

To Test and Demonstrate Residential Sustainability

Resources such as small-diameter timber, harvested rainwater, energy from wood waste, and energy from the sun are all plentiful and renewable. Using these resources efficiently can provide a sustainable support system for cold climate housing by reducing our reliance on non-renewable fuels and making better use of forest resources. The technologies to harness and use these resources are being developed, tested, and evaluated under real-world conditions.

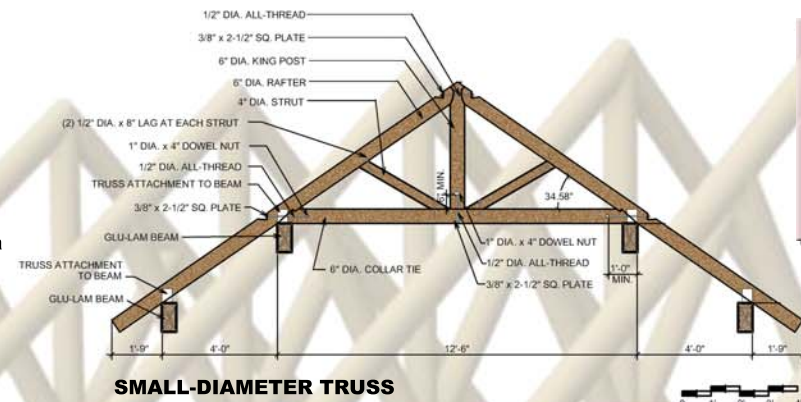
This project is designed to demonstrate and validate several points:

- The combination of a BioMax biopower system with solar energy (photovoltaics) can provide the power needs for residential structures in a cold climate.
- Rainwater can be reliably harvested and treated for potable use.
- Systems to save energy and water are safe, reliable, and provide sustainable security.
- Technologies are available and work well in cold climates.

The Carriage House is appropriately scaled to fit the site and complement the existing Research Demonstration House on the grounds of the Forest Products Laboratory in Madison, WI, and will be the size of a contemporary two-car garage. This new building will demonstrate the technical feasibility of using small-diameter roundwood and other small-diameter material in the conventional housing market.

The energy and water harvesting systems in the Carriage House are designed to supply the energy needs and the potable water requirements for an average residential home in a cold climate.

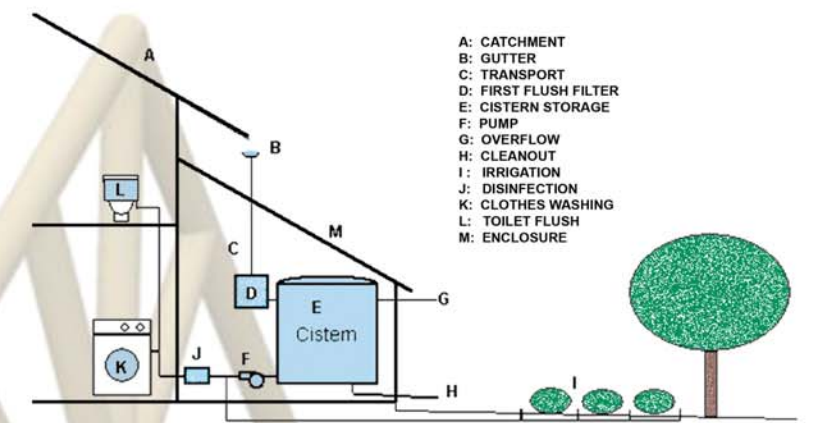
The systems in the Carriage House, located on Forest Products Laboratory ground in Madison, WI, are designed to supply the energy needs and the potable water requirements for an average residential home in a cold climate like Wisconsin.



SMALL-DIAMETER ROUNDWOOD

Small-diameter roundwood is harvested from forest thinnings using logs that are less than 12 inches in diameter. Leaving the timber round, rather than cutting it into lumber, retains more strength and requires less processing.

The roof is sheathed with decking made from lumber cut from small-diameter trees that is laminated to create a strong, warp-resistant product.

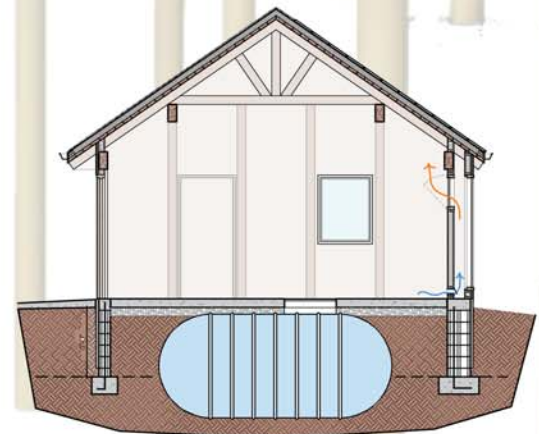
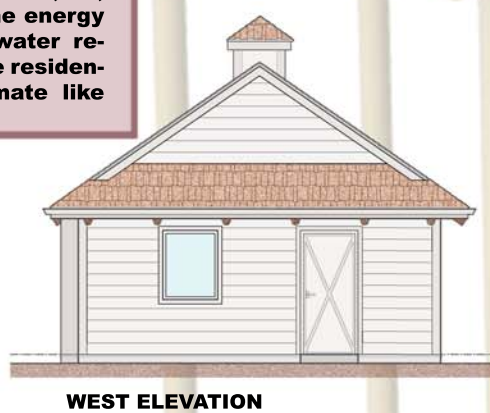
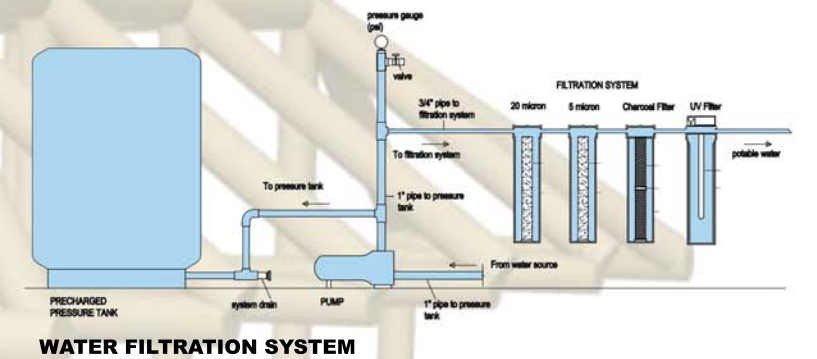


ELECTRICAL POWER SYSTEMS

The 3 kW photovoltaic solar collectors are roof integrated.

The BioMax system gasifies wood chips to run an electrical generator and provide heat energy.

Both systems provide electrical energy for the residence that is used for immediate electrical needs or the surplus is sent to the utility grid.

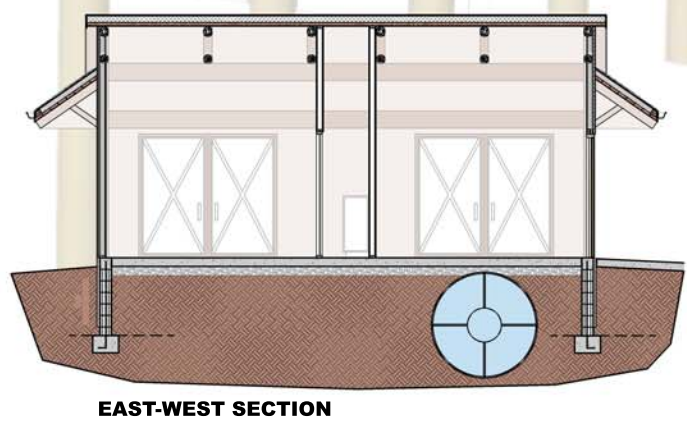
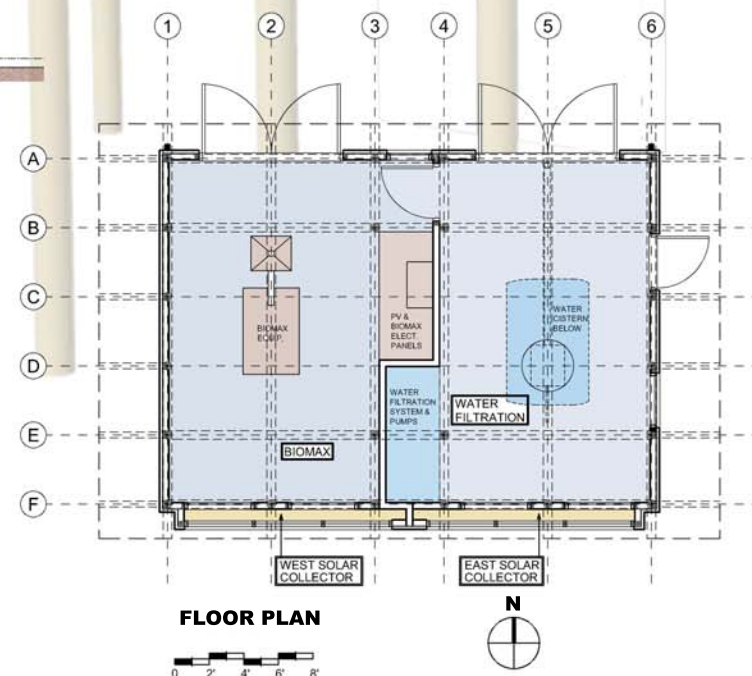


PASSIVE SOLAR SUNSPACE

Hot air collecting behind the glass on the south side of the Carriage House will flow via a natural or fan-assisted convection loop into the building. Cool air enters the sunspace at floor level from the building interior through a barometric damper. As the air is warmed, it rises and flows through the operable windows, conveying heat to the building interior. When the sunspace cools, the damper closes and the sunspace is insulated from the building interior.

WATER SECURITY

Rainwater harvested from rooftops is stored in a below ground cistern. From the cistern the water is filtered, disinfected, and then pumped to the residence as a potable water source.



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