

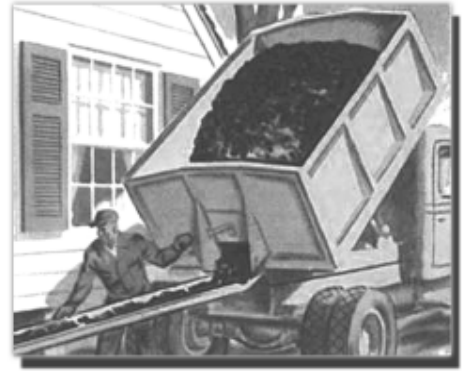
8. Energy

Electricity prices continue to rise. Home heating oil prices projected to outpace last year. Gas prices on the decline at the end of 2004.

It was like a perfect storm. Hurricanes, war, and financial problems at a Russian oil company converged to drive energy prices to record highs in the fall of 2004. These conditions, on top of increased worldwide demand for petroleum, continued to worry New Hampshire residents as the weather turned colder and the possibility of paying more than last year to heat their homes became greater. Drivers winced as gasoline prices topped \$2.00 a gallon in many areas. Businesses were concerned too, because money spent on

energy is money not spent on other goods. For businesses that depend on trucking, the high cost of diesel fuel is a problem because there is no substitute so they eventually pass the cost on to consumers.

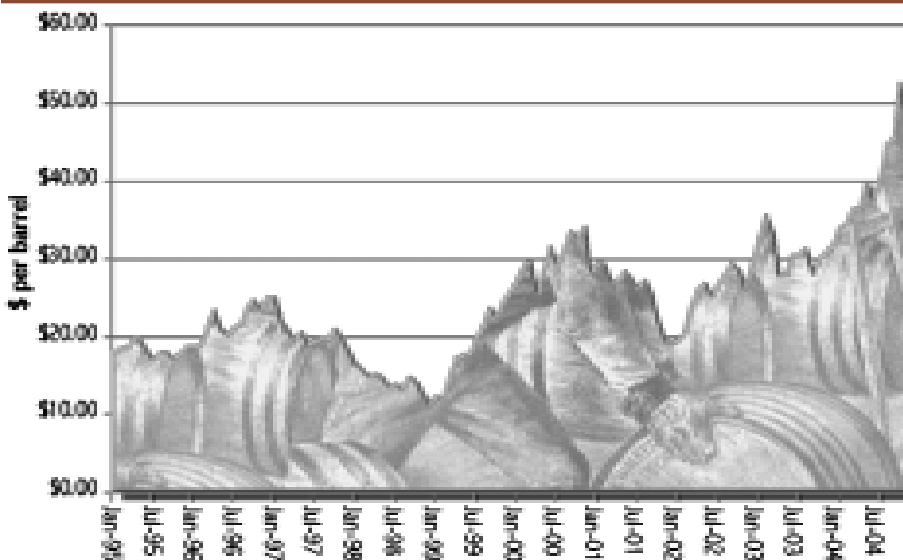
Energy costs are closely tied to the price of crude oil, either directly or indirectly because of substitution effects. For example, when the price of heating oil goes up, people respond by switching to natural gas, which drives up demand for gas and makes it more expensive.



Energy costs influence consumer behavior in other ways. When gasoline is costly, people take fewer or shorter trips, which can have a negative or positive effect on the tourism industry in the state. Fewer people may come from out of state on one hand, but local residents may decide to stay closer to home. Airlines pass on increased fuel costs to customers, who respond by flying less. Energy-intensive industries find it harder to compete and may trim back employment or cut production in order to control costs.

The price paid for energy is beyond the control of a single consumer or business. In the short run, consumers can try to lock in heating oil prices in early fall, convert to energy-efficient appliances, carpool, and practice better driving habits. In the long run, development of hydrogen-based fuels, expanded drilling for oil, and other technological advances could provide alternatives to costly energy sources. These however, will take time to come on line.

The per barrel price of West Texas Intermediate crude oil (WTI) is a widely-used benchmark for petroleum prices in the US

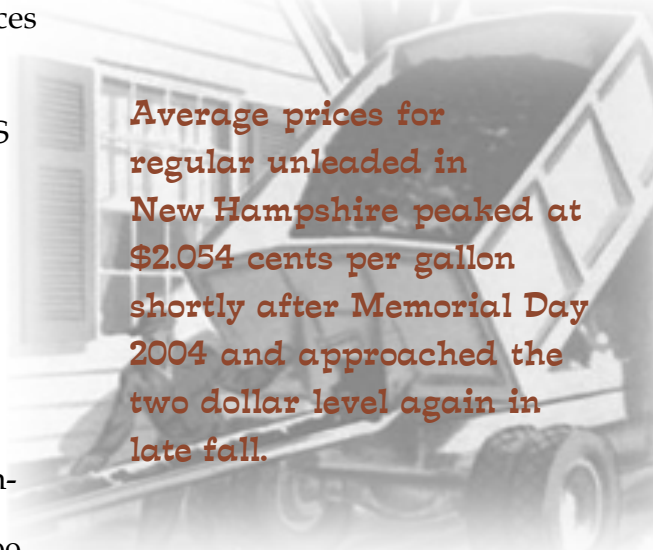


Electricity

Electric rates in New Hampshire are not as sensitive to the price of oil as in other states, because much of the generating capacity is from coal-burning plants. There was little direct impact on rates as the price of oil climbed higher during 2004. After a period of transition in the early 1990s, rates have been relatively stable. Nonetheless, New Hampshire ranked 6th highest in electricity prices in 2002, according to the Energy Information Administration of the US Department of Energy, slightly more expensive than Massachusetts, but cheaper than Vermont and Maine. Rates for residential customers in New Hampshire averaged 11.77 cents per kilowatt-hour while commercial and industrial customers averaged 10.09 cents and 8.83 cents, respectively.¹

Residential customers pay higher rates than commercial and industrial users because it costs more to serve them — electricity can be delivered to large power users at higher voltages. For customers that use smaller amounts of electricity, voltages must be reduced. By the time electricity gets to individual houses, it has gone through several steps of voltage reduction and incurred more costs.

Public Service Company of New Hampshire serves 69.8 percent of retail customers in the state. New Hampshire Electric Cooperative serves many small towns and rural areas in the state with 11.3 percent of the total. Unitil Energy Systems, a holding company that provides distribution services through its Concord Electric and Exeter and Hampton Electric subsidiaries,



Average prices for regular unleaded in New Hampshire peaked at \$2.054 cents per gallon shortly after Memorial Day 2004 and approached the two dollar level again in late fall.

accounts for another 11.1 percent. Granite State Electric serves 6.0 percent and a small percentage of customers are served by municipal utilities.²

A major energy company, AES Corporation, found that the new competitive environment in energy could have a downside. In 2002, the company broke ground on AES Granite Ridge, a gas-fired generating plant in Londonderry. The company had hoped to sell electricity on the open market in New England, but had difficulties because of the

excess capacity in the region. That reason, plus the increased cost of gas prompted the company to transfer its ownership in the plant to a group of creditors. The plant will continue to run until a buyer can be found.³

More than a quarter of New Hampshire's electric production depends on coal. Coal has been used to produce electricity since the early days of electric power and is still widely used by utilities because coal-fired units generally cost less to run than petroleum- or gas-fired units. Merrimack Station in Bow is a 478-megawatt plant that serves the base load electricity demand for PSNH. At this plant, coal is burned to heat water to produce steam, which then turns a large turbine that produces electricity. In the US, coal is used for 51.8 percent of electricity production.

Natural Gas

While it is the most popular heating fuel source for the nation as a whole, as just over half of US homes heat with natural gas, less than 20 percent of New Hampshire homes use it as the primary heating source. One reason for this is that many homes in New England are older than homes in the rest of the country and still retain their original heating system; many of these

homes use oil as the primary fuel for heating needs.

Natural gas usage is making inroads in new residential construction in New Hampshire and is more common in the densely populated southern part of the state. A major user of natural gas is the electric utility industry for its power-generating plants. In the past ten years, three pipeline systems have been added in New England and existing lines have been enhanced to increase capacity to meet the growing need.

Nearly all of the natural gas currently used in the United States comes from domestic sources, but a growing portion will come from sources outside of North America as demand increases.⁴

Residential natural gas prices in New Hampshire during the extremely cold winter of 2004 were considerably higher than in the previous year. The average price of \$13.21 per thousand cubic feet (\$/Mcf) was the highest for a December to March period since 2001. By the summer of 2004, the price of natural gas in New Hampshire topped out at \$15-16 per thousand cubic feet.⁵

Delivery rates (the rate charged by the utility to get the gas through local pipelines to a home or business) are

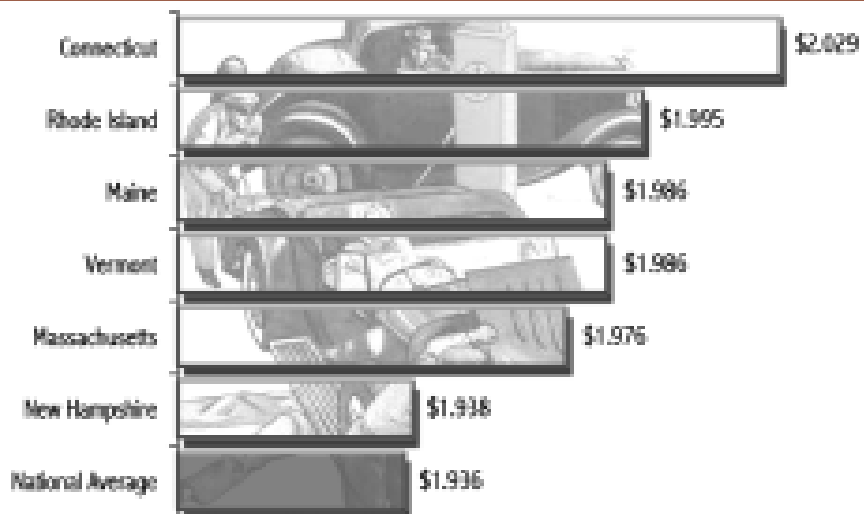
relatively stable, but the cost of gas to the utility can vary considerably.

Even though demand is higher in the winter, the price of gas tends to be lower than it is in the summer. Utilities purchase gas on the open market and enter into contracts for gas supply, and will tend to store gas for the peak winter period, lowering the chance of spikes in the price. Nonetheless, utilities are still subject to the supply and demand forces in effect in the US and internationally. Gas utilities are allowed to pass along the cost of gas to customers subject to the rate setting authority of the New Hampshire Public Utilities Commission. Rising natural gas prices would eventually translate to higher bills for customers.

One reason that prices for natural gas are higher in New

England is that the supply of gas is far away. Most of the natural gas in the United States comes from domestic sources on the Gulf Coast, Texas, and Oklahoma. A network of pipelines is needed to move the gas to New England where it is eventually distributed to businesses and households. As an alternative, natural gas can be cooled to very low temperatures (-260° F) where it is transformed to liquefied natural gas (LNG) which can then be transported by ship to terminals on the East Coast. No LNG terminal exists in New Hampshire, but there is a large one in Everett, Massachusetts. Capacity to handle more tankers will be increased to meet the growing demand for natural gas. A proposed liquefied natural gas plant in Saint John, New Brunswick has recently received approval by Canadian regulators and is scheduled to open in 2007.⁶

New Hampshire had the lowest gasoline prices in New England, early December 2004



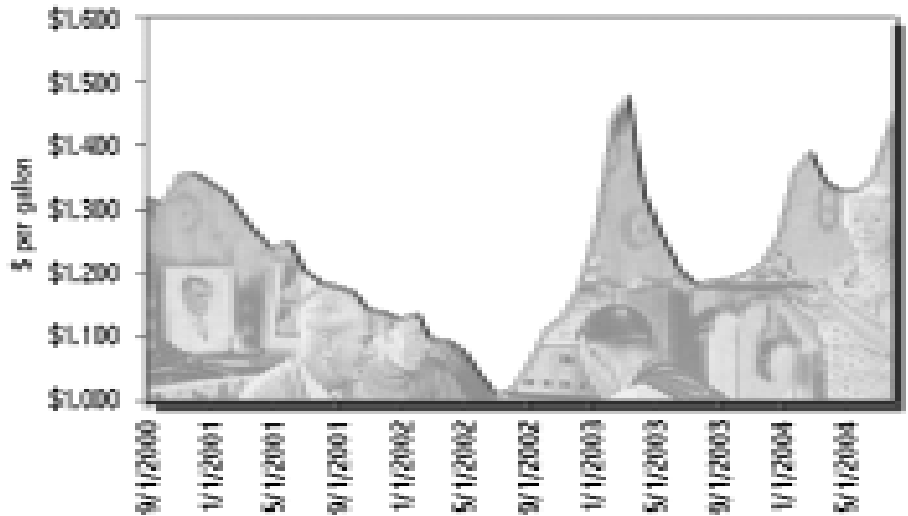
Source: American Automobile Association (AAA)

Gasoline

When a driver grudgingly pays for gas that was more expensive than it was yesterday, does the local filling station make a windfall profit? Most likely, it does not. Like any retailer, a local dealer must monitor the “replacement cost” of inventory, which in this case is what the dealer thinks he will pay for the next delivery of gasoline. While prices of crude oil may gyrate wildly in world petroleum markets, there is a lag time before there is an effect on prices at the pump. It may take a few weeks for record high crude oil prices to effect a significant change in local prices of gasoline. Local dealers also keep an eye on the “spot” price of gasoline and adjust their pump price frequently to keep up with market trends. In periods of volatility, it is not unusual to see the price change several times in one day.

Generally, a retailer can charge whatever the traffic will bear, so to speak. A seller must cover his costs and make a profit, but competition will prevent him from raising his price too high. Location of the gas station is important, as is the time of year. Gas will be more expensive in central New Hampshire during Bike Week and NASCAR events, while holiday weekends can assure high prices all around. Average prices for regular unleaded in New Hampshire peaked at \$2.054 cents per

Home heating oil prices were on the rise again in 2004



Source: New Hampshire Office of Energy and Planning

gallon shortly after Memorial Day 2004 and approached the two dollar level again in late fall⁷.

So where does the money spent on gasoline go? Assuming a gasoline price of \$1.88 per gallon (the US average price in August 2004), 52.0 percent of that cost is for crude oil. Taxes at the federal, state, and local levels accounted for 22.0 percent. Profits and costs for refining (processing crude oil into gasoline) make up another 14.0 percent.⁸ Finally, the costs and profits of distribution, marketing, and retailing, take another 12.0 percent. In recent years, crude oil has varied between 35 to 50 percent of the total cost. At the retail level, profit margin can be as little as a few cents per gallon. While this example uses national averages, gasoline taxes in New Hampshire are relatively low. Total state taxes are 20.6 cents per gallon,

while the national average is 25.3 cents. Of the six New England states, only Vermont has a lower gasoline tax.

Finding the cheapest gasoline is often a matter of being in the right place at the right time. To find out where the least expensive gas is on a given day and area, drivers check out a number of web sites, where visitors can view and post recent gasoline price activity at individual service stations throughout the state.

Home Heating Oil

The winter of 2004 was very cold. January's average monthly temperature in Concord was only 14.2 degrees, six degrees below normal. As residents turned up the thermostat, they may have felt relieved that heating oil prices peaked at \$1.398 in February, compared to a high of \$1.484 the previous winter. Tightening of heating oil supplies in

world markets raised concerns as the price reached \$1.46 this past August. That upturn could be a harbinger of higher prices in the winter to come.⁹

More than half of the homes in New Hampshire use heating oil as the primary fuel. As the average home consumes about 800 gallons a year, an increase that would put prices in the \$2.00 per gallon level would add nearly \$500 to the cost of last year's heating bill. A colder than normal winter could mean higher prices, too.¹⁰

Heating oil is closely tied to the price of crude oil and is subject to the factors that affect its price. Heating oil is traded in a separate market on the New York Mercantile Exchange. Local supply and demand factors, along with the unpredictable weather are also major factors.

Many home heating oil dealers offer programs where customers can lock in a price early in the heating season to protect from potential increases during the winter, but take the risk that the price will drop. In recent years, locking in has been a very good bet.

Michael Argiropolis

¹ State Electricity Prices, 2002. US Department of Energy, Energy Information Administration. Accessed November 8, 2004. <www.eia.doe.gov/neic/rankings/stateelectricityprice2002.htm>

² Home—Electric. New Hampshire Public Utilities Commission. Accessed November 8, 2004. <www.puc.state.nh.us/Electric/electric.htm>

³ "Troubled Power Plant Changing Hands." Foster's Sunday Citizen September 5, 2004.

⁴ Clean Vehicles. Union of Concerned Scientists. Accessed November 30, 2004. <www.ucsusa.org/clean_vehicles/>

⁵ New Hampshire Natural Gas Residential Price. US Department of Energy, Energy Information Administration. Accessed November 29, 2004. <tonto.eia.doe.gov/dnav/ng/hist/n3010nh3m.htm>

⁶ Howe, Peter. "Gas Plant Could Ease N.E. Demand." Boston Globe August 10, 2004.

⁷ Daily Fuel Gauge Report. American Automobile Association. Accessed December 2, 2004. <www.ouraaa.com/news/news/fuel.html>

⁸ Gasoline and Diesel Fuel Update. US Department of Energy, Energy Information Administration. Accessed November 8, 2004. <tonto.eia.doe.gov/oog/info/gdu/gasdiesel.asp>

⁹ EIA's Petroleum Product Prices for New Hampshire. US Department of Energy, Energy Information Administration. Accessed November 8, 2004. <www.eia.doe.gov/emeu/states/oilprices/oilprices_nh.html>

¹⁰ Moskowitz, Eric. "Money to Burn as Oil Costs Climb." Concord Monitor October 4, 2004.

Energy Expenditures and Prices

| | 2000 | 2001 | 2002 | 2003 | Source |
|------------------------------------|---------|------|------|------|--------|
| Energy Expenditures Per Capita | \$2,611 | n/a | n/a | n/a | EIA |
| United States rank | 20 | n/a | n/a | n/a | EIA |
| Energy Prices (\$ per million Btu) | \$13.32 | n/a | n/a | n/a | EIA |
| United States rank | 4 | n/a | n/a | n/a | EIA |
| Petroleum prices (per million Btu) | \$10.67 | n/a | n/a | n/a | EIA |
| United States rank | 15 | n/a | n/a | n/a | EIA |
| Electric prices (per million Btu) | \$32.98 | n/a | n/a | n/a | EIA |
| United States rank | 3 | n/a | n/a | n/a | EIA |

Energy Purchased and Generated

| | 2000 | 2001 | 2002 | 2003 | Source |
|---|---------|---------|---------|---------|----------|
| Electric Energy Purchased | | | | | |
| Sales to Ultimate Customers (million KWH) | | | | | |
| New Hampshire: | | | | | |
| Total | 10,159 | 10,316 | 10,490 | 10,822 | EIA |
| Percent change | 2.7% | 1.6% | 1.7% | 3.2% | NHES |
| Residential | 3,656 | 3,789 | 4,045 | 4,253 | EIA |
| Percent change | 0.4% | 3.6% | 6.7% | 5.1% | NHES |
| Commercial | 3,774 | 3,912 | 4,014 | 4,174 | EIA |
| Percent change | 4.7% | 3.6% | 2.6% | 4.0% | NHES |
| Industrial | 2,597 | 2,483 | 2,288 | 2,253 | EIA |
| Percent change | 3.2% | -4.4% | -7.8% | -1.5% | NHES |
| New England: | | | | | |
| Total | 116,987 | 118,809 | 116,614 | 122,946 | EIA |
| Percent change | 2.9% | 1.6% | -1.8% | 5.4% | NHES |
| Residential | 41,302 | 43,161 | 44,411 | 46,455 | EIA |
| Percent change | 0.7% | 4.5% | 2.9% | 4.6% | NHES |
| Commercial | 47,527 | 51,496 | 49,285 | 51,639 | EIA |
| Percent change | 4.5% | 8.4% | -4.3% | 4.8% | NHES |
| Industrial | 26,531 | 22,622 | 20,769 | 23,275 | EIA |
| Percent change | 3.0% | -14.7% | -8.2% | 12.1% | NHES |
| Net Energy Generated, New Hampshire (million KWH) | 12,702 | 13,095 | 12,276 | 6,232 | EIA |
| As percentage of energy purchased | 125.0% | 126.9% | 117.0% | 57.6% | NHES |
| As percentage of total generated by type ^a | | | | | |
| Hydroelectric | 2.6% | 1.7% | 2.1% | 5.3% | EIA/NHES |
| Fossil fuel | 35.1% | 31.9% | 36.0% | 94.7% | EIA/NHES |
| Nuclear | 62.4% | 66.4% | 61.9% | - | EIA/NHES |

^a Rounding may cause percentages to not equal 100 percent

Energy and Fuel Consumption

| | 2000 | 2001 | 2002 | 2003 | Source |
|--|---------|--------|--------|-------|----------|
| Energy Consumption | | | | | |
| Total consumption (trillion Btu) | 329.1 | n/a | n/a | n/a | EIA |
| Annual percent change | 0.3% | n/a | n/a | n/a | EIA/NHES |
| United States rank | 45 | n/a | n/a | n/a | EIA/NHES |
| Types of energy consumption (percent of total) | | | | | |
| Residential | 24.0% | n/a | n/a | n/a | EIA/NHES |
| Commercial | 17.8% | n/a | n/a | n/a | EIA/NHES |
| Industrial | 27.2% | n/a | n/a | n/a | EIA/NHES |
| Transportation | 31.1% | n/a | n/a | n/a | EIA/NHES |
| Energy consumption per capita (million Btu) | | | | | |
| United States rank (including D.C.) | 44 | n/a | n/a | n/a | EIA |
| Net Interstate flow of electricity and assoc. losses | -16,856 | n/a | n/a | n/a | EIA |
| Fuel Consumed to Generate Electricity In equivalent barrels of oil | | | | | |
| New Hampshire total (thousand barrels) | 19,804 | 20,600 | 19,190 | 8,748 | NHES |
| Oil | 783 | 831 | 1,152 | 3,489 | EIA |
| Coal | 5,543 | 5,030 | 5,005 | 5,259 | EIA/NHES |
| Gas | 129 | 87 | 181 | 0 | EIA/NHES |
| Nuclear | 13,349 | 14,651 | 12,852 | 0 | EIA/NHES |