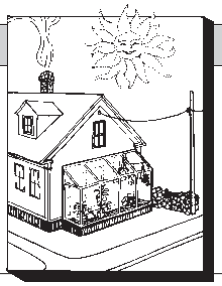
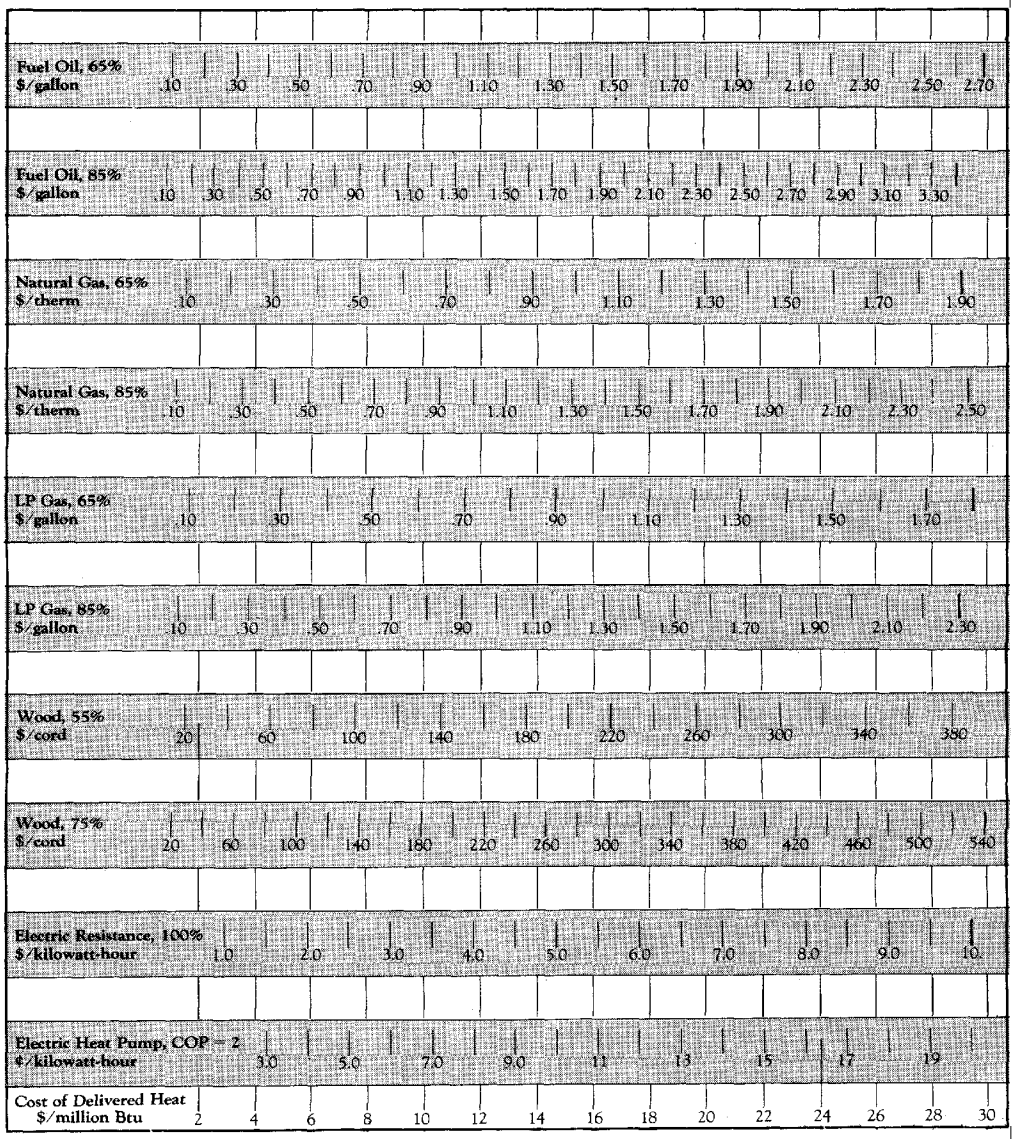
Comparing Energy Costs



by Alex Wilson



Which is cheaper: oil or natural gas? What's the least expensive type of heat? Is wood heat now more expensive than oil? Does it make sense to switch from electric to LP-gas water heating? And how can you compare oil and natural-gas heat if the efficiencies aren't the same?

There are lots of questions, and the answers are often misleading. This chart should help you answer those questions and make more intelligent decisions about space-and-water heating, whether you are choosing equipment for a new house, buying a more efficient system, or deciding whether to switch fuels.

Don't be scared off by the numbers: the chart is quite easy to use. It compares the cost of heat delivered by different fuels at different efficiencies. To use it, find the bar that applies to your present heating system. Then go along that bar to the current price for that type of fuel: $/gallon, $/therm, $/cord, etc. A vertical line from that point compares the cost of other fuels that provide the same heating value (the same quantity of heat delivered per dollar spent).

For example, if you pay 80 cents per gallon for oil, have a standard furnace (efficiency about 65 percent), and are thinking about replacing it with a high-efficiency wood furnace (75 percent efficiency), you will save money or fuel as long as you spend less than $160 per cord. If you replace the furnace with a low-efficiency wood furnace, you will make out all right as long as the wood costs less than about $120/cord.

If you are replacing a high-efficiency oil furnace with a wood system, the economics aren't as favorable. Oil at 80¢/gallon burned at 85 percent efficiency is equivalent in dollars per delivered Btu to wood costing $90/cord burned in a low-efficiency stove or furnace. You can see the importance of efficiency in these comparisons.

Consider water heating. If you heat water with electricity costing 10¢/kilowatt-hour and are thinking about switching to natural gas, you will save money as long as the price of the gas does not go above $1.90/therm. (That's assuming the price of electricity stays the same.) With water heating, assume the lower efficiency of the two given. It's a pretty safe bet that you will do better with natural gas. If you switch to LP gas, you will make out better as long as it costs less than about $1.80/gallon.

The chart also shows that switching from a standard to a high-efficiency furnace or boiler protects against rising energy costs. If you switch from a 65 percent efficient oil boiler to one that's 85 percent efficient, the price of oil could rise 30 percent and you would still be paying the same for your heat.

The more efficient the heating system, the more costly the fuel you can burn and still be competitive. With a less-efficient heating system, you reach the point sooner at which it makes sense to switch to a cheaper fuel. The chart includes only two efficiencies for each fuel. Heating systems with higher efficiencies are available—efficiencies in the mid-90s are not uncommon—so take that into account when comparing fuels and systems.

No assumptions about what will happen to fuel costs are built into the chart. If you currently heat with oil and you find that natural gas would be a little cheaper, don't run out and switch over (at a cost of several thousand dollars) unless you have good reason to believe that gas will continue to be cheaper. (And if you can predict what will happen to energy prices, there are a lot of big companies that will be glad to pay you handsomely for your knowledge!)

In some cases, you can make reasonable guesses about future energy prices. In many areas of New England, for example, you can be pretty sure that electricity prices will continue to rise as nuclear plants come on line. Some people in New England are already paying over 15¢/kwh during peak periods—and that's off the chart. But if you cut your own firewood, you know that the cost is just your labor and the upkeep on a chainsaw and other equipment. With other fuel sources, don't be too hasty in switching from one to another.

These cost comparisons are safer and more valid for a new house although, again, you have no way of knowing what the relative costs will be five or ten years down the road. ■

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Assumptions

Fuel Oil:
- Heat content: 138,000 Btu/gallon
- 65 percent efficiency: $/MMBtu = $/gallon × 11.15
- 85 percent efficiency: $/MMBtu = $/gallon × 8.53

Natural Gas:
- Heat content: 100,000 Btu/therm (1 therm = 100 cubic feet)
- 65 percent efficiency: $/MMBtu = $/gallon × 15.38
- 85 percent efficiency: $/MMBtu = $/gallon × 11.76

LP Gas:
- Heat content: 93,000 Btu/gallon
- 65 percent efficiency: $/MMBtu = $/gallon × 16.54
- 85 percent efficiency: $/MMBtu = $/gallon × 12.65

Wood (mixed hardwood):
- Heat content: 24,000,000 Btu/cord
- 55 percent efficiency: $/MMBtu = $/cord ÷ 13.2
- 75 percent efficiency: $/MMBtu = $/cord ÷ 18

Electricity:
- Heat content: 3,412 Btu/kilowatt-hour
- Resistance heat (100 percent efficiency): $/MMBtu = $/kwh × 293
- Electric heat pump (COP = 2): $/MMBtu = $/kwh × 147