

How Much Wood Would a North Country School Chip...

- Wood chip boiler system designed, manufactured, and installed in New York and uses in-state energy source
- System will reduce greenhouse gas emissions by 184 tons per year
- Environmental stewardship central to school's mission



The North Country School

Located in the heart of the six-million acre Adirondack Park, the North Country School cultivates environmental leadership in its pupils from a location of extraordinary natural beauty. The core values of the boarding school - and corresponding Camp Treetops summer camp - highlight a commitment to simple and sustainable living and to responsible decision making regarding natural resources.

It's thus fitting that the school has dedicated itself to finding renewable sources of fuel to heat the approximately 85,000 square feet of heated space on campus. After investigating many options, installing a wood chip boiler emerged as the most environmentally and economical choice, due in large part to the availability of wood chips that are a by-product of the Forest Stewardship Council certified forest woodlot that is a part of the school campus.

"We would like to reduce our reliance on fossil fuels in order to meet the primary goal of reducing our carbon footprint and reaching carbon neutrality," says Mr. John Culpepper, Facilities Manager. "The nearly 28,000 gallons of fuel oil consumed each year to heat roughly half of our space created a huge carbon footprint. Being able to mitigate this environmental impact was an easy decision to make."

Green Ethics – Green Energy – Green Economy

Beyond its setting in an oasis of green from surrounding forests and fields, the school also is "green" in its teaching of recycling and composting, complemented by lessons in the gardens, greenhouses, and barnyards.

"Ever since its founding, the camp and school have had a land ethic that was ahead of its time," Mr. Culpepper says. "Beyond our liberal social practices, such as being one of the first institutions to integrate women, Jewish children, and African American children into our camp, we've always had a farm and a focus on being good stewards of the environment.

"Energy independence and biomass fits in with our proud history of forward thinking."

Though the school is committed to continually reducing its environmental footprint, the large upfront costs of a centralized wood chip boiler and associated piping network presented a significant barrier to installation. Enter the New York State Energy Research and Development Authority, and a grant of \$246,413 in American Recovery and Reinvestment Act monies.

"For a small, not-for-profit institution like ours, it would have been nearly impossible to come up with the upfront cost without NYSERDA funding," Mr. Culpepper says.

Robert Haley of Haley Plumbing and Heating of Upper Jay, NY, the mechanical contractor for the project, agrees. “This is a project that wouldn’t have happened without this ARRA funding.” Mr. Haley has maintained and upgraded the North Country School buildings over a working relationship of thirty years. He notes that the school has long been devoted to moving away from oil and toward propane and fuel sources “that are not so destructive to the environment and not subject to the major fluctuations in fuel costs that set energy budgets out of whack.”

Let There Be Heat

The new 1.4MMBtuh wood chip boiler system will be located in a utility building at the core of the campus. Piping will lead to the 32,000 square foot main school building, which is currently heated with oil and propane. The wood chip boiler will heat the main school building, and is expected to be expanded in the future to encompass an additional four buildings.

“This system will be a model for other schools as they reduce their reliance on fossil fuels,” says Mr. David Dungate, President of Advanced Climate Technologies, the Schenectady, New York, firm manufacturing the biomass system.

Reduced Environmental Impact

Beyond the benefit of reduced energy costs, estimated at \$38,970 annually, the high efficiency of the biomass boiler is expected to raise awareness of the potential of wood as a cost-effective solution for achieving energy sustainability and low environmental impact objectives.

The boiler technology will be an ACT Bioenergy system, manufactured by Advanced Climate Technologies in Schenectady, NY. The boiler is expected to achieve up to 85-95% efficiency; due to a compact combustion zone with controlled airflow for optimal burning, the boiler is designed to emit exceptionally low emissions. In turn, by replacing fossil fuels with greenhouse gas neutral wood biomass, the system is expected to reduce carbon dioxide emissions by an estimated 184 tons per year.

“Because wood energy is a low carbon fuel compared with oil or propane, one benefit of the system is lower greenhouse gas emissions,” says Mr. Dungate.

“The high efficiency biomass boiler plant really is an incredible thing. If you look at the smoke stack, its emissions look similar to those of a clothes dryer in the winter,” says Mr. Haley. “When the school was using oil, there was soot everywhere.” Now, the ash resulting from burning the wood is collected through centrifugal force, rendering emissions ‘extremely clean’.”

The simple payback for the system, without considering inflation of fuel prices, is six years. As the school can supply non-commercial forest thinnings from its sustainably managed woodlot as one source of fuel, the payback may be even faster.

“We’re taking ultimate responsibility for our own fuel wood,” says Mr. Culpepper. “We’ve found we can demonstrate that for a small industrial project like ours we will be able to harvest and process the majority of our fuel within a circle that’s not very large. Our ‘local source’ is within a 100-meter, as opposed to 100-mile, radius.”

Sustainable Wood Source

“The wood that the system uses will be harvested locally, through methods that take lower valued species and create a market for them. The result is better management of the forest,” says Mr. Dungate. The pellets that the school will use to supplement its fuel supply will be sourced from the first Forest Stewardship Certified producer in the United States, located in the North Adirondacks.

Some people are concerned about the sustainability of harvesting wood for use in biomass heating systems. Identifying whether or not a source is harvested sustainably is an important criteria. According to Mr. Dungate, “the fact is, yes, wood can be harvested sustainably. The amount of biomass and tree growth in New York has increased over the last ten years. That regenerated wood can benefit from being thinned and managed.”

“We’re sitting on a wealth of BTUs, and they’re growing faster than they’re being harvested,” says Mr. Culpepper. “Our ability to purchase local pellets, and eventually produce our own chips, translates into employment for local folks, and continues a several-year effort of sustainable harvesting on campus.

“Biomass makes sense for us in our part of the country.”

Local Business Growth

The project and school will help support the growth of New York’s high efficiency wood boiler industry by using locally manufactured equipment and employing local design services and labor. With projects like these, the ACT Bioenergy system manufacturer, Advanced Climate Technologies of Schenectady, New York, hopes to expand its market to additional New York schools and beyond.

“Every time someone purchases and installs a boiler, we hire workers,” says Mr. Dungate. Mr. Dungate notes that supporting jobs in the community “keeps money and resources circulating in the region.”

“Projects like these are particularly important for schools,” he says, “where students are looking to their future and their careers. Viewing products that are manufactured locally opens their eyes to what is possible in the manufacturing field.”

“Clearly, when one speaks of sustainability, it has to be broader than just purchasing ‘green’ products, and it must extend to employing local craftspeople,” Mr. Culpepper says. “To the extent that we can, be it hiring for facility positions or for building projects, we believe it’s an important part of our mission to keep labor within the community.”

What’s Next?

“This is a school and camp that puts an emphasis on hands-on, minds-on learning,” says Mr. Culpepper. “We love to integrate everything we do into the curricula. The biomass project gives us the opportunity to talk about sustainable energy technologies conceptually and it allows us to get kids out in the woods to assess and even harvest a little of the fuel source.”

“There are wonderful people at the North Country School who do great things,” says Mr. Haley. “There are a lot of people whose hearts are wrapped up in the place.”

With people like them, the school’s contribution to sustainable energy and environmental development in the Adirondacks is sure to continue.

American Recovery and Reinvestment Act – State Energy Program

The North Country School received this award from the [U.S. Department of Energy’s State Energy Program](#). The State Energy Program provides grants to states and directs funding to State Energy Offices from technology programs in DOE’s Office of Energy Efficiency and Renewable Energy. States use grants to address their energy priorities and to adopt emerging renewable energy and energy efficiency technologies. SEP is distributing \$3.1 billion of funding to the states and U.S. territories under the [2009 Recovery Act](#).