

1. Introduction

Purpose

This study was undertaken at the request of the U.S. Secretary of Energy, Bill Richardson.¹ As stated by the President, "I've asked Secretary Richardson to conduct a 60-day study on converting factories and major users from oil to other fuels, which will help to free up future oil supplies for use in heating homes."² The principal purpose of this study is to examine the feasibility and impacts of converting factories and major users of heating oil to different fuels, and to discuss other possible supply-related policy options that may mitigate future heating oil supply problems in the Northeast.³ This study examines how the market behaved in the winter of 1999-2000, identifies the key price and demographic factors that influence the market, compares the market behavior in 1999-2000 with that in previous winters, and discusses options that could encourage major users of distillate fuel oil to convert to other fuels. Given the oil price environment in the winter of 1999-2000, the options considered are those that could have a meaningful impact over the next 5 years.

Throughout this report, the terms "home heating fuel oil" and "heating oil" are used to indicate number 2 high-sulfur distillate fuel oil. There are exceptions to this which, for the sake of improved communication to a broader audience we often simplify—for example, number 1 distillate oil and low-sulfur number 2 distillate fuel can also be easily used for home heating if necessary and available. Price usually precludes their normal use for these purposes.

Review of the Oil Market Situation

Over the past 12 months, the average daily price of West Texas Intermediate crude oil in world markets ranged from \$12 per barrel to more than \$34 per barrel in early

March (before subsiding in recent weeks), as members of the Organization of Petroleum Exporting Countries (OPEC) and several other exporting countries cut production and world oil demand increased. Prices were influenced by the successful adherence to announced cutbacks in production by OPEC and key non-OPEC members, notably Mexico and Norway. Also influencing prices were strong growth in oil consumption in the industrialized countries (which accounted for 60 percent of the growth in demand in 1999) and rising demand in Southeast Asia as the economies there began to recover from the recession of 1997-1998.

Stocks were used to meet demand growth in many countries. At the end of March 2000, world stocks of crude oil and refined products were below average levels. In response, prices rose from about \$12 per barrel in mid-February 1999 and over \$34 per barrel in early March 2000 (although \$34 per barrel is still less than half the peak inflation-adjusted price of \$70 per barrel—\$39 per barrel in 1981 dollars—that occurred in 1981). Following the OPEC agreement on March 29, 2000, to raise production by 1.7 million barrels per day and earlier declarations by Mexico that it would raise its oil production, crude oil prices fell into the \$25 per barrel range in early April 2000 (see discussion in Chapter 2).

Low U.S. stocks of heating oil in January 2000 set the stage for a price spike in the Northeast.⁴ Low inventories (stocks)⁵ left little cushion to meet sudden increases in demand or decreases in supply without creating upward pressure on oil prices. The demand for distillate and diesel fuel⁶ in the Northeast increased in mid-January 2000 in response to cold weather. Delivery problems, primarily affecting tanker ships and barges,⁷ compounded the problem of low stocks in the region by delaying the refill of depleted stocks (inventories). As local supplies diminished, prices surged. New England home heating oil prices⁸ peaked in January at \$1.96 per

¹See Appendix A for a copy of the letter requesting the study.

²The White House, Office of the Press Secretary, Press conference by the President, Feb. 16, 2000, web site www.pub.whitehouse.gov/uri-res/I2R?urn:pdi://oma.eop.gov.us/2000/2/17/1.text.1 (Washington, DC, February 17, 2000).

³Readers should note that "heating oil" is "distillate fuel oil."

⁴For purposes of this study, the Northeast is defined as New England (Maine, Vermont, New Hampshire, Massachusetts, Rhode Island, and Connecticut) and the Mid-Atlantic Census division (New York, New Jersey, and Pennsylvania). Oil supply data are collected at a larger level of aggregation (New England, Mid-Atlantic, Maryland, Delaware, and Washington, DC). The discussions in each case refer to the Northeast and the reader should keep the distinction in mind.

⁵The terms "stocks" and "inventories" are used interchangeably in this report.

⁶Diesel fuel is low-sulfur distillate fuel oil used for truck and heavy freight transportation.

⁷Frozen waterways slowed the arrival and unloading of distillate fuel oil in New York and Boston harbors.

⁸Home heating oil is distillate fuel oil.

gallon (again, this price is still lower than the U.S. average heating oil price in 1981 of about \$2.45 per gallon in 1999 dollars—\$1.29 in 1981 dollars). In response, in early February 2000, U.S. refineries began increasing their output of distillate, and marketers substantially increased their purchases of imported distillate fuel oil. It takes several weeks for refiners to increase production and deliver product to the Northeast, and by mid- to late February new distillate supplies began arriving and prices began to decrease.

Distillate fuel oil imports played a major part in controlling the stock decline and moderating distillate fuel oil prices after the first week of February. Distillate fuel oil imports jumped from 105,000 barrels per day during the week of February 4 to 528,000 barrels per day during the week of February 11 and averaged more than 550,000 barrels per day for the last three weeks of February.

The surge in home heating oil and diesel fuel prices, primarily in the Northeast United States, prompted the President's request for a review of policy options that might help reduce the volatility of these prices in the future. The Secretary asked the Energy Information Administration (EIA) and the U.S. Department of Energy's Office of Policy to conduct an analysis of the causes of the price increases and the potential for conversion of large-volume distillate fuel users to other fuels by 2005. The options considered in this report are: (1) increasing natural gas pipeline capacity for deliveries to the Northeast, (2) removing obstacles to conversions from distillate fuel oil, (3) improving the management of distillate fuel oil supplies, particularly by large industrial users and electricity generators, and (4) increasing on-site distillate fuel oil storage capacity. The framework and results of EIA's analysis are described in this report.

Chapter 2 describes what happened in the 1999-2000 winter season and what factors contributed to the rapid price runups for heating oil in the Northeast. Chapter 3 focuses on Northeast energy consumption, describing the historical fuel mix in the Northeast by sector and estimating the ability of the region's large distillate fuel oil consumers to switch to different fuels. The chapter also examines the economics of space heating equipment choices in the Northeast, typically distillate fuel oil or natural gas, and provides an illustrative example for such choices. The historical costs of heating Northeast homes using home heating oil (distillate) and natural gas are analyzed and compared with those in the Midwest region and the United States as a whole. The economics of future heating fuel choices are examined, based on fuel price projections through 2005 from EIA's *Annual Energy Outlook 2000*.⁹

Chapter 4 examines the current supply, infrastructure, and processing for natural gas and describes how the current business environment affects supply, contracting practices, seasonal pricing, and storage. The chapter ends by examining the feasibility, from the supply perspective, and implications of moving a portion of the distillate fuel oil demand by large energy users to an alternate fuel like natural gas. Chapter 5 examines the supply, infrastructure, and processing for distillate fuel and describes how a successful conversion of large distillate fuel oil users in the Northeast might affect the market for distillate fuel oil.

The following definitions are provided to facilitate the discussions that follow:

Distillate Fuel Oil: Nos. 1, 2, and 4 heating oils and diesel fuels. Most often subdivided (by EIA) into:

- High-sulfur distillate fuel oil (often called "heating oil" but has other uses, including off-highway transportation, agricultural, and industrial)
- Low-sulfur distillate fuel oil (often called "diesel fuel" or, more appropriately, "on-highway diesel fuel"). Although low-sulfur distillate can also be used for heating, and sometimes is, its higher price normally precludes its use as a heating fuel.

Technically, the high-sulfur and low-sulfur designations are based on product specifications, whereas the diesel and heating designations are based on use.

New England: Census Division 1 and Petroleum Administration for Defense District (PADD) 1a. Includes Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, and Connecticut.

Middle Atlantic: Census Division 2. Includes New York, New Jersey, and Pennsylvania.

Lower Atlantic: PADD 1c. Includes Virginia, West Virginia, North Carolina, South Carolina, Georgia, and Florida.

Midwest: Census Region 2. Includes Ohio, Indiana, Illinois, Iowa, Michigan, Wisconsin, Minnesota, Missouri, Kansas, Nebraska, North Dakota, and South Dakota.

Northeast: Census Divisions 1 and 2.

Central Atlantic: PADD 1b. Includes New York, New Jersey, Pennsylvania, Delaware, Maryland, and the District of Columbia.

South Atlantic: Census Region 5. Includes Maryland, Delaware, District of Columbia, West Virginia, Virginia, North Carolina, South Carolina, Georgia, and Florida.

⁹Energy Information Administration, *Annual Energy Outlook 2000*, DOE/EIA-0383(2000) (Washington DC, December 1999).