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UNIVERSITY OF WISCONSIN - STEVENS POINT

## UW-SP faculty member designs "green" building

### Renewable energy and sustainable design on display

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Driving down county highway S, in the midst of the aspen uplands, mixed hardwoods and open marshes of the Mead Wildlife Area, you may come across an unfamiliar sight. At about 120 feet straight up, peeking just over the tree line, is a new state-of-the-art wind turbine that stands in front of one of the greenest publicly owned buildings in all of Wisconsin. And it was designed by a faculty member of UW-SP.

Tom Brown, associate lecturer in interior architecture, is the man responsible for designing the new Mead Education and Visitor Center, which is located about 20 miles northwest of campus. The new building, open for the first time to the public Saturday, was packed with people curious to have a look at the science and technology that went into this largely private-funded building.

With the incorporation of sustainable design principles, a number of renewable energy components, and the use of recycled materials, the 6,200 square-foot center consists of three wings: a lobby area, a staff area and an educational area.

"The education wing will be open on an as-needed basis, basically for school groups, hunter safety classes, environmental groups, wildlife groups

or whoever needs to use the building," said Brown. "The three wings have separately zoned mechanical systems, so they can operate independent of each other."

Efficiency is key to the operation of the building on a daily basis. Thanks to a "high performance building envelope," the center is able to better maintain indoor temperatures.

"The wall is blown solid with cellulose insulation," explained Brown. "There's a thermal break that separates the outside surface of the wall from the inside surface of the wall, which makes the wall perform much better."

"I think this is the first time a state facility has been built this way," he added.

While most of us tend to rely on electric lights when indoors, the center is designed to utilize as much daylight as possible.

"Most of the time this building doesn't need any lights on at all," stated Brown. "Some of the lights in the building have daylight sensors that sense the amount of natural light coming in and dim the lights accordingly."

The building relies on "cool daylighting" during the summer, which brings in light without bringing in the heat of the sun. You wouldn't think such a feat was possible after visiting the center and peering through the staggering number of windows that look out across the beautiful central Wisconsin landscape. But you'd be wrong.

According to Brown, passive solar design makes the seemingly impossible, pos-

sible. The building's southern exposure permits the sunlight to pour in during the winter when the sun sits lower in the sky. But in the summer, when the sun is higher in the sky, the extra long overhangs - twice as long as typical overhangs - shade the interior from the sun's hot rays.

When they need to directly control the temperature, however, they are able to do so in a couple of different ways, using renewable sources.

The first way is through geothermal heating and cooling. Basically, a bunch of tubes are buried 8 feet underground and hold a bunch of water that maintains a constant temperature year-round. A pump allows that water to be moved between the ground and the building when needed.

"We take heat out of the building and dump it in the ground in the summer," said Brown, "and we take heat out of the ground and dump it in the building in the winter."

The building also contains a wood biomass central masonry heater. It looks something like a giant chimney in the middle of the lobby. What it does is burn wood at very high temperatures.

"One load of wood (an armful) burning for about an hour-and-a-half will cause this thing to generate heat for about 24 hours," said Brown.



Photo by Tom Brown

solar water panels, which you will see as you pull up to the front of the building. The heated water is put into storage tanks for later use.

As far as electricity generation goes, the building relies on both wind and photovoltaic energy.

The photovoltaic array, with the aid of a tiny motor, literally follows the sun as the day wears on and converts the light into electricity, even on cloudy days. It is able to generate 2.3 kilowatt-hours of electricity on a sunny day.

The wind turbine is able to produce up to 10 kilowatt-hours of electricity.

Together, these two technologies always generate electricity and supply the building with much of its power needs.

Since the site is tied into the grid, when the devices generate more power than the building needs, the excess is sold directly to the power company. When the building requires additional electricity, they can get it from the power company.

"Alliant Energy buys elec-

the same price we buy from them," said Brown.

The building was also constructed with recycled and environmentally friendly materials. Some examples include paint free from volatile organic compounds, and floor tiles made of recycled glass, manufactured locally. Brown estimates that 95 percent of the waste from the construction of the center was, in turn, recycled.

Two-thirds of the project was financed by private donations. Donations came in the form of money, materials and time. The project also received an Energy Incentive Grant to help finance the renewable technologies.

"We're hoping that this building is a start to get all state and public facilities employing these practices," said Brown. "And hopefully private individuals who are building homes or commercial buildings start to incorporate some of these features."

"After all, we're just a small dot in the cosmos, and this is the only earth we've got."