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Form Follows Function in Archbold's building

In Florida we worry about energy use in buildings during our hot, steamy summers and everyone is probably noticing a spike in power consumption from cold snaps during the last few weeks. One place in Highlands County to learn about energy saving is the Frances Archbold Hufty Learning Center at Archbold Biological Station. Hilary Swain, Archbold's Director explains, "When we completed construction of the Learning Center in 2011 we were awarded the prestigious LEED Platinum® certification, the highest rating achievable from the U.S. Green Building Council. Saving energy was one of the six green building components needed to achieve this rating. At that time the Center was only the 11th commercial building in Florida to have achieved this lofty designation."

Swain added, "Constructing a green building requires concerted time and effort in planning and design. It took the ideas of a large team to meet our goal. Archbold staff worked for months alongside architect Jeff Mudgett from the Fort Myers firm PMS, engineering firm TLC, construction contractor OAK, and the 'built environment' consultants from the Rocky Mountain Institute, in Colorado. Key to energy savings was developing an 'energy model', a

computer model that evaluated each aspect of the building design, predicting energy use and how close we were to meeting our energy goals. The modelers from Florida, Colorado, and India worked collaboratively. As Archbold scientists we appreciated asking questions one day, like, "How many inches of insulation should go under this roofed area that will pay off in energy savings over a 15 year life cycle", and getting the model answer—4", 6", or 8"—the next day. We went through 35 iterations of the design before we correctly modeled our energy savings."

A lot of the choices the design team made were proven, traditional Florida approaches to energy savings, ideas from the days before electricity and air conditioning. Foremost, one third of the building space is 'outdoors', with huge screened in porches using little energy, not unlike the deck of a family home. Dustin Angell, Archbold's Education Coordinator whose office is in the Learning Center explains that, "Archbold activities with schoolchildren trips, public visitors, and meetings often taking place outdoors in these shady, breezy spaces. People enjoy being outdoors in comfort".

Bert Crawford, Archbold's head of maintenance explains further, "We used many passive solutions to reduce energy use. For example, the long axis of the building runs east-west with a central open corridor which lets in light, but not heat, and allows breezes to blow through. Windows on the north side of the building are large with minimal eaves or overhangs: they let in sunlight but not direct heat from the sun. Windows on the south side are shaded by very large eaves, 6' or 8' in width, that prevent direct heat but allow light through windows via reflection off concrete walkways below. And there are few windows on east or west walls because it's hard to shelter these from the heat of the Florida sun."

Obviously using energy efficient lighting fixtures was another key to energy savings, but more important was precisely locating windows and strategic 'lightshelves' to reflect balanced light into every room. Dustin Angell explains that, "During the day we only ever use natural lighting in the Learning Center." Victor Olgyay, architect with the Rocky Mountain Institute, added, "Daylight provides a superior visual environment, and saves energy by displacing electric light. This building is one of the best natural lighting designs we have ever seen in this country".
A key part of the energy design was using a new technology for air conditioning called Variable Refrigerant Flow, essentially piping refrigerant to each space and precisely controlling which rooms are being cooled or heated, rather than ducting large volumes of cool/warm air around.

"The new HVAC technology is effective", says Bert Crawford, "although we experienced several problems with installation and maintenance of electronic controls that are more expensive than anticipated."

Of course, insulation was vital for efficient heating and cooling. Thick walls, that prohibit the sun's heat from penetrating, with different window glazing types based on window locations, keep cooled air from escaping, helping to sustain efficient air temperature inside the buildings. Jim Keohane, engineer from TLC noted that, "We are particularly proud to have achieved the maximum LEED energy points (using 50% less energy than typical new, permitted construction), largely by reducing energy consumption through design and technology".

Jeff Mudgett, once shared that, "As the architect, the Learning Center will always be my favorite. I was given the freedom to design it entirely from first principles." The Learning Center is certainly a testimony to his approach, where form follows function. Using this principle Mudgett also produced a very beautiful, inspiring building, voted the public's "4th favorite new building in Florida" in 2012. When the Learning Center opened in 2011, Mollie Doctrow, former curator at the Museum of Florida Arts and Culture wrote, "Being in the Learning Center, in this space, changes you. It changes how you feel." Sebastian Atucha, Archbold Board member, added "The buildings have enhanced Archbold's goal of serving as a world-class showcase of sustainability."

Consider visiting Frances Hufty Learning Center at Archbold and learn more on the short, self-guided 'Green Notes' tour. Archbold is open to the public from sunrise to sunset 7 days a week. The Welcome Office in the Learning Center is staffed with volunteers from 9am to 1pm on Fridays and Saturdays, January through April.

Photo 1: Light gathered from clerestory windows high up is reflected from light shelves into interior rooms. Photo by Archbold Biological Station.

Photo 2: A sign from Archbold's 'Green Notes' tour in the Frances Hufty Learning Center at Archbold. Photo by Archbold Biological Station.

Photo 3: A sign from Archbold's 'Green Notes' tour in the Frances Hufty Learning Center at Archbold. Photo by Archbold Biological Station.

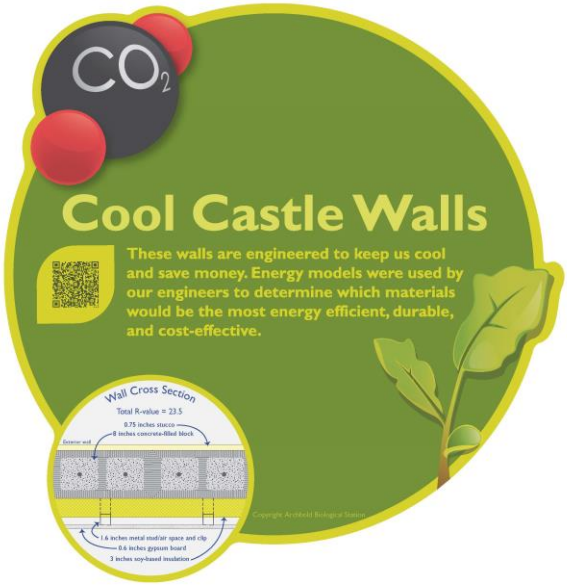

Photo 4: A sign from Archbold's 'Green Notes' tour in the Frances Hufty Learning Center at Archbold. Photo by Archbold Biological Station.

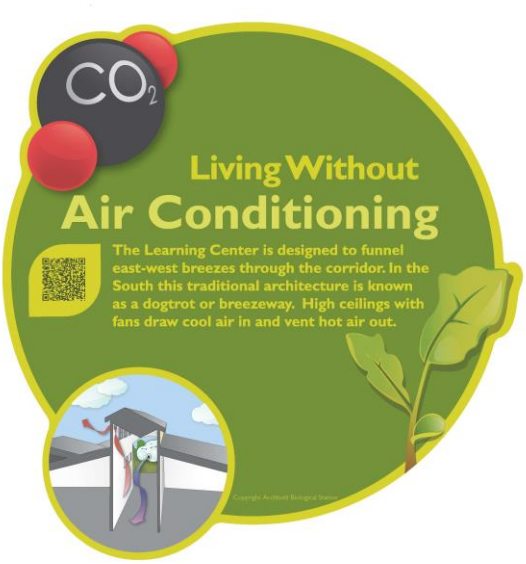

Photo 5: A sign from Archbold's 'Green Notes' tour in the Frances Hufty Learning Center at Archbold. Photo by Archbold Biological Station.