caused major disruptions in oil supplies, such as occurred toward the end of the first Gulf War, when Kuwaiti oil wells were destroyed by Iraq.

Finally, the value of the U.S. dollar on open currency markets could also affect future crude oil prices. For example, because crude oil is typically denominated in U.S. dollars, the payments that oil-producing countries receive for their oil are also denominated in U.S. dollars. As a result, a weak U.S. dollar decreases the value of the oil sold at a given price. Some analysts have recently reported in the popular press that this devaluation can influence long-term prices in two ways. First, oil-producing countries may wish to increase prices for their crude oil in order to maintain their purchasing power in the face of a weakening U.S. dollar. Secondly, because the dollars that these countries have accumulated, which they use, in part, to finance additional oil exploration and extraction, are worth less, the costs they pay to purchase technology and equipment from other countries whose currencies have gained relative to the dollar will increase. Such higher costs may deter further expansion of oil production, leading to even higher oil prices.[7]

Conclusions

In closing, the wide-ranging effects of Hurricane Katrina on gasoline prices nationwide are a stark illustration of the interconnectedness of our petroleum markets and reveal the vulnerability of these markets to disruptions, natural or otherwise. Current U.S. energy supplies remain highly dependent on fossil energy sources that are costly, largely imported, and potentially harmful to the environment. No matter what the price of petroleum is, alternative energy options seem always to remain uneconomic. Striking a balance between efforts to boost petroleum

[7]Higher oil prices, because they increase the U.S. trade deficit, may also contribute to the further devaluation of the dollar. Hence, analysts have called this process a vicious cycle in which a weak dollar drives up oil prices, which then feeds back into the trade deficit causing the dollar to weaken further.

supply, provide incentives for developing of alternative energy sources, develop policies and technologies focused on improving the fuel efficiency of petroleum burning vehicles, and promote overall energy conservation, presents challenges as well as opportunities. Clearly, all providers and consumers of energy need to get serious about conserving energy. The challenge is to boost supply and reduce demand. We need to choose wisely and we need to act soon. How we choose to meet the challenges and seize the opportunities will help determine our quality of life and economic prosperity in the future.

We are currently studying the determinants of gasoline prices in particular, and the petroleum industry more generally, including an evaluation of world oil reserves; an assessment of the security of maritime facilities for handling and transporting petroleum, natural gas, and petroleum products; an analysis of the viability of the Strategic Petroleum Reserve; and an assessment of the impacts of a potential disruption of Venezuelan oil imports. With this body of work, we hope to continue to provide Congress and the American people the information needed to make informed decisions about energy that will have far-reaching effects on our economy and our way of life.

Mr. Chairman, this completes my prepared statement. I would be happy to respond to any questions you or the other Members of the Committee may have at this time.

GAO Contacts and Staff Acknowledgments

Contact points for our Offices of Congressional Relations and Pulic Affaris may be found on the last page of this statement. For further information about this testimony, please contact Jim Wells at (202) 512-3841 (or at wellsj@gao.gov). Individuals who made key contributions to this statement include Godwin Agbara, Byron Galloway, Dan Haas, Michelle Munn, Melissa Arzaga Roye, and Frank Rusco.

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Short-Term Energy Outlook

October 12th, 2005 Release
(Next Update: November 8th, 2005)

Overview (Figures 1 and 2)

Warnings from previous Outlooks about the potential adverse impacts of an active hurricane season on domestic energy supply and prices are unfortunately being reflected in the challenging realities brought about by Hurricanes Katrina and Rita.

The impact of the hurricanes on oil and natural gas production, oil refining, natural gas processing, and pipeline systems have further strained already-tight natural gas and petroleum product markets on the eve of the 2005-2006 heating season (October through March). This combined Short-Term Energy and Winter Fuels Outlook provides a current view of domestic energy supply and prices and provides projections for average household heating expenditures this winter by fuel and by region; baseline forecasts for domestic fuel markets; and projections for international petroleum demand, supply, and price.

Energy market projections are subject to considerable uncertainty. Price projections are particularly uncertain, because small shifts in either supply or demand, which are both relatively insensitive to price changes in the current market environment, can necessitate large price movements to restore balance between supply and demand. On the supply side, this Outlook reflects a "Medium Recovery" baseline scenario for recovery of energy operations in the Gulf of Mexico based on information available to EIA as of the end of the first week of October. On the demand side, the baseline projections incorporate the mean values for heating degree-days by Census Division as provided by the National Oceanic and Atmospheric Administration's (NOAA) Climate Prediction Center. EIA also examines 10-percent colder and 10-percent warmer winter cases to provide a range of heating fuel market outcomes.

Highlights from this Outlook include:

Average Winter Heating Expenditures. This winter, residential space-heating expenditures are projected to increase for all fuel types compared to year-ago levels. On average, households heating primarily with natural gas are expected to spend about $350 (48 percent) more this winter in fuel expenditures. Households heating primarily with heating oil can expect to pay, on average, $378 (32 percent) more this winter. Households heating primarily with propane can expect to pay, on average, $325 (30 percent) more this winter. Households heating primarily with electricity can expect, on average, to pay $38 (5 percent) more. Should colder weather prevail, expenditures will be significantly higher. These averages provide a broad guide to changes from last winter, but fuel expenditures for individual households are highly dependent on local weather conditions, the size and efficiency of individual homes and their heating equipment, and thermostat settings.

Energy Product Prices. Prices for petroleum products and natural gas will remain high due to tight international supplies of crude and hurricane-induced supply losses. Under the baseline weather case, Henry Hub natural gas prices

Price Summary

	Year				Percent Change		
	2003	2004	2005	2006	03-04	04-05	0
WTI Crude[a] ($/barrel)	31.12	41.44	57.60	64.50	33.2	39.0	1
Gasoline[b] ($/gal)	1.56	1.85	2.34	2.45	18.8	26.6	
Diesel[c] ($/gal)	1.50	1.81	2.45	2.58	20.3	35.2	
Heating Oil[d] ($/gal)	1.36	1.54	2.08	2.34	13.5	35.4	1
Natural Gas[d] ($/mcf)	9.51	10.74	12.93	15.25	12.9	20.5	1

[a] West Texas Intermediate. [b] Average regular pur price.
[c] On-highway retail. [d] Residential average.

Detailed STEO Information

Query STEO database assumptions, data, projections
Real Petroleum Prices charts, data, projections
Short-Term Energy Spreadsheet

Tables	Format
H1. U.S. Supply and Demand Summary	html xls
1. U.S. Macroeconomic and Weather Assumptions	html xls
1a. U.S. Regional Macroeconomic Data	html xls
2. U.S. Energy Indicators	html xls
3. International Petroleum Supply and Demand	html xls
3a. OPEC Oil Production	html xls
4. U.S. Energy Prices	html xls
5a. U.S. Petroleum Supply and Demand	html xls
5b. U.S. Regional Motor Gasoline Inventories and Prices	html xls
5c. U.S. Regional Distillate Inventories and Prices	html xls
5d. U.S. Regional Propane Inventories and Prices	html xls
6. U.S. Petroleum Demand Sensitivities	html xls
7. Forecast Components for U.S. Crude Oil Production	html xls
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9. U.S. Coal Supply and Demand	html xls
10a. U.S. Electricity Supply and Demand	html xls
10b. U.S. Regional Electricity Retail	

are expected to average around $9.00 per thousand cubic feet (mcf) in 2005 and around $8.70 per mcf in 2006. Retail gasoline prices are expected to average close to $2.35 per gallon in 2005 and about $2.45 in 2006. Residential electricity prices are expected to average 9.3 cents per kilowatthour (kwh) in 2005 and about 9.5 cents per kwh in 2006, with significant regional differences depending on the fuel mix used to generate electricity in each region of the country. Under a colder weather scenario, prices for natural gas and all petroleum products are projected to be somewhat higher.

Crude Oil Prices. The price of West Texas Intermediate (WTI) crude oil is projected to average close to $58 per barrel in 2005 and $64-$65 per barrel in 2006. Continued high crude oil prices had been expected prior to Hurricanes Katrina and Rita.

Hurricane Recovery. Complete recovery of energy infrastructure from hurricane damage will take many months. However, considerable recovery should occur by the end of 2005. The restart of two major refineries in Western Louisiana and another in Pascagoula, Mississippi over the past week is particularly encouraging as is the resumed although limited operation of the Henry Hub.

Weather Forecast. NOAA projects a 0.4-percent colder winter in the lower-48 States, in terms of heating degree-days, relative to normal winter weather, which would be 3.2 percent colder than last winter.

U.S. Energy Demand. Total U.S. energy demand is projected to decline from 25.2 quadrillion Btu in the third quarter of 2005 to 25.1 quadrillion Btu in the fourth quarter due to hurricane-related destruction and higher energy prices. Total energy demand is projected to increase 0.3 percent between 2004 and 2005, compared with 1.5 percent from 2003 to 2004. Demand growth is projected to rebound in 2006.

Figure 1. U.S. Average Winter Fuel Expenditures Are Expected to be Significantly Higher

	Winter of		Winter of 05-06			% Change from last Winter		
Fuel	Average 99-04	04-05	Warmer	Base	Colder	Warmer	Base	Colder
Natural Gas								
Price ($/mcf*)	8.41	11.13	15.32	15.95	16.58	37.7	43.4	49.9
Expenditures ($)	586	742	964	1,096	1,242	29.8	47.6	67.3
Heating Oil								
Price ($/gallon)	1.35	1.92	2.34	2.54	2.80	21.7	32.0	45.4
Expenditures ($)	865	1,199	1,326	1,577	1,893	10.6	31.5	57.9
Propane								
Price ($/gallon)	1.29	1.64	1.91	2.05	2.25	16.0	24.8	37.0
Expenditures ($)	885	1,102	1,215	1,427	1,700	10.3	29.5	54.3
Electricity								
Price ($/kwh**)	0.08	0.09	0.09	0.09	0.09	3.4	3.4	3.3
Expenditures ($)	685	717	719	755	791	0.3	5.4	10.4
Average Expenditures	668	786	929	1,044	1,176	18.1	32.9	49.6

Expenditures are based on typical per-household consumption.
* thousand cubic feet, ** kilowatthour

Hurricanes Katrina and Rita

The loss of a considerable amount of crude oil and natural gas production from the Gulf of Mexico region and significant disruptions to the nearly half of the U.S. refining industry located in the region following Hurricanes Katrina and Rita have resulted in significantly higher natural gas and petroleum product prices in U.S. markets than were anticipated in mid-summer. These developments are expected to carry very high prices for heating fuels (and other products) into the coming heating period compared to the situation last winter

Hurricane Rita made landfall on September 24, 2005, just as the Gulf was well into recovery from Hurricane Katrina. See EIA's September Short-Term Energy Outlook for discussion of the impacts of Hurricane Katrina. As Hurricane Rita approached, 16 refineries along the Gulf Coast shut down as a precautionary measure and to allow employees to evacuate. Damage to some of these refineries, and the lack of electrical power supply to others, prevented their immediate return to service.

Hurricane Rita resulted in over a dozen natural gas processing plants going off-line owing either to flooding, lack of supplies, an inability to move stored liquids, or safety precautions. Natural gas pipelines sustained significant damage and the Sabine Pipeline, operator of the Henry Hub, implemented a force majeure.

Hurricane recovery is underway but it will take many months for a complete recovery. As of October 11, three refineries are still shut down from Hurricane Katrina, and 4 from Hurricane Rita, amounting for a total of about 1.9 million barrels per day of refining capacity that is currently off-line (11 percent of the Nation's refinery capacity) due to hurricane-related outages.

According to Minerals Management Service (MMS) data and EIA data, as of October 11, shut-in Federal Gulf of Mexico crude production has declined to about 1.1 million barrels of oil per day, about 67 percent of normal Gulf of Mexico crude oil production. Shut-in natural gas production has declined to 6.0 billion cubic feet (bcf) of natural gas, about 60 percent of normal Federal Gulf of Mexico natural gas production. There are also significant outages of natural gas and oil production remaining in areas under Louisiana's jurisdiction. The MMS reports a cumulative loss of crude oil and natural gas production in the Federal Gulf of Mexico from August 26 through October 11 of 55 million barrels, with a loss of 272 bcf of natural gas production over the same period.

As of October 6, there are 20 natural gas processing plants in Texas, Louisiana, and Mississippi each with capacities equal to or greater than 100 million cubic feet per day, which are not active. A number of the inactive plants are expected to be operating within 4 weeks.

By October 11, the Department of Energy's Office of Electricity Delivery and Energy Reliability reports that about 181,290 customers in Louisiana and Texas remain without electric power, down from a peak of 2.7 million.

EIA's baseline projections in this Outlook reflect a scenario of continued recovery of energy infrastructure in the Gulf region through the end of the year. In this scenario, Gulf of Mexico shut-ins for December 2005 are projected to average 33.1 percent for crude oil (10.4 percent of total U.S. production) and 20.6 percent for natural (4.2 percent of total U.S. natural gas production). For refinery capacity, 1.7 percent is projected to be offline.

International Petroleum Markets

Prices. The WTI crude oil price averaged about $66 per barrel in September, with an average price of about $64 per barrel projected for October under the baseline weather scenario, accounting for hurricane damage. Quarterly averages for the WTI price are projected to remain above $63 per barrel for the rest of 2005 and 2006. Continued high crude oil prices had been expected prior to Hurricanes Katrina and Rita.

Under the baseline weather scenario, the projected fourth-quarter average WTI price of $64.40 per barrel is approximately $16 per barrel above the year-ago level, but is about $3 per barrel lower than in the previous Outlook, which was made prior to the additional loss of crude oil production and refining capacity resulting from Hurricane Rita. While oil product prices rose in response to the resulting product shortages, the loss of operable refining capacity from Rita (which was more than twice as large as the shut-in crude production resulting from Katrina) reduced the demand for crude oil, moderating WTI prices. Should

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10-percent colder weather prevail in the United States this winter, WTI prices are projected to be $ 4 per barrel higher than the baseline. Should the U.S. winter be 10 percent milder, WTI prices are expected to be $3 per barrel lower this winter. WTI prices will also be significantly impacted by demand in other parts of the world, which is sensitive to both weather and economic conditions, and by global supply developments.

Demand. Worldwide petroleum demand growth is projected to slow from 2004 levels, but still remain strong during 2005 and 2006, averaging 1.8 percent per year over the 2-year period, compared with 3.2 percent in 2004. This reflects a downward revision from the previous Outlook. The average annual worldwide oil demand growth is now projected to be about 1.2 million barrels per day in 2005, down from the 1.7-million-barrels-per-day growth projected for 2005 in the previous Outlook.

Production. Moreover, only weak production growth in countries outside of the Organization of Petroleum Exporting Countries (OPEC) is expected. With the loss of production in the Gulf of Mexico from the hurricanes, production declines in the North Sea, and the slowdown in growth in Russian oil production, non-OPEC supply is projected to increase by an annual average of only 0.1 million barrels per day during 2005 before increasing by 0.9 million barrels per day in 2006. In addition, worldwide spare production capacity is at its lowest level in 3 decades; and in reality, only Saudi Arabia has any spare crude oil production capacity available. Lastly, the continued geo-political risks, such as the insurgency in Iraq and potential troubles in Nigeria and Venezuela, have boosted the level of uncertainty in world oil markets.

High levels of production from OPEC members contributed to inventory builds in the Organization for Economic Cooperation and Development (OECD) countries in the first half of 2005, with these stocks moving above the upper end of the 5-year historical range. However, OECD stocks have not grown as quickly in terms of days' supply (the number of days that inventories would satisfy demand) because demand has grown rapidly as well. In addition, stocks were drawn down in the aftermath of hurricanes Katrina and Rita, with OECD inventories moving back towards the middle of the 5-year historical range.

U.S. Petroleum Markets

Total petroleum demand in the United Sates in 2005 is projected to average 20.5 million barrels per day, or 0.9 percent less than in 2004. This demand level is 290,000 barrels per day less than that projected in the previous Outlook. Average demand for the first half of 2005 was at about the same level as during the first half of 2004 because rapidly rising prices constrained motor gasoline demand growth, weather factors depressed heating oil demand, and relative price factors lowered residual fuel oil and propane demand. Hurricane-related disruptions combined with increased prices result in a lower projected demand for petroleum products relative to pre-hurricane predictions. Petroleum demand in 2006 is expected to average 21 million barrels per day, or 2.2 percent over 2005.

Distillate

Inventories. For the week ending September 30, distillate fuel inventories fell by 5.6 million barrels, and are just above the middle of the average range for this time of year. A sharp drop in low-sulfur (diesel fuel) distillate fuel more than compensated for a slight rise in high-sulfur (heating oil) distillate fuel. Fourth quarter distillate inventories are projected to be 1.9 million barrels above third-quarter levels; in 2004, the fourth-quarter build was 3.2 million barrels. The average over the last 5 years was 7.5 million barrels. Although distillate inventories are expected to remain within the previous 5-year range this winter under baseline assumptions, a 10- percent colder winter could push inventories to the low end of the range or lower during the first quarter of 2006.

Prices. In October, retail diesel fuel prices are expected to hit their highest

average monthly level ever, at over $3.00 per gallon. This price is also the highest diesel price in more than 50 years, adjusted for inflation. Fourth quarter diesel fuel prices are projected to average $2.85 per gallon, an increase of 29 cents over the third quarter prices. Prices could be significantly higher if winter weather is colder than currently predicted. Retail diesel fuel prices are projected to remain high throughout the forecast period, averaging $2.45 in 2005 and $2.58 in 2006.

Residential retail heating oil prices (including State and local taxes) averaged $1.92 per gallon during the 2004-2005 heating season, which was a 33-percent increase from the winter of 2003-2004. Prices are expected to be $2.54 per gallon this winter season, a 32-percent increase, reflecting not only high crude oil prices, but also strong demand in the international market for distillate fuels. Colder weather this winter would increase residential heating oil prices. Residential retail heating oil prices vary by region; for example, average winter season prices range from $2.46 per gallon in the Midwest (where 3 percent of households rely on heating oil as their primary fuel) to $2.63 per gallon in the West (where 1 percent of households rely on heating oil). Prices in the Northeast, where 30 percent of households rely primarily on heating oil are projected to average $2.55 per gallon this winter.

Overall, projected gasoline, diesel fuel, and heating oil prices in this Outlook are somewhat higher than those in the previous edition, notwithstanding the fact that projected crude oil prices are generally slightly lower. The higher estimated refiner margins on petroleum products primarily reflect the impact of Hurricanes Katrina and Rita on refinery operations in the Gulf region. The resulting shortfall, both past and anticipated, in the supply of refined products has dramatically increased the need for product imports to balance U.S. supply and demand. For imports to increase, wholesale prices in the U.S. must rise relative to offshore market prices by an amount sufficient to justify product shipments form foreign refining centers to U.S. markets. Finally, because the balance between supply and demand for petroleum products is so tight, small changes in demand, imports, or the supply of products from domestic refineries could result in prices that differ significantly from those in our baseline forecast.

Gasoline

Inventories. For the week ending September 30, total motor gasoline inventories dropped by 4.3 million barrels, putting them just above the lower end of the average range. The drop in gasoline inventories came despite a record level of imports as well as refiners and blenders making as much gasoline as possible. Some refineries that are shut down have been able to bring imported petroleum products, such as gasoline, directly into their refinery docks, instead of crude oil, which they can't currently refine, in order to help replace some of the lost supply. Year-end 2005 motor gasoline inventories are projected to be 6.5 percent below the year-end 2004 level. Gasoline inventories, which are currently tight, are expected to improve as the heating season progresses. However, an abnormally cold winter could discourage gasoline output and tighten supplies for next spring.

Prices. Average retail regular gasoline prices increased after Hurricane Rita and are expected to average close to $2.84 per gallon for October. The average pump price for the third quarter of 2005 is now expected to be about $2.56 per gallon, up $0.67 per gallon from the third quarter of last year. National average pump prices are expected to increase to $2.68 per gallon for the fourth quarter due, in part, to the effect of the hurricanes on refinery capacity. However, hurricane recovery should result in price decreases by the first quarter of 2006. Gasoline prices are projected to average $2.34 in 2005 and $2.45 in 2006. Should colder weather prevail, retail gasoline prices are projected to be 10-14 cents per gallon higher, on average, during the winter months. The real price of gasoline (in inflation adjusted 2005 dollars) remains below the 1981 peak.

While all regions of the country are paying more for gasoline, pump prices vary across the United States. The West Coast, particularly California, typically pays more than other regions. California's higher prices are related to the State's

reformulated gasoline program, and limited suppliers and higher State and local sales taxes.

Propane

Inventories. U.S. inventories of propane continued to build on strong imports that more than offset a decline in production, with inventories moving up to an estimated 68.6 million barrels as of end of the third quarter. Moreover, even the recent hurricane activity failed to limit the monthly stockbuild that showed inventories slightly above the most recent 5-year average during September. The seasonal stockbuild that typically spans the April through September period totaled about 41.4 million barrels this year, a level more than 8 percent (or 3.1 million barrels) higher than the 5-year average for this period. Propane inventories managed to surpass the 5-year average build during each month this year, except during August, with inventories reaching their highest pre-heating season level (September 30) since 2002. Propane inventories are project to decline to 53.3 million barrels in the fourth quarter as seasonal draws increase.

Prices. Spot propane prices are primarily determined by crude oil and natural gas wellhead prices. Retail propane prices are influenced by heating oil and natural gas prices, alternative petrochemical feedstocks, and other factors, such as weather. Continuing tightness in crude oil and natural gas markets is expected to keep crude oil and wellhead natural gas prices elevated, resulting in increased residential propane prices for the upcoming winter season. They are projected to average $2.05 per gallon compared to $1.64 per gallon last winter. The average U.S. residential propane price (including State taxes) is projected to be $1.80 per gallon for 2005, 29 cents above the 2004 average. Prices are expected to average $2.07 cents per gallon in 2006. Regional residential prices for the upcoming season range from $2.18 per gallon in the Midwest to $2.27 per gallon in the Northeast.

U.S. Natural Gas Markets

Demand. Total natural gas demand is projected to fall by 1.2 percent from 2004 to 2005 due mainly to higher prices, but recover by 3.0 percent in 2006 due to an assumed return to normal weather and a recovery in consumption by the industrial sector, which is projected to increase by about 6 percent over 2005 levels. Residential demand is projected to decline slightly from 2004 to 2005 mostly because of relatively weak heating-related demand during the first quarter, while industrial demand is estimated to decline by nearly 8 percent over the same period due to the much higher prices for natural gas as a fuel or feedstock. By 2006, both end-use sectors recover somewhat with residential demand estimated to increase 2.6 percent from 2005 levels and industrial demand increasing by 6 percent. The industrial rebound in 2006 is partly because of assumed reactivation of damaged industrial plants in the Gulf of Mexico region but also reflects renewed fuel demand growth as domestic industrial plants adjust to higher prices. Power sector demand growth continues through the forecast period along with electricity demand growth. The pace is slower that the 5.7 percent rate projected for 2005 because an unusually hot summer and high cooling demand boosted 2005 growth significantly.

Production. Domestic dry natural gas production in 2005 is expected to decline by 3.0 percent (due in large part to the major disruptions to infrastructure in the Gulf of Mexico from both Hurricanes Katrina and Rita), but increase by 4.2 percent in 2006. Net imports of natural gas (pipeline and liquefied natural gas (LNG)) are expected to increase only slightly in 2005 (0.1 percent over 2004) but increase by 10.4 percent between 2005 and 2006. Imports of LNG appear to have exhibited little change through the first half of 2005 compared to year-ago levels. High natural gas prices in other world markets during the first three quarters of 2005 have served to attract available supplies of LNG that might otherwise have been directed to the United States, although fourth quarter imports are estimated to increase in response to high U.S. prices. Currently, total LNG imports for 2005 are expected to be approximately 680 bcf compared to 650 bcf in 2004; LNG imports are projected to be just over 1,000 bcf in 2006.

Prices. The Henry Hub natural gas price is expected to average about $9.00 per mcf in 2005 and $8.70 per mcf in 2006. In September, the Henry Hub natural gas spot price averaged $12.40 per mcf, as hot weather in the East and Southwest increased natural gas-fired electricity generation for cooling demand, crude oil prices increased, and Katrina hit. The natural gas market is likely to stay tight over the next couple of months, particularly in light of the supply impacts from Katrina and Rita. Henry Hub prices are likely to remain above $12 per mcf until peak winter demand is over.

Depending on the region of the country, residential natural gas price increases from 2004 to 2005, on an annual average basis, are expected to range from 14 percent (New England region) to 27 percent (East South Central). Similarly, for industrial users, the natural gas price increases are expected to range from 16 percent (Mountain region) and 40 percent (Pacific and West North Central) between 2004 and 2005. Pressure on delivered natural gas prices may be exacerbated in regions where heating demands are likely to increase the most, particularly during the heating season.

Given that the opportunity to offset the market impact of a weather-related increase in demand through an increase in imports is far more limited for natural gas than for oil products (net natural gas imports are estimated to account for about 15 percent of total U.S. demand in 2005 and 16 percent in 2006), weather conditions in the United States have an even larger impact on U.S. natural gas markets than on petroleum product markets. Consequently, retail natural gas prices are expected to be significantly higher should winter weather be 10 percent colder than predicted.

Storage. Working gas in storage as of September 30 was estimated at 2.93 trillion cubic feet (tcf), a level 151 bcf below a year-ago but still 1.4 percent above the 5-year average, and about 122 bcf above last month's projection. Although natural gas storage remains above the 5-year average, the double blows of Hurricanes Katrina and Rita reduced the peak storage achievable over the remainder of the injection season from what was expected previously. Expected working gas in storage at the end of the fourth quarter is expected to be about 2.5 tcf, 200 bcf below year-ago levels and about 50 bcf above the 5-year average.

End-of-year storage levels are expected to decline 7.3 percent between 2004 and 2005 but increase about 5.2 percent in 2006 over 2005 levels. However, storage levels will be very sensitive to weather and the return of domestic natural gas production following the recent hurricanes. For example, each 3.3 bcf of daily supply reduction sustained over the course of a month translates into a supply loss of roughly 100 bcf. Recovery profiles that differ from the scenario used for this month's baseline forecast would significantly affect the storage forecast.

Electricity

Demand. Electricity demand is expected to increase by 3.5 percent in 2005 and about 1.0 percent in 2006 due largely to weather conditions as well as continuing economic growth. Very hot weather conditions generated a large increase in demand in the third quarter of 2005. Thus, year-over-year electricity demand growth rates are expected to be particularly strong, as cooling and heating demands are likely to be higher than in the mild third and fourth quarters of 2004. Regional demand exhibits increases for nine out of the ten regions (Alaska and Hawaii, treated as one region, are the exception) in 2005 compared with 2004. Commercial and industrial demand also increases across most regions, but the rate of growth tends to be smaller compared with residential demand.

Prices. Estimated 2005 prices for delivered electricity across all end uses range from 6.4 cents per kwh in the West North Central region to nearly 12 cents per kwh in New England. Due primarily to increased utility fuel prices, average electricity prices for all end uses are estimated to increase by 8.9 percent in

New England and 8.2 percent in West South Central, but less than 6 percent for all other regions between 2004 and 2005. End-use electricity prices - residential, commercial, and industrial - also exhibit regional variability. For example, 2005 estimated residential prices range from 7.3 cents per kwh in East South Central to 13 cents per kwh in New England. Estimated 2005 industrial prices range from a low of 4.2 cents per kwh in East South Central to 8.1 cents per kwh in New England.

Coal

Demand. Coal demand in the electric power sector is expected to increase by 4.5 percent in 2005 and remain at about 2005 levels in 2006. Power sector demand for coal continues to increase as oil and natural gas prices continue to rise. U.S. coal production is expected to grow by 2.6 percent in 2005 and by an additional 1.6 percent in 2006.

Winter Fuel Expenditures by Fuel and Region

Natural Gas. Nation-wide, 55 percent of all households depend on natural gas as their primary heating fuel. Households in all regions will pay significantly more for natural gas this winter, due to both increased consumption and increased prices. For example, in the Midwest, about 75 percent of households rely on natural gas to heat their homes. This winter, these households can expect to pay nearly 61 percent more in natural gas expenditures relative to last winter. Increased expenditures in this region are caused primarily by the projected 55-percent increase in price but also are attributed to a 4.2-percent increase in consumption relative to last winter. In the West, about 62 percent of all households rely on natural gas - these households can expect to pay 34 percent more in natural gas expenditures this winter, also due to both increased consumption and increased price.

Heating Oil. Nationwide, only 7 percent of U.S. households depend on heating oil for winter fuel. Households in the Northeast where 30 percent of households use heating oil as their primary heating fuel, are projected to pay about 30 percent more in heating oil expenditures compared to last winter. Midwest households relying on heating oil can expect to pay 41 percent more than last winter, but relatively few households in the Midwest -3 percent - use heating oil as their primary fuel.

Propane. Only 4 percent of U.S. households use propane as their primary heating fuel. Households heating with propane can expect to pay 20 percent (Northeast) to 36 percent (Midwest) more this year in propane expenditures.

Electricity. Twenty-nine percent of all U.S. households rely on electricity as their primary heating fuel. Electricity is the primary heating fuel for 28 percent of households in the West, 49 percent of households in the South, 11 percent in the Northeast, and 10 percent in the Midwest. While winter electricity expenditure increases are not as high as expenditures for natural gas and heating oil, households in the South are projected to pay about 9 percent more this winter on electricity bills due to increased consumption and prices relative to last winter.

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