

Corn-Burning Boiler Heats House, Shop, Domestic Hot Water

"I get all my heat from corn," says Tim Ziegler, Foreston, Minn., about the corn-burning boiler he made out of an old gas-fired boiler. It heats his home and shop and provides hot water.

The entire system operates just like any other hot water boiler system. A series of pumps send hot water through pipes that lead to his house and shop, where separate heat exchangers deliver forced air to both buildings as well as to a series of baseboard heaters located in the newest part of his house. The boiler burns extremely hot - at temperatures of more than 2,000 degrees Fahrenheit.

He started with a 1947 Heil gas boiler which he bought for \$50. The boiler was originally designed to burn natural gas. He modified the unit to burn corn by cutting 6 in. off the round bottom of the boiler and installing a plate steel fire box. He used 3/8-in. thick steel pipe and 1/4-in. thick plate steel to build the fire pot. Then he built a new housing around the boiler out of angle iron and stainless steel.

Corn is augered out of a metal hopper he designed and built from scratch that's located right alongside the boiler. A series of DC drive motors power the feed auger as well as a stainless steel agitator inside the fire pot. Everything runs on timers, with variable speed controls regulating speed of the auger, agitator, and blower. "This allows me to produce the optimum flame," he says. The system includes a pair of circulating pumps, with one pumping water to the shop and the other to the house. A 6-in. stainless steel stack vents exhaust out of the boiler.

"I couldn't be happier with it," says Ziegler. "We burned about 500 bushels of corn last winter in order to heat our 3,000 sq. ft. house, 630 sq. ft. shop, and our domestic hot water.

"We came up with the idea about three years ago after we bought a commercial corn burning boiler. We couldn't get it to work right and the company wouldn't help out or stand behind its product. I lost about \$5,000 on it. It made me mad enough to decide to build my own.

"I spent a lot of time and money to design and build the system but still saved a lot of money. My total cost was about \$3,000. A

commercial boiler of comparable capacity would probably cost \$7,000 to \$8,000. However, it's the idea of bio energy and helping out farmers that I like," he says.

The boiler puts out more than its rated 150,000 btu's per hour because the corn burns so efficiently, says Ziegler. "I think my corn burning boiler produces more heat per bushel of corn than any other corn burning boiler on the market. The fire pot produces temperatures exceeding 2,000 degrees, whereas the hottest corn burning boilers on the market don't reach more than 1,700 degrees. I'm able to get a near-perfect flame because of the way we can control the speed of the agitator inside the firepot. I used stainless steel to make the agitator, after burning up several other agitators that I had made out of 1/2-in. thick mild steel.

"I plan on setting up computerized controls that will automatically adjust the boiler to the outside temperature."

He uses 5-gal. buckets to dump the corn into the hopper next to the boiler. The hopper holds a 4 to 5-day supply. He recently bought a 40-ft. grain auger and a 1,000-bu. grain bin so he can automatically feed grain to the hopper.

Ziegler designed a cleanout system that lets him use a shop vac to remove ashes from the boiler while it's still running. "I run a brush on a metal rod through the boiler from the front side, then remove a door on back to vacuum out the ashes. When cleaning out the clinkers and ash in the corn burning pot, I shut the boiler down, put on a pair of welding gloves and reach right in and scoop them out. Then I use a stainless steel shop vac equipped with a special aluminum hose, and vacuum out the rest of the ashes. I do this every two days to maintain the hottest flame possible," he says.

He starts the boiler using wood pellets soaked in kerosene. "I fill the corn pot full of corn, then dump a can of wood pellets pre-soaked with kerosene into the center of the fire pot, then push the pellets down and use a torch to ignite them," he notes.

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Ziegler started with a 1947 Heil gas boiler and built a new housing around it (left). Corn is augered out of a metal hopper alongside boiler.



He used steel pipe and plate steel to build the fire pot (left). DC motors power the feed auger as well as a stainless steel agitator inside firepot.



He uses 5-gal. buckets to dump corn into hopper (left). A 6-in. stainless steel stack vents exhaust out of boiler.



Grain bin panels were used to put together this goat shelter (left). Panels are bolted to a wood framework that mounts on skids, making shelter easy to move.

Simple Log Splitters Sold On The Web

"Log Splitters Under \$200. American Made. Full Lifetime Warranty. www.westcoastminisplitter.com."

That small ad in the back of a magazine recently caught our attention.

Upon checking the website, we learned that Patrick Green sells a \$199 (plus \$25 S&H) 6-ton manual mini splitter with a foot-powered hydraulic wedge. The 47-lb., 34-in. tall chopper splits logs up to 19 in. long.

Green's other American-made splitters include an 8-ton heavy-duty mini splitter that can be upgraded to an air/hydraulic model and a 12-ton air/hydraulic model. "It's a hydraulic jack that is air operated. The air runs the hydraulics so you don't have to pump it. It can also be manually pumped by hand," he says.

"Our product fills the gap between the splitting mall and expensive engine-powered splitters," Greens says, adding that the elderly and women like them because they can "split" wood without swinging an ax.

In fact, nearly half of Green's customers are women. "Right now, we have servicemen in Iraq whose wives and families are depending on the splitter. They're splitting their firewood while their husband's off fighting for



Green's 5-ton manual mini splitter has a foot-powered hydraulic wedge. It splits logs up to 19 in. long.

our country," he says.

But if you don't have internet access, contacting Green will be difficult. His business is strictly web-based. "I'm always happy to call customers and answer questions if they email me their phone number," he told FARM SHOW.

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Grain Bin Makes Great Goat Shelter

Grain bin panels and a few 12-ft. 4 by 4's, make quick and effective shelters for Eugene Batterton's goats. The price couldn't be beat either. The wood for a single hut cost him less than \$50, and he purchased enough panels for six huts for just \$100.

"I had seen similar huts for \$700 to \$800," says Batterton. "The grain bin panels came from a bin with a bad roof, but they still had a lot of good metal in them."

Batterton has made five shelters so far. They all start with construction of a wood framework with three cross members. They're laid 3 ft. apart with the ends trimmed for skids. Two 4 by 4's are then laid lengthwise about a foot in from the ends of the cross members and bolted in place to form the rigid frame.

Batterton then sets up a sawhorse at each end of the framework and lays a 16-ft. long 4 by 4 across them. Three 12-ft. metal panels are draped across the 4 by 4. One end of each panel is bolted to one of the two framing 4 by 4's running the length of the frame.

"I drive in lag bolts to attach the end of

each panel to the first 4 by 4," says Batterton. "I leave the bolts a little loose to allow the panels to flex."

Once all three panels are secured on one side, he attaches a scrap I-beam or even another 4 by 4 to the still unsecured ends of the panel. Three come-alongs attached to the framework and the I-beam are then tightened to pull the panel ends into place behind the second lengthwise 4 by 4. This puts the curve in the roofline and gives the goats needed headroom. With a 10-ft. distance between panel ends, the center height is about 52 in.

Once the ends have been lag bolted in place, the I-beam can be removed or left in place. The entire process takes only a couple of hours.

"It takes me longer to gather the materials than it does to build a shelter," says Batterton. "The goats love 'em. One can hold as many as 20 goat ewes, and the kids love to jump on top."

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