Oberlin College photos courtesy of Oberlin College

A LESSON FOR ALL

College campuses often serve as incubators for the solutions to some of society's greatest challenges. At Oberlin College, a small, private liberal arts college in Oberlin, Ohio, the monumental challenge of addressing climate change and minimizing a building's environmental impact is being tackled through an innovative facility that proves buildings can give more than they take from the environment.

The 13,600 ft^2 Adam Joseph Lewis Center for Environmental Studies serves as a tool for Oberlin students to learn how nature works and how humans interact with it. The Center is composed entirely of materials selected for their ability to contribute to a green building – including STYROFOAM™ Brand Extruded Polystyrene (XPS) Insulation. Several years after its completion, the building continues to inspire a generation of architects committed to designing functional yet innovative buildings that combat rising utility costs, economic dependency on foreign oil, climate change, natural resource depletion and landfill issues.

William McDonough + Partners of Charlottesville, Va., an architectural firm specializing in sustainable design, worked closely with Oberlin to establish strict criteria for material selection – demanding products with proven durability and green characteristics, especially energy-efficient performance. The team's decision in 1998 to use STYROFOAM™ Brand XPS Insulation in the roofs, walls and floors has helped contribute to one of the world's premier examples of a green-centered building.

Graduating With Honors

Since its completion in 2000, the Adam Joseph Lewis Center has achieved astonishing success. On average, the building generates about 13 percent more energy than it needs to operate.

All of the materials selected for the Center's construction had to pass a meticulous examination by both the building's designers and the college before they could be specified.

STYROFOAM™ Brand Extruded Polystyrene Insulation, with exceptional water resistance compared to expanded polystyrene, passed the exam with honors.

STYROFOAM™ Brand XPS Insulation also excelled in:

- Energy savings
- Fuel conservation
- Protection against thermal loss, moisture intrusion and air infiltration
- Reduced emissions
- Reusability and durability

"We intended to create ... a building that would help to redefine the relationship between humankind and the environment – one that would expand our sense of ecological possibilities."

– DAVID ORR, DIRECTOR OF ENVIRONMENTAL STUDIES
OBERLIN COLLEGE

Head of the Class

In the United States, the building sector accounts for about 50 percent of all energy consumption and greenhouse gas emissions annually.* And 76 percent of all power-plant-generated electricity is used just to operate buildings.** These telling statistics prompted Architecture Magazine to issue its "Architecture 2030 Challenge" to reduce fossil-fuel consumption by 50 percent in all new buildings and renovations by 2010 and to make all new construction and renovations carbon-neutral by 2030.

By carefully selecting energy-efficient building materials like STYROFOAM™ Brand XPS Insulation, and then using them in conjunction with systems that manage energy flow and natural cycling of matter, including photovoltaic cells to generate renewable energy from solar power, McDonough + Partners and Oberlin College designed the Adam Joseph Lewis Center to serve as a superb example of how these goals can be achieved. And the Center's proven track record answers an important question posed by David Orr, a national environmental expert and professor and director of the Environmental Studies program at Oberlin College:

"Is it possible to design buildings so well and so carefully that they do not cast a long ecological shadow over the future that our students will inherit? We now know that such things are possible – that buildings can be designed to give more than they take."

"We designed the building to be a net energy exporter – to create more energy than it uses yearly. We conducted several extensive energy models to ensure an efficient thermal envelope."

KEVIN BURKE, AIA, PROJECT ARCHITECT
MCDONOUGH + PARTNERS

Walls and Floors Make the Grade

The Adam Joseph Lewis Center design called for STYROFOAM™ Brand CAVITYMATE™ Ultra Insulation to be used in the Center's wall construction, and with good reason. Due to a patented carbon black technology, the product's higher insulation value at a lesser thickness – (5.6 per inch) – allowed designers to push the cavity wall out 4" and introduce an air barrier system to reduce air infiltration and exfiltration.

The wall construction consists of 8" and 12" concrete masonry units, an air barrier, STYROFOAM™ Brand CAVITYMATE™ Ultra Insulation mechanically fastened with wall ties on 16" center, a 1" air space and the masonry brick.

Protecting and insulating the Center's floors is a 2" layer of STYROFOAM™ Brand HIGHLOAD 40 Insulation, providing an R-value of 5 per inch and a compressive strength of 40 psi.

*World Business Council for Sustainable Development
**Architecture 2030

"We now know that such things are possible – that buildings can be designed to give more than they take."

Two Roofs, One Solution

STYROFOAM™ Brand XPS products also fit the bill on the Center's two roofing systems.

A PMR (protected membrane roof) assembly over the office spaces consists of a rubberized asphalt membrane, 6" of STYROFOAM™ Brand ROOFMATE™ Insulation and stone ballast. In a PMR assembly, a system patented by Dow in 1968, the insulation is placed on top of the roofing membrane, protecting the membrane from light degradation, thermal shock and foot traffic.

A PMR assembly also allows for the reuse of the insulation if the building is expanded vertically or when an original roof is replaced. STYROFOAM™ Brand Extruded Polystyrene Insulation can also be reused, allowing the college to save money in new materials and minimize landfill waste.

Above the Center's auditorium, a standing seam metal roof on a curved metal deck is covered by two layers of 3" thick STYROFOAM™ Brand DECKMATE™ Insulation, a single-ply membrane and curved metal panels with solar panels attached to them.

For every million buildings insulated with STYROFOAM™ Brand XPS Insulation, energy consumption is reduced by over one billion barrels of oil during the average life of the structures.

"The Center operates on three fundamental principles of nature – waste equals food, use current solar income and respect diversity. An integrated approach to natural energy flows allowed the center to evolve into a net energy exporter."

– MCDONOUGH + PARTNERS

Project Snapshot

Adam Joseph Lewis Center for Environmental Studies:
13,600 ft² New Construction

Owner:
Oberlin College, Oberlin, Ohio

Completed:
2000

Architect:
McDonough + Partners, Charlottesville, Va.

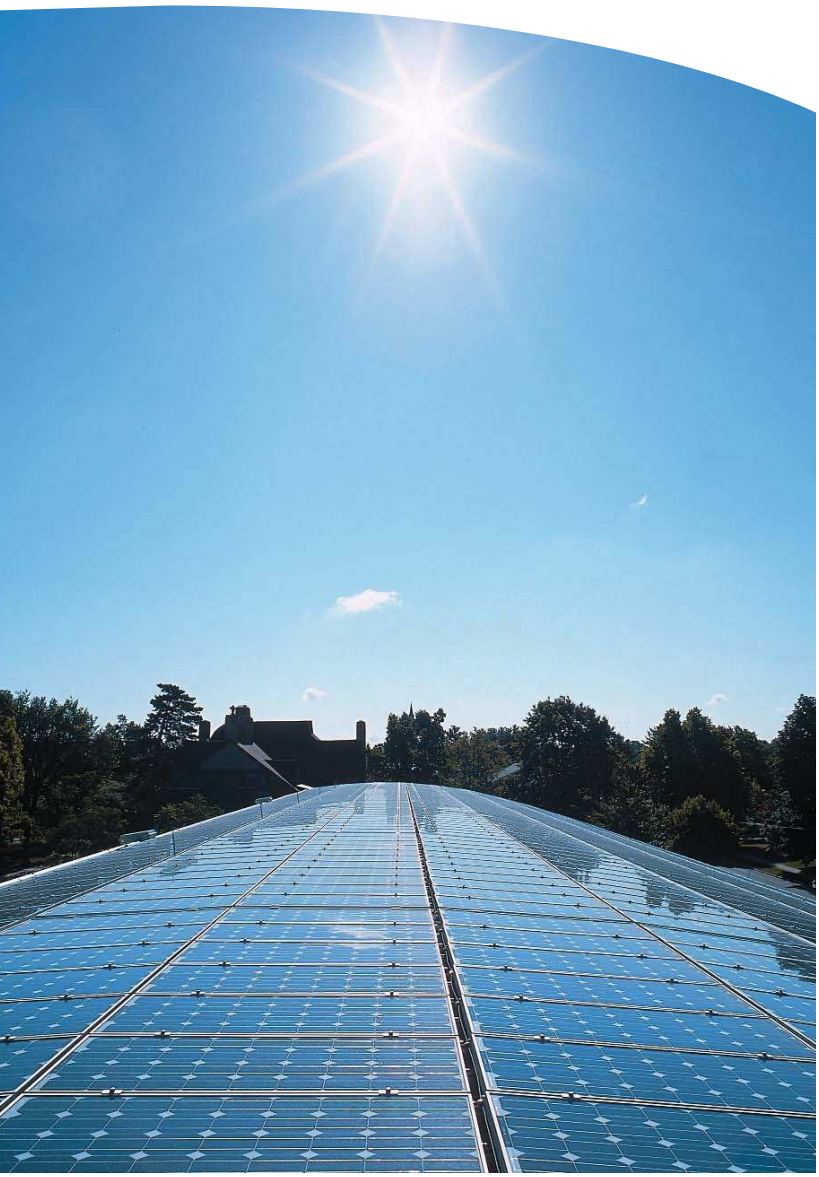
Dow Products Used:

Roof: STYROFOAM™ Brand ROOFMATE™ Insulation (incorporated in protected membrane roof above office space) and STYROFOAM™ Brand DECKMATE™ Insulation (covering the standing seam metal roof above the auditorium)

Walls: STYROFOAM™ Brand CAVITYMATE™ Ultra Insulation

Floors: STYROFOAM™ Brand HIGHLOAD 40 Insulation

PRACTICE WHAT YOU TEACH.



Design for the Future

Oberlin's campus is dotted with buildings more than 100 years old. With durability a priority during its construction, the college is confident the Adam Joseph Lewis Center will last at least as long.

The Center includes more than 150 environmental sensors throughout the building and the landscape to monitor and display the flows of energy and cycling of matter. This documented performance helps demonstrate that installing STYROFOAM™ Brand XPS Insulation is one of the best methods available to help reduce greenhouse gas emissions. And – as is the case with the Adam Joseph Lewis Center – it is an ideal complement to renewable energy sources such as photovoltaics (solar energy).

It's all part of how the Adam Joseph Lewis Center reinforces Dow's commitment to addressing climate change. Dow is proud to have played a role in contributing to this invaluable effort dedicated to discovering how society as a whole can experience a cleaner, greener planet.

One square foot of properly installed STYROFOAM™ Brand XPS Insulation (1" thick) can avert over one ton of CO_2 emissions during the average life of a building.

IN THE U.S. AND CANADA:
For Technical Information: 1-866-583-BLUE (2583) **(English)** 1-800-363-6210 **(French)**
For Sales Information: 1-800-232-2436 **(English)** 1-800-565-1255 **(French)**

THE DOW CHEMICAL COMPANY . Dow Building Solutions . 200 Larkin . Midland, MI 48674
DOW CHEMICAL CANADA ULC . Dow Building Solutions . 450 – 1st St. SW . Suite 2100 . Calgary, AB T2P 5H1
www.dowbuildingsolutions.com

ENERGY STAR PARTNER

Printed in U.S.A.

Form No. 179-04000X-0109P&M
178-01008-0109P&M

MAKE YOUR MARK. MAKE A DIFFERENCE.