

EXPLORING WOODY BIOMASS ENERGY OPTIONS FOR FACILITIES IN THE NEW YORK CITY WATERSHED REGION

PROGRAM ANNOUNCEMENT & REQUEST FOR APPLICATIONS

PROJECT SUMMARY

Since 1993, the Watershed Agricultural Council (WAC) has engaged in a variety of initiatives aimed at sustaining the economic viability of farming and forestry in the New York City Watershed Region. In 2008, WAC joined a national effort guided by the U.S. Forest Service toward increasing the use of wood residues in biomass energy production. Woody biomass comes in a wide variety of forms, including cordwood (firewood sized), chunkwood (fist-sized pieces), chips (about 1 inch square) and pellets. The fuel source for woody biomass typically originates as “residuals,” wood left over from another process, such as milling logs into boards or making furniture. Other sources include municipal tree trimmings, construction waste, and low-value wood from non-commercial forest improvement operations.

In 2009 and early 2010, WAC worked with Richmond Energy Associates, LLC, a professional consulting firm with extensive experience in wood energy systems, and the Forest Service’s Wood Education Resource Center to conduct two rounds of preliminary biomass heating assessments at several facilities including three public schools, two businesses, and one municipality. The studies found that for many of the facilities, converting their heating system from their current fuel (generally fuel oil) to woody biomass could cut their heating bill by 30-50%. Furthermore, in some cases, the biomass system would pay for itself with reduced heating costs in less than five years.

Building on these successes, WAC is pleased to offer a third round of funding for woody biomass prefeasibility studies. This effort is targeted toward municipalities, businesses, non-profits, and other institutions that have buildings from 6,000 – 25,000 square feet, including maintenance garages, warehouses, manufacturing facilities and offices.

WAC will provide funds to institutions that are interested in exploring biomass heating options for their building(s). **At this time, we plan to fund five projects.** Selected applicants will receive a site visit and report on the economic, environmental and technical feasibility of installing a high efficiency, low-emissions biomass heating system most likely fueled by cordwood, chunkwood, tree trimmings, or pellets. The report, a “pre-feasibility” assessment, is a critical first step for any capital improvement or energy efficiency project.

The project area includes Delaware, Dutchess, Greene, Putnam, Schoharie, Sullivan, Ulster and Westchester Counties. Applicants outside these counties may submit applications for review; however, the project must show positive economic impacts to forestry in the above counties. All project proposals must be received by the Watershed Agricultural Council no later than **5:00 PM, Monday, November 1st, 2010** to be considered.

BENEFITS OF WOODY BIOMASS HEATING

In addition to potentially reducing energy expenses, woody biomass heating has several other advantages, including reducing fossil fuel use and greenhouse gas emissions and keeping energy dollars local. For instance, according to the US Department of Energy, New York imports all of its oil, mostly from Canada, the Caribbean, Europe, South America, and North Africa. Instead of sending energy dollars around the world, switching some heat load to locally produced woody biomass keeps those dollars in the Catskills. Finally, modern biomass furnaces have low emissions. Using a technology called “gasification,” these systems heat the wood to such high temperatures that creosote is eliminated and little or no visible smoke is created. Modern biomass furnaces can have emissions, on a per unit of energy basis, of about 6% of a traditional, EPA-certified wood stove. Moreover, any ash created by the combustion process is non-toxic and can be applied to lawns and fields as a soil amendment. Finally, woody biomass heating is an established, efficient technology that has been put to use in numerous facilities in New York and throughout the northeast (for examples of sites using biomass, please see the case studies attached to this announcement, or for even more examples, see the Biomass Energy Resource Center’s database of facilities and case studies at www.biomasscenter.org/database.html).

PROGRAM DESCRIPTION

Selected applicants will receive a site visit from an experienced wood energy specialist working under contract to WAC. The contractor will survey your facility, collect appropriate energy consumption data and prepare a written report which will detail the technical and economic feasibility of integrating a biomass heating system including:

- Options and estimated costs for installation of an appropriately scaled biomass energy system
- Projected savings (including a “payback through savings scenario”) compared to existing fuel
- Amount and general specifications of biomass to be consumed annually
- The availability and accessibility of raw material to fuel the system (including the amount and condition of material generated in the vicinity of the site, source of material, and cost estimates of material purchase and delivery)
- Potential source(s) of funding for the biomass system
- A review of permits that may be required
- Recommendations for additional energy efficiency measures that will complement a biomass system

Based on the results of this Preliminary Feasibility Assessment, your facility may appear a good candidate for biomass energy. The next step may be to work with an architectural and engineering firm with biomass experience to develop site specific design and construction cost estimates. Additional support is available from WAC to assist your facility in taking the next steps.

EVALUATION CRITERIA & SELECTION PROCEDURES

Parties seeking selection under this program must submit a completed application. WAC will evaluate each application thoroughly based on the following review criteria:

1. Impact of proposed project on use of local wood residues generated from one or more of the following sources: sawmills, forest management activities, and municipal wood waste
2. Scientific or technical merit of project as determined by completion of the *Application for Biomass Pre-feasibility Grant* form
3. Role in serving as a pilot or demonstration facility and ability to pursue installation if study results are favorable.
4. Demonstrated interest or commitment to renewable energy projects (ex. through previous completion of energy audits, preliminary engineering assessments, or other energy-related initiatives)
5. Demonstrated organizational commitment to project. (ex. written statement of approval from organization's governing board)

Applications will be reviewed and ranked based on the evaluation criteria. The WAC Forestry Program selects proposals and decides on specific allocation of available funds.

WAC reserves the right to reissue this request if no applications adequately meet the evaluation criteria. Selected applicants may be required to sign a Cooperator's Agreement and provide pre-arranged access to their facility by a biomass energy contractor. Applicants may also be asked to provide additional documents such as organizational reports or financial statements as necessary. A summary statement of the review and evaluation by the committee will be provided to applicants upon request.

PROJECT REPORTING

Selected applicants will be notified by mail and work will commence in January 2011. The contractor will be providing periodic updates to WAC and the facility personnel on relevant findings that surface during the project. When the contractor completes all phases of the study, each site will receive three hardcopies and a PDF file of the final report as well as one resource binder with pertinent information to aid the site in moving forward. Participants may be required to complete a brief exit interview to evaluate the success of this cooperative program.

SUBMISSION GUIDELINES & DEADLINES

The Review Committee will *not* evaluate incomplete applications. Application materials may be recreated on your computer as long as they follow the exact format as the enclosed forms. Additional copies of the application (either electronic or paper) can be obtained by contacting the WAC office.

COMPLETED APPLICATIONS MAY BE MAILED, FAXED, OR E-MAILED AS A PDF OR MS WORD ATTACHMENT TO:

Joshua VanBrakle
Wood Products Utilization & Marketing Specialist
Watershed Agricultural Council
33195 State Highway 10
Walton, NY 13856
Fax: (607) 865-4932
jvanbrakle@nycwatershed.org

All application materials **must** be received at the WAC office before 5:00 PM on **Monday, November 1, 2010**. To inquire about assistance with application development contact Joshua VanBrakle at (607) 865-7790 ext 112.

Applicants will be notified by mail of their selection status within 4-6 weeks of the application deadline.

Major funding for the Watershed Woody Biomass Program is provided by the Rural Development through Forestry: Economic Action Program administered by the US Forest Service Northeastern Area's Division of State & Private Forestry. Significant technical assistance for this project is also provided by the New York State Department of Environmental Conservation. The Watershed Agricultural Council (WAC) is a non profit organization with offices in Hamden, Walton and Yorktown Heights. WAC's mission is to support 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. The WAC is funded by New York City Department of Environmental Protection, the U.S. Department of Agriculture, the U.S. Forest Service and other federal and foundation sources. The WAC is an equal opportunity employer and provider. The Northeastern Area Division of State & Private Forestry of the US Forest Service provides significant funding to the WAC Forestry Program to support forestry/wood products-related economic development activities and projects within the NYC Watersheds. These funds are in the form of grant money and are used to:

- *Promote forestry as a preferred land use for protecting water quality*
- *Promote and enhance regional economic activity within the forest/wood products industry*
- *Improve the economic viability of forestry within the NYC Watershed*
- *Support the development of business relationships between wood processors and wood users in the NYC Watershed*



Application for Biomass Pre-Feasibility Grant

Company/Institution Information		
Company/Institution Name & Mailing Address:	Year of Building Construction: _____	
	Years of Major Renovation(s)	
	First: _____	
	Second: _____	
County: _____	Institution Type:	
	<input type="checkbox"/> Public <input type="checkbox"/> Private	
Contact Person for questions regarding this form	Type of Facility (check one)	
Name: _____	<input type="checkbox"/> Garage	
Title: _____	<input type="checkbox"/> Warehouse	
Phone: _____	<input type="checkbox"/> Manufacturing Space/Shop	
Fax: _____	<input type="checkbox"/> Office	
E-mail: _____	<input type="checkbox"/> Other _____	
Building(s): Below, list each building at your facility, its size in square feet, and state whether it is heated from a central boiler plant.		
Name of Building	Size (square feet)	Central Boiler? (Y/N)
Heating System		
Does your facility have a central heating system? <input type="checkbox"/> Yes <input type="checkbox"/> No		
Do you have more than one heating system? <input type="checkbox"/> Yes <input type="checkbox"/> No		
Do you have one heating plant in one location? <input type="checkbox"/> Yes <input type="checkbox"/> No		
Do you have heating plants in multiple locations? <input type="checkbox"/> Yes <input type="checkbox"/> No		
Do you have individual, room by room heating systems? <input type="checkbox"/> Yes <input type="checkbox"/> No		
How is heat delivered to areas that need it? (check all that apply)	How is heat generated? (check all that provide at least 20% of space heating)	
<input type="checkbox"/> Hot water	<input type="checkbox"/> Hot water boiler	
<input type="checkbox"/> Steam	<input type="checkbox"/> Steam boiler	
<input type="checkbox"/> Ducted air	<input type="checkbox"/> Hot air furnace	
<input type="checkbox"/> Electric resistance	<input type="checkbox"/> Electric baseboard	
<input type="checkbox"/> One heating plant in one location	<input type="checkbox"/> Rooftop packaged units	
<input type="checkbox"/> Different heating plants in multiple locations	<input type="checkbox"/> Heat pumps	
If buried steam lines or hot water lines are used to connect multiple buildings to a central boiler plant, in what condition are the lines? Check one:		
<input type="checkbox"/> Poor <input type="checkbox"/> Fair <input type="checkbox"/> Good <input type="checkbox"/> Excellent <input type="checkbox"/> N/A		
Heating Equipment: List each piece of heating equipment separately below. Include size in boiler horsepower or BTU, state what fuel it uses (ex. natural gas, #2 fuel oil, propane, etc.), when it was installed, and its condition (Poor, Fair, Good, Excellent)		
Size	Heater Type	Fuel type, year installed, condition
<i>Ex. 3.5 MBTU or 200 BHP</i>	<i>Hot water boiler</i>	<i>#2 fuel oil, installed 1998, fair</i>

Fuel Usage: Please review your heating bills from the past two years and list each type of heating fuel used, the total volume and the total spent on each fuel in the past year.

Fuel type	Year	Volume	Units	Cost
<i>Ex. #2 Fuel Oil</i>	<i>2009</i>	<i>20,000</i>	<i>Gallons</i>	<i>\$50,000</i>
				\$
				\$

Other Information

Describe your fuel storage for each heating fuel storage tank

Tank Capacity	Date Installed	Fuel Type
<i>Ex. 10,000 gallon buried</i>	<i>1953</i>	<i>#2 fuel oil</i>

Is your domestic hot water heated from a central boiler? Yes No

Has your facility recently undergone an energy audit? Yes (year _____) No

Do you have plans for expansion or major renovation in the near future? If so, describe below, including project timing.

The goal of this project is to identify organizations that demonstrate the best likelihood of completing installation of a woody biomass system dependent on the results of the prefeasibility study. On a separate sheet, summarize the short and long term energy goals (2-5 years) for your organization and how you feel this Biomass Grant can help you achieve those goals. Provide as much detail as possible about your current energy outlook, previous energy efficiency projects, and organizational commitment. Attach and label as many sheets as necessary to explain your response (ex. letter/statement from your governing board, copies of your latest fuel and electric bills, diagrams of your facility's layout).

Authorized signature: The signature below is that of the person authorized to testify as to the accuracy of this application.

Signature _____ Date _____
 Print Name _____ Title _____

Completed application forms may be mailed, faxed, or e-mailed to Joshua VanBrakle at:
Fax: 607-865-4932 **Mail:** Watershed Agricultural Council
E-mail: jvanbrakle@nycwatershed.org 33195 State Highway 10
 Walton, NY 13856

For Council Use Only

Date reviewed _____ Approved: _____ Yes _____ No* Amount: \$ _____

Signature of WAC Officer _____

*Reason for Denial:



Thank you for your interest in wood energy utilization!



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

Catskill Craftsmen (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 to investigate further woody biomass heating opportunities. The Council, a regional nonprofit that supports the economic viability of agriculture and forestry industries through the protection of water quality and land resources 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, ordered in fall 2009, was operational in mid-December. 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.



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 PM emissions 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 (EPA) 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 EPA’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.

Catskill Craftsmen’s cordwood system will need just two years to pay for itself, even excluding the USDA grant. Better still, the unit has a long lifespan; many of the original BCS units built in 1985 are still functioning. As a result Catskill Craftsmen’s new furnace will continue to save them money for many years to come.

Catskill Craftsmen’s Cordwood Furnace By the Numbers:

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

Watershed Agricultural Council
Forestry Program
www.nycwatershed.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.

NRG WIND SYSTEMS, HINESBURG, VERMONT, UNITED STATES

At a Super-Efficient Industrial Site, Pellet Boilers Are the Choice

Business Wood Pellet Heating System

Heating Capacity (output): Two 43 kW (150,000 Btu/hr) boilers

Annual Pellet Fuel Use: 25 tons

Year Installed: 2007

Thermal Output: Hot water

When David and Jan Blittersdorf, owners of NRG Wind Systems in Hinesburg, Vermont, were planning their business's new manufacturing and office facility—a building that would use one-fifth to one-third as much energy as typical facilities of comparable size—they pondered how best to heat it.

“Being in Vermont, and having grown up burning wood, I really liked the idea of pellets,” David Blittersdorf recalls. “Very clean-burning, dry, buy all your fuel at once.”

For their 46,000-square-foot facility, which opened in 2004 and manufactures wind testing equipment, NRG installed two Danish-made TARM boilers, each with 150,000 Btu capacity.

“The idea of the building is that it's not metered,” Blittersdorf says. “The emphasis is to be super-efficient, and then to do everything with renewables—with wind, solar, and pellets.”

NRG's total heating bill for the winter of 2007-08: \$5,905.

“Bulk pellets cost us about \$190 per ton last year, and we used 25 tons, or \$4,750,” Blittersdorf explains. The pellet fuel is made from various wood by-products of lumber milling and other wood processing. “This year we are paying about \$210/ton. Delivery from Jaffrey, New Hampshire is expensive. We need a local supplier!”

NRG uses a propane boiler for backup heat “that's just this little teeny thing next to the wood boilers,” Blittersdorf says. “We run it in the shoulder seasons, when we start heating, in October-November and in April.”



NRG also fuels its backup electric generator with propane, and spent \$1,155 for propane during the winter.

So Blittersdorf figures total heating fuel costs at \$4,750 plus \$1,155, or \$5,905.

“I'm a big proponent of multiple boilers instead of one huge one, because then you can stage things and work at maximum efficiency,” he says.

NRG Systems gets 53 percent of its electricity from solar photovoltaics and a wind generator, with 78.5 kW of solar voltaics on its roof, awnings, and a movable tracker. A 10 kW wind turbine is mounted on a 100-foot tower on a hill behind the building. Six solar hot-water collectors and a 240-gallon storage tank meet some of the company's hot water needs.

The architects who designed NRG's building won Vermont's top architectural award for the project, the 2004 Honor Award for Excellence from the Vermont Chapter of the American Institute of Architects.

“So few industrial buildings reach this level of sophistication,” said the award citation.



BERC

Renewable • Reliable • Resourceful

**Biomass Energy
Resource Center**

Pictured on front: NRG Wind Systems headquarters. Right: Behind the headquarters building, NRG's 30-ton pellet silo is filled once a year, off season. "It's really nice to be able to buy your fuel in the summertime, and have your year's supply," (NRG owner) Blittersdorf says.

'It's Completely Controlled'

"The nice thing about the pellet system is, it's completely controlled," Blittersdorf says. "Very low maintenance, and very low amounts of ash. We burn 25 tons of fuel, but we only get a couple hundred pounds of ash. We clean the ash out a couple of times a week. We just use it on the garden—it's clean.

"I also like the super high efficiency. These boilers are 90 percent efficient, with very low pollution levels. And with the wood pellets, we're almost 100 percent renewable."

The heating system uses radiant floor technology, with almost 10 miles of radiant piping for both heating and cooling. A two-thirds-acre pond in front of NRG is used for cooling, heat pumping, storm water collection, and recreation.

Behind the headquarters building, NRG's 30-ton pellet silo is filled once a year, off season. "It's really nice to be able to buy your fuel in the summertime, and have your year's supply," Blittersdorf says. "I don't like deliveries in the winter."

Overall, the pellet system is working so well for NRG that it is installing two new pellet boilers in the 31,000-square-foot addition it is currently building.

"With the increase in our business," Blittersdorf says, "we've almost tripled our people since we opened three years ago."



For more information on this and other biomass energy projects, contact:

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