

# What Took So Long?

by Dr. James E. Houck,

High heating fuel cost is nothing new, wood stoves have been aesthetically pleasing for quite a while and, most important, they no longer pollute the air.

It's not surprising that homeowners are electing to heat their homes with cordwood and pellet fuel in lieu of the more conventional big four – natural gas, heating oil, electricity and propane. The key reason can be explained in one word – cost. The federal Energy Administration in its Short-Term Energy Outlook publication (<http://www.eia.doe.gov/emeu/steo/pub/contents.html>) says it all, "On average, households heating primarily with natural gas likely will spend \$306 (41 percent) more for fuel this winter than last winter. Households heating primarily with heating oil can expect to pay, on average, \$325 (27 percent) more this winter than last. Households heating primarily with propane can expect to pay, on average, \$230 (21 percent) more this winter than last. Households heating primarily with electricity can expect to pay, on average, \$33 (5 percent) more."

While it's not surprising that consumer response to the recent jump in fuel cost has resulted in the increased purchasing of cordwood and pellet heaters, what is surprising is that it has taken so long to happen. Increasing heating fuel cost is nothing new.

From 1970 to 2001, the cost of natural gas and heating oil to the residential consumer increased by factors of 8.9 and 7.5, respectively, in nominal dollars (2.4 and 2.0, respectively, in inflation adjusted dollars). During the same time (1970-2001), the number of cords of wood burned for residential space heating did not increase but in fact dropped slightly from 20 million to 18 million annually. Taking it a bit further by going back as far as we have good records (1949) and tracking residential wood consumption until last year (2004), we reach the same conclusion: The number of cords of wood burned for residential space heating is documented to have dropped substantially (from 53 million in 1949 to 17 mil-

lion in 2004) while the cost of natural gas, propane and heating oil has risen significantly as assessed by any metric.

Certainly the unusually large jump in energy cost forecast for this winter was the key catalyst in causing cordwood and pellet sales to increase so dramatically. However, other factors also must have contributed. Perhaps the comforting safeguard against fuel shortages provided by wood-fueled heaters was also important to some, considering all the issues currently centering on petroleum producing regions.

Twenty-nine percent of the energy consumed in the U.S. (2004 records) is imported, and wood, after all, is a domestic source. Perhaps the fact that many new models of wood stoves are aesthetically pleasing, compared to older models that were, in many cases, frankly ugly, is important to some.

Finally, and very importantly, is the issue of air pollution. Old cord-

wood-fired models emitted high levels of air pollutants. New models do not. However, wood heaters have carried the stigma of being dirty for a long time. Perhaps that is starting to fade a bit, just a bit, which is contributing to the acceptability of cordwood heaters. This newly found perception of being cleaner-burning is witnessed by the recent ongoing and planned wood stove change-out programs, such as in Libby, Montana, and Pittsburgh, Pennsylvania.

As most in the hearth industry know, during the 1988 through 1992 time period, the U.S. EPA's wood stove New Source Performance Standard (NSPS) was phased in. The NSPS requires that all cordwood-fired heaters must be certified for low emissions in order to be sold. Those without a catalyst are required to have particulate emission levels of less than 7.5 g/hr as measured using a strictly specified test method. Those that have a catalyst are required to have lower particulate emissions (4.5 g/hr). The lower requirement for catalytic heaters is because catalysts degrade with use and will, with time, produce higher emissions.

As of Nov. 7, 2005, the EPA listed 623 models that have been certified (many are now obsolete and their certification has expired). The certification of 623 models is a testament to the industry's innovative capabilities and its commitment to consumers. It also represents a very significant investment

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## U.S. Average Consumer Prices and Expenditures for Heating Fuels for the Winter

Fuel	Winter 03-04	Winter 04-05	Forecast for Winter 05-06
<b>Natural Gas</b>			
Price (\$/mcf)	9.76	11.13	15.44
Expenditures (\$)	655	742	1,048
<b>Heating Oil</b>			
Price (\$/gal)	1.44	1.92	2.47
Expenditures (\$)	903	1,199	1,524
<b>Propane</b>			
Price (\$/gal)	1.42	1.64	1.93
Expenditures (\$)	962	1,102	1,332
<b>Electricity</b>			
Price (\$/kwh)	0.08	0.09	0.09
Expenditures (\$)	700	717	750

# Certified Stoves Hall of Fame

Less than 2 grams/hr; certification valid as of Jan. 1, 2006

	Name	Emissions (grams/hr)	Btu Output (per hour)	Firebox Size	Retail \$
	<b>Vermont Castings</b> Encore 1450-1454 N/C	0.7	10,600-24,050	2.1 cu. ft.	\$1,899-\$2,349
	<b>Krog Iverson</b> DSA 4	1.1	10,500-27,900	1.13 cu. ft.	\$1,879
	<b>Quadra-Fire</b> 4300 ACT	1.2	11,900-58,500	2.4 cu. ft.	\$1,499-\$1,804
	<b>Quadra-Fire</b> 3100 ACT	1.3	11,400-46,900	2 cu. ft.	\$1,299-\$1,654
	<b>CFM Dutchwest</b> Small 2477	1.4	7,800-25,100	1.6 cu. ft.	\$1,025
	Medium 2478	1.5	10,600-25,300	2.04 cu. ft.	\$1,189
	Large 2479	1.3	11,300-26,500	2.8 cu. ft.	\$1,349
	<b>Country Stoves</b> Striker Model				
	S160	1.6	12,500-41,200	1.6 cu. ft.	\$1,101-\$1,587
	C160	1.6	12,500-41,200	1.6 cu. ft.	\$1,178-\$1,464
	<b>England's Stove Works</b> 30-NC	1.6	11,950-28,337	3.5 cu. ft.	\$1,077
	<b>Lopi</b> Endeavor	1.9	9,300-42,200	2.2 cu. ft.	\$1,721

Non-Catalytic Stoves	
Expiration dates current as of Jan. 2006	
Grams per hour	Total
Less than 1	1
1 to Less than 2	9
2 to Less than 3	34
3 to Less than 4	62
4 to Less than 5	47
5 to Less than 6	24
6 to Less than 7	12
7 to Less Than 7.5	8
<b>TOTAL</b>	<b>197</b>

*Total certified stoves as of Dec. 5, 2005 - 623.*

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by a small industry. It easily takes \$100,000, to \$200,000 to develop and certify a new model.

The List of EPA Certified Wood Stoves (<http://www.epa.gov/Compliance/monitoring/programs/caa/whcert.html>) shows clearly that some wood heater models have very low emissions. In fact, 5 percent of the non-catalytic models had

particulate emissions of 2 grams/hour or less. (We did not evaluate the catalytic models, as it is difficult to estimate the effect of catalyst degradation on their effective emissions over the lifetime of the heater.)

Cordwood models with 2 grams/hour or less of emissions are not just clean, they are very clean; in fact, their emissions are in the range of pellet heaters, which have been viewed by some to be in a completely different class than cordwood stoves in terms of low air emissions.

We have highlighted the very cleanest non-catalytic cordwood heaters – those that have certified emission values of less than 2 grams/hour. To be fair, we also have made a list of those that have emission values of less than 2.5 grams/hour, as the EPA certification testing protocol has an uncertainty of at least ±20 percent at low emissions rates; models with emission values of less than 2.5 grams/hour could easily be equivalent to the best 5 percent with emission values of less than 2 grams/hr.

A note on firebox size should be made – smaller firebox non-catalytic stoves tend to have lower emissions

### Certified Stoves Honorable Mention

2 grams/hour to 2.5 grams/hour;  
Certification Valid as of Jan. 1, 2006

Aladdin Hearth Products,  
Quadra-Fire 2100 Millennium  
& 2100 ACT, 2.0 g/hr

Travis Industries, Avalon  
Rainier 90/Rainier 45, 2.0 g/hr

Blaze King,  
Princess Insert Model PI 1010A,  
2.0 g/hr

Aladdin Hearth Products,  
Quadra-Fire 4300, 2.1 g/hr

Hearth & Home Technologies,  
Quadra-Fire 3100F,  
3100I, 2.1 g/hr

HearthStone  
Quality Home Heating Products,  
Shelburne 8370, 2.1 g/hr

Olsberg Hermann Everken,  
GmbH, Bristol OH-L, 2.1 g/hr

Rais and Wittus,  
Gabo Pina Viola, 2.1 g/hr

Aladdin Hearth Products,  
Quadra-Fire 1900, 2.2 g/hr

Hearth & Home Technologies,  
Quadra-Fire Cape Cod, 2.2 g/hr

Krog Iversen & Co. A/S,  
Basic 1 & 3, 2.2 g/hr

Krog Iversen & Co. A/S,  
Basic 4, 2.2 g/hr

Harman Stove Company,  
Oakwood, 2.3 g/hr

HearthStone  
Quality Home Heating Products,  
Heritage, 2.3 g/hr

England's Stove Works,  
13-NCMH, 2.4 g/hr


HearthStone  
Quality Home Heating Products,  
Phoenix 8612, 2.4 g/hr

than ones with larger fireboxes, and stoves with the largest fireboxes are generally catalytic. Therefore, if a consumer wants a larger stove, there are fewer options among the low-emitting non-catalytic models.

Consumers and regulators should be made aware that these very clean models exist. The designers, manufacturers, distributors and retailers of these very clean stoves should be congratulated.

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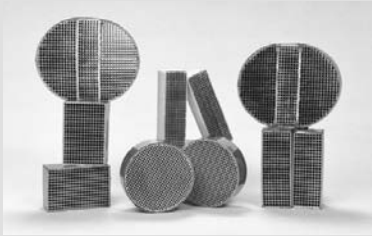





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