

# Frequently Asked Questions and Answers on Heating Fuels

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## **Heating Fuels and Prices**

## **What is happening with heating fuel prices?**

All fuels used for home or office heating have been increasing over the past few years.

- Heating oil prices have risen by nearly 53% since 2000.
- Natural gas prices have risen by nearly 110% since 2000.
- Propane has been going up at around 15% per year.
- Electricity prices in deregulated areas are creeping up due to the pressures of high natural gas prices on electricity generation.

## **Should consumers consider switching fuels to save money in their heating bills?**

Our research indicates that since both oil and gas prices are rising, there is really no cost advantage from switching from one fuel to the other. At the Consumer Energy Council, we typically recommend NOT switching from one heating fuel to another based on the current price of the fuels because prices are volatile, and will most likely continue to be so in the near future.

## **What is causing the increase in fuel prices?**

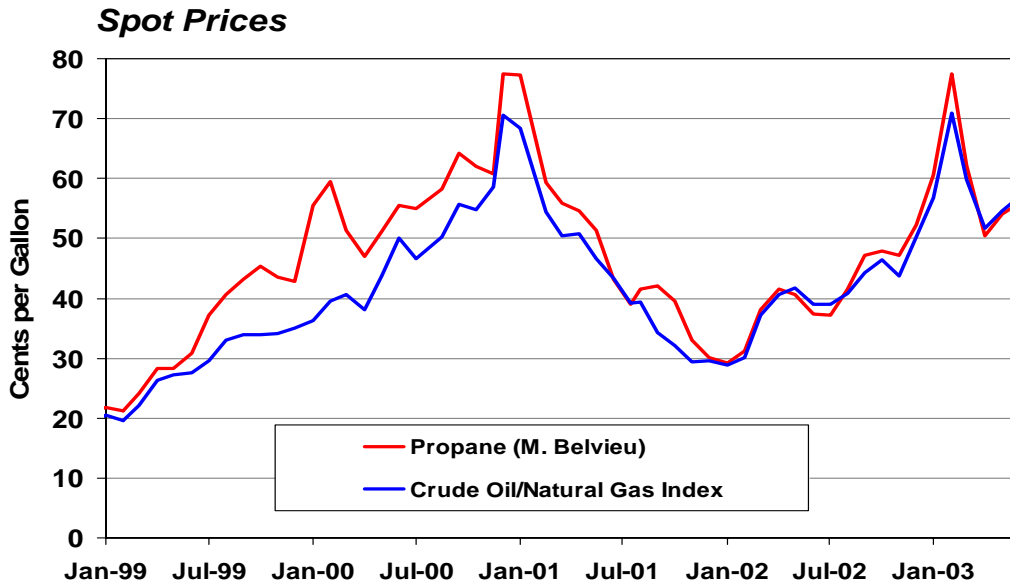
There are a variety of factors currently affecting fuel prices:

- The price of heating oil is heavily influenced by (1) the market price of crude oil; (2) the capacity of refineries to produce heating oil in a timely manner; (3) the demand for gasoline – since gasoline and heating oil come out of the same barrel of crude oil, if the refinery needs more gasoline, then it will end up with less heating oil, and vice-versa; (4) the amount of stored fuel going into the heating season; and (5) the severity of the winter.
- The price of natural gas is mainly influenced by (1) increasing demand from the electricity industry; (2) the amount of stored gas leading into the heating season; and (3) bottlenecks in the distribution system (affects prices regionally).
- Propane is influenced by both oil and gas prices and availability. Propane is a product deriving from the combination of petroleum and natural gas within the refining process.

## **Are the fuel prices related in some way?**

Historically heating oil and natural gas prices have track each other over time. The price of one fuel might spike at one point in time and the price of the other might spike at another moment, but over the life of a typical heating system the prices will be comparable.

Since propane is derived from natural gas and crude oil, the price of propane is directly related to those of oil and gas. The chart below shows that the price of propane very closely mirrors the oil and gas price index.



### How did Hurricane Katrina affect oil prices?

In terms of heating oil, there was a spike in prices that mirrored what was happening with the gasoline prices. However, distillate prices did not go up nearly as much (at gas stations on-road diesel prices nudged upwards compared to the dramatic increases in unleaded gas prices), and are already back to pre-Katrina price levels. In fact, in some instances, the price per gallon for #2 heating oil is actually slightly less than before Katrina struck.<sup>1</sup> Even though the prices have dropped back, the increase for the winter is still predicted to be substantially higher than last winter. Before Katrina, the EIA was predicting a 16% increase in heating oil prices. Now they are predicting an increase of between 29-33%.

There are a couple of reasons for this: (1) it is off-season so demand is low. Typically residential consumers who are buying in August/September are ones who want to lock in prices for the upcoming season. With no demand to lock in high prices, the rates dropped quickly back to market levels. (2) Inventories of distillate are high, and there is enough time before the heart of heating season either to get some of the production and refinery facilities back online, or to order supplies from overseas (i.e., Venezuela).

### How did Hurricane Katrina affect natural gas prices?

Natural gas will have more long-term effects that may continue through the heating season. Gas suppliers no longer have the luxury of building up inventories during the summer months because there is so much new demand from electricity generators. Supplies are already tight, and a reduction in production from the Gulf will have far worse consequences if there is a severe winter

<sup>1</sup> From the Massachusetts Energy Consumers' Alliance.

because supplies cannot be barged in from Venezuela in an emergency. Even before Katrina hit, the EIA was anticipating tight supplies, and predicted that “the natural gas market is likely to stay tight over the next couple of months, with prices projected to rise further as the winter heating season increases demand.”<sup>2</sup> In the latest EIA Weekly Update, the EIA is reluctant to predict the effect on prices because it is still unclear how difficult the post-hurricane recovery will be. However, it does show scenarios whereby depending upon the quickness of the recovery efforts, wholesale natural gas prices will rise by 25-30% by December.<sup>3</sup>

### **Do you have any predictions about fuel prices in the future?**

At CECA, we do not make predictions about the future prices of heating fuels because there are so many factors that can influence the prices from one year to the next. However, there are some trends that we expect to continue:

1. Natural gas prices have risen lately in part because electric power generators have been investing heavily in gas-powered facilities in order to comply with environmental regulations. This increased demand will continue to strain the supply lines, keeping the price higher than it has been over the past decade. We do not see an immediate end to this situation.
2. Oil prices are high now because global demand has risen significantly over the past couple of years, mainly due to China and India buying more of their energy needs on the international market. It has become more difficult for producers to meet demand with easily accessible oil, so producers are turning to fields that are less convenient and more expensive from which to produce.
3. Propane, as a by-product of gas and oil, will continue to track the combined prices of oil and gas.

These factors do not favor one fuel over another, but do suggest that heating fuel supplies are going to continue to be strained for the immediate future.

### **What do others say about fuel prices?**

Most energy analysts have similar reservations about predicting energy prices, but mostly do agree that oil and gas prices will continue to be affected by tight supplies for the immediate future. The tight supplies will result in pricing peaks and valleys that are more volatile than we are accustomed to in the past. The data (below) collected by the Charles River Associates shows that in the last few years, the prices of oil and gas have become more volatile, making it impossible to assess if one fuel holds an edge over the other.<sup>4</sup>

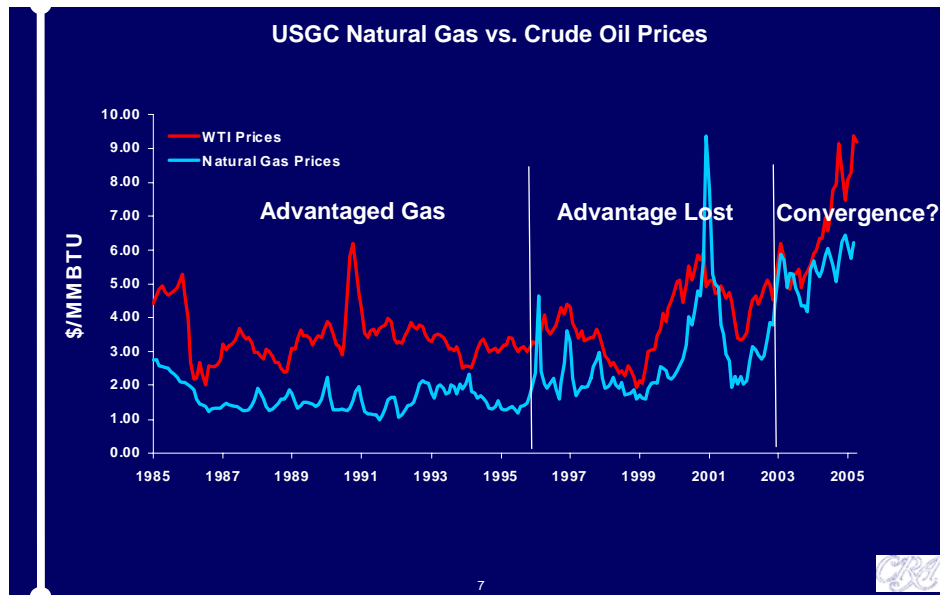
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<sup>2</sup> Energy Information Administration, “Short-Term Energy Outlook,” August 9, 2005.

<sup>3</sup> Energy Information Administration, “Short-Term Energy Outlook,” September 7, 2005.

<sup>4</sup> CRA presentation to GEMI, April 8, 2005.

## We have witnessed three distinct periods of feedstock advantage



## Fuel Comparisons

### How do you compare one fuel to another?

Heating fuels are not easy to compare because each has a different unit of measurement, have different energy contents, and often have different billing fees and costs. In order to compare two different fuels, each of these factors must be considered. More specifically:

Unit of measurement – with gases and liquids, it is impossible to compare the fuels in similar units. In fact, even within the natural gas industry, gas is sold to consumers in three different measurements (therms, ccf, and mcf). To compare two different fuels, therefore, one of the fuels must be converted into an “equivalent.”

Energy content – The way to put all of the fuels into a similar comparison category is to evaluate their energy content. The British Thermal Unit (BTU) is a measure of heat energy (the amount of heat it takes to raise one pound of water one degree Fahrenheit). The BTU content can be determined for each of the fuels.

Cost structure – both oil and propane are generally sold at a price that includes delivery fees, overhead, and other fixed costs. Natural gas (and electricity) is slightly different, especially in states where retail deregulation have taken place. There are multiple charges on the consumer’s bills. Some of the charges that can occur on a typical gas bill:

- **Commodity charge** – this is the actual price of the gas itself. The charge is per unit (e.g., therm, ccf).

- **Distribution charge** – this is the charge for getting the gas to the customer through the distribution network of pipes. The charge is also assessed per unit consumed.
- **Fuel charge** – this represents a seasonal adjustment for periods of high demand or colder/warmer than anticipated weather. The charge is also assessed per unit consumed.
- **Adjustment charge/debit** – in some markets the state PUC will allow a slight adjustment charge to reflect the higher or lower than expected price of gas.
- **Customer Charge** – usually a fixed monthly charge that covers items like meter reading and general administrative costs.

### How do I deal with all the different charges while comparing fuels?

The main issue in comparing fuels prices is to add up ALL of the costs that are associated with one unit of the fuel.<sup>5</sup> For gas this means adding all of the charges – the commodity charge, distribution charge, fuel charge, and adjustment charge. Secondly, if there are monthly or other flat charges, they should be divided by the anticipated number of units that would be consumed in one month, and that number should be included in the per unit charge.

For example:

Gas commodity charge	\$0.95	per therm
Gas distribution charge	\$0.20	per therm
Gas fuel charge	\$0.05	per therm
Monthly charge	\$0.04	based on \$5.00 monthly fee divided by 125 therms used
<b>Total</b>	<b>\$1.24</b>	

After the total per unit charge is determined, then find the equivalent measurement in the following conversion table.

Conversion Table	
1 therm	100,000 Btu
1 therm	0.72 gallons of #2 heating oil
1 therm	0.97 * 100 cubic feet of natural gas (97c.f.)
1 therm	1.05 gallons of LPG
100 cubic feet of natural gas	103,046 Btu
100 cubic feet of natural gas	1.03 therms
100 cubic feet of natural gas	0.74 gallons of #2 heating oil
100 cubic feet of natural gas	1.08 gallons of LPG
1 gallon of #2 heating oil	139,874 Btu

<sup>5</sup> It is not necessary to include sales tax since the tax rate within the state is the same regardless of the fuel. While a more expensive fuel will add more sales taxes to the overall bill, it will not change the ratio of difference between the fuels.

1 gallon of #2 heating oil	1.39 therms
1 gallon of #2 heating oil	1.35 * 100 cubic feet of natural gas (135 c.f)
1 gallon of #2 heating oil	1.45 gallons of LPG
1 gallon of LPG	95,500 Btu
1 gallon of LPG	0.96 therms
1 gallon of LPG	0.93 * 100 cubic feet of natural gas (93 c.f.)
1 gallon of LPG	0.69 gallons of #2 heating oil

### **How do I make use of the conversion table?**

The conversion table shows how to take one fuel and convert it into the equivalent of another fuel. For example, according to the conversion table, one gallon of oil has the same energy content (measured in BTUs) as 1.39 therms, (i.e., it takes 1.39 therms of natural gas to provide the same energy that is contained in one gallon of heating oil).

Therefore, if you want to compare prices between oil and gas, then you can determine how much gas would cost if it were sold by the gallon (as oil is).

In the example above, we determined that one therm of natural gas has a total delivered cost of \$1.24. Since it takes 1.39 therms of natural gas to equal the energy content of one gallon of oil, we can multiply:

$$\mathbf{\$1.24 * 1.39 = \$1.72 \text{ per gallon equivalent}}$$

After determining how each fuel compares price-wise, the next step is to compare equipment.

## **Heating Equipment**

### **How long do oil and gas furnaces (or boilers) generally last?**

Most boilers and furnaces will last at least 20 years, and it is not unusual for them to last twice that long. With regular maintenance and care, gas and heating oil equipment can continue operating for years.

### **How about if a consumer needs to replace equipment anyway? Then does it make sense to switch fuels?**

If the heating equipment is old and needs to be replaced, then the consumer has the advantage of evaluating the different fuels based on preference. However, CECA still recommends NOT basing the decision on fuel price since prices fluctuate so much. If historical trends continue, oil and gas prices will average out to a level that achieves relative price parity.

## **What should a consumer look for when replacing heating equipment?**

One of the most important elements of a new furnace or boiler is its efficiency rating, which is usually measured in terms of its AFUE rating. The AFUE rating measures the amount of heat actually delivered to your house compared to the amount of fuel that you must supply to the furnace. Thus, a furnace that has an 80% AFUE rating converts 80% of the fuel that you supply to heat – the other 20% is lost out of the chimney. Note that the AFUE refers only to the unit's fuel efficiency, not its electricity usage.

## **Why is the AFUE rating important?**

Since the AFUE rating tells how much heat is being used, it is also telling how much heat is being wasted. The more heat that is wasted means that the homeowner needs to burn more oil or gas to keep the house warm.

The US Department of Energy (DOE) determined that all furnaces sold in the US must have a minimum AFUE of 78%, beginning January 1, 1992. Mobile home furnaces are required to have a minimum AFUE of 75%. (Information from <http://www.furnacecompare.com>).

## **Will the rating predict how much energy will be used in a particular home?**

No – the rating tells how much of the heat stays inside your building instead of going up the chimney, but cannot predict usage since that is determined by the house and personal preferences. For example, a person in a well-insulated house will use less energy than a person with the same furnace in a poorly insulated house.

## **Are there other factors to consider?**

Yes – it is important to make sure that the heating system fits the heating needs of the building. It may seem like a bigger system is better, but in fact a system that is too large may actually end up costing much more money than one that is properly sized.

## **What is Energy Star?**

Energy Star is a program supported by the Environmental Protection Agency (EPA) and the U.S. Department of Energy (DOE) with the mission of assisting residential and business consumers save money and protect the environment by using energy efficiency appliances. The Energy Star program provides an energy rating system that rates appliances based on their energy performance.

## **Is an Energy Star rating important for heating equipment?**

Boilers and furnaces that achieve the Energy Star certification from the EPA use 10% less energy than standard equipment and must have an AFUE rating of at least 85%. According to Energy Star, these appliances achieve greater efficiency through features such as:

- Electric ignition, which eliminates the need to have the pilot light burning all the time;
- New combustion technologies that extract more heat from the same amount of fuel;



- Sealed combustion that uses outside air to fuel the burner, reducing draft and improving safety.<sup>6</sup>

### **Where do I go to find unbiased information on new boilers and furnaces?**

The American Council for an Energy Efficient Economy (ACEEE) has done extensive research and testing on furnaces and boilers at <http://www.aceee.org/consumerguide/topfurn.htm>. Scroll down to the bottom of the page for information on boilers and electric heat pumps. For a paid subscription, a site named FurnaceCompare.com ([www.furnacecompare.com](http://www.furnacecompare.com)) has extensive information on a broad range of equipment and equipment manufacturers.

## **Cost Savings**

### **I have a relatively new system – what can I do?**

In 95% of the cases (that is, when a heating system is less than 20 years old and is functioning well), switching fuels does not make smart economic sense. However, there may be some things that can be done to the system to make it more efficient. If the system is a forced hot air system, checking the ductwork and sealing the leaks in the system can improve overall system performance. To find out more about sealing the system, see [http://www.energystar.gov/ia/home\\_improvement/home\\_sealing/DIY\\_COLOR\\_100\\_dpi.pdf](http://www.energystar.gov/ia/home_improvement/home_sealing/DIY_COLOR_100_dpi.pdf). In addition, older heating oil burners may be upgraded easily by replacing the traditional burner with a flame retention burner.

### **What is a flame retention burner?**

The main difference between a conventional and a flame retention burner is the way air and fuel is combined. The flame retention burner has a specially designed end cone and a high-pressure fan that causes better fuel-air mixing. Most homeowners with older oil burners can reduce their fuel cost substantially, with savings averaging 15% and some saving over 20%. The combination of low burner cost and high fuel savings make new retention head burners one of the best conservation investments available to homeowners.<sup>7</sup>

### **What else can I do to reduce my heating bills?**

No matter where you live in the U.S., you should be able to find a “home performance contractor” nearby. These professionals come to your home and test the heating system, check for leaks in your ductwork, and point out areas in the house that could benefit from weatherization measures. You should be able to find a contractor who can perform an energy audit on your house for \$100 to \$150. This may sound like a lot of money, but a typical homeowner can save much more than that by having a professional point out the little things to do that can add up to big savings.

In the meantime, pay attention to the house itself – there are signs you can pick up on that will give you a good indication of how the house stacks up in terms of energy efficiency. If you live

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<sup>6</sup> From [www.energystar.gov](http://www.energystar.gov).

<sup>7</sup> NORA, “Gold Book,” 2004.

in a cold climate, does the snow stay on your roof after a snowstorm, or does it melt quickly? If it melts quickly, that means that heat is escaping from your house through the roof. Are there any parts of the roof that melt before other parts of the roof? That can help you pinpoint some problem areas inside the house where warm air is leaking (usually around vent pipes). Are your bathrooms a little chilly? That is often the case when pipes (like water pipes, drain pipes, and venting pipes) create leaky passageways that cause drafts.

### **Some simple, low cost solutions to reduce heating bills**

- If you have forced hot air heating, close the vents in any rooms that are not used. This concentrates the heat where you want it.
- Make sure the damper for the fireplace is closed tightly. Even better, consider having a top mount fireplace damper installed. This provides tighter seals and prevents heat from escaping.
- Install a programmable thermostat – one that can automatically set the temperature higher when you are awake and lower when you are sleeping or at work.
- Install caulking around windows and doors, and use weather-stripping to ensure that there are no gaps that are letting warm air out.
- Tune up your heating equipment every year or two to keep it running cleanly and efficiently.
- Draw curtains or drapes over the windows after sunset to block cold air drafts from coming into the house.
- Use ceiling fans to gently push the warm air back down from the ceiling and help it circulate.
- Set your thermostat back a degree or two. For every degree lower you set your thermostat, you will save 3% on heating costs.
- Replace filters in the forced air systems. The more clogged the filters, the harder the system has to work just to give you the same amount of heat – and the more you pay just to have the same amount of heat.
- Add more insulation to the attic. Even though your windows and doors may also be drafty, the majority of your heat escapes through the ceiling. If your attic is accessible, rolling out another layer of insulation is an easy weekend project.

### **Other considerations**

During the winter when the cost for fuel is high, that means that you are also paying a higher price for heating the water in your house. Heating the water in your house represents up to 20% of your energy costs, so finding ways to reduce your hot water needs in the winter will also help keep your overall energy costs down. Some things to consider are:

- Turn down the thermostat on your hot water heater to 120 degrees. This is still hot enough for baths, showers, cooking, and washing, but reduces your energy consumption and consequently reduces the dollars you spend.
- Consider installing a water-saving showerhead. Most people cannot tell the difference between a regular showerhead and a water-saving one. However, the result is less water used, meaning that there is less water that needs to be reheated, which means you are using less energy and that means saving dollars.

- Use cold water for washing clothes. After all, the detergent is doing the work, not the temperature of the water. The colors in the clothes may even last longer.
- Repair leaky faucets, especially if they are dripping hot water. It may not seem like a lot, but a steady drip can waste gallons of water during the course of a day. That means that the hot water heater is working harder than normal to keep the water hot – and you are paying for wasted energy.
- Install a heater wrap around the hot water tank. A wrap with an R-11 insulating rating is sufficient.

### **If you have a forced hot air system**

Even in new houses, the network of ducts that push the air around often leaks air from gaps, cracks, and other problems. Some estimate that a typical duct system loses 25% to 40% of the heating energy it starts with — meaning that the typical homeowner with forced hot air is spending 25% to 40% more in heating costs than necessary.<sup>8</sup>

Ironically, duct tape—used for everything from holding up car bumpers to making kitsch clothing—is actually NOT a good choice for sealing ducts. The adhesive backing on the duct tape dries out. There are other tapes, made specially for sealing ducts, available at hardware stores that work well. While at the hardware store, also look for duct insulation if you have ductwork that runs through unheated areas like crawl spaces or attics.

Unfortunately unless there is a visible gap in the basement, crawlspace, attic, or other open area, it is difficult to know whether or not warm air is leaking out of the system and not getting to where it is needed. In this case, a home energy audit from a professional contractor is essential. The contractor can test the system with special gauges and seal leaky ducts within walls and ceilings. Here are some simple tests: if rooms within the house always seems to be at different temperatures, if the air feels clammy or stuffy, or if the whole house seems to fluctuate between being too hot or too cold, then it could indicate that you have leaky ductwork.

### **If you have an oil heating system**

If your oil system is over ten years old, chances are you can save at least 15% to 20% on fuel consumption – and therefore on your heating bills – by upgrading to a flame retention burner for your heating oil system.<sup>9</sup> Replacing the burner is significantly cheaper than replacing the entire system, yet at current prices for oil, the payback could be as quick as a couple of years. The older the system, the greater the savings when upgrading to a flame retention burner.

## **Fuel Costs**

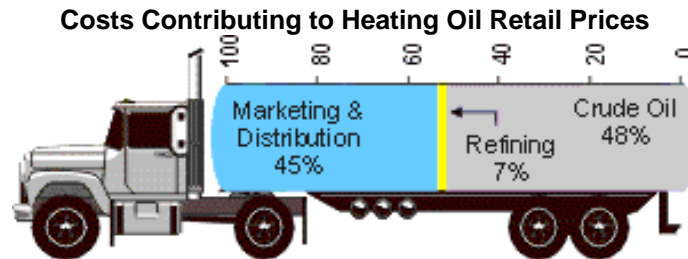
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<sup>8</sup> From *Home Energy Magazine* (accessed online at [www.homeenergy.com](http://www.homeenergy.com)).

<sup>9</sup> National Oilheat Research Alliance, *Gold Book for Oilheat Dealers*, 2004.

## What contributes to the costs of heating fuels?

The Energy Information Administration of the Department of Energy show the following breakdowns of the costs that are associated in end energy prices. As can be seen, for both heating oil and gas, the fuel itself only accounts for roughly half the final cost.



Source: Energy Information Administration.

