MUM's Sustainable Living Center

New Zero-carbon Classroom Showcases Green Living

BY LINDA EGENES

An architect's rendering of the Sustainable Living Center at Maharishi University of Management in Fairfield, Iowa, now under construction

With U.S. buildings consuming 77 percent of our electricity and creating over half our country's greenhouse gas emissions, most major architecture firms have adopted the Architecture 2030 challenge to bring their buildings' carbon footprints to zero by the year 2030.

Yet many experts wonder if we couldn't be moving faster. Now a building under construction at Maharishi University of Management is about to show that we don't have to wait until 2030 for zero carbon—anyone can do it right here, right now.

A Building Like No Other

The Sustainable Living Center is a 7,000-square-foot classroom and office building that combines so many features of sustainability and meets so many standards of ecological building that it is being widely heralded by architects and builders around the world.

"This building will be completely off the grid in electricity, heating, cooling, water supply, and waste disposal," says David Fisher, Ph.D., the intrepid head of the Sustainable Living department at MUM, who, with his wife, Mabel Scaroni-Fisher, spearheaded the building's development from its inception. Fisher has seen his department grow from six students in 2003 to 80 today, making it one of the largest sustainable living programs in the U.S.

"We wanted to create a building that walked our talk, that demonstrated sustainability and self-sufficiency as a teaching model for our students," he says. "And for the public too—to show that we can live sustainably."

When it's done, the SLC will create more energy than it uses—enough to supply itself and provide power to the university's nearby library. And it's doing all this using off-the-shelf technologies that are available to anyone—at a fraction of the cost of other energy-efficient buildings.

As if that weren't enough to put it on the cutting edge, the building also demonstrates four philosophies of sustainability—something that has never been combined in one building anywhere on the planet.

First of all, it is designed to earn the LEED Platinum certification, the highest award from the internationally known green building certification system. Second, it meets the more rigorous criteria

of the Living Building Challenge. When complete, it will be one of the select few buildings in the world to achieve this demanding building standard, which calls for new structures to produce all of their own energy, use only water that falls on-site, rely on sustainably sourced materials that come from within a 250-mile radius, and avoid a "red list" of toxic materials including asbestos, mercury, and PVC.

Third, the building will also demonstrate the 25 nontoxic principles of Building Biology (known in Germany as Bau Biologie).

Finally, it is designed in accord with Maharishi Vastu architecture, a complete system of natural-law-based architecture, which creates wholly nourishing influences on the occupants.

"By having all those certifications, it's a way of conveying to our students and the world how you can combine the ancient wisdom of Maharishi Vastu architecture with the modern visions of LEED, Living Building Challenge, and Bau Biologie," says David Fisher. "It's a kind of ancient-meets-present and an east-meets-west kind of building."

Peace and Harmony

The first thing I notice when I enter the building is the trees. It turns out that even a soft wood has tremendous strength when left intact, and in this building 16 whole aspen trunks support the entire structure like Atlas holding up the heavens. Stripped of their bark and burnished in golden sunlight that floods every corner of this building, they give the feeling of a living forest.

These trees were sustainably harvested near La Crosse, Wisconsin, from a forest managed by the Forest Stewardship Council. The trees meet the Sustainable Building Challenge guidelines to source all materials within a 250-mile radius.

"Aspen trees have no commercial value," says Dal Loiselle, the affable developer and construction manager for the project. Dal's been constructing eco buildings since 1989, and like David Fisher and architect Jon Lipman, he's been researching systems for the project for five years, donating thousands of hours before the project got off the ground.

"They're softer than softwood trees like pine and fir that we typically use in dimensional lumber," he continues. "But when you take a whole tree, it has double the strength. "

The next thing I notice are the compressed earth blocks, stacked like bricks, forming the inner layer of the envelope of the building. It feels calm and peaceful here even with the typical construction sounds of buzzing saws and thwacking hammers. The blocks are made of local earth that was harvested when the neighboring Argiro Center's parking lot was excavated.

"Soren Pearson, a student in the Sustainable Living program, researched the feasibility of using rammed earth," says Dal. "We rented a machine and the students themselves produced the 26,000 blocks." Many other students, including Dal's own daughter Nelina, helped with the fundraising, the research, and the testing for the building's systems.

It's hard to convey the degree of sheer intelligence and hours of research that have gone into this project. Dal points out the double wall that forms the outer envelope of the building. "The outer wall is a 2x8 stud wall with sheathing on both sides, filled with cellulose (recycled newspaper) for insulation. There's a two-inch gap, and then there's the layer of earth blocks for thermal mass. The insulating layer keeps heat or cold out and the thermal mass layer stores heat or cool. The gap prevents thermal bridging."

Dal says one of the reasons they used earth blocks is because that's the way the Native Americans and early pioneers built here—out of earth and out of wood. "Earth also has a nice quality," he says. "It's cooling in summer and it grounds you, so you feel good. You feel settled."

Earth breathes and absorbs moisture. "It's what you call hydroscopic," he says. "In summer when it's humid it will take some of that moisture and absorb it. In the winter when it's dry it will give that moisture back. So it maintains a relative humidity. Earth does that, and the whole trees will do the same."

Dal takes me up on the roof where there's a glorious view of the campus. The roof will serve as an outdoor space for classes and social events. On the southern edge stand 10 solar tube panels lined up in two rows. Water circulates through a manifold and is heated by the solar tubes. Once heated, it's stored in a 4,800-gallon stainless-steel insulated tank and then circulated under the floor as radiant heat. The building has five kinds of solar power—in the form of passive heat, solar thermal tubes, photovoltaic panels, film, and shingles. The roof's membrane also reflects the sun to help heat the solar tubes.

"The tank is insulated and large enough so that even if the weather is cloudy and there is no wind for a while, we'll still have enough hot water to heat the building," says Dal.

Solar energy is also used to cool the building—as moist air is drawn over a liquid desiccant and the warm, moist air is extracted by heat from the solar tubes and pushed outside, reducing the humidity

in the building. Cooling is also achieved through "night flushing" by an air well that draws in cool night air in summer, resetting the earth block walls that radiate the cool during the day.

Covered with a TPO membrane, which is free of toxic PVC, the roof is slightly sloped to catch rainwater in six drains. The rainwater is purified with an ultraviolet filter and stored in a cistern underground.

"It only takes one inch of rainfall to fill our 6,000-gallon cistern," says Dal.

Below us we can see the area where the peat-moss-based sewage treatment system will be built. "This is a system that prevents nitrogen and other toxic nutrients from entering our waterways and contributing to the dead zone in the Gulf of Mexico," says Dal. "It's also a way for municipalities to help their overworked waste management systems."

Dal points out the utility cottage below that contains the equipment to convert wind and solar energy to AC electricity. It was one of the first structures built on the site, and has 12 solar panels of its own, which generate the electricity needed for construction. All construction waste is also being recycled, making the building non-polluting from day one.

Preparing for the Public

"According to Mike Nicklas," says David Fisher, referring to the architect and green building expert, " there are now several hundred building professionals who know about this building and are watching and waiting to see how it performs."

The first thing the visitors will see as they climb off their bus (yes, there's a tour bus parking plan) is a charming bridge over a waterfall and stream meandering through a garden of edible and native habitat plants that not only look beautiful, but capture storm water and purify it, preventing toxic runoff and flooding of nearby buildings.

The building will feature 12 exhibit bays to explain its unique features. Environmental monitors around the building will record and archive the performance of the building in real time on a website, so anyone anywhere in the world can see how the building is performing.

With so many sustainable features packed into one building, the project has attracted national media attention. At a press conference that marked the use of solar panels to produce the energy to build the building, Iowa State Representative Curt Hanson said, "Let's use this as a learning tool and learn from the experiments that are taking place in this building and perhaps get more of us off the power grid, more of us off the foreign oil, more of us energy efficient.

Read more about the team of experts and volunteers that came together to make this building happen: "Sustainable Living Center: It Takes a Team to Go Green."

For more information, see MUM Sustainable Living Center.

Linda Egenes is a Fairfield-based freelancer who writes about green and healthy living. Visit her blog at www.lindaegenes.com.

If you would like to be part of this remarkable adventure in sustainability, contact Dal Loiselle at (319) 217-2179.

Visit the index for more articles on green living.

Comments (3)

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written by Tom lollis, March 07, 2011

What a wonderful idea/reality.....I am currently trying to develop ceramic walls that can be fired in brush fires.....I am not certain concerning the pollution factor but wish to be as pollution free as possible.....these walls can be fired in whole sections and in site/place.....the composition of the native clay is the key.....If you are interested? Please contact me via email..

..thank you.....nice to see you doing this david.....your good friend Tom.....i like grits grin

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written by tlccabin, November 22, 2010

What a remarkable project. I love what MUM and the Fairfield community create for themselves and model for the world! Good stuff!
Votes: +0 vote up vote down report abuse

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written by HarperValleyGirl, November 21, 2010

Inspiring, stupendous, groundbreaking and just so way cool! Go MUM and TM people!
Votes: +0 vote up vote down report abuse

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