



## **Living Learning Center to be the First Living Building in the Country**

Washington University's [Tyson Research Center](#) acts as a living laboratory for ecology and environmental biology. During the summer, the Center houses a very active undergraduate research program. Last summer, Tyson received a grant that will allow it to play host to a high school internship program. This new grant program required Tyson Research Center to build a new facility to house it. The appointed architect, Dan Hellmuth, brought the idea of participating in the [Living Building Challenge](#) – and the Living Learning Center was born.

The [Cascadia Region Green Building Council](#), one of three original chapters of the U.S. Green Building Council, created the Living Building Challenge a few years ago. The

challenge encourages construction of a completely self-sustainable building. The first completed entry for the challenge was opened May 29, 2009 at Tyson Research Center.

Kevin Smith, an Associate Director at Tyson, says "The Living Building Challenge suggests that even though everyone is comfortable with green sustainable buildings now, we can still do a lot better. There are much higher criteria that we can meet to constantly be pushing the limits of what we consider as green and sustainable. [Tyson] is an environmental research station, and so putting our money where our mouth is in terms of sustainability really appealed to us."



The Living Learning Center (LLC) had to meet stringent requirements in order to be in compliance with the Living Building Challenge. **The building has to use zero net energy and zero net water. This means the building itself must produce all of the energy it uses.** Water must be collected when it rains, filtered and stored at the facility. Other requirements set by the Green Building Council include the types of building materials used.

"There are two sets of requirements, really," said Smith. "There were Red List materials that could not be used in the building for the most part, PVC and lead for example. Also, the materials that could be used could only come from so far away, because of the carbon footprint created by all of the transportation."

The Building Council set distances for materials based on the material's density. Heavy materials such as metal had to be delivered from within 250 miles, wood 500 miles, and other materials could come from further away the lighter they were. Some alternatives were found for Red Listed materials, but they came from too far away. When this happened, Tyson would work with the Cascadia Region Green Building Council and file for an exemption. "A lot of this was a learning process, not only for us, but for the Green Building Council as well. They were relying on us to feel out a lot of these requirements to see how possible they were."



Tyson has met all of the requirements of the challenge so far. The features of the building are what make it so impressive. All of the exposed wood is manufactured from trees that come from around Tyson Research Center. The Center found trees that were invading other habitats and had to be removed, and also used trees that had already fallen.

The largest roof is slanted and covered in solar panels that produce the energy for the Living Learning Center. **On a sunny day, the solar panels can produce 80 kilowatts of energy. This is enough energy to power 21/2 houses a day.** Because the LLC uses less energy than an average home, the excess energy is fed back into the grid, and the LLC is given credit from Ameren through a program called "net metering". This means that on a cloudy day when there is little solar energy being produced, the LLC can draw energy from the grid and continue to maintain zero net energy.

The slanted roof also aids in fulfilling the requirement of zero net water. Rainwater runs down the roof into a gutter system that collects the water, passes it through 4 different types of filters and then into an underground, 3,000-gallon storage tank. Then, as an extra requirement implemented by building inspectors, another filter on every faucet will eliminate any bacteria that could be remaining in the water. The LLC uses minimal amounts of water due to composting toilets, and landscaping that requires little watering. **The 3,000 gallon tank could sustain the LLC for 60 days during a severe drought (zero inches of rainfall).**



Landscaping around the building plays its part in sustainability, too - all of the plants are native to the area and require low maintenance and water, which reduces the carbon footprint necessary to sustain. A rain garden collects runoff from one of the un-slanted. The water goes down a decorative "rain chain" and into the rain garden. The Living Learning Center even reduces runoff with the use of porous concrete. Rainwater that falls on the sidewalk permeates right through it and into the soil below.

Every piece of the LLC is designed to increase its sustainability and to make it more eco-friendly. From siding, energy usage, hyper-efficient zone controlled air-conditioning, double glazed windows, and composting toilets, the Living Learning Center can be used as an example for anyone that wants to create a greener living, learning, or working environment.

"The building as a system isn't separate from the environment, but integrated with the environment," says Smith. "It really fits with our mission."

If the Living Learning Center can maintain the requirements of the Living Building Challenge for one year, then they will be the first certified Living Building in the country. The building - used as classroom, office, research center, computer lab, and meeting space - will inspire anyone that walks inside to strive to include green-living in their day-to-day lives.

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