

Answers to questions 3 and 4 of *Heating Your Home with a New Heating System*:

3. Most of the 40 percent of energy that is not used to heat the house is lost when exhaust gases are vented up the chimney. The rest is either lost warming the furnace itself or is used to restart the furnace after it has cycled off.
4. Efficiency is the percentage of energy in the fuel that is converted into useful heat. Another definition of efficiency is the useful heat delivered to the house from the heating system divided by the energy of the fuel being burned by the heating system.

Amount of heat needed by house each year = 80.0 million Btu

Heating System	Efficiency (%)	Amount of Heat Needed by Heating System Each Year (million Btu)	Fuel	Fuel Cost per Unit (\$)	Energy Content of Fuel (Btu per Unit)	Fuel Cost per million Btu (2000 costs)	Amount of Fuel Used by Heating System Each Year per Unit	Total Fuel Cost per Year (\$)	Energy Saved by New Heating System (million Btu)	Fuel Costs Saved or Extra Each Year Using New Heating System (\$)
Old Fuel Oil Furnace	60%	133.3	Fuel Oil	\$0.85 per gallon	138,690 Btu per gallon	\$10.00	961 gallons	\$1,333.00	N/A	N/A
High Efficiency Gas Furnace	95%	84.2	Natural Gas	\$0.58 per therm	100,000 Btu per therm	\$10.00	842 therms	\$842.00	49.1	\$491.00 Saved
High Efficiency Oil Furnace	85%	94.1	Fuel Oil	\$0.85 per gallon	138,690 Btu per gallon	\$10.00	679 gallons	\$941.00	39.2	\$392.00 Saved
Electric Baseboard Heaters	100%	80.0	Electricity	\$0.07 per kilowatt-hour	3413 Btu per kilowatt-hour	\$25.00	23,440 kilowatt-hours	\$2,000.00	53.3	\$667.00 Extra Spent
High Efficiency Propane Furnace	95%	84.2	Propane (LPG)	\$0.75 per gallon	95,475 Btu per gallon	\$15.00	882 gallons	\$1,263.00	49.1	\$70.00 Saved
High Efficiency Woodstove	70%	114.3	Wood: Average Hardwood	\$100.00 per cord	21,000,000 Btu per cord	\$6.00	5.4 cords	\$685.80	19.0	\$647.2 Saved

Source: Wisconsin Energy Bureau. *Wisconsin Energy Statistics 1996*. Madison, Wisc.: Wisconsin Energy Bureau, 1996.

Wood cost of \$100 per cord is an informal estimate based on wood prices in Central Wisconsin

Note: Students' answers may differ slightly due to rounding.