



Jim Dulley

Thank you for your interest in writing to me about using a central wood-burning furnace to heat your house. Using firewood is probably the least expensive source of heat. See the worksheet on page four to estimate the savings from heating with wood. Using coal, wood pellets (from sawdust) or waste feed corn are also environmentally-sound fuels some of these furnaces can use. See page four for descriptions of corn and pellet furnaces.

I have listed only the highest quality central furnaces/boilers made. The most convenient furnaces are indoor models with a multifuel design. When the fire burns down, the backup gas or oil burners automatically start. You can also purchase most of these in wood-burning-only models. Unless you looked at the furnace, you would never know it switched from wood to gas or oil. If you are now heating your water with

electricity, select a wood furnace with a hot water coil option for even more savings.

Consider getting an outdoor model if you plan to use wood exclusively for heat. These obviously reduce any fire hazards and you never have to haul wood indoors. Most outdoor wood furnaces heat water like a boiler because it is easier to super-insulate water pipes than hot air ducts. Just install a heat exchanger coil in your existing furnace blower and it will heat your home just like your existing furnace does. This way, you still have your old furnace for backup heat.

If you plan to install an indoor wood furnace, Charmaster makes a model with a fireplace built into one side (page four.) When not viewing the fireplace, you close safety doors.

Several typi-

cal suggested prices are:

Alpha American - Eagle 1 (w/oil) - \$3,463
Charmaster II (built-in fireplace) - \$4,411
Daka - model 521 - \$800
Harman - PF 100 Pellet Pro - \$2,917
Heatmor - 100CSS - \$4,190
Ja-Ran - Superior model - \$2,995
Pinnacle - GBU-130 - \$3,450
Sure-Flame - S-F 6000 - \$3,495

Fuel Cost Comparison				
Type	Fuel Cost	Efficiency	Price per Useful Therm	Est. Annual Cost
Electric	.07/kWh	95%	2.15	\$1,505.00
Propane	.95/gal.	70%	1.49	\$1,043.00
Oil Furnace	1.05/gal.	70%	1.08	\$756.00
Heat Pump	.07/kWh	190%	1.07	\$749.00
Natural Gas	.76 therm	80%	0.95	\$665.00
Pellet	135.00/ton	80%	0.94	\$658.00
Corn	2.20/bushel	80%	0.55	\$385.00

Estimated annual cost based on an 1800 sq. ft. home with annual heat demand of 700 therms. Useful therm pro-rates efficiency. 1 therm equals 100,000 Btu's. Fuel equivalents — Electric: 3415 Btu's/kWh • Propane: 90,600 Btu's/gal. • Oil: 138,000 Btu's gal. • Natural Gas: 1 million Btu's/MCF • Heat Pump 190% eff. average COP 1.9 @ 47°F • Pellets: 9,000 Btu's/lb @ 8% MC • Corn: 9,000 Btu's/lb @ 12% MC.

Selected Manufacturers of Wood, Coal or Multi-Fuel Boilers/Furnaces

- CENTRAL BOILER**, 20502 160th Street, Greenbush, MN 56726 - (800) 248-4681 (218) 782-2575 www.centralboiler.com
model - Classic 4436 (outdoor unit) fuel - wood Btuh output - 250,000
firebox capacity - 18.3 cu. ft. log length - 38" water capacity - 185 gal.
features - The boiler is available in a variety of colors and it is designed to look like a storage building. There is urethane foam surrounding the water jacket. The cast iron door has a lifetime warranty that it won't warp. There is a night light on the unit. A domestic water-to-water heat exchanger can be added to heat all your hot water. There are larger models available.
- HARDY MFG. CO.**, 12345 Road 505, Philadelphia, MS 39350 - (800) 542-7395 (601) 656-6948 www.hardyheater.com
model - H2 (outdoor unit) fuel - wood Btuh output - 120,000
firebox capacity - 16 cu. ft. log length - 30" water capacity - 100 gal.
model - H4 (outdoor unit) fuel - wood Btuh output - 180,000
firebox capacity - 22.6 cu. ft. log length - 30" water capacity - 130 gal.
features - The unit is stainless steel construction inside and out. There are several heating coils available to heat hot water for household use or to heat your swimming pool. There is a 10 year warranty on the unit.
- HEATMOR, INC.**, Hwy. 11 E., Box 787, Warroad, MN 56763 - (800) 834-7552 (218) 386-2769 www.heatmor.com
model - 100CSS (outdoor unit) fuel - wood Btuh output - 120,000
firebox capacity - 9.0 cu. ft. log length - 24" water capacity - 85 gal.
model - 200CSS (outdoor unit) fuel - wood Btuh output - 180,000
firebox capacity - 13.5 cu. ft. log length - 36" water capacity - 114 gal.
features - These units have 10" fiberglass insulation and look like a colorful outdoor storage shed. The firebox is lined with fire brick. There is a water temperature gauge and the water temperature is adjustable. Accessories available — water to water or water to air heat exchangers and circulation pumps. These are stainless steel units with a 10-year warranty. See details on page three.
- HARMAN STOVE CO.**, 352 Mountain House Rd., Halifax, PA 17032 - (717) 362-9080 www.harmanstoves.com
model - SF-160 Trident (boiler) fuel - wood or coal Btuh output - 90,000
firebox capacity - 1.5 cu. ft. log length - 19" water capacity - 25 gal.
features - This small model uses a spiral chamber and a cast iron grate system with external shaker lever. The SF-160 Trident is fitted for an optional domestic hot-water coil which can be fitted at any time. Fittings are also provided for an electric back-up package which includes two 4500 watt heating elements, a dual function aqua-stat and a control box. There is five-year warranty on the unit.
- HS TARM**, PO Box 285, Lyme, NH 03768 - (800) 782-9927 www.woodboilers.com
model - two Excel 2000 models (indoor unit) fuel - wood / gas or oil Btuh output - 102,500 • 140,000
firebox capacity - 4.0 cu. ft. • 6.6 cu. ft. log length - 20" water capacity - 64 gal. • 72 gal.
features - These boilers use a gasification burning process for high efficiency. There are fully automatic controls that switch from wood to gas/oil whenever the wood fire burns out. A domestic hot water coil for household water can be used year round. There are ceramic bricks in the combustion chamber that have air injection slots built into them to provide the oxygen needed for complete combustion. There is a 20-year limited warranty. There are add-on models available.

Selected Manufacturers of Wood, Coal or Multi-Fuel Boilers/Furnaces - cont'd.

TAYLOR MFG., PO Box 518, Elizabethtown, NC 28337 - (800) 545-2293 (910) 862-2576 www.taylormfg.com
model - T450MF (outdoor unit) fuel - wood or coal / oil or gas Btuh output - 115,000
firebox capacity - 11.1 cu. ft. log length - 32" water capacity - 360 gal.
model - T750MF (outdoor unit) fuel - wood or coal / oil or gas Btuh output - 160,000
firebox capacity - 12.5 cu. ft. log length - 32" water capacity - 600 gal.
features - Options and accessories include — heat exchange cabinet, hydronic baseboard heater, heat exchanger coil, circulator pump, and additional coils are available for swimming pools, hot tubs or other applications. The units are covered by a one-year warranty with a optional six-year warranty for an additional charge. Use during summer for hot water - only add wood twice a week.

Selected Manufacturers of Wood, Coal or Multi-Fuel Forced-Air Furnaces

ALPHA AMERICAN CO., PO Box 20, Palisade, MN 56469 - (800) 358-0060 (218) 845-2224 www.yukon-eagle.com
model - Eagle I fuel - wood or coal / gas or oil Btuh output - 112,000
blower cfm - 800 to 1,400 firebox capacity - 2.7 cu. ft. log length - 24"
model - Eagle II fuel - wood or coal / gas or oil Btuh output - 151,000
blower cfm - 1,200 to 1,800 firebox capacity - 3.0 cu. ft. log length - 24"
model - Eagle III fuel - wood or coal / electric Btuh output - 68,300
blower cfm - 800 to 1400 firebox capacity - 2.7 cu. ft. log length - 24"
model - SuperJack (add-on model) fuel - wood only Btuh output - 75,000 to 150,000
blower cfm - uses existing blower firebox capacity - 5.2 cu. ft. log length - 24"
features - There is a two-stage thermostat which shows which fuel is being used. It controls both combustion chambers at separate temperature settings. The oil/gas fire comes on automatically if the wood fire dies down or does not maintain the temperature you set. (Electric model not self-igniting). You can also ignite the fire with kindling. The furnaces have a 20-year limited warranty.

AMERICAN ENERGY SYS., 50 Academy Ln, Hutchinson, MN 55350 - (800) 495-3196 (320) 587-6565 www.magnumfireplace.com
model - Magnum 4000 fuel - wood or coal Btuh output - 175,000
blower cfm - 1780 firebox capacity - 10.0 cu. ft. log length - 28"
features - The cabinet is fully insulated so it is cool to the touch. The firebox is lined with firebrick. There are cast iron grates, stainless steel firebrick holders and a large scoop-type ash drawer.
model - Countryside fuel - corn or wood pellets Btuh output - 15,000 to 50,000
blower cfm - variable hopper capacity - 75 lbs. weight - 250 to 300 lbs.
features - These models are available as freestanding or fireplace insert models. The exterior has optional gold-plated trim and the burning systems use a self-cleaning firepot.

CHARMASTER, 2307 Highway No. 2 West, Grand Rapids, MN 55744 - (218) 326-6786 www.charmaster.com
model - Chalet oil or gas models fuel - wood / gas or oil Btuh output - 105,000
blower cfm - 1780 or 2500 firebox capacity - n/a log length - 24"
model - Charmaster models fuel - wood / gas or oil Btuh output - 170,000
blower cfm - 1780 or 2500 firebox capacity - n/a log length - 30"
model - Charmaster II oil or gas models fuel - wood / gas or oil Btuh output - 170,000
blower cfm - 1780 or 2500 firebox capacity - n/a log length - 30"
model - Embers (outdoor use) fuel - wood Btuh output - 105,000
blower cfm - 2500 firebox capacity - n/a log length - 24"
features - The "Charmaster II" is a wood/oil or gas combination furnace/fireplace. It has full brass-bound bi-fold doors with heat resistant glass. There is a steel door that contains the logs and fire when the fireplace is not used. The fireplace extension bolts on. You have your own choice of fireplace materials — brick, stone, etc. to blend into your home's decor. There are wood only furnaces and an outdoor wood-fired hot water furnace available. See pages three and four for illustrations and details.

DAKA CORP., 955 Industrial St. N.E., Pine City, MN 55063 - (800) 884-3252 (320) 629-6737 www.dakacorp.com
model - 521(usually add-on) fuel - wood or coal Btuh output - 105,000
blower cfm - 500 or optional 1580 firebox capacity - 2.2 cu. ft. log length - 22"
features - Several of the "Deluxe" models have a built-in washable air filter. A shaker grate kit is available to allow burning of coal. A "Hot-Tube" domestic hot water preheater kit that connects to the hot water tank is available. The firebox in the "Super Line" models has an angled fire brick lining. There is a five-year warranty.

HARMAN STOVE CO., 352 Mountain House Rd., Halifax, PA 17032 - (717) 362-9080 www.harmanstoves.com
model - PF 100 Pellet Pro fuel - corn or wood pellets Btuh output - 112,000
blower cfm - 1,000 • 1,400 optional hopper capacity - 160 lbs. log length - not applicable
model - SF 2600-A fuel - wood or coal / oil Btuh output - 120,000
blower cfm - 1,400 firebox capacity - 2.2 cu. ft. log length - 27"
features - The PF 100 can be installed as a stand alone hot air heating system or incorporated into existing hot air systems. A chimney is not required for venting. This direct vent system can also use outside air. A huge ash pan allows three to four tons of pellets to be burned before the ash pan needs to be emptied. When no heat is required the fire will go out, lighting again automatically if more heat is needed. The SF-2600-A triple fuel oil burner fires into a separate combustion chamber and goes through a 24-tube, triple-pass heat exchanger. With this system, the oil nozzle should not get clogged with coal dust or soot which can happen on some other designs. There is five-year warranty on both units. See page four for illustration and details of the PF 100.

HAHSA CO., PO Box 112, Falls, PA 18615 - (800) 344-2472 (570) 388-6172 www.hahsa.com

features - This is a "plans only" package to build a do-it-yourself outdoor wood furnace with easy to follow step-by-step instructions. The unit can be built completely from locally-purchased materials. The unit is approximately 8'x10'.

JA-RAN ENTERPRISES INC., 3541 Babcock Rd., Lexington, MI 48450 - (810) 359-7985 www.ja-ran.com

model - Superior model

fuel - corn or wood pellets

Btuh output - 100,000

blower cfm - 1190 to 1780

hopper capacity - 12 bushel

log length - not applicable

features - The thermostat controls the fuel feed system to provide a constant temperature. It will shut down automatically if the fuel runs out. The burn pot is made of 60 pounds of cast iron. The hopper is mounted on the side of the furnace. It is a bottom-fed furnace so clinkers are not a problem. Rye and cherry pits can also be burned. There is a "double" model with a heat output of 200,000 Btuh. See page four for illustration and more design features.

L. B. BRUNK & SONS, INC., 10460 State Route 45, Salem, OH 44460 - (330) 332-0359 www.brunks.com

model - four Brunco models

fuel - wood or coal

Btuh output - 90,000 to 190,000

blower cfm - 495 • 1300 • 1500

firebox capacity - 4.1 to 6.3 cu. ft.

log length - 22" • 25" • 30"

features - The firebox has shakable grates, a cast iron rear brick and it is lined with high temperature 1½" fire brick. The furnace has a wall thermostat control that maintains the heat output you desire. The baffle system is adjustable to help burn extra gasses and to reduce heat loss up the chimney.

PINNACLE PELLET, INC., 4252 Dog Prairie Rd., Quesnel, B.C., Canada, V2J-6K9 (800) 967-9777 www.pinnaclepellet.com

model - GBU-70

fuel - corn or wood pellets

Btuh output - 56,000

blower cfm - 1250

hopper capacity - 80 lbs.

log length - not applicable

model - GBU-130

fuel - corn or wood pellets

Btuh output - 104,000

blower cfm - 1160 -1820

hopper capacity - 260 lbs.

log length - not applicable

model - TPB-150 (boiler model)

fuel - corn or wood pellets

Btuh output - 120,000

blower cfm - not applicable

hopper capacity - 150 lbs.

log length - not applicable

features - "GBU-130" has an optional coil for domestic hot water. "GBU-70" has a wall thermostat and a built-in pilot.

SURE-FLAME MFG., 245 Erie St., Huntington, IN 46750 - (219) 356-1905 no web site

model - S-F 6000 (outdoor use)

fuel - wood

Btuh output - 200,000

blower cfm - 1900

firebox capacity - 16 cu. ft.

log length - 30"

features - The firebox has a five-year warranty. The fire is laid directly on the fire brick hearth. The ashes are removed easily through the loading doors. Depending on the type of fuel, you could get 12 hours or longer burn time.

U.S. STOVE CO., PO Box 151, S. Pittsburg, TN 37380 - (423) 837-2100 www.usstove.com

model - 4 Hotblast models

fuel - wood or coal

Btuh output - 87,000 to 119,000

blower cfm - 550 • 810 • 550 (twin)

firebox capacity - 5.0 to 7.1 cu. ft.

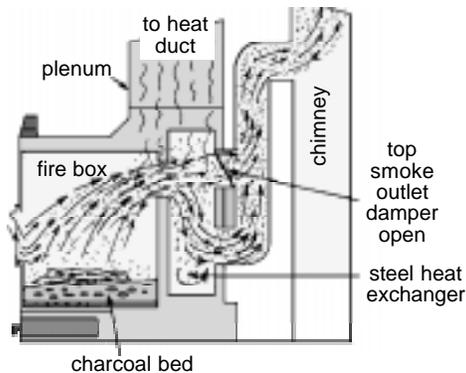
log length - 24"

features - There are cast iron rocker-style grates. The firebox has a fire brick liner. A front-mounted smoke curtain reduces smoke spillage during refueling. The automatic thermostat provides heat control. An optional remote wall thermostat is available. There is a full length ash pan that has handles on the front and rear. See below for diagram.

The Two-Pipe System by Charmaster

Early Fall — Late Spring Burning

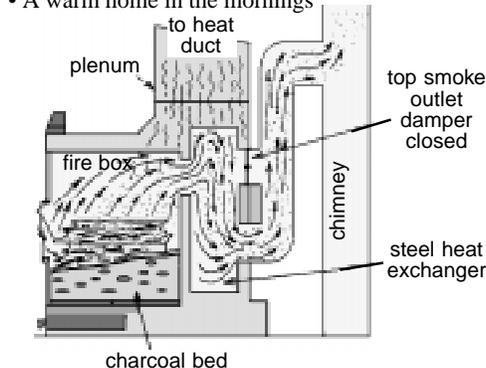
- Top heat exchanger damper open slightly
- Controlled, even heat loss keeps chimney warm
- Eliminates creosote
- Small charcoal bed — small wood load



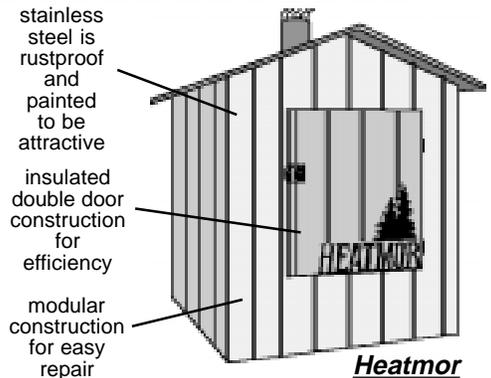
Early Fall — Late Spring your heating requirements would be lower — plus you would have small fires and a small charcoal bed. The top smoke outlet damper would be opened slightly to allow a little more heat out of the chimney to reduce creosote. A warm chimney is a clean, safe chimney and a cold chimney is a dirty, dangerous chimney.

Cold Weather Burning

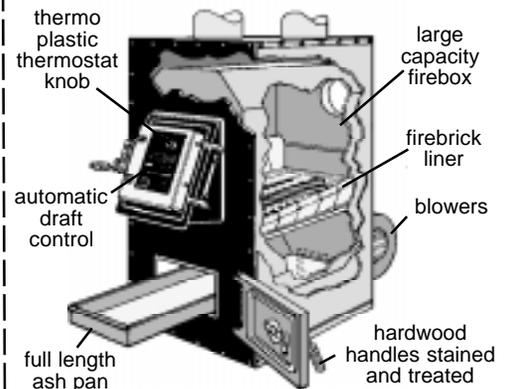
- Top heat exchanger damper closed — all smoke must go down — highest efficiency
- Charcoal production at peak, larger charcoal bed — larger wood load keeps chimney warm
- Longer burn time — more heat from less wood — even heat
- A warm home in the mornings



Cold weather burning requires a larger load of firewood and a larger bed of charcoal. Your wood furnace would be burning harder — thus producing more heat. The top heat exchanger damper can now be closed completely. Your chimney will be automatically warmer. Now your furnace is in its most efficient mode.



Hotblast Warm Air Furnace by U. S. Stove Co.

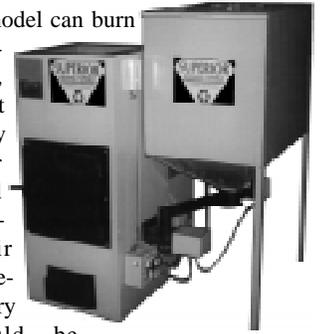


Wood Heat Evaluation Worksheet

1. Heating fuel you now use	
2. Fuel unit (gal., cu. ft., etc.)	
3. Number of Btu's per fuel unit - see Chart A	
4. Number of fuel units you used last year	
5. Money that you spent for this fuel	
6. Potential Btu's you actually received (#3 x #4)	
7. Efficiency of your heating system - see Chart B	
8. Btu's you actually received (#6 x #7)	
9. Percentage of the heat load you want from wood	
10. Convert to percentage (#9 ÷ 100)	
11. Type of wood you will burn	
12. Cost of one cord of wood	
13. Potential heat content in cord of wood - see Chart A	
14. Number of cords containing enough heat to heat your home (#8 ÷ #13)	
15. Number of cords to supply the heat you need (#14 x #10)	
16. Type of wood-burning device you install	
17. Efficiency rating of device - see Chart B	
18. Number of cords you will need to buy (#15 ÷ #17)	
19. Money you will spend on wood (#18 x #12)	
20. Proportional cost of heat (#5 x #10)	
21. Annual savings from burning wood (#20 - #19)	

Superior Model by Ja-Ran

This model can burn wood pellets, corn, rye, wheat and, cherry pits. For wheat and rye, combustion air should be reduce. Cherry pits should be burned with some corn mixed in.

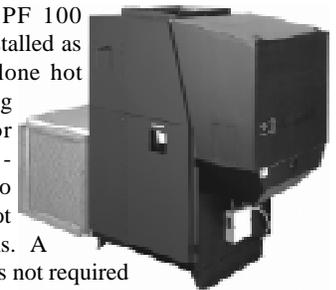


Design features:

- Heat exchanger is made of 14-gauge steel
- Burn pot is 60 pounds of cast iron
- Auger adjusts from zero to 24 lbs. per hour
- Furnace and bin augers are floating so they handle small particles easily
- Timer for low-cycle firing - acts as a pilot
- Thermostatically controlled -even heating

PF 100 Pellet Pro by Harman

The PF 100 can be installed as a stand alone hot air heating system or incorporated into existing hot air systems. A chimney is not required for venting. This direct vent system can also use outside air.

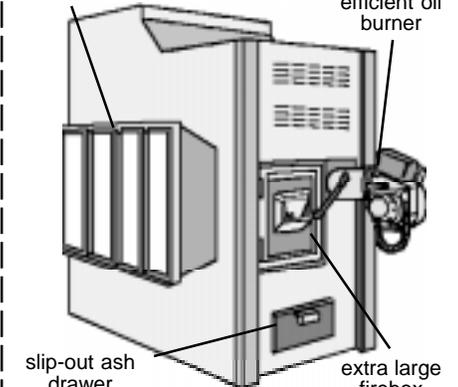


Design features:

- Totally automatic operation
- 160 pound hopper
- Extra large ash pan and ash door
- 1000-cfm, three-speed blower
- Dual heat exchangers extract more heat
- Uses four-inch pellet vent pipe

Charmaster II Wood/Oil Burning Furnace/Fireplace

brass-bound bi-fold doors



Heat Value - Millions of Btu per Cord*		
High	Medium	Low
24-31	20-24	16-20
Live oak	Holly	Black spruce
Shagbark	Pond pine	Blue spruce
Black locust	Nut pine	Hemlock
Dogwood	Loblolly pine	Catalpa
Slash pine	Tamarack	Red sider
Hop hornbeam	Shortleaf pine	Tulip poplar
Persimmon	Western larch	Red fir
Shadbush	Juniper	Sitka spruce
Apple	Paper birch	Black willow
White oak	Red maple	Large-tooth aspen
Black birch	American elm	Butternut
Yew	Black gum	Noble fir
Blue beech	Sycamore	Redwood
Red oak	Gray birch	Quaking aspen
Rock elm	Douglas-fir	Sugar pine
Sugar maple	Pitch pine	White pine
Am. Beech	Sassafras	Balsam fir
Yellow birch	Magnolia	Cottonwood
Longleaf pine	Red cedar	Basswood
White ash	Norway pine	Western red cedar
Oregon ash	Bald cypress	Balsam poplar
Black walnut	Chestnut	White spruce

* Assume 80 cubic feet of solid wood per cord and 8600 Btu/lb. of oven dry wood.

Chart A - Heat Content per Fuel Unit

Fuel	Unit	Btu/Unit
Oil	gallon	138,700
Kerosene	gallon	138,500
Natural Gas	therm	100,000
	cu. ft.	1,025
Electricity	kwh	3,414
Hardwood	cord	27,000,000
Mixed Woods	cord	22,000,000
Soft Woods	cord	18,000,000
Propane	cu. ft.	2,500
	gallon	91,000
	pound	21,500
Coal	ton	27,000,000

Chart B - Heating System Efficiency

Fuel	Heating Device	Efficiency
Oil or Kerosene	New high efficiency	.85
	Recently tuned with flue damper	.70
	Without flue damper	.60
	Average untuned	.50
Electricity	Resistance type	.95
	Heat pump	1.75
Natural Gas or Propane	New high efficiency	.94
	Good condition with stack damper	.80
	Average condition	.70
	Untuned	.60
Coal	New high efficiency	.70
	Good with flue damper	.60
	Without flue damper	.55
Wood	High efficiency wood stove or furnace	.80
	Standard wood stove	.60