



Ohio University
Athens, Ohio
Green Building - OHIO Ecohouse

SCHOOL

Ohio University is a public 4 year university with 29,486 students in Athens, Ohio.

ABSTRACT

The OHIO Ecohouse is a 3-person student residence, designed to demonstrate affordable green technology and sustainable living in order to inform, engage and inspire both residents and visitors. The 100 year old home features a 2.4 kilowatt photovoltaic array, a solar thermal water heating system, Energy Star rated appliances, a biomass furnace, organic vegetable garden, blown cellulose insulation, as well as various composting systems. Undergraduate and graduate students compete annually for selection as a resident. Over the four years since the project was launched, thousands of Ohio University students and community members have engaged with the project by attending Ecohouse events, as well as incorporating the Ecohouse into student projects, curricula and public campaigns. The Ecohouse is the most prominent public sustainable living education center in Southeast Ohio.

GOALS AND OUTCOMES

Goals

- Provide a dynamic and experience-based educational experience for tenants and visitors;
- Stimulate and foster critical thinking on sustainability questions among community members, and the students, faculty and staff of Ohio University;
- Develop community-based partnerships and outreach programs on sustainability issues;
- Demonstrate affordable green technology and sustainable living as applied to the Southeast Ohio region.

Accomplishments and Outcomes

A professional whole-house energy audit (including blower-door test) was performed on the property in order to establish baseline consumption and identify potential for efficiency upgrades. A number of different systems that address resource consumption issues have been installed at the Ecohouse including an outdoor clothes dryer, 2.4 kW solar array, a solar thermal water heater, an instant hot water heater, high efficiency water fixtures, outdoor compost bins and a vermicomposting system, a rain barrel water harvesting system, a whole house attic fan, compact fluorescent lighting, a biomass furnace, an organic vegetable garden, a programmable thermostat, and an Energy Star refrigerator, clothes washer and dishwasher. The house has been sealed and properly insulated, using blown-cellulose material manufactured from recycled newspaper. Initial funding for improvements was provided by Cinergy Solutions, which was engaged in a performance contract relationship with Ohio University at the time of the launch.

Between October 2007 and June 2009, over 15,600 kWh of energy were produced by the photovoltaic array and 17,400 kWh by the solar thermal water heater. Ecohouse energy production has offset the equivalent of approximately 36 tons of carbon emissions. However, in the same time period the Ecohouse has consumed an additional 6,900 kWh. Due to a heavily coal dependent utility, this has resulted in approximately 6 net tons of carbon emissions annually. According to the U.S. Environmental Protection Agency, the average American home produces approximately 12 tons of carbon emissions each year from heating and electric.

In the few years since the OHIO Ecohouse was founded, it has established itself as a primary hub for information and education on sustainability in Southeast Ohio. Thousands of students and community members have toured the Ecohouse, participated in workshops, and joined potluck dinners. Hundreds of Ohio University students also regularly tour the house as part of their curriculum in a number of courses, including Environmental Geography and Environmental Risk Communication. Hocking College, in nearby Nelsonville, Ohio, also brings students enrolled in their Sustainable Development course. The Ecohouse serves as one of the learning community sessions for the Kanawha Project, a faculty development initiative. The Ecohouse also hosts programs which bring school age students from the region to campus to participate in grade-appropriate lessons tailored to curriculum standards.

Outreach to the larger community is an integral goal of the Ecohouse. To address the needs of individuals who are not able to come to the site, we developed a web site (www.ohio.edu/ecohouse) which includes a virtual tour of the property, with specific information on the technology and available incentives for homeowners. In addition, the website is linked to a Lucid Dashboard, which tracks hour by hour utilities consumption and production for the house.

We also launched the Ecohouse Digest in 2005, a weekly e-newsletter that contains information about green living and sustainability in Southeast Ohio. Over 148 issues have been published to since 2006. We frequently receive inquiries from individuals across the state of Ohio interested in installing green technologies in their communities who have found our information as a result of a general web-based search on the topic.

Challenges and Responses

The Ecohouse is over 100 years old. There were challenges right from the start that were inevitable considering the age of the property. Before any “space-age” technology could be installed, we had to repair the slate roof.

Maintaining installed systems that are by definition unconventional has also been an issue. For example, we have had problems with the inverter for the solar array, the solar thermal water heating system and the high efficiency washing machine that were difficult to address due to the fact that our university maintenance staff are not as accustomed to working with these technologies.

We had to close down one of the early features of the house which was a waste vegetable oil (WVO) filtration system, accessible to community members. It turned out to be unfeasible (and very expensive) to bring the garage where it was housed up to proper health and safety codes and limit liability issues.

The Lucid monitoring system, installed a few years into the project, has not performed consistently. We have also not found very effective ways to leverage this tool beyond the “neat” factor. In the future, we would like to continue to strengthen the curricular connections between the Ecohouse and our course offerings.

In terms of student involvement, the project is fairly labor intensive in that new student residents must be retrained every year to be able to manage the house and lead tours. In addition, keeping the project fresh and current can be an ongoing challenge. Student projects need to be actively followed and maintained to prevent the Ecohouse from becoming a graveyard of half-completely projects.

Campus Climate Action: Your School's Carbon Footprint

The OHIO Ecohouse was created with the intention of creating a way to demonstrate sustainable living behaviors and systems for the region. In this respect, it directly addresses climate change by fostering critical thinking on the issue among community members, both university and the community at large. Further, the technologies in the house have enabled the project to avoid the equivalent of 36 tons of carbon emissions since October 2007. Sustainable living practices have also contributed to lowering the carbon footprint of the house, though those are more difficult to quantify.

Commentary and Reflection

The Ecohouse is a great way to show off our institution's commitment to sustainability. Despite the fact that it is a small-scale project, it has a large presence on campus. Many students will first encounter our sustainability initiatives through their interest in or exposure to the Ecohouse. It is a vital piece of our sustainability community here at Ohio University.

ENGAGEMENT AND SUPPORT

Leaders and Supporters

The OHIO Ecohouse project was initiated by interested faculty, students, community members, and business leaders. Fundraising and the initial implementation of the project was coordinated by the on-campus representative of an ESCO (Energy Services Company), before the entire project moved under the Office of Sustainability after its creation in May of 2006.

Many community organizations and local businesses have participated in the planning and development of the OHIO Ecohouse and events held there, including Dovetail Solar and Wind, Third Sun Solar and Wind Power, the Ohio Ecological Food and Farmers' Association, the Corporation for Ohio Appalachian Development (COAD), Community Food Initiatives (CFI), Worms N Bats, Habitat for Humanity, Leadership Athens and Healing Heart Herbs.

Funding and Resources

In the first year of implementation, over \$60,000 in grants were made available for the project. Of this, more than \$43,445 was received as a grant from Cinergy Services, Inc, an ESCO that was engaged in a performance contract on our campus at that time. An additional grant of \$15,540 was made to Ohio University by the Ohio Department of Development through the Energy Loan Fund. This funding supported the installation of a 2.4 kW solar array and a solar thermal water heater.

On going funding for maintenance is provided by rent payments of \$360/month/person as of July 2009. Utility costs are covered by the University's General Utilities Budget, and are not covered by residents. Rent payments provide funding for improvements including: an energy audit performed by the COAD and Nu-Wool insulation, a Danby Design dishwasher, a Staber Industries washing machine, and a rainwater harvesting barrel.

In addition, funding from rent payments also goes toward student-led projects. Past projects have included previously mentioned efficiency upgrades, such as the rain barrel and insulation, but have also included finances for the vegetable garden, an herb garden, and a fire circle.

Education and Community Outreach

Much of the education and outreach outcomes are discussed above in the Accomplishments section, as this project is designed in large part as an outreach vehicle.

In regards to the basic tour that we provide for visitors, we tried to focus on several goals:

- Give visitors a complex appreciation of sustainability challenges and solutions;
- Provide visitors with up-to-date information on the various physical systems and equipment used at the house;
- Engage visitors in self-reflection on their own lifestyles and life circumstances;
- Inspire visitors to consider making concrete changes toward a more sustainable lifestyle;
- Connect visitors to the large community and family of sustainability programs at Ohio U.

The tour begins with a go-around in which participants discuss some aspect of their own lives at this moment in time in terms of its impact from a sustainability perspective. We emphasize that whatever they choose can be “good” or “bad” – it’s not about judging people, it’s about exploring the relevant issues. In this way, we are able to engage people right from the right in a conversation, rather than a lecture. I personally also make a point of challenging commonly held beliefs that are considered pro-environment so that visitors understand that this experience is about critical thinking and not band-wagon mentalities. There are no sacred cows at the Ecohouse.

We try to tailor the tours to each individual group. For example, when we are setting up tours for a particular class, we try to get a hold of the syllabus to make sure we tie the material back in to their course content.

As we explore the various parts of the house and the property, we ask lots of questions. The residents of the Ecohouse are expected to avoid message-dissemination as a form of communication. Participatory inquiry better describes our approach.

We try as much as possible to avoid over-emphasizing technological solutions to problems (see “Challenge” section). Even when we are discussing a particular piece of technology, we often will ask questions that deal with openness to adoption, patterns of use, social-economic factors, etc. We don’t shy away from problematizing common held beliefs or attitudes about solar power, organic food and other beloved solutions to sustainability challenges. We believe that a critical informed population will ultimately be best positioned to successfully navigate complex problems.

We also host monthly open houses for all community members. Often, guest speakers will speak about a variety of related topics, from green cleaning to composting. Open house events are often potlucks that encourage community interactions and communication.

We are actively involved in organizing school trips for local elementary school classes. Usually the program begins or ends at the Ecohouse, but also includes hikes, visits to Campus Recycling, invasive species activities, and visits to the Compost facility. This past spring, over 200 local children participated in an Ecohouse scavenger hunt.

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MORE ABOUT YOUR SCHOOL

Campus Sustainability History

The Ohio University Office of Sustainability was established in May of 2006 (www.ohio.edu/sustainability). During the same time frame as the OHIO Ecohouse, the Office of Sustainability has bottom lined many projects including participation in the Presidents Climate Commitment, the Green House Project, the composting project, and the Residents Challenge.