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Nonprofit goes green

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A local nonprofit in Plymouth is discovering that being green requires both traditional wisdom and new technologies. Farm and Wilderness Foundation operates six summer camps for children ages 4 to 17 during the summer, as well as a year-round farm on 1,600 acres of land that it owns around Woodward Reservoir and Lake Ninevah. As the foundation moves toward carbon neutrality, it is relying on both old and new approaches. During this process, the campers are learning how to promote sustainability and reduce their own carbon footprints. A carbon audit conducted onsite in 2007 provided baseline data that the organization is using to measure its progress. Cutting back on heating oil - 6,141 gallons in 2007 - was the obvious first step because of the foundation's abundant timber resources. Farm and Wilderness owns more than 1,600 acres of land with the potential to sustainably generate more than 50 cords of wood per year by removing hazard trees around buildings, trails and roads. Without management, these trees would die and rot, releasing over time the same amount of carbon they would if burned. With funds provided by the Vermont Department of Agriculture through the Renewable Energy for Agriculture Grant Program, F&W undertook an engineering study to evaluate the feasibility of using wood to heat its farmhouse, dairy barn and greenhouses - buildings used year-round to support the organization's farming operations.

The results of the engineering study indicated that the optimal system could be completed in two phases at a total project cost of \$65,000. The first phase was to install a wood gasification furnace and then, as funding allowed, a solar hot water system mounted on the farmhouse roof. The complete system is estimated to reduce fuel use by nearly 80 percent, equivalent to saving 4,000 gallons of heating oil per year. It will also decrease F&W's propane use by 300 gallons per year and should pay for itself within seven years, based on heating fuel costs of \$2.60 per gallon.

Pieter Bohen, F&W's executive director, reports that sufficient funds have

already been raised for the project.

"Farm & Wilderness donors very much understand that sustainability and social justice go hand in hand," Bohen said. "We have to focus on how we're going to both respond to climate change and produce enough food for everyone to thrive. F&W has the ability to teach hands-on techniques to create a sustainable world."

The wood gasification furnace and solar system will heat water in a 2,500-gallon heat exchange tank. Water from this tank will supply heat and hot water to the farmhouse, dairy barn and greenhouses through insulated underground piping systems - an arrangement known as district heating. The warm water piped to the greenhouse will flow through small hoses under growing tables and soil. This root-level heating speeds germination and extends the effective growing season, which means that F&W will be able to grow food nearly year round.

The underground piping from the farmhouse to the greenhouses was installed during the fall of 2010. The remaining elements of the system - wood-fired furnace and solar panels - are currently in the design and permitting phase. F&W hopes to have the complete system installed by the end of 2011.

In moving towards its goal of carbon neutrality, F&W is also focusing on the sustainability of its new buildings. Bohen describes the LEED (leadership in energy and environmental design) standards as a "game changer," because instead of emphasizing only technological fixes for creating green buildings - such as photovoltaic cells or solar water-heating systems - the standards also identify more traditional ways to gain points, such as thoroughly insulated, durable building shells and local materials.

The recently completed resource (maintenance) building exemplifies the benefits of such time-proven techniques. Board member Paul Stone of Orwell, determined to create a well-insulated building, worked in partnership with Robert Owen, F&W's project manager, and John Berryhill, principal of NBF Architects of Rutland, to ensure that this new building would use minimal fossil fuels throughout its history.

The original plan called for walls to be framed with 2 x 6s; however, this was later changed to 2 x 8s so that additional insulation could be used. "Insulation is the most cost-effective, green way to create a low carbon footprint building, hands down," Bohen said.

The building also features a radiant heating slab in its floor. The end result, Bohen said, is a building that requires very little propane to heat.

Locally available construction materials were obtained for the resource building. F&W forester Silos Roberts works with local loggers to harvest timber from F&W's own property and property owned by the Ninevah Foundation (more than 4,000 acres). The timber is transported by local truckers to Gagnon Lumber in Pittsford, less than 30 miles away, to be milled into lumber. By harvesting its sustainable forests plots, F&W is able to use its own timber for 60 percent of camp building projects and create local jobs for loggers, truckers and mill workers.

The camps' increased reliance on wood for heating provides many teaching opportunities. Campers learn what kind of trees yield good firewood, such as ash or maple, and those to avoid, such as poplar or pine. They are taught how to cut, buck and split firewood.

Bohen says, "Campers have a very tangible sense of how one goes about growing food, milking a cow or cutting wood. What we're trying to do is make the fundamentals of our communities very hands-on, so they know they have been part of a community that has produced its own food, created its own heat - all that a community needs to thrive."

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