

# Renewable Energy *in the* Farm Barn

## What's behind the glass below?

This section of the Farm Barn is heated with a radiant floor heating system. The pipes below are part of it. Two miles of pipes run in a looping pattern under the floors, carrying hot water from our wood chip boiler in the basement. The heat is completely quiet and very consistent.

The hot water can be pumped to several different zones in the Education Center. Each zone has its own pipe (below) and is controlled by a different thermostat. When someone raises the thermostat in one zone, the beige valve on top of the correct pipe will lift, and hot water will flow to that area.

The heat comes primarily from a biomass energy source: wood. Each year, the Farm Barn uses about 210 tons of wood chips to generate hot water for both heating and cheesemaking. This



Radiant floor heating keeps students warm in the McClure Education Center, especially when they're practicing how to walk like a wild animal during our "Active in Winter" program, one of our many field trips.

equals the energy of 14,500 gallons of oil. In the milder shoulder seasons, the water is heated by an oil boiler, because the chip system runs too hot. Soon we'll replace the oil boiler with a small biomass system, and install more insulation in the Farm Barn walls to reduce the energy needed to heat the building.



## BIOMASS ENERGY

Energy generated from biomass (usually plants or plant-based materials not used for food or feed) can be carbon-neutral because the carbon in the biomass is part of the natural carbon cycle. Plants store carbon as they grow, and release it when destroyed or burned. Fossil fuels, on the other hand, permanently add their carbon to the environment when burned. But biomass is only renewable if we sustainably manage our forests and fields for regrowth.



In the winter, a one-ton dump truck delivers wood chips to the boiler system below the Education Center 3-4 times a week.



## Biomass and Forestry at the Farm

Vermont is the fourth most forested state in the U.S. — 76% of its 4.5 million acres is forested.\* Much of this is second growth forest. (In the 1850s only 30% of Vermont was forested!) At the Farm, we sustainably manage 400 acres of northern hardwood stands and softwood plantations for lumber, firewood, and maple syrup, not to mention for wildlife habitat, recreational trails, and open-air classrooms.

Wood products, including chips, pellets, and firewood, supply 20% of the Farm's energy. In addition to the Farm Barn, they heat several other staff residences.

\*The top 3 forested states are: Maine (86% forested); New Hampshire (78%); and West Virginia (77%)

The wood chips currently feeding the Farm Barn boiler are derived from scrap wood at a lumber yard in Bristol, Vermont, but a new chipper will soon allow us to produce chips from our own woods. Meanwhile, we're also investigating the potential for grass energy from our fields (in the form of pellets) to meet some of our energy needs.

The promise of biomass energy on the Farm will go hand in hand with our sustainable forestry and farming practices.

RIGHT: Woodlands Manager Marshall Webb shares the basics of our forest management practices with aspiring foresters in our "Forester for a Day" program. It's how our forests serve as living classrooms for all.

## Why support renewable energy?

By burning fossil fuels like oil and coal for heating, humans are adding carbon dioxide (CO<sub>2</sub>) to the atmosphere, which directly contributes to global warming. Climate change is the single greatest threat to our long-term survival on this planet.

As an organization educating for a sustainable future, it is our responsibility to teach and demonstrate ways that we can minimize our contributions to atmospheric CO<sub>2</sub> and other greenhouse gases.

Our goal is to build a carbon negative farm by switching to renewables, and by managing our

land and animals to maximize carbon sequestration in topsoil and biomass. In terms of energy, this means:



**Reduce consumption through efficiency and conservation**



**Replace fossil fuels with renewables where possible**



**Produce energy on the Farm from wood, grass, solar, wind**

We're aligning ourselves with the State of Vermont's own renewable energy goals.

### Vermont's Renewable Energy Goals

2025: 25% renewables  
2035: 40% renewables  
2050: 90% renewables

SOURCE: publicservice.vermont.gov

