SECTION 3.6

PETROLEUM RESOURCE ASSESSMENT

INTRODUCTION

New York State is a major consumer of petroleum fuels such as motor gasoline, home heating oil, diesel fuel, propane, and residual oil. The State is the fourth largest petroleum fuel market in the U.S., exceeded only by Texas, California, and Florida. In 2000, total Statewide expenditures on all petroleum fuels by all economic sectors equaled $16.3 billion. The transportation sector accounted for $12.3 billion, or 75% of the total. To meet this demand, numerous multi-national, national, and independent companies supply refined petroleum products to the State through an extensive distribution system. The Port of New York, with large petroleum storage terminals located on both the New York and New Jersey sides of the port, is an important component of this system. These deep water terminals receive a steady flow of refined petroleum products and crude oil into the New York area from domestic and foreign sources. Crude oil is used by refineries located in the mid-Atlantic region to produce refined products for the Northeastern U.S. Once refined fuels arrive at these facilities, they are distributed by barge and truck transport to smaller coastal and inland terminals for further redistribution to customers. New York State also receives petroleum products from several pipeline systems that connect terminals located throughout the State to the major refining centers located along the Gulf and East Coasts.

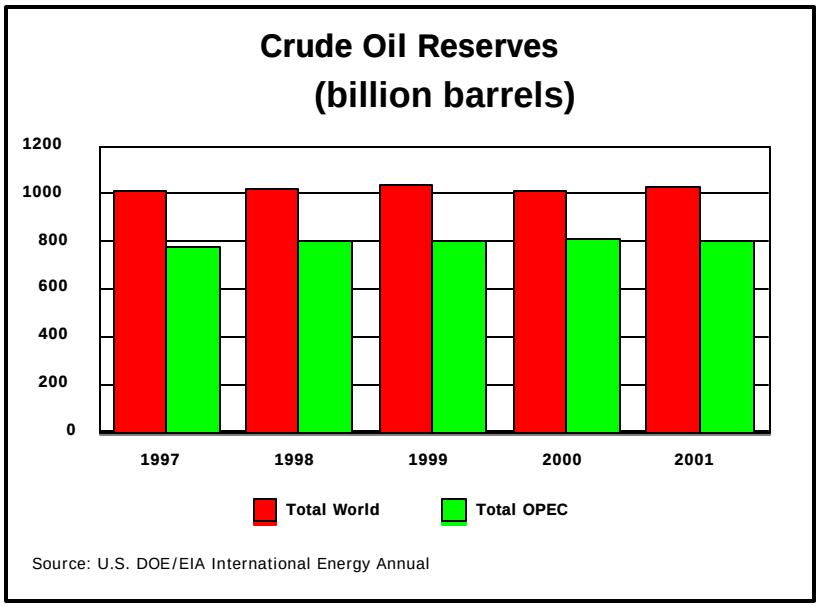
PETROLEUM SUPPLY OVERVIEW

Crude Oil Reserves

Geographic location is as important a consideration as the quantity and quality of crude oil. The amount of proven world crude oil reserves varies annually with new discoveries and improved extraction techniques. In recent years, world crude oil reserves have remained relatively stable as new discoveries have effectively offset depletion of existing reserves. Between 1997 and 2001, estimated worldwide reserves remained steady at approximately one trillion barrels, as shown in Figure 1. While there are a number of important crude oil producing regions around the world, one of the most vital is the Middle East, home to many

member nations of the Organization of Petroleum Exporting Countries (OPEC)[1]. Current OPEC crude oil reserves equal approximately 800 billion barrels and accounted for 77% to 80% of total world reserves between 1997-2001. As a comparison, United States crude oil reserves for this same period averaged about 22 billion barrels, slightly more than 2% of the total world-wide.

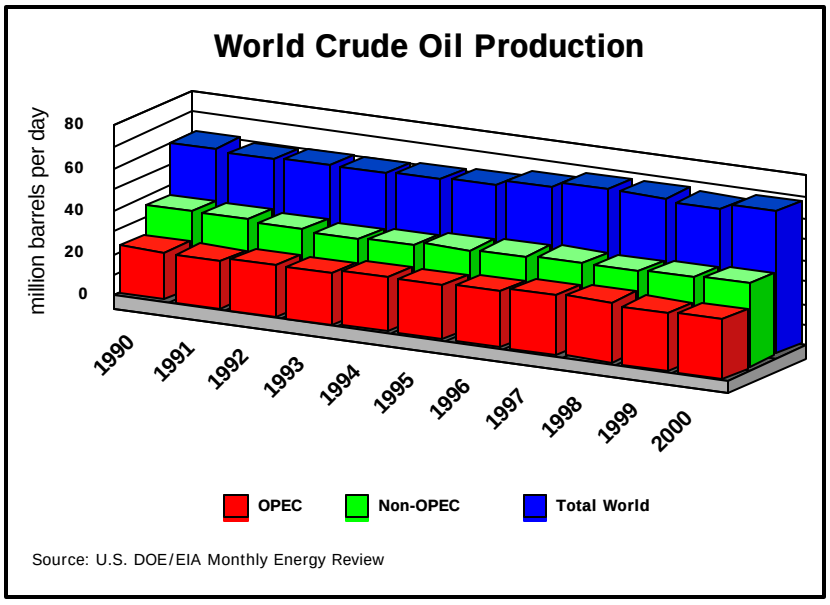
Figure 1



World Production Trends

In general, world crude oil production has increased steadily to meet growing world demand. This gradual trend is occasionally interrupted by periods of inventory draw down and short duration reductions in demand resulting from reduced economic activity. World crude oil production, as shown in Figure 2, fell slightly from 60.6 million barrels per day (mmb/d) in 1990 to an average of 60.2 mmb/d for the

Figure 2



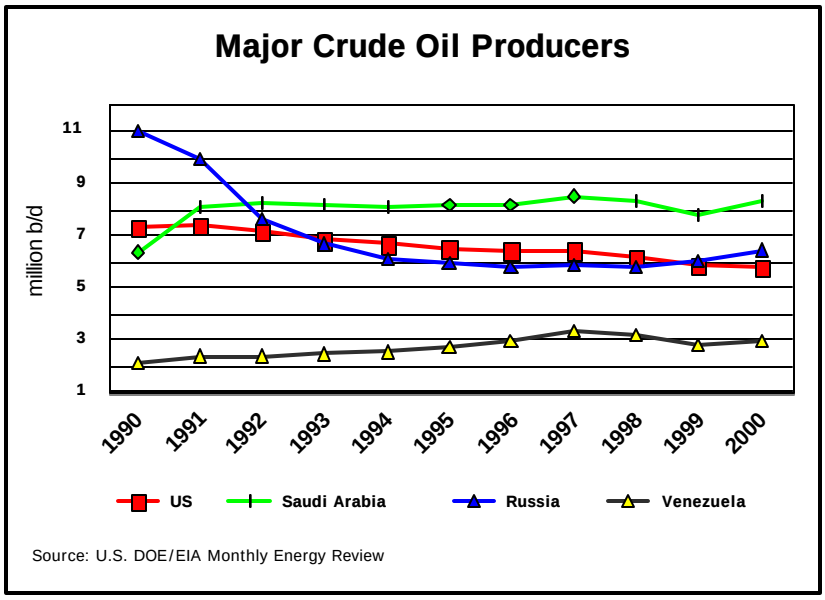
[1] Member nations include Algeria, Indonesia, Iran, Iraq, Kuwait, Libya, Nigeria, Qatar, Saudi Arabia, the United Arab Emirates, and Venezuela. Ecuador withdrew in 1992 and Gabon withdrew in 1994.

1991-1993 period, a decline of 0.7%. During the 1994-1998 period however, world demand continually moved higher and reached 67.0 mmb/d by 1998. A small reduction of 1.6% occurred in 1999, but this was offset by an increase of 3.5% in 2000 as total world production reached 68.2 mmb/d and petroleum fuel use rose in response to a growing world economy.

Over the past ten years, the percentage of world crude oil production attributed to OPEC member nations has climbed steadily, rising from 38.3% in 1990 to 42.7% in 2000. This upward trend was briefly interrupted in1996 and 1999. In 2000, the OPEC percentage share was at its highest level since 1980 when the 44.6% level was reached. OPEC's all time highest percentage share of 55.0% occurred in 1973.

Figure 3 presents the annual crude oil production volumes of several major producers between 1990 and 2000. The four countries, Venezuela, Russia, Saudi Arabia, and the United States, accounted for 34.6% of world production in 2000, down from 44.3% in 1990. The reduction in combined market share by these countries is primarily the result of production declines in Russia[2] and the United States. U.S. crude oil production fell from 7.4 mmb/d in 1990 to 5.8 mmb/d by 2000, a 20.8% decline. During the same period Russian production fell from 11.0 mmb/d to 6.5 mmb/d, a 41.0%[3] decline as that country dealt with the breakup of the Soviet Union. While U.S. production continues on a downward trend, production in Russia has rebounded in recent years from a low of 5.9 mmb/d in 1996 to 6.5 mmb/d in 2000, an

Figure 3



[2] Data for Russia from 1990-1991 consists of the volumes for the 15 republics that made up the Union of Soviet Socialist Republics (USSR). The USSR ceased to exist on December 31, 1991.

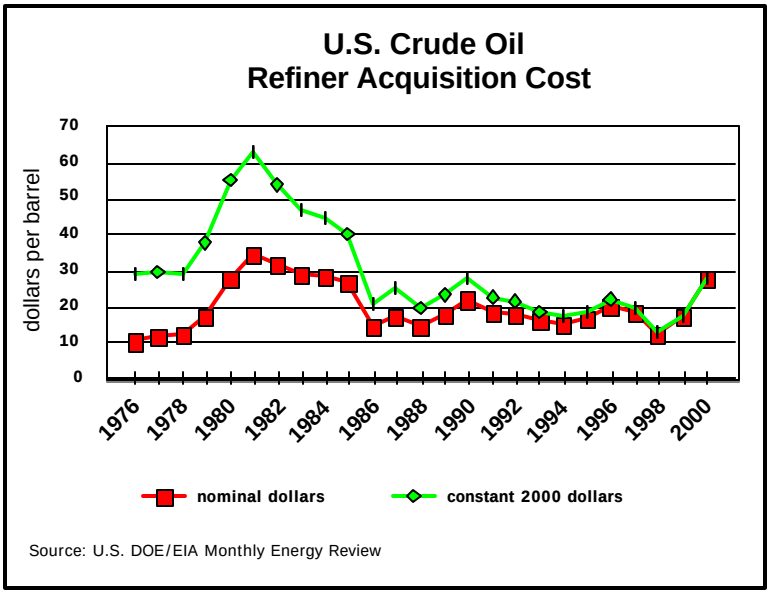
[3] In 1992 Russia accounted for approximately 90% of total USSR production. Data from 1992 onward does not include the remaining 14 former USSR republics.

increase of 10.2%. Increases in production from Saudi Arabia and Venezuela partially offset the declines recorded by the U.S. and Russia. Between 1990 and 2000 production from Saudi Arabia rose from 6.4 mmb/d to 8.4 mmb/d, a 31% increase. Similarly, production in Venezuela increased from 2.1 mmb/d to 2.9 mmb/d, a gain of 38%.

Petroleum Price Review

A review of the refiner acquisition cost (RAC) of crude oil, the average price paid by U.S. refiners for crude oil processed at domestic refineries, in both nominal and constant year-2000 dollars, is presented in Figure 4. The nominal dollar line shows the average price paid by a U.S. refiner for a barrel of crude oil in that year. The constant year-2000 line indicates the price that a refiner would have paid in year-2000 dollars during a given year. In 1981, on a nominal basis, RAC prices reached a high of $35.24 per barrel (bbl) as the Iranian revolution disrupted the world petroleum markets. As high as this price seems, in terms of constant year-2000 dollars, the price of crude oil actually reached an estimated $63.28/bbl that year.

Figure 4

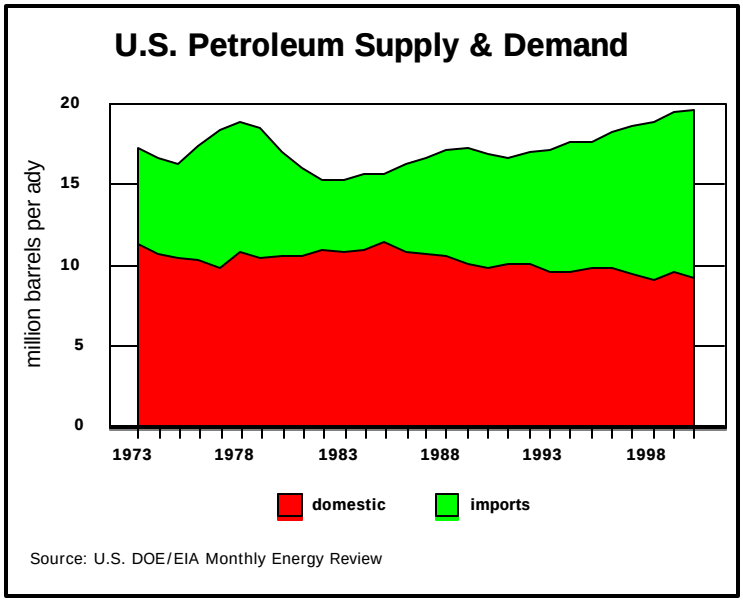


Since the mid-1980s, nominal RAC prices have generally remained within the $15/bbl to $25/bbl range. Even significant events such as the Persian Gulf War in 1990 only temporarily interrupted the relative stability of crude oil prices. More recently, OPEC member nations, as well as some large non-OPEC producers including Mexico, Norway, Oman, and Russia, have sought greater control over crude oil prices internationally by restricting production. The reduction in the amount of crude oil available on world markets has forced RAC prices upward from a 1998 low of $12.52/bbl to $28.23/bbl in 2000, an escalation of $15.71/bbl or about 125%.

U. S. Petroleum Supply and Demand

U.S. demand for petroleum products has grown steadily over the past nine years, as illustrated in Figure 5. Petroleum demand increased from 16.7 mmb/d to 19.7 mmb/d between 1991 and 2000, an increase of 3.0 mmb/d or approximately 18%. During this same period U.S. domestic production, see Figure 3, fell from 10.1 mmb/d to 9.3 mmb/d, a reduction of 7.9%. To offset both the decline in U.S. production and to meet the rise in domestic consumption, imports rose from 6.6 mmb/d to 10.4 mmb/d, a gain of 57.6%. On a percentage of total supply basis, by 1998 imports of crude oil and refined products passed the 50% level for the first time, equaling 51.6%. For the most recent year, 2000, imports achieved a U.S. market share of approximately 53%. For comparison, the 1990 import share was 42% and in 1980 it was 37%.

Figure 5



OPEC's share of total U.S. petroleum product imports exceeded 50% for the first time in 1974 when OPEC supplied 55.7% of total imports. The percentage share moved steadily higher until 1977, when an all time high of 72.3% of total imports were supplied by OPEC members. During the 1978 to 1985 period, the Arab oil embargo and sharply higher world crude oil prices pushed the OPEC share down to 42.7% by 1985. Since that time, OPEC's share of the U.S. market has remained in the 50 to 60% range.

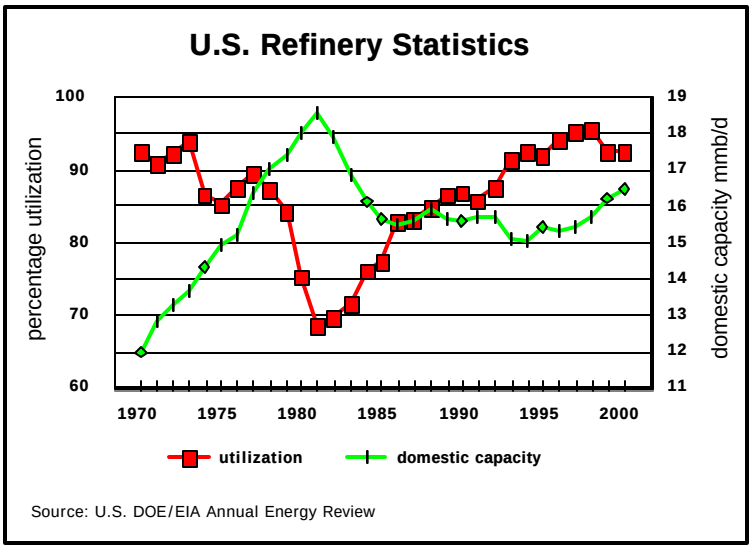
Refining Industry Profile

The domestic refining industry has undergone significant changes over the past 30 years. During the 1970s and early 1980s, domestic refining capacity climbed from approximately 12 mmb/d to 18.6 mmb/d, a 55% gain, as the number of refineries increased from 276 to 324 by 1981. This increase in refinery capacity occurred in response to rising domestic

demand. However by 1978, petroleum demand had reached a peak of 18.8 mmb/d, and as a result of higher energy prices stimulating conservation initiatives, U.S. use began to decline.

As domestic capacity rose, see Figure 6, the percentage utilization rate for domestic refineries began to fall from the 1973 peak of 93.9%. In effect, capacity additions were occurring at a faster rate than the growth in demand. This caused utilization rates to decline. The combination of rising capacity and falling demand pushed refinery utilization rates sharply downward until they reached a low of 68.6% in 1981. As a result, between 1981 and 2000, the number of domestic refineries fell from 324 to 158, a 51% decline. The corresponding reduction in capacity from 18.6 mmb/d to the current level of 16.5 mmb/d, a decrease of 11.3%, resulted in increased utilization rates in the mid-90% range for the remaining refineries during the 1990s. While this consolidation effort has increased the utilization rate of the remaining refineries, it has made the industry more susceptible to equipment breakdowns and outages as facilities have been required to operate closer to their maximum design capacity over longer durations. One result of this consolidation effort is that regions of the country once served by a number of different companies and facilities now must depend on fewer refineries. When operational problems occur at one of the remaining facilities, a region may experience supply disruptions and price surges until adequate replacement volumes find their way to the affected markets.

Figure 6

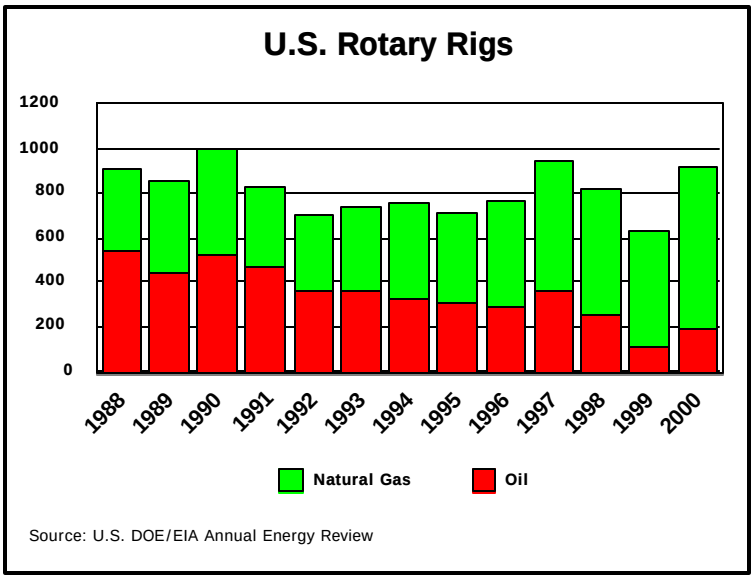


Since 1995, domestic refining capacity has increased even as the number of refineries continues to decline. While financial, environmental, and legal considerations make it difficult for new refineries to be built in the U.S., many facilities have added capacity as various existing processing units are upgraded or expanded. Refiners are also altering processing units to maximize the production of higher value "light products" such as gasoline, distillate, jet fuel, and liquified petroleum gases at the expense of residual fuel which has seen its market share decline for many years.

Exploration Industry Profile

The amount of exploratory drilling and development drilling undertaken by the industry relies heavily on the prices of crude oil and natural gas as well as on drilling costs. Data showing the number of rotary rigs operating in the U.S. for natural gas and oil exploration over the past 13 years are presented in Figure 7. The direct correlation between oil prices and the number of rigs in operation was most pronounced in 1990 and 2000. By referring back to Figure 4, it can be determined that crude oil prices were relatively high during those two years. Correspondingly, Figure 7 shows that the number of rotary rigs exploring for oil also increased. Between 1999 and 2000 the number of rigs exploring for oil increased from 128 to 197, a rise of almost 54%. This escalation in activity follows a two year upturn in crude oil RAC prices from $12.52/bbl in 1998 to $28.23/bbl in 2000, a gain of $15.71/bbl, or 125%. The rise in drilling activity in 1990 also followed a two year crude oil price gain equaling $7.55/bbl, or 51.5%. Additionally, the 2000 data indicates that higher prices greatly stimulated natural gas exploration activities. The number of rotary rigs exploring for natural gas climbed from 496 in 1999 to 720 in 2000, a gain of 224 rigs or 45.2%, as natural gas prices surged to record highs.

Figure 7



As important as the raw prices of crude oil and natural gas are, the productivity of drilling operations is also critical. As the cost of operations and activities, such as data acquisition and processing, and the display and integration of seismic data with geologic data, continue to fall, the costs of drilling become more affordable. Additional factors, such as powerful computers and the general increase in knowledge and experience, continue to exert downward pressure on drilling costs and help stimulate exploration.

NEW YORK STATE OVERVIEW

Infrastructure and Distribution Network

Meeting New York's future petroleum demands requires both an adequate supply of refined products and an efficient distribution network to move the various fuels from refining centers to end users. However, the reliability and efficiency of the present petroleum distribution system will be continually challenged by changing circumstances, such as stricter environmental requirements, land use issues, and the general aging of the infrastructure throughout the forecast period.

The petroleum supply industry in New York has adapted over time in response to ever greater dependence on imported oil. As domestic sources of crude oil and refined products became less plentiful, the Port of New York developed into a ready entry point for petroleum products. As tanker shipments of petroleum products from foreign and distant Gulf Coast refineries increased, many terminal companies established large supply operations along the New York and New Jersey sides of the Port. Today, these primary oil storage facilities are vital mechanism's for redirecting bulk deliveries of imported and domestic products to end users across the State and throughout the Northeast.

A diverse distribution network has developed over the years to transport petroleum products into and throughout New York State. Several pipeline systems connect New York consumers to the major refining centers located along the Gulf and East Coasts. Waterways, consisting of coastal channels, rivers, and canals, allow barges and coastal tankers to move supplies of refined products to end users Statewide. These water routes also provide an alternative means for shipping fuels from domestic refineries located outside the State. Highway transport vehicles deliver supplies from New Jersey, Pennsylvania, and Canada across the southern and northern regions of the State. Rail shipments are not as common as other modes of transportation and generally are confined to interstate movements of bulk quantities of fuel. Refined products often are placed in interim locations, such as major regional terminal centers, for later truck or barge distribution to retail outlets and end users.

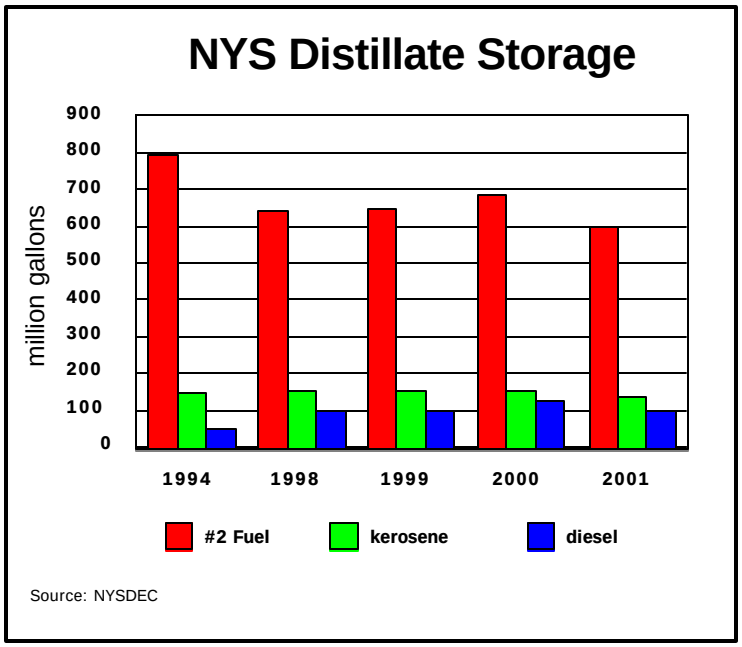
Statewide Storage Capacity

In recent years, petroleum product distribution companies throughout the State have expressed concern over the long-term decline in the number of storage terminals and associated

storage capacity. They note that this reduction has impaired the operating flexibility needed to satisfy consumer oil demand. Petroleum storage terminal facilities face many of the same environmental, land use, and economic pressures that affect the refining sector. Operators note the high costs associated with meeting more stringent environmental regulations, increased insurance costs, greater carrying costs associated with holding petroleum products, and the lack of market incentives to build new facilities as impediments to adding storage capacity in the State.

Statewide distillate fuel storage capacity, which includes volumes of #2 home heating oil, kerosene, and diesel fuel, is shown in Figure 8. Operational storage capacity of #2 home heating oil has declined from 794 million gallons in 1994 to 600 million gallons by 2001, a reduction of 194 million gallons or 24.4%. However, over the same period, Statewide demand for this fuel by the residential, commercial, industrial, and electricity generation sectors has increased 4.3%. This indicates that while terminal capacity is being used more efficiently to meet normal everyday demand, there is less capacity to meet atypical demand surges associated with cold weather. This creates marketplace supply uncertainty and contributes to greater short-term price volatility. In effect, consumers have become more dependent on the ability of the petroleum transport industry (tugboats, barges, and tankers) to resupply the remaining terminals during peak demand periods.

Figure 8

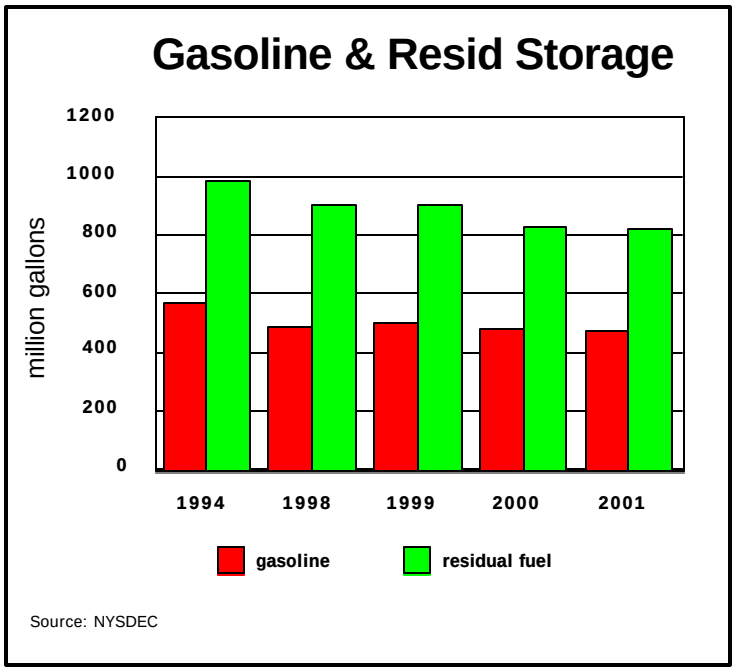


Kerosene is an important fuel used to meet heating needs and as a blending agent to prevent cold weather gelling in diesel fuel. Statewide storage capacity of this fuel has remained steady at approximately 150 million gallons between 1994 and 2000. It was only in the most recent year that capacity declined to 136 million gallons, a reduction of 13.2% from 2000.

Storage capacity of diesel fuel increased steadily from 48 million gallons in 1994 to 127 million gallons by 2000, a gain of 79 million gallons or 165%. However, a significant decline in capacity occurred in 2001 as the total Statewide volume equaled 99 million gallons, a fall of 28 million gallons, or 22%.

Statewide motor gasoline and residual fuel storage capacities, presented in Figure 9, indicate the same declining capacity trend discussed for distillate fuels. Between 1994 and 2001, gasoline capacity fell from 571 million gallons to 471 million gallons, a drop of 17.5%. Again, while capacity decreased, demand for gasoline over the same period increased from 5.5 billion gallons to 5.8 billion gallons, a gain of 4.2%. Similarly, the capacity of residual fuel, a fuel used by the electricity generation sector and in large industrial, commercial, and residential boilers, saw capacity move downward from 981 million gallons in 1994 to 823 million gallons in 2001, a decline of 158 million gallons, or 16%.

Figure 9

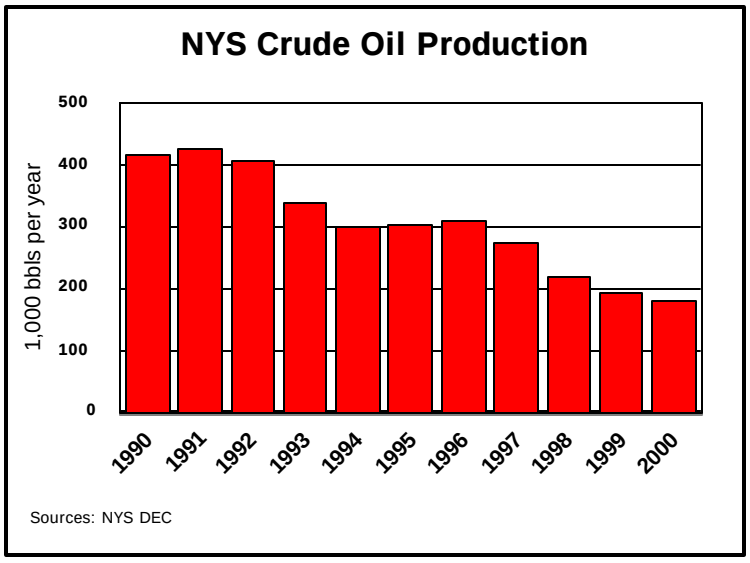


Exploration Activities

Historic Industry New York's first commercial oil well began production in 1865, and Statewide production peaked in 1882 at 6.8 million barrels per year. This initial oil boom was short lived, and by 1893 production was down to one million barrels per year. New York's second oil boom occurred with the invention of water flooding, the first enhanced oil recovery technique. The technique led to a second peak of 5.4 million barrels in 1943. Since then, Statewide oil production has steadily declined. The last major oil find occurred in 1981 when the "Bass Island Trend" was discovered in Chautauqua County. This geographic formation proved to hold a significant amount of oil and has produced over 1.5 million barrels of oil and significant volumes of natural gas.

Current Production Trends According to the U.S. Energy Information Administration (EIA), New York ranked 29th out of 31 oil producing states in the year 2000. New York's oil production comes from two distinct regions: 1) the historic areas of Allegany, Cattaraugus, and Steuben counties, and 2) from the Bass Island Trend in Chautauqua County. Oil production in 2000 totaled 180,590 barrels, less than 0.1% of annual demand, and a 57% decline from 1990 as shown in Figure 10. By the end of 2000, there were 2,803 active oil wells and another 1,906 not reporting any production. Active wells in the State produce a yearly average of 64 barrels per well. New York's historic oil fields in Allegany, Cattaraugus, and Steuben counties accounted for 87% of reported production, reflecting the rapid decline of the Bass Island Trend in Chautauqua County.

Figure 10



From 1990 to 2000, oil well completions ranged from a high of 71 in 1992 to a low of 7 in 1998. Completions rebounded slightly to 25 in 1999 and 17 in 2000. This modest rebound in new wells can be partly attributed to a 125% increase in average crude oil prices from 1998 to 2000. In 1997, the only wildcat[4] well drilled in New York in the last ten years led to the discovery of a small field in northern Cattaraugus County. The field, named Bixby Hill, continues to produce approximately 3,000 barrels of oil per year.

Crude Oil Production Outlook New York's decreasing oil production can be attributed to the lack of new discoveries, declining Bass Island production, and the continued plugging of both oil and injection wells caused by increased environmental compliance costs. Though low product prices have been blamed as a factor for declining production in the past, increased prices in 1999 and 2000 only stimulated a moderate drilling increase that did not alter the downward trend in Statewide production.

[4] An exploratory well drilled in unproven territory.

Yet, the remaining resource base is substantial. In an extensive geological study of the State's resource base done in the 1980s, original oil-in-place was estimated at 1.118 billion barrels.[5] Cumulative production through 2000 totaled approximately 244 million barrels. This represents an estimated recovery rate of approximately 22%. Primary production can usually recover a maximum of 30% with another 15% possible from water flooding. Using this very optimistic 45% maximum recovery factor, total New York production from primary and secondary methods may total 600 million barrels with 356 million barrels yet to be recovered. In reality, any significant recovery of this resource requires new and expensive technologies, such as tertiary recovery methods and horizontal drilling.

The New York State Energy Research and Development Authority (NYSERDA) has funded projects that demonstrate horizontal drilling and enhanced recovery techniques in New York's oil fields. A particular success was the Maring 3-B horizontal well recompletion drilled in the Bass Island Trend. The well was completed in August 1998 with flow rates in excess of 250 barrels of oil per day with associated gas.

Without renewed commercial interest, discovering any new major geologic target may be difficult. If business conditions improve, the application of new technologies, such as horizontal drilling and tertiary recovery methods, may help slow the State's production decline. Otherwise, the outlook for crude oil production is a continued decline of 5 to 10% per year.

Petroleum Share of New York Sector Demand

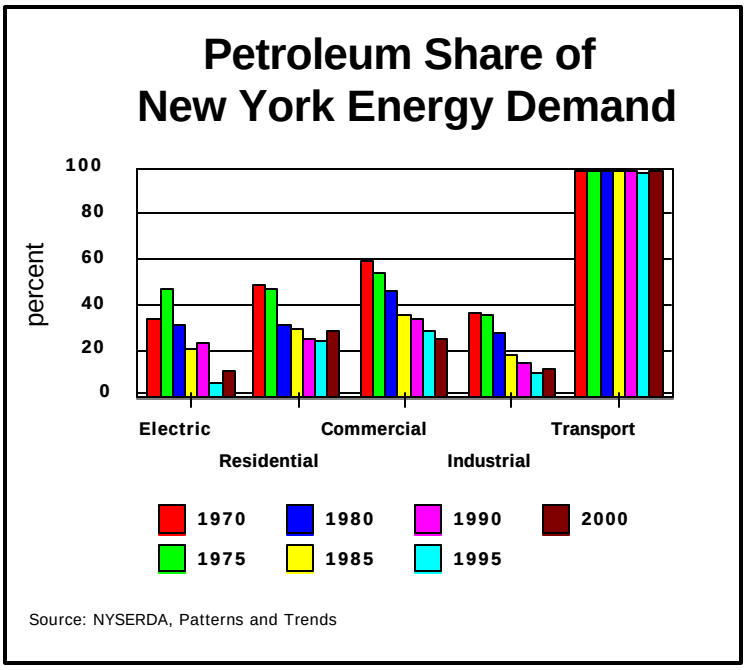
Petroleum fuels are vital to the State's economy and remain the single largest source of energy consumed in the State. As of 2000, petroleum supplied approximately 42% of New York's total demand. While this is well below the 65% level recorded in 1975, it is greater than the 28% figure for natural gas in 2000. Petroleum fuels provide energy for each of the State's economic sectors, as shown in Figure 11. The electric sector has posted the sharpest decline, falling from about 48% in 1975 to the year 2000 rate of 10.2%. Since the early 1990's, the electricity sector has steadily turned to natural gas to satisfy the State's increased electricity demand. However, petroleum products such as residual fuel continue to supply a number of large baseline generating units. Distillate fuels serve the dual purpose of fueling electricity generation peaking units and providing backup fuel capability at some generation

[5] Reed, C. ed., 1989. *New York State Oil and Gas Drilling and Production 1988*. New York State Department of Environmental Conservation - Division of Mineral resources, p. 59.

facilities during periods when natural gas is unavailable. Finally, in the transportation sector, gasoline and diesel fuel still account for over 99% of energy supplies.

In the residential sector demand for all petroleum fuels, including home heating oil, kerosene, and propane fuel, declined as higher prices in the 1970s and early 1980s encouraged homeowners to convert to natural gas, increase home insulation, lower thermostats, and purchase high efficiency furnaces. Similar end-user sentiment in both the commercial and industrial sectors acted to reduce petroleum's share of total energy supply. A limited amount of dual-fuel capability exists in large apartment buildings in the residential sector and in both the commercial and industrial sectors. Dual-fuel equipment allows end-users the option to switch between natural gas and distillate fuels when the price for one makes it an economic advantage to do so. As a result, if a sufficient amount of fuel switching occurs, petroleum use may increase from year to year. This occurred in both the residential and industrial sectors between 1995 and 2000.

Figure 11



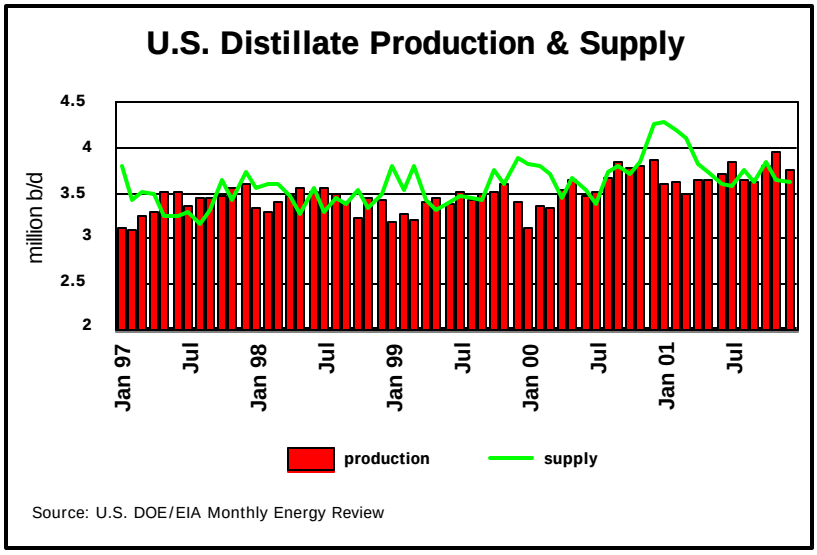
REFINED PRODUCT REVIEW

Distillate Supply and Demand

Monthly total U.S. distillate fuel production and supply is presented in Figure 12. In this analysis supply is used as a surrogate measure for demand. As the graph illustrates, there are a number of months during the winter period when demand outstrips the production capacity of domestic refiners. It is during these times that inventories and product imports

become critical to meet consumer needs. A review of the graph shows that the spread between domestic production and demand has widened over the past four winter seasons. During the October 1997 through March 1998 winter period, the demand to production spread averaged 153,000 b/d. The following year the spread increased to 295,000 b/d, a gain of 142,000 b/d, or 93%. Over the next two winter periods the spread climbed to 371,000 b/d in 1999-2000, and finally to 375,000 b/d in 2000-2001.

Figure 12



New York Distillate Fuel Focus

New York State is a major user of distillate fuel[6] with an estimated 2.9 million households (representing nearly one-half of the population) using home heating oil and kerosene for heat. The three distillate fuels are utilized in each of the economic sectors of the State and accounted for approximately 27%[7] of total petroleum fuel used in New York in 2000. New York consumers use approximately 20% of the nation's total distillate supply, with the residential sector accounting for the majority of the use within the State. New York uses more heating oil than any other state in the nation. The residential, commercial, industrial, and electricity generating sectors use an average of 11 million gallons of distillate fuel per day over the four-month November through February winter period. This figure does not include diesel volumes used in the transportation sector.

[6] Distillate fuel is defined as home heating oil, kerosene, and diesel fuel.

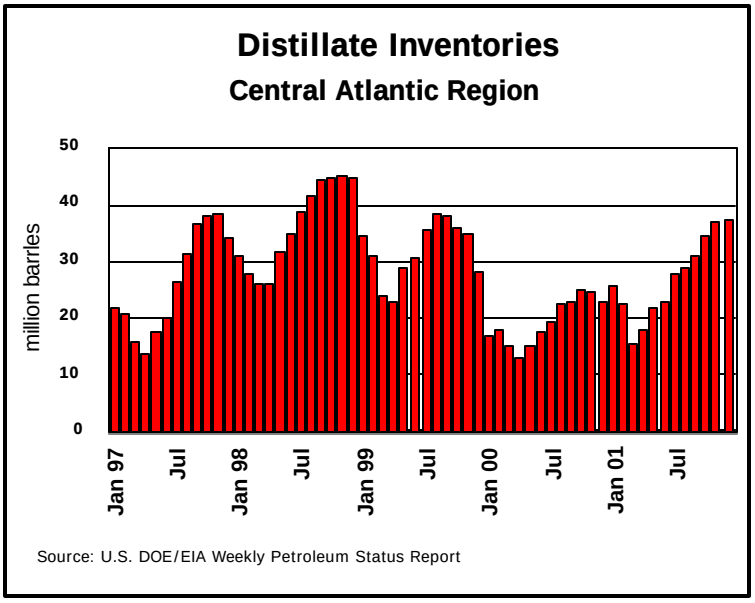
[7] NYSERDA, *Patterns and Trends 1999*.

Distillate Inventory Trends

Inventory volumes are important components of the distillate fuel supply system and at the regional level act as critical buffers to meeting demand during the winter months. Monthly distillate fuel quantities for the Central Atlantic Region[8] of the U.S. are presented in Figure 13. Regional analysis is important because New York's fuel needs, as well as those of neighboring states, are met from terminals located both within and outside the State. Correspondingly, some fuel inventories held at terminals in the New York Harbor area and northward along the Hudson River, supply neighboring New England and Central Atlantic states.

Figure 13 illustrates that the three-year trend of progressively lower inventory volumes of distillate fuel in the Central Atlantic Region at the start of the heating season was reversed during the 2001-2002 winter season. The data show that distillate fuel inventories in 1998 peaked at 45.2 million barrels in November. The following year, a peak inventory of 38.4 million barrels was reported in August. This represents a 6.8 million barrels reduction, 15% lower than the previous year. By 2000, inventory volumes reached the 24.9 million barrel level at the October highpoint, 35% less than the year earlier and 45% below the 1998 level. However, by December 2001 inventory quantities had reached 37.4 million barrels, the highest monthly total since September 1999.

Figure 13



The three-year pattern of lower inventories reflects the industry's movement to "just-in-time" inventory resupply. Just-in-time inventory practices reflect the desire of petroleum terminal operators and distributors to lower costs. The industry now relies on the petroleum supply chain to deliver fuel to satisfy market requirements. While this management practice

[8] Includes Delaware, District of Columbia, Maryland, New Jersey, New York, and Pennsylvania.

reduces inventory carrying costs, it exposes the petroleum distribution chain to a greater level of potential volatility and vulnerability should supply disruptions occur anywhere, or for any reason, along the distribution chain. The higher volumes recorded at the beginning of the most recent heating season offered greater supply and price certainty.

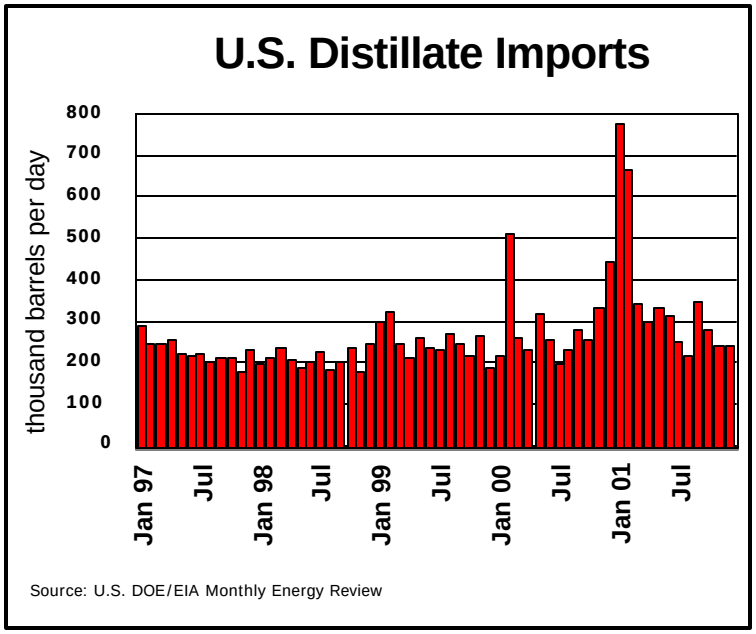
Northeast Home Heating Oil Reserve

As a result of the distillate fuel shortfalls that occurred during the 1999-2000 winter season, the U.S. Department of Energy (U.S. DOE) established the Northeast Home Heating Oil Reserve in the summer of 2000. This reserve consists of two million barrels of government-owned heating oil. The reserve is intended to provide insurance against lower than normal inventories, supply shortfalls, and delivery interruptions. In the initial year of operation, reserves of 500,000 barrels each were held at Equiva's Motiva Terminal and Morgan Stanley's Williams Terminal, both in New Haven, Connecticut, and one million barrels were held at the Hess Terminal in Woodbridge, New Jersey. In the summer of 2001, U.S. DOE approved the relocation of 150,000 barrels of the Reserve from New Haven to Providence, Rhode Island. There is also an option to expand this Rhode Island volume to 250,000 barrels in the future. This third location enhances the distribution capabilities by increasing truck and marine loading options. States covered by the reserve are New York, Connecticut, Maine, New Hampshire, Rhode Island, Vermont, Massachusetts, Pennsylvania, and New Jersey.

Distillate Imports

In response to lower inventory levels and relatively steady domestic production trends, the petroleum industry has increased imports of distillate fuel to meet the surge in demand that occurs during peak periods. Monthly total U.S. distillate fuel imports are shown in Figure 14. The graph illustrates that, as inventory volumes declined over the past three years, the petroleum

Figure 14



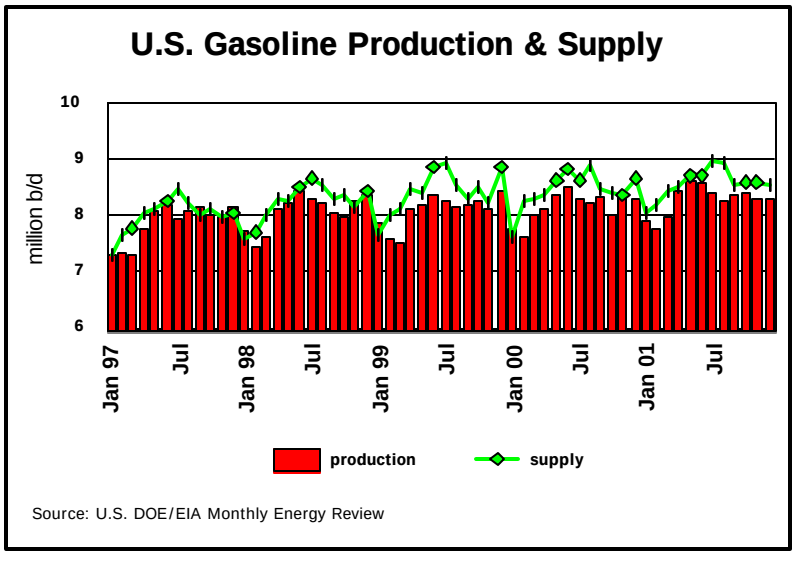
industry satisfied demand with increasingly larger quantities of imports. In February 1999, the industry imported a high of 322,000 barrels per day (b/d), 85,000 b/d or 36% more than the previous year. By February 2000, the total had climbed to 510,000 b/d, 188,000 b/d or 58% above the year earlier level. Finally in 2001, the petroleum industry imported record volumes for two consecutive months, 778,000 b/d and 668,000 b/d, respectively for January and February.

With import volumes of this magnitude, there is concern whether the distribution system, including barges and tankers, can satisfy the future requirements of the region. Also, potentially significant increases in demand for distillate products used as backup fuel for natural gas in the electricity generation sector add to the concern. Lower storage tank capacities and quantity of fuel stored increase the likelihood that supply disruptions caused by winter storms or heavy ice conditions could adversely affect New York end users in all economic sectors.

Gasoline Supply and Demand

Monthly total U.S. gasoline production and supply are presented for the January 1997 to December 2001 period in Figure 15. Once again, supply is used as a surrogate measure for demand. The clear pattern that emerges from the data is that, for numerous months of the year, the U.S. depends on imported gasoline to meet every day demand. This is particularly true during the summer months and again highlights the importance of maintaining adequate inventories. On an annual basis the data indicate that from 1997 to 1999 the difference between domestic production and demand increased from 147,000 b/d to 320,000 b/d, an increase of 173,000 b/d or about 118%. For 2000, this difference declined to 286,000 b/d and for 2001 the difference equaled 294,000 b/d, a decrease from 1999 of 26,000 b/d or 8.1%. The greatest

Figure 15

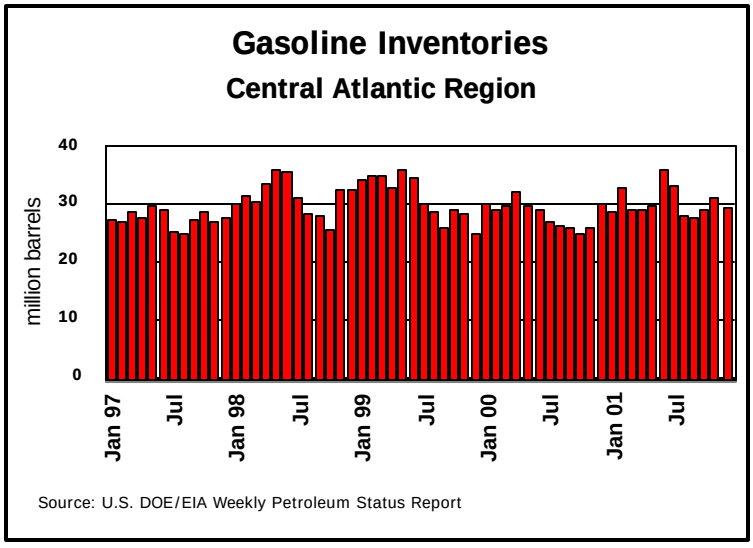


individual monthly difference since 1997 occurred in August 2000, when demand surpassed domestic production capacity by 673,000 b/d.

Gasoline Inventory Trends

Like distillate fuel inventories, gasoline inventories play critical roles in ensuring adequate supplies of motor gasoline, particularly during the peak summer driving season. Total gasoline inventories for the Central Atlantic Region for both conventional and reformulated gasoline are presented in Figure 16. Unlike distillate fuels, which show a downward trend in total volume, seasonal gasoline inventories have remained relatively stable since January 1997. In general the petroleum industry increases stock levels during the spring in anticipation of higher demand during the summer driving season. During 2000, inventories on average were below the previous two years but in 2001 they once again moved to a higher level.

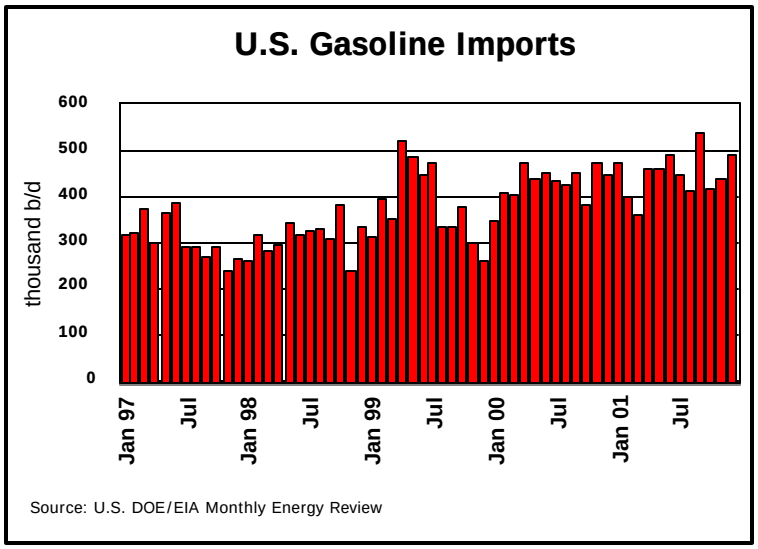
Figure 16



Gasoline Imports

Since the increase in domestic gasoline production has not kept pace with the rise in demand, volumes of imported fuel have been on an upward trend. Monthly total U.S. gasoline imports are shown in Figure 17. As the graph illustrates, since 1997 the quantity of gasoline imports has

Figure 17



been rising. In 1997, imports averaged 309,000 b/d. By 2001, the volume had risen to 448,000 b/d, an increase of 139,000 b/d or approximately 45%. During the 1997 to 2001 period, U.S. dependence on gasoline imports to meet domestic demand climbed from 3.8% of total supply in 1997 to 5.2% in 2001. While it is expected that product imports will continue to be available, the difference in U.S. gasoline regulations compared to other areas of the world may limit supply availability in the future.

New York State Gasoline Focus

New York gasoline requirements are satisfied by either conventional grade fuel or U.S. Environmental Protection Administration (U.S. EPA) mandated reformulated (RFG) gasoline. Gasoline retailers are required to sell RFG grade gasoline throughout the year in New York City, Long Island, and in the counties of Westchester, Putnam, Orange, Dutchess, and Rockland. This region of the State uses an estimated 2.9 billion gallons, or approximately 50% of New York's annual gasoline demand. One of the primary components of RFG is methyl tertiary butyl ether (MTBE). This additive has been used in gasoline since 1979. Initially it was used as an octane enhancing replacement for lead and later as an oxygenate to reduce ozone, carbon monoxide, and other air pollutants. Other areas of the State use conventional gasoline.

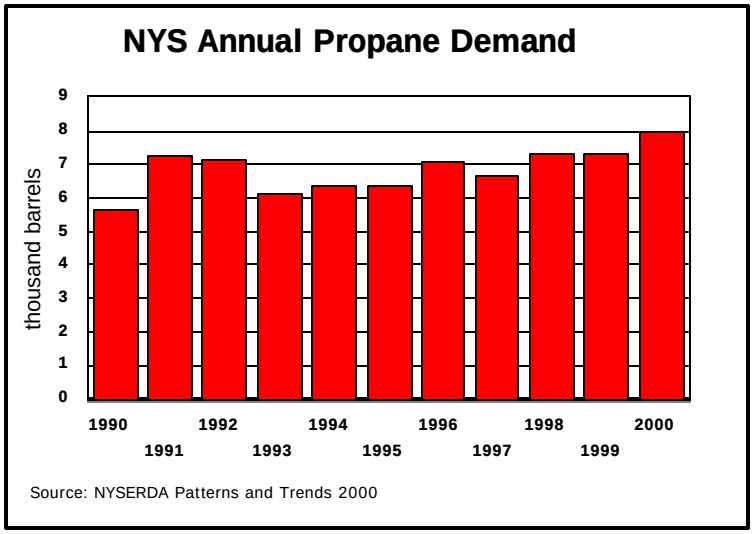
About 50% of all gasoline delivered to New York State is produced at Gulf Coast refineries. Most of this fuel is shipped by pipeline to storage terminals in northern New Jersey and central and western New York. A small volume of this supply is transported by coastal tanker into New York Harbor. Approximately 40% of the gasoline consumed in New York is produced at Mid-Atlantic refineries, located primarily in New Jersey and Pennsylvania, and moved into New York Harbor and Long Island terminals by barge. The remaining 10% of the gasoline used in the State is imported by ocean tanker from the Caribbean area, largely from Virgin Islands and Venezuelan refineries, or by truck from Canada. Gasoline reaching New York Harbor is also barged to regional terminals along the Hudson River, north to Green Island, and east to Long Island. Tanker trucks then move the gasoline from regional terminals to neighborhood gasoline stations.

Propane Overview

Propane fuel is a small but essential source of energy for New York residents and business owners. Propane, often referred to as "bottled gas" or "LP-gas," is used in the residential sector for heating homes and water, cooking, drying clothes, and fueling fireplaces.

It is also used in the commercial and industrial sectors and as transportation fuel. As shown in Figure 18, demand for propane fuel in New York State has risen steadily since 1993. Between 1993 and 2000 annual propane demand increased from 6.1 to 8.0 million barrels, a gain of 1.9 million barrels or 30%.

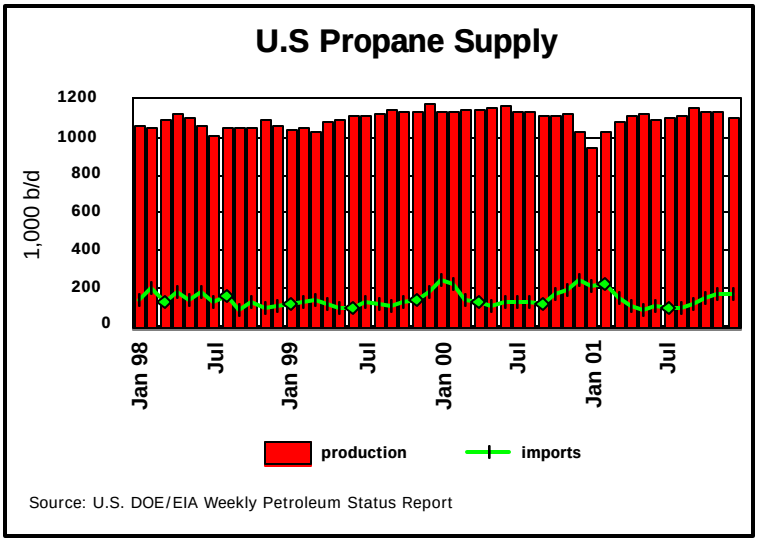
Figure 18



Propane Supply

Propane is produced as a by-product of natural gas processing and petroleum refining. Domestic propane is shipped to New York State via the Texas Eastern Products Pipeline, which originates in the U.S. Gulf Coast, and by rail car and by truck. Propane is also imported from Canada by rail car and pipeline, and from foreign sources by ocean going tankers. While propane is used year round, the highest demand period in the State is during the winter heating months. As shown in Figure 19, the U.S. becomes more dependant on imports to meet demand during the winter months.

Figure 19



Propane Storage

Propane storage is important because the sole pipeline supplying propane to the State does not have sufficient capacity to meet peak winter demand. Additionally, rail car deliveries and truck transport are often slowed due to weather conditions in the winter months. In New York State there are three levels of storage for propane inventories: primary, secondary, and

tertiary. At the primary level, in central New York, there are several underground salt dome storage caverns that hold large volumes of propane. These facilities are injected with propane during the summer and early fall in anticipation of high demand during the winter months. At the secondary level there are a many pressurized above-ground tanks located at retail dealers around the State. Finally, tertiary storage is represented by small above-ground storage tanks located at residences and commercial properties.

Article X Focus

Table 1 summarizes petroleum fuel information for 12 of the 23 Article X projects that have filed applications and have been approved by the New York State Board on Electric Generation Siting and the Environment, filed applications and are pending, filed pre-application reports, and/or filed preliminary scoping statements as of April 15, 2002.

These 12 projects have indicated plans to use petroleum distillate fuel products, such as #2 fuel oil and kerosene, as backup fuel. All the projects plan to use natural gas as the primary fuel. Of the 12 projects that have stated they plan to use distillate fuel as a backup to natural gas, three of the projects, with their winter megawatt capacity in parenthesis are: Athens (1080), Bowline Point 3 (750), and Bethlehem Energy Center (750); all are located on the Hudson River between Albany and New York City. The remaining nine projects with winter megawatt capacity are: Astoria Energy (1000), East River Repowering (360), Ravenswood Cogeneration (250), Sunset Energy Facility (580), Poletti Station Expansion (500), Kings Park (600), Caithness Island Power (750), Astoria Repowering (589), and Trans Gas Energy (1100); all are located in New York City and on Long Island. The 11 projects that do not plan to utilize backup fuels are: Sithe Sentry Station (827), Ramapo (1100), Twin Tier Power (520), Grassy Point (550), Glenville Energy (520), Brookhaven Energy (580), Oak Point Energy (1075), Wawayanda Energy (540), Empire State Newsprint (510), Spagnoli Road Energy Center (250), and Indian Point Peaking Facility (330).

Table 1

ARTICLE X PROJECTS PETROLEUM PROFILE						
Project Name	**Winter Capacity (MW)**	**Backup Fuel**	**Storage Capacity million gallons**	**Average Burn Rate Days of Storage**	**Backup Fuel Maximum Burn Rate gal./hr.**	**Backup Fuel Average Burn Rate** gal/hr.**
Athens	1080	#2 Oil	4	3.9	66,000	43,000
Astoria Energy	1000	#2 Oil	6	6.9	56,000	36,400
Bowline Pt. 3	750	#2 Oil	n/a	n/a	34,300	22,300
East River Repowering	360	#2 Oil	4.4	9.4	30,000	19,500
Ravenswood Cogeneration	250	< .04% kerosene	2	8.5	15,000	9,750
Sunset Energy	580	#2 Oil	0.25	0.5	30,528*	19,843*
Bethlehem Energy Center	750	<.04% distillate	10.5	17	39,476*	25,660*
Poletti Station Expansion	500	< .04% kerosene	6	14.6	26,318*	17,106*
Kings Park	300	#2 Oil	0.08	0.5	31,581*	20,528*
Caithness Island Power	750	#2 Oil	2.5	4.1	39,476*	25,660*
Astoria Repowering	589	#2 Oil	n/a	n/a	31,002*	20,151*
Trans Gas Energy	1100	#2 Oil	n/a	n/a	57,899*	37,634*
Total	8,009		35.73		457,580	297,532

Table notes:

* Calculated using a 7,300 Btu/hour heat rate.

** Based on an average burn rate of 65%.

- Assuming a 65% average daily load factor on backup fuels, if each the 12 projects were to call upon backup distillate fuel capability at the same time, the average Statewide burn rate would be approximately 298,000 gallons per hour, or an estimated

7.1 million gallons per day. If the facilities were to use the maximum capacity burn rate, the 12 projects would consume almost 458,000 gallons per hour, or approximately 11 million gallons per day. To put this usage level into perspective, it is estimated that on a typical winter day New York State uses, on average, 11 million gallons. Therefore, the potential exists that these generating facilities could double the demand for distillate fuels were each of them to have their natural gas supply interrupted at the same time.

- With hourly use of this magnitude, adequate on site storage capacity for backup fuel is critical. While several of the projects have not yet provided complete information, a number are considering backup fuel storage capacity ranging from 4 to 15 days of supply. However, there are several projects that are proposing only very limited backup fuel capacity, some as low as less than one day. The implications of this limited capacity is that the electricity generation facilities may not be able to secure timely resupply of backup fuel and be forced to completely curtail operation.

- Whether electricity generation facilities choose interruptible or firm natural gas service will affect several sectors of the State's economy. If interruption of gas service to these facilities should occur at the same time that the residential sector is maximizing the use of #2 heating oil to meet heating demand, there is concern whether the petroleum supply and transportation industries, including trucking, barge, and tugboats, will have the resources available to meet the increase in demand by the electricity generators. During the peak heating season, most petroleum transportation resources are fully committed to the resupply of traditional customers in the residential, industrial, and commercial sectors. Although these transportation companies also serve the electric sector during the winter, the magnitude of increase associated with the Article X generators raises important resupply questions.

- Six of the 12 Article X projects propose to be supplied by barge, three will use truck transport to receive fuel, two have yet to specify a delivery option, and one, proposed to be built at an existing petroleum terminal, will have access to both barge and petroleum pipeline supplies. During peak demand periods much of the petroleum transport industry is already fully committed. A facility that consumes 20,000 gallons of distillate fuel per hour and does not have, or has only limited, on site storage would need enough truck transport delivery capacity to cover the actual burn rate, the time needed to cover the travel distance to and from a petroleum terminal, highway and weather delays, loading and unloading times, and delays that may be encountered at the terminal. This may require the total commitment of 6-8 trucks or more for just one of the generating facilities. If additional facilities turn to backup fuel at the same time, the unavailability of sufficient transport resources will be magnified.

- Increased reliance on #2 heating oil as a backup fuel is not exclusive to New York

State electricity generators. Numerous states in the Northeast are seeing construction of electricity generation facilities using natural gas as the primary fuel and relying on distillate for backup. Whether there will be sufficient quantities of natural gas, backup fuel, and the ability to transport the backup fuel to facilities located in New York State is being examined by Charles River Associates, Inc. for NYSERDA and the New York Independent System Operator (NYISO). A final report is expected by June 2002 (see Natural Gas Assessment).

FORECAST SUMMARY

As is evidenced in Table 2, the Energy Plan projects total residential distillate (home heating oil) demand will decline 1.61% annually over the forecast period. Residential distillate demand is projected to decline by 57 TBtu in the reference case forecast from 197 TBtu in 2000 to 140 TBtu in 2021. However, motor gasoline is expected to increase 0.97% annually during the forecast period from 697 TBtu in 2000 to 853 TBtu in 2021.

Table 2

New York State Petroleum Demand and Price Forecast						
	Actual	Outlook	Outlook	Average Annual Growth		
	2000	2006	2021	2000-2006	2006-2021	2000-2021
DEMAND: TBtu						
Residential						
Distillate	197	167	140	-2.68%	-1.18%	-1.61%
Gasoline	697	758	853	1.4%	0.79%	0.97%
PRICE*: cents/gal.						
Residential						
Distillate	152.56	116.51	128.22	-4.39%	0.64%	-0.82%
Gasoline	158.80	142.74	140.66	-1.76%	-0.10%	-0.58%

Source: Energy Plan, *Forecast Summary*.

* Petroleum prices are expressed in constant 2000 dollars.

Residential distillate fuel prices are estimated to decrease 0.82% per year over the forecast period. The Energy Plan projects that New York State residential distillate prices will decline from 152.56 cents per gallon in 2000 to 128.22 cents per gallon in 2021. Similarly, gasoline prices will decrease by 0.58% over the forecast period from 158.8 cents per gallon in 2000 to 140.66 cents per gallon in 2021.

For a more detailed discussion of the various forecast assumptions and a description of the forecast methodology see the Forecast Summary section of the Energy Plan.

PETROLEUM INDUSTRY AND INFRASTRUCTURE SECURITY

The events of September 11, 2001 have alerted the petroleum industry that there are numerous steps the industry can take to help protect the critical energy facilities that supply petroleum fuels to end-users. Company officials, trade associations, and federal and State government representatives are working together on the common goal of ensuring the security of critical energy infrastructure components. Just a partial list of these critical components includes: off-shore and on-shore crude oil production facilities; a vast network of crude oil and refined product pipelines; refineries; storage terminals; transportation components such as trucks, railroad tank cars, barges, and tankers; and even the local service station and convenience store. Fortunately, the petroleum industry, as well as others, addressed many security concerns and upgraded various measures in preparation for the "Y2K" event. There will be many challenges in the future and more work needs to be done. Together, the petroleum industry and government representatives need to devise a long-term strategy to ensure the security of the national energy delivery system.

Reliance on any one crude oil producing region of the world has the potential to disrupt the domestic economy in the event that supplies from that region are interrupted. Such reliance could cause price volatility and increased prices paid by consumers. To offset this reliance, greater diversity of sources of oil supply may be achieved by developing new exploration and production technologies and expanding trade and investment initiatives between consuming and producing countries. Equally important is the development of energy efficiency programs and services that offset demand and create permanent changes in the market place.

FINDINGS AND CONCLUSIONS

- U.S. production of crude oil continues to decline. Between 1990 and 2000, domestic production has declined 20.8%. As a consequence, both U.S. and New York State continue to increase their dependance on foreign sources of crude oil and refined petroleum products to meet consumer demand.

- In-State petroleum terminal storage capacity for distillate fuels, gasoline, and residual fuel continues to decline. The size of the decline for each fuel is: distillate, 15.9%; gasoline, 17.5%; and residual fuel, 16.0%. Reasons for this decline include land use

concerns associated with storage, costs associated with properly maintaining facilities, increased insurance costs, lack of market incentives to construct new facilities, and the costs of holding large volumes of fuel.

- Lower inventory storage can result in degradation of the operational flexibility needed to satisfy consumer demand, greater supply uncertainty, and greater short-term price volatility.

- If the natural gas fueled electric generation facilities with interruptible gas contracts are unable to acquire their primary fuel and are forced to switch to distillate fuel, they will use significant quantities of distillate over a very short period of time. This could strain the ability of the petroleum infrastructure to respond to this need.

- Electricity generation facilities burning distillate fuel as a backup when natural gas is interrupted, have the potential to disrupt the delivery of electricity in cases where such facilities are being relied upon to meet peak demand and where availability of distillate fuel is limited. In addition, a sudden, large increase in petroleum use in electricity generation could potentially have negative impacts on air quality.