The Northeast Heating Fuel Market: Assessment and Options

Executive Summary

The Distillate Fuel Oil Market in the Winter of 1999-2020 | Distillate Fuel Oil Consumption | Switching or Converting From Distillate Fuel Oil

In January 2000, prices for heating oil, the oil consumers use to heat their homes, increased dramatically in the Northeastern United States. As a result, many consumers were faced with unexpectedly high heating bills as the weather turned colder. The level and duration of the price increase prompted the President to ask Secretary of Energy Bill Richardson to examine opportunities for converting factories and major users from oil to other fuels, which will help to free up future oil supplies for use in heating homes.

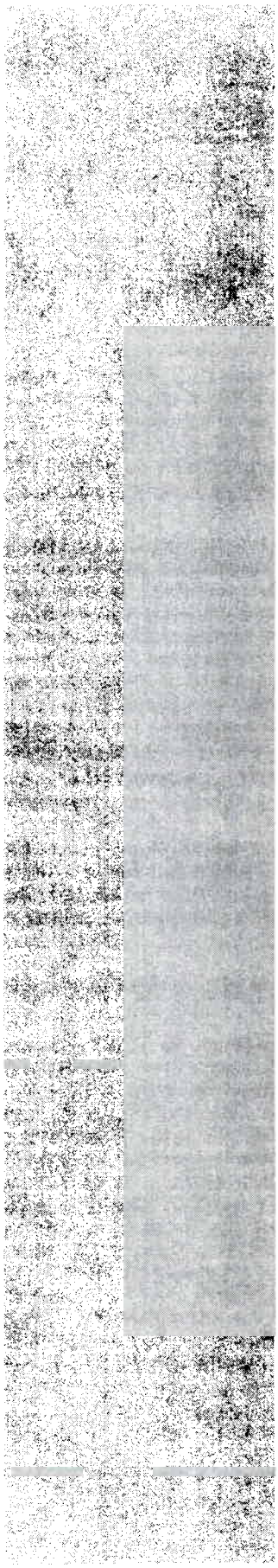
In response to the President's request, this study examines how the distillate fuel oil market (and related energy markets) in the Northeast behaved in the winter of 1999-2000, explains the role played by residential, commercial, industrial, and electricity generation sector consumers in distillate fuel oil markets and describes how that role is influenced by the structure of the energy markets in the Northeast. In addition, this report explores the potential for nonresidential users to move away from distillate fuel oil and how this might impact future prices, and discusses conversion of distillate fuel oil users to other fuels over the next 5 years. Because the President's and Secretary's request focused on converting factories and other large-volume users of mostly high-sulfur distillate fuel oil to other fuels,[1] transportation sector use of low-sulfur distillate fuel oil is not examined here.

Fuel switching and conversion from distillate fuel oil to a different fuel can occur in either of two ways, depending on the time frame available. In the short term, existing equipment that has dual-fuel (e.g., distillate and natural gas) switching capability can be used. In the longer term, other equipment may be amenable to retrofits or replacements.[2]

The Distillate Fuel Oil Market in the Winter of 1999-2000

In mid-January 2000, prices for distillate fuel oil[3] and natural gas rose dramatically in the Northeast. For example, between January 14 and February 4, 2000, New York Harbor spot prices for home heating oil (generally, high-sulfur Number 2 distillate fuel oil) rose from $0.76 to $1.77 per gallon, a 133-percent increase. Over a similar period, from January 11 to January 21, 2000, the New York spot prices for natural gas rose from $2.65 to $11.75 per million Btu, an increase of more than 340 percent. Retail prices for distillate fuel oil—the prices faced by consumers—rose less dramatically but still showed strong increases. For example, between January 17 and February 7, 2000, the average price of home heating oil for residential customers in New England rose from $1.18 to $1.96 per gallon, a 66-percent increase. For the typical household with a 275-gallon tank that was filled up at the peak price, the increase amounted to approximately $140 for an average fill-up (two-thirds of a tank). During the same period, the New England retail price of diesel fuel (low-sulfur distillate used for transportation) rose from $1.44 to $2.12 per gallon, a 47-percent increase.[4] In February, the return to warmer weather and the arrival of new distillate supplies, mainly in the form of imports, relieved the market imbalance and prices fell.

In the markets for distillate fuel oil, as in all competitive markets, the balancing of supply and demand sets prices. Any factor that leads to a significant imbalance—insufficient supply to meet demand or, vice versa, supply that exceeds demand—can cause sharp price changes. The key factors that



influence prices in distillate fuel oil markets include supply and demand in the world crude oil market, supply and demand in the markets for competing fuels (such as natural gas), the status of distillate fuel oil refining and delivery capacity, the level of stocks held by wholesalers and retailers, and weather-induced fluctuations in demand. The last factor, weather, is especially important in the market for home heating oil, because its chief uses are for heating homes in the Northeast and meeting the marginal fuel requirements of some industrial plants and power plants when demand is high and other fuels are not available.

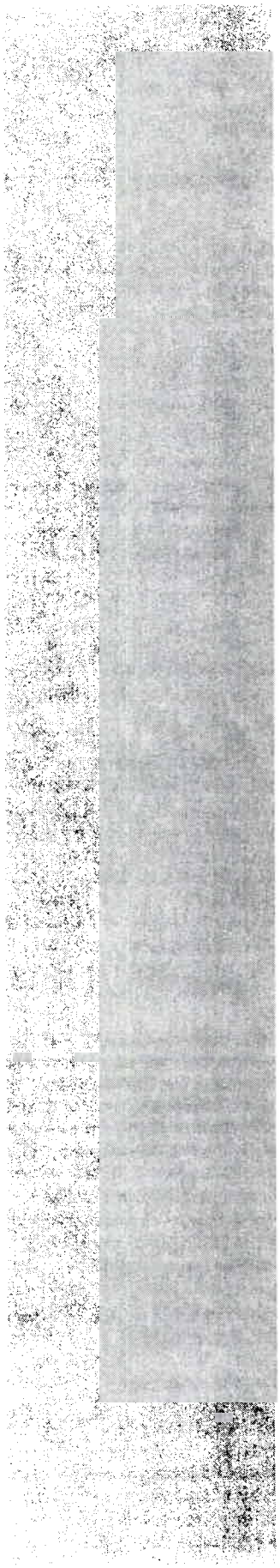
Sharp movements in any combination of the factors mentioned above can cause, and historically have caused, significant swings in distillate fuel oil prices. In the winter of 1999-2000, several factors appear to have played key roles in the price increases seen in the Northeast: rapidly rising world oil prices, lower than normal inventories of distillate fuel oil, adverse weather conditions, constraints on natural gas pipeline capacity in some areas of the Northeast, and delivery and production problems for distillate fuel oil. These factors taken together led to the sharp increases in distillate fuel oil and natural gas prices seen in the Northeast in mid-January 2000.

When the colder weather hit in January, consumers increased their demand for both home heating oil and natural gas, and prices rose. Because distillate fuel oil stocks were below normal levels, quickly available supplies were limited and prices responded sharply to the increase in demand. At the same time, the demand for natural gas in the region stretched the capacity of some pipelines, and natural gas customers on interruptible contracts, mainly distillate-switchable large industrial and power plants,[5] were asked to switch to their alternative fuel—primarily, distillate fuel oil. When customers seeking to avoid high natural gas prices and interruptible natural gas customers entered the distillate fuel oil market, the upward pressure on distillate oil prices increased still further.

Coming into the winter of 1999-2000, world oil prices rose dramatically. After several years of low prices, the price of crude oil rose from approximately $12 per barrel[6] in February 1999 to about $34 per barrel in early March 2000—still much lower than the record high world oil price of $70 per barrel (in 1999 dollars) seen in 1981. Members of the Organization of Petroleum Exporting Countries (OPEC) and key non-OPEC countries, notably, Mexico and Norway, had reduced their production in response to the low crude oil prices in 1997 and 1998. The production decline, in combination with increased consumption in industrialized countries and Southeast Asia, led to an imbalance in world crude oil supply and demand: more was being consumed than produced. This, in turn, led to a drawdown of world crude oil inventories.

A related drawdown occurred in distillate fuel oil inventories. With crude oil prices rising faster than product prices in 1999, refiners saw their operating margins shrinking. In response, they reduced their purchases of expensive crude oil and their production of refined products, including distillate fuel oil. The production cutbacks contributed to a nationwide drawdown of distillate fuel oil inventories toward the end of 1999. Given the normal stocks and the relatively warm weather in early December, the drawdown in December was stronger than expected, particularly in the Northeast.[7] For example, in New England stocks of high-sulfur distillate fuel oil fell by 35 percent, from 11.6 million barrels in early December to 7.5 million barrels in early January. Similarly, in the Central Atlantic,[8] high-sulfur distillate fuel oil stocks fell by 24 percent, from 24.5 million barrels in early December to 18.6 million barrels in early February. Although heating oil inventories often decline in December, the magnitude of the stock draw was greater than expected from historic patterns.

When cold weather hit in January, low stocks could provide little supply, and prices reacted strongly. During the week of January 22, 2000, temperatures in the New England and Middle Atlantic areas shifted from being 15 to 17 percent warmer than normal, respectively, to 24 and 22 percent colder than normal. The change increased weekly heating requirements by about 40 percent. As a result, the demand for distillate fuel oil increased in all segments of the market. Residential and commercial consumers increased their use of distillate fuel oil to heat their homes and businesses, power companies increased their use to



meet the demand for electricity (in some cases by switching from natural gas), and industrial customers with dual-fired facilities increased their use of distillate fuel oil by switching from natural gas, either as required by their gas supply contracts or to avoid the higher price of natural gas. The problem of unexpected rapid increases in demand for distillate fuel oil was aggravated by serious delivery problems. For example, Coast Guard ice breakers worked overtime to keep the Hudson River open during the coldest weather, and high winds and rough water in Long Island Sound made it too difficult for barges to unload heating oil from a waiting tanker in New Haven, Connecticut, in early February.

The pressure put on distillate fuel oil markets by the sudden change in weather was exacerbated by relatively high natural gas prices. In some uses like boilers or generators, natural gas and distillate fuel oil can be substitutes for one another. If the price of one rises relative to the other, some consumers—mostly large industrial facilities or power plants—will switch to the other fuel. In October 1999, wellhead and spot market prices for natural gas were 35 percent and 60 percent higher, respectively, than in October 1998. The increase was due in part to higher prices for competing fuels and in part to expectations of higher natural gas consumption if normal weather patterns developed.

When the weather turned colder in the Northeast in late December 1999, natural gas spot prices for delivery to the New York citygate rose substantially. Early in December natural gas prices were generally below $3.00 per million Btu, but on December 21 they rose to $4.11, and they stayed between $3.55 and $4.87 per million Btu through December 29. New York citygate prices fell substantially in early January 2000, before rising to $6.34 per million Btu on January 18. Gas traded above $6.00 per million Btu on a majority of the days between January 13 and February 13. Gas pipeline capacity into the Northeast was heavily utilized during the period. Several pipeline companies indicated that they had reached new peak levels for service; representatives of one company, Transco, testified that they had no interruptible capacity available on their system from October 20 to the date of the testimony, February 24, 2000.

In general, the ability to bring natural gas into the Northeast is more limited than in other areas of the country. The region receives the majority of its natural gas supplies through a single supply corridor from the Southwest through Pennsylvania and New Jersey. In addition, the Northeast markets are separated from major natural gas supply areas in the U.S. Southwest and western Canada by substantial distances.

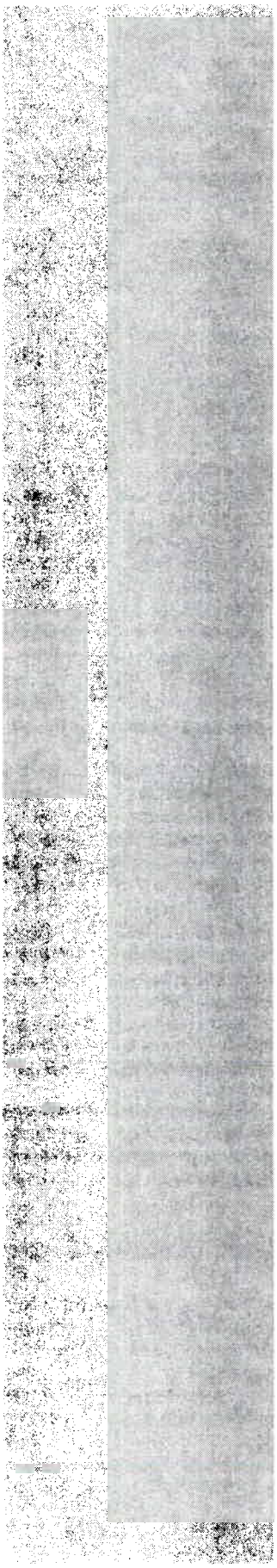
Although New York citygate natural gas prices and New York Harbor distillate fuel oil prices are about equally volatile, retail natural gas prices to residential customers appear to be less volatile than retail heating oil prices. For residential natural gas customers, the distribution charges added by local distribution companies (about $4.00 per million Btu) mute the effects of citygate price volatility. Further, the purchasing and billing practices of natural gas distribution companies also can obscure short-term price fluctuations.

To address the surge in heating fuel prices, the Federal Government responded with release of funds from the Low Income Home Energy Assistance Program (LIHEAP), to relieve some of the financial burden to low-income households. The surge in distillate home heating oil prices subsided four weeks after it started.

Distillate Fuel Oil Consumption

Among customer types in the Northeast, residential consumers are by far the largest users of distillate fuel oil,[9] excluding transportation use. In 1997 they accounted for more than two-thirds (68 percent) of the distillate fuel consumption in the region. The entire buildings sector—residential plus commercial users—accounted for more than 90 percent of total distillate fuel oil consumption in the region. Industrial firms and power plants accounted for smaller shares, 8 percent and 2 percent, respectively, on an annual basis. However, while small on an annual basis, the role played by industrial users and power plants can vary significantly during the course of a year.

In the residential sector, distillate fuel oil is mostly used for home heating, primarily in the Northeast. Nationwide, distillate fuel oil accounted for only 8



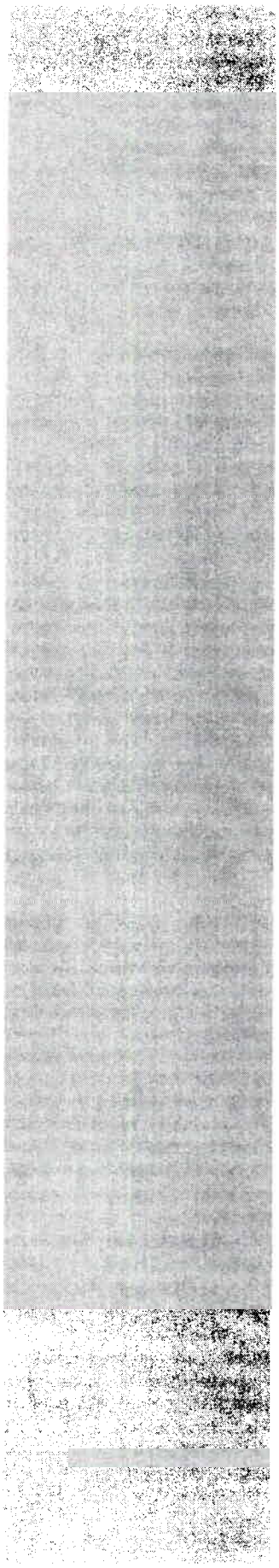
percent of the energy delivered to the residential sector in 1997, but 73 percent of that consumption occurred in the Northeast. Homes in the Northeast rely on home heating oil for heating because heating oil prices compare favorably to other heating fuels in the region. Even with the occasional surge in heating oil prices, historically, heating with distillate fuel oil in the Northeast has been less expensive than heating with natural gas. An illustrative example, using actual household heating bills, estimated that a house on Long Island saved $1,800 in fuel costs (in real 1999 dollars) over the past 20 years by continuing to use heating oil rather than switching to natural gas for heating. Although natural gas heating systems tend to be slightly more efficient than comparable oil heating systems, the study assumed for simplicity of presentation that their efficiencies were equal. In that sense, the analysis overestimates the fuel savings that resulted from staying on heating oil. On the other hand, the savings are even larger when the cost of the new gas furnace needed to switch fuels is included.

Over the past 20 years, residential use of distillate fuel oil in the Northeast has declined by 20 percent, and the number of customers using it has declined by 10 percent. Efficiency gains in building shells and furnaces, combined with warmer winters, have contributed to the decline. In addition, the construction of new gas pipelines into the region has given more consumers the choice between distillate fuel oil and natural gas. Since 1993, however, distillate fuel oil prices have been relatively low, allowing it to maintain a 30-percent share of the heating market in new homes in the region. Projections from the *Annual Energy Outlook 2000* (*AEO2000*) show this trend continuing over the next 5 years.

Although generally small in comparison with residential use, distillate fuel oil use in other sectors in the Northeast can have a significant impact on prices, especially when demand is strong and supplies are tight. As in the residential sector, distillate fuel oil use in the commercial sector has declined over the past 20 years, and its use is expected to continue to decline over the next 5 years. In the commercial sector, distillate fuel oil consumption declined from 18 percent of total commercial energy use in the Northeast in 1980 to 12 percent in 1997. Typically, distillate fuel oil is used in the commercial sector for heating, water heating, cooking, and electricity generation. Using 1995 data for buildings whose owners reported that they could switch heating fuels without any new equipment purchases or retrofits, it is estimated that just under a quarter (52 trillion Btu or about 9 million barrels) of the distillate fuel oil used in the commercial sector in the Northeast could be switched to other fuels, such as natural gas.

In the industrial sector, distillate fuel oil is a relatively minor fuel, accounting for only 4 percent of total U.S. industrial fuel consumption in 1997. In the Northeast, the 79 trillion Btu (about 13.5 million barrels) of industrial distillate fuel oil consumption in 1997 accounted for only 3 percent of total industrial fuel consumption. The consumption of distillate fuel oil in the industrial sector in the Northeast is divided nearly equally between manufacturing and nonmanufacturing uses. In the nonmanufacturing segment, where distillate fuel oil is used primarily for on-site transportation (moving things around the plant and farm sites), it is unlikely that a significant portion of it could be easily switched to another fuel. Within the manufacturing segment in the Northeast the key uses of distillate are as a boiler fuel (37 percent), as a process fuel (32 percent), for heating and ventilation (12 percent), and for on-site transportation (9.8 percent). Using 1994 data,[10] it is estimated that approximately 24 percent (9 trillion Btu or about 1.6 million barrels) of the distillate fuel oil used in the Northeast manufacturing segment could be switched quickly to other fuels without equipment purchases or retrofits. Over the next 5 years, distillate fuel use in the Northeast industrial sector is expected to increase by just over 1 percent annually, but the rate could vary depending on oil prices.

Oil plays a small role in the electricity generation sector, and generation from distillate fuel oil is a very small portion of that. In 1998, oil accounted for less than 3.4 percent of total U.S. electricity generation, and generation from distillate fuel oil accounted for only 0.4 percent of total generation. Overall, the share of generation from oil has been declining for some time, as natural gas has become more available and the efficiency of new natural gas generating technologies has continued to improve. This trend is expected to continue over the next 5 years. Even in the early 1980s, when oil-fired generation was more important, the share from distillate fuel oil never exceeded 1 percent. The vast



majority of the oil used for electricity generation is residual fuel oil.

In the Northeast the power generation sector is more dependent on oil than in other parts of the country. For example, in New England 24 percent of generation comes from oil. Even in these more oil-dependent regions, however, distillate fuel oil plays a small role— only 6 percent of total oil generation. Distillate fuel oil is typically used in small amounts in steam plants for flame control and in relatively inefficient combustion turbines and internal combustion engines when the demand for electricity is high and other fuels are unavailable to generate electricity. If all the distillate fuel oil use in the power generation sector in the Northeast were switched to another fuel—most likely, natural gas—it would amount to about 35 trillion Btu (6.1 million barrels) of distillate fuel oil. Under more severe weather conditions, as experienced in December 1989, the annual consumption could rise to as much as 41 trillion Btu (7.1 million barrels). It is unreasonable to assume, however, that all of that fuel use could be quickly switched. Some of the plants that burn distillate fuel oil are not dual-fired and may not have easy access to natural gas.

In summary, on an annual basis, if all the distillate fuel oil used in the Northeast commercial, industrial, and electric power sectors that could conceivably switch (even with equipment purchases and retrofits) were replaced with another fuel, total distillate fuel oil use would be reduced by 33.6 million barrels. However, as discussed earlier, it is unlikely that all of this distillate fuel oil use could be switched to another fuel. Looking only at the quantity of consumption that is estimated to be reasonably switchable,[11] the total that could be made available for residential use is only 13.1 million barrels.

We believe this to be a high estimate of the distillate fuel switching potential in the Northeast.[12] In addition, as is explained later, the reduction in nonresidential distillate fuel use may not lead to a permanent increase in supplies available for home heating, and the volatility in the market may not be reduced.

Because the use of distillate fuel oil varies significantly across the seasons, it is more important to look at the potential for reducing nonresidential sector use during the winter months, when the use of distillate fuel oil for heating is greatest and rapid price increases are most likely. Using historical information about the distribution of seasonal use of distillate fuel oil in the commercial, industrial, and electricity generation sectors, it is estimated that the volume of their winter season switchable distillate use could be as high as 133,000 barrels per day—about 11 percent of residential heating oil use in the winter (Table ES1).

Table ES1. Estimated Distillate Fuel Oil Switching and Conversion Potential in the Northeast by Sector

Because the Northeast's residential sector is highly dependent on home heating oil, whose prices are normally highest in the winter, colder-than-normal winter weather will further increase the demand and prices for heating oil. If, in addition, heating oil resupply problems are coupled with additional distillate fuel oil demand of 100,000 to 133,000 barrels per day from interruptible and/or fuel-switchable customers, home heating oil prices could rise sharply, as they did in the winter of 1999-2000.

Switching or Converting From Distillate Fuel Oil

Homeowners can be given increased access to distillate fuel oil or, at least, protected from steep price runups in future winters. Actions that may help include: encouraging distillate fuel oil users outside the residential sector to use other fuels, particularly natural gas; improving the operation of the Northeast distillate fuel oil market (for example, with better planning tools, more local storage capacity at the wholesale, retail, and consumer levels, and/or better delivery channels); and providing more direct assistance to consumers. Each of these approaches has practical limits, however, and their costs would have to be borne by consumers and taxpayers.

Natural Gas Market Effects

Possible changes to natural gas use considered in this report include (1) keeping large consumers with "switchable" equipment (that can use either fuel) from moving to distillate fuel oil when gas prices are high; and (2) in combination with keeping switchable firms on natural gas, moving some of the "distillate-only" capacity[13] to natural gas. In this analysis it is estimated that, over a 3-month winter period (contiguous December, January, and February), the maximum "average-day" switchable fuel consumption[14] is equivalent to about 133,000 barrels of distillate fuel oil per day. No three-month winter period in the past 20 years has had average-day switchable distillate consumption that exceeded this average. On very cold winter days, however, switchable consumption may be higher for brief periods.

NAT GAS 78,000

The conversion of distillate fuel oil consumers to natural gas by 2005 depends on the economics (end-use equipment and gas supply costs) and the effectiveness of their implementation. Because the ultimate effectiveness of policy initiatives cannot be known in advance, the estimates used in this report are sensitivities representing different sizes of the market that might be moved away from distillate fuel oil. A commitment to switch to natural gas usually means that the consumer will also have to commit to firm contracts for supply, transportation, and local delivery of the gas.

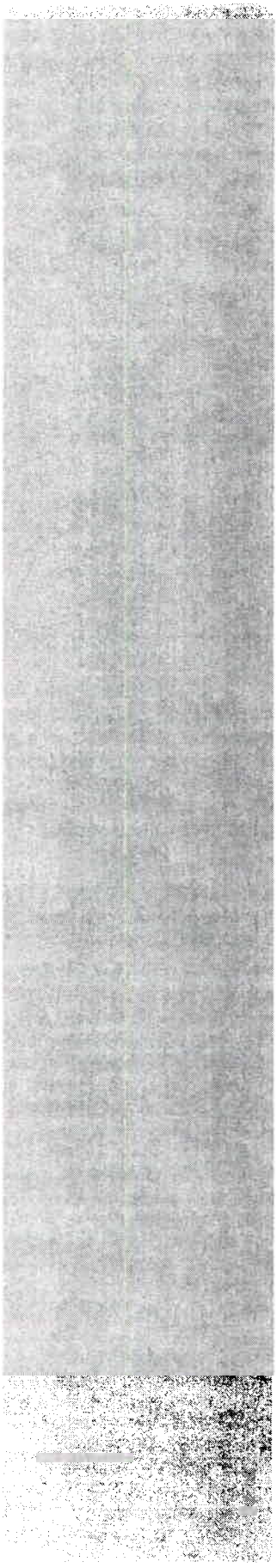
Conversion from distillate to natural gas would require a natural gas supply line and gas burners in existing distillate-burning equipment, such as boilers or turbines. Alternatively, installation of a new system that burns a different fuel may be considered when fuel price differences are expected to be large for some time (economic conversion) or when the original equipment fails and needs to be replaced or repaired. The rate of equipment failure is likely to be the primary factor affecting market opportunities for conversions from distillate fuel oil to other fuels.

The Northeast receives 71 percent of its current natural gas supply[15] from net inflows from other U.S. regions, 24 percent from international imports, and 2 percent in the form of liquefied natural gas (LNG) imports. Less than 3 percent of the supply comes from production in the Northeast region, all of which occurs in the Mid-Atlantic Census division. New England is highly dependent on flows from other U.S. regions, obtaining 89 percent of its current supply from the domestic transportation network.

Natural gas flow from the Sable Island pipeline project began in the first week of January 2000 to serve parts of New England and Eastern Canada. The pipeline was first forced to shut down on January 7, 2000, due to hydrate formation in a subsea line (essentially, ice sludge blockage).[16] The second shutdown occurred in mid-January, when the gas processing plant developed a gas leak and was again shut down for repair.[17] Early gas flow reached about 110 million cubic feet per day, of which 36 million cubic feet per day entered U.S. markets. By early March, the gas flow was about 300 million cubic feet per day to markets in the United States. The Sable Island project is expected to reach flows of 450 million cubic feet per day by summer 2000, the majority of which is expected to serve U.S. markets.

Pipeline capacity entering the entire Northeast region was 12,519 million cubic feet per day at the beginning of 1999. If large-volume users with dual-fired capability switched from distillate to natural gas, 839 million cubic feet per day of additional pipeline capacity would be needed. By 2005, the additional new capacity required, relative to the beginning of 1999, to provide gas service to the converted customers and to supply the baseline increase in gas use could reach 2,241 million cubic feet per day.

A number of recently completed pipeline expansion projects (including the completed expansion from Canada's Sable Island gas fields to New England), as well as the proposed Millennium, Independence, and associated projects, are intended to meet the growing demand for natural gas in the Middle Atlantic and New England regions. Although the demand for natural gas in the Northeast is expected to grow, all pipeline construction projects must satisfy a number of State, environmental, and regulatory requirements and gain public acceptance before they are approved and considered certain. Consequently, the fate of any proposed project remains uncertain until final approval is received. The current proposals alone represent about 2 billion cubic feet per



day of potential additional capacity, well in excess of the additional capacity that would be needed on a peak day (839 million cubic feet per day) to address the new gas demand resulting from switching out of distillate, and nearly enough for the additional 2005 potential requirements, including the baseline projected growth in natural gas consumption. The Sable Island gas supply project (about 400 million cubic feet per day to New England) also appears to be more than adequate to handle the additional capacity (340 million cubic feet per day) needed to address New England's portion of the new switching to gas, leaving the need for an additional 506 million cubic feet per day to support the potential conversions through 2005 (see Chapter 4 of this report).

Serving the switchable market with natural gas appears to be physically feasible by fall 2002 with projects already built or with construction of expansion projects planned for the Northeast; however, those projects were not intended to provide firm service to current interruptible customers. Because of the lack of sufficient commitments, the construction dates for proposed pipeline projects to the Northeast, such as Market Link, are uncertain. Even if the proposed projects are built, at least 250 million cubic feet per day of additional capacity would be necessary to also serve the new potential conversion customers in 2005. Because the planned pipelines were sized and targeted for specific customers with specific operating requirements (e.g., pressures), the system may not be capable of serving all the additional requirements of the former distillate users and, therefore, could require even more additional capacity than estimated. One of the major hurdles that potential new Federal policies must overcome, however, appears to be economic. For industrial consumers and electricity generators with the capability to switch between natural gas and distillate fuel oil, firm year-round contracts for natural gas may not be economical in the Northeast. The New Jersey Board of Public Utilities findings on pipeline construction for interruptible customers are consistent with this study:[18]

"To design and construct a gas distribution system to serve the interruptible customer class on a year-round basis would require significant investment and take years to install. Furthermore, on a cost of service basis, the resultant tariff rates would undoubtedly make it uneconomical for large customers to avail themselves of year-round service. Therefore, absent the current interruptible service offerings by natural gas utilities, larger customers would burn an alternate fuel continuously and further complicate the supply situation."

Through 2005, several potential obstacles or unintended consequences are possible if establishments with current dual-fuel switchable systems become firm natural gas customers. Because any capability to meet the new load will require pipeline and storage capacity expansion that is sufficient to meet the new peak, the costs of the incremental pipeline and storage capacity will have to be recovered from new customers, as is usually the current policy of the Federal Energy Regulatory Commission (FERC). Otherwise, costs to existing firm gas customers (usually residential and small commercial customers) will increase. Firm transportation capacity has proved to be too costly for fuel-switchable customers in the past.

When interruptible customers use the natural gas system, at least some of the resulting revenues are applied to reducing transportation costs for firm customers, including residential users, for whom the pipelines were originally justified and built. If interruptible natural gas customers became firm customers, unless uncommitted capacity were available for firm service, new capacity would have to be built. Their previous purchases of interruptible service would no longer benefit the firm customers on existing capacity by reducing their costs. Further, pipeline operators would be faced with more unused off-peak capacity to auction off, with a very limited base of seasonal users, thereby reducing the value of the interruptible capacity. Pipeline companies currently gain some revenues from the sale of interruptible capacity. There could be a considerable loss of efficiency in the operation of the gas market and the economy in general if switchable capacity were kept on natural gas all year round.

Distillate Fuel Market Effects

While the elimination of incremental distillate fuel oil demand from customers

switching from natural gas at peak is likely to reduce the potential for distillate fuel oil price spikes in the short term because of the overcapacity created, it cannot eliminate their possibility in the longer term, and it could increase the volatility of natural gas prices. Successful conversion of large-volume customers from distillate to natural gas could also exacerbate the potential for distillate price spikes, because it would remove a stable base of heating oil consumption. The remaining distillate fuel oil market would be smaller, consisting of the portion of current customers with a stronger seasonal usage pattern. Thus, distillate fuel oil dealers and refineries would be inclined to reduce inventories given the smaller market, the relative swing between seasons could be larger, and inventory management could be more difficult and uncertain. As the stock cushion diminished, the distillate fuel oil market could become less prepared for sudden increases in demand or decreases in supply.

Current Market Mechanisms

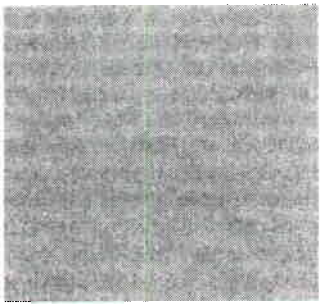
Simple and relatively low-cost market mechanisms are already provided by distillate and natural gas distributors to soften price shocks created by weather. About 98 percent of the Northeast heating oil dealers participating in a voluntary survey offer a budget payment plan,[19] as do all gas utilities. The budget plans estimate the annual heating bill and allow customers to pay 11 equal amounts plus a 12th payment that reconciles any discrepancy in collections. Other pricing mechanisms that can minimize the risk of price shocks include price caps and guaranteed pricing.

About 54 percent of the Northeast oil dealers responding to a voluntary survey indicated that they provide price cap programs on distillate fuel oil to residential customers for a small "insurance" premium, and 55 percent offer guaranteed pricing. For a small premium per-gallon charge, dealers cap the maximum price they charge to residential customers. Others simply offer a fixed price per gallon charge for a 12-month period. These programs, for customers who had chosen them, would have lessened the financial pain of the 1999-2000 surge in winter distillate prices or completely insulated the customers from it. The extent of participation in these payment programs is not known; however, the persistence of relatively low world oil prices for all but one of the past 8 years suggests that they may not have been widely used.

Some existing market mechanisms are already available to mitigate future heating oil price spikes, including: (1) for large-volume, distillate-natural gas switchable users, maintaining adequate distillate fuel oil backup at the start of the winter season to reduce the potential for large intrusions into the heating oil market during very cold periods; (2) for residential consumers who buy new oil-heated homes, installing a larger oil tank to reduce the number of required fill-ups during the peak period; (3) for residential heating oil customers, adopting any one of the fuel oil purchasing plans (budget plan, cap price, or fixed price) that will meet their preferences for avoiding risks; (4) for all residential heating oil consumers, adding additional conservation measures, buying more efficient heating systems when they need to be replaced, and, in some cases, switching to a different fuel. As recent reports in the press have indicated, some Northeast consumers have reacted to the recent price spike by switching to natural gas or by purchasing high-efficiency heating systems, or are seriously considering switching to a more predictable heating oil plan. As a result of recent hearings by the New Jersey Board of Public Utilities, the Board noted that it will reconsider reimposing the requirement that interruptible gas customers maintain adequate alternate fuel supplies:

"Given the magnitude of the [distillate volumes] involved, it is unlikely that this would have a significant effect on the price of heating oil. It is, however, worth considering as part of a future, overall response plan."[20]

Other market approaches that are available for the electricity generation market include the expansion of interregional transmission capability and the construction and expanded use of nuclear, coal and renewables generation. Besides switching to other fuels for generation, regional distillate fuel oil use could be reduced by increasing interregional electricity transmission capacity and/or building new capacity to displace existing capacity. Given the high cost and long lead times for building new transmission capacity, however, displacing intermittent use of distillate fuel oil by electricity generators may not be an



economical choice.

New gas-fired plants can be brought on line in 1 to 2 years, and many are already planned. Other new capacity types—coal, wind, biomass, nuclear and solar—are much less economical than gas and normally take longer to bring on line. In addition, because wind and solar are not dispatchable,[21] they probably are not good substitutes for plants that use distillate fuel oil. The industrial sector already uses the maximum available amounts of black liquor and residues for cogeneration applications. Other incremental cogeneration opportunities are small in the 2000-2005 time frame without substantial financial incentives. The situation in the residential and commercial sectors is similar.

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