



## CATSKILL CRAFTSMEN: A Case Study in Saving Money Heating with Woody Biomass

Catskill Craftsmen ([www.catskillcraftsmen.com](http://www.catskillcraftsmen.com)) is the nation's leading manufacturer of domestic, "ready-to-assemble" kitchen carts, islands and work centers. They also manufacture gourmet butcher block chopping blocks, cutting boards, hardwood cabinets, furniture, book carts and racks. Located in Stamford, New York in the heart of New York City's water supply system and with a staff of about 50 employees, Catskill Craftsmen sells its products across the United States and throughout the world, with products available in countries such as Great Britain and New Zealand. Its products are featured in top stores including Lowe's, Home Depot, and Target. The company processes over one million board feet of lumber per year, much of that supply purchased from local mills using locally harvested timber.

Catskill Craftsmen formerly heated 48,000 square feet of factory and warehouse space with a combination of a wood boiler, fuel oil boiler, and four electric space heaters. In 2008, however, the company applied for and received a grant from the Watershed Agricultural Council (WAC) to investigate further woody biomass heating opportunities. WAC, a non-profit with the mission of supporting the economic viability of agriculture and forestry through the protection of water quality and the promotion of land conservation in the New York City watershed region, provided funds for a biomass specialist from Richmond Energy Associates of Vermont to visit Catskill Craftsmen's facility and provide recommendations. Among these, Richmond Energy advised Catskill Craftsmen to supplement their heating system with an additional woody biomass furnace. Catskill Craftsmen conducted a New York State Energy Research and Development Authority (NYSERDA) energy audit, which found that the company could save \$9,805 in energy costs each year by replacing its electric space heaters with the wood fired furnace. Acting on these recommendations, the company purchased an 800,000 BTU/hour furnace from Biomass Combustion Systems (BCS) of Massachusetts at a cost of \$22,000. The furnace can burn a wide variety of woody material, including cordwood (firewood sized), chunkwood (fist sized pieces) and even municipal tree trimmings. The system was ordered in the fall of 2009 and began operation in mid-December the same year. Including installation, total costs for getting the furnace operational were \$30,000. To assist with initial costs, the company applied for a grant through the United States Department of Agriculture (USDA)'s Rural Energy Assistance Program, which provided \$7,600 in funding.

With their new biomass furnace running, Catskill Craftsmen noticed an immediate improvement in their heating situation. Overnight, their four electric heaters became unnecessary. The company also reduced its oil consumption by 50 gallons per day, a savings not accounted for in the NYSERDA audit.

Watershed Agricultural Council  
Forestry Program  
[www.nywatershed.org](http://www.nywatershed.org)



The WAC is funded by NYC Environmental Protection, US Forest Service, USDA and other sources. The WAC is an equal opportunity employer and provider.



Paying \$2.00/gallon for fuel oil, the company now saves \$15,000 each heating season on top of its electricity savings. In addition, due to effective placement of the furnace in a back section of the facility far from existing boilers, the shop is warmer and more comfortable than ever before.

The BCS furnace consumes about 20 – 25 cords of wood (one cord is a stack of wood four feet by four feet by eight feet) in a typical heating season. Because Catskill Craftsmen already uses its own wood waste material to produce wood pellets, the company fuels the furnace by purchasing cordwood from local suppliers at a cost of \$200/cord. The wood is stored onsite and can be purchased months in advance of needing it. Maintenance requirements are about one hour daily, and Catskill Craftsmen keeps its unit running using staff already on the payroll. Each morning, ash is scraped out of the furnace. This ash is nontoxic and can be used as a soil amendment for lawns and fields. A staff member loads the furnace five to six times daily, with each loading taking about five minutes. Coals from the previous night, after raking, are still hot enough to ignite the furnace when the first load of wood is added in the morning. Even factoring in the costs of maintenance and buying the fuel, Catskill Craftsmen expects the system to pay for itself in just two years.



Cordwood shop furnaces such as that installed by Catskill Craftsmen come in a variety of sizes for different sized buildings. On their own, the units are ideal for shops, warehouses, and maintenance garages ranging in size from under 6,000 square feet to as much as 25,000 square feet. They can also, as with Catskill Craftsmen, provide supplemental heat in larger facilities.

The biomass furnace installed by Catskill Craftsmen meets both UL 391-06 “Solid-Fuel and Combination-Fuel Central and Supplementary Furnaces” and CSA B366.1-M91 “Solid-Fuel-Fired Central Heating Appliances” guidelines for product safety. The unit also has minimal emissions. While wood typically compares well with fossil fuels in terms of emissions, wood fired systems do emit more particulate matter (PM). However, the emissions of PM from modern furnaces such as Catskill Craftsmen’s are very low compared with home systems. On a per million BTU basis, a home wood stove certified by the U.S. Environmental Protection Agency produces about 1.4 pounds of PM. By contrast, Catskill Craftsmen’s unit, according to tests conducted by CK Environmental, Inc., emitted just 0.086 pounds of PM/million BTU, barely 6% of the home wood stove emissions. Catskill Craftsmen did not require an air quality permit for its unit, since the furnace’s output fell below the one million BTU/hour threshold used for both the U.S. Environmental Protection Agency’s proposed boiler emissions rule and New York State’s air quality permit requirement.

Catskill Craftsmen’s biomass heating solution not only saves them money, but it provides numerous other benefits, including supporting the local economy, replacing non-renewable oil imported from foreign countries with locally harvested wood produced in the Catskills, and reducing greenhouse gas emissions.

Even excluding the USDA grant, Catskill Craftsmen’s cordwood system will need just two years to pay for itself. Better still, the unit has a long lifespan; many of the original BCS units built in 1985 are still functioning. As a result, after two years, Catskill Craftsmen’s new furnace will be a profit source for the company for many years to come, as the annual net savings of \$15,305 adds directly to their bottom line.

### **Catskill Craftsmen’s Cordwood Furnace By the Numbers:**

<b>Initial cost, including installation:</b>	<b>\$30,000</b>
<b>Estimated days used per heating season:</b>	<b>150</b>
<b>Annual operating costs:</b>	<b>\$5,000 (wood fuel)</b> <b>\$4,500 (labor, assumes wage/benefits are \$30/hour)</b>
<b>Annual savings:</b>	<b>\$9,805 (electric heaters unnecessary)</b> <b>\$15,000 (offset 50 gallons oil/ day at \$2/gallon)</b>
<b>Net annual savings (savings – cost)</b>	<b>\$15,305</b>
<b>Payback period:</b>	<b>2 years</b>