

Lindner Hall

Martha S. and Carl H. Lindner III Hall was designed and constructed to be a high performance, sustainable building. It is the first building on campus to receive LEED Gold certification. LEED stands for Leadership in Energy and Environmental Design. Several sustainable features contributed to Lindner's LEED Gold certification.

Lindner Hall anchors the Academic Village and Elon College, the College of Arts and Sciences. It is 35,590 square feet. Construction began in the spring of 2008 and concluded in the summer of 2009. It is mainly classroom and office space with about 44 full-time occupants and many daily visitors for classes, meetings and studying.



[Click here to view a video about Lindner Hall's sustainable features.](#)

Sustainable Sites



Lindner Hall is situated in a prime location. It is within walking distance of many commonly used buildings on campus such as Belk Library, Moseley Center and McEwen Dining Hall. Elon BioBus stations are a short walking distance away. There students can catch the BioBus routes, which service local apartments and shopping centers.

To encourage alternative transportation, bike racks are provided next to the building. Bike racks are a common feature on Elon's campus, but Lindner is unique in that there are two shower and changing rooms on the second floor for faculty and staff who choose to bike to campus.

Another unique feature associated with Lindner is the 4 low-emitting vehicle (LEV) parking spaces located in the parking lot behind the building. LEVs include non-hybrid and hybrid models. They have been classified as Zero Emission Vehicles (ZEVs) by the California Air Resources Board or have achieved a minimum green score of 40 on the American Council for an Energy Efficient Economy (ACEEE) annual vehicle rating guide. To learn more about LEVs and to find out if you drive one visit www.greencars.org. A LEV permit is required to park in these spaces and can be obtained from the Traffic Office.

The parking lot has 91 fewer parking spaces than the lot in this location prior to construction. In total, 11,000 square feet of asphalt paving was removed to provide more green space, allow for stormwater infiltration and improve aesthetics.

The provided green space and pedestrian walkways encourage the use of outdoor space. The landscaping around the building is designed to minimize the need for irrigation. When it is needed, the automatic irrigation system is supplied with reclaimed stormwater collected in the ponds located on campus.

Water Efficiency

All of the plumbing fixtures in Lindner are low-flow, or no-flow in the case of the waterless urinals. The faucets use 0.5 gallons of water per minute and sensors control how long they operate. The toilets have green, dual-flush handles. An upward flush uses 1.1 gallons of water and a downward flush uses 1.6 gallons. There are also low-flow shower heads. These fixtures are expected to reduce the building's potable water usage by 49% or 96,790 gallons/year.

The automatic irrigation system at Lindner is part of the campus-wide system, which utilizes reclaimed stormwater collected in the ponds on campus.



Energy Efficiency



Energy efficient systems were essential in the design and construction of Lindner Hall. The building is 27% more efficient than a building that just meets the building energy code.

Some of the features contributing to Lindner's energy efficiency include:

- An efficient mechanical system including variable frequency drive (VFD) control on supply and exhaust fans and an energy recovery system, which utilizes energy captured in exhaust air to precondition supply air.
- Energy Star qualified windows and layers of building insulation keep the building cooler in the summer and warmer in the winter.
- Occupancy sensors on lights in multi-occupant spaces to automatically control the lights and reduce energy costs.

Varied light level options in classrooms and dual light levels in offices to allow for lower levels as needed.

There are photovoltaic panels and a solar water heating system on the roof representing the first building-use of renewable energy on Elon's

campus. The energy created by these systems provides a portion of the building's energy needs, which reduces the need for fossil fuel based energy.

To determine the building's energy efficiency a building energy model was created and compared to the energy consumption of a 'baseline' building model that just met the energy code. Lindner's actual energy consumption will be compared to the expected consumption from the model. The results will inform the selection of systems for future Elon buildings.



Materials and Resources



Products containing recycled content such as concrete, steel, drywall, carpet and others were used to reduce the need for virgin building materials. Twenty-five percent of the building materials (based on cost) contain recycled content. The concrete used in and around the building contains 20% pre-consumer recycled content. The structural steel used in the building contains 93% post-consumer recycled content. The drywall is 95% pre-consumer recycled content and 5% post-consumer recycled content, and the majority of the carpet contains 20% post-consumer recycled content.

Regional materials were used as much as possible to reduce the impact of transporting the building materials and to support the regional economy. Based on cost, 30% of the building materials were regionally sourced.

Like every building on Elon's campus Lindner Hall has recycling bins throughout. Elon's recycling program accepts all kinds of paper, cardboard, plastic, glass and metals.

During the construction of Lindner Hall, 95% of the construction waste was diverted from the landfill for recycling and/or reuse.

Indoor Environmental Quality

Providing excellent indoor environmental quality was another essential component in the design and construction of Lindner Hall as it contributes to the health and productivity of building occupants. Great care was taken during construction to ensure the building and its systems were kept clean and free of contaminants benefiting the construction workers and the eventual building occupants and users.

During construction, duct work was kept covered to prevent debris from accumulating, and a special sweeping compound was used to minimize dust.

The adhesives, sealants, paints and carpets used in the building contain low amounts of volatile organic compounds (VOCs). Low VOC products allow for better air quality during and after construction.

Carbon dioxide sensors are in classrooms and other large spaces as well as the ventilation system to monitor levels and maintain appropriate ventilation.

The HVAC (heating, ventilating and air conditioning) system and building envelope were designed to meet thermal comfort standards to promote the productivity and well-being of occupants. In addition, thermostats are provided to allow occupants to adjust the temperature to suit their personal thermal comfort within a pre-defined range.

Lindner has a great deal of windows, which provide natural light, reducing the need for artificial light. Daylighting (natural light) has been shown to improve occupant well-being and productivity. The adjustable light levels will allow occupants to take full advantage of the natural light.

The conditioned air introduced into Lindner has been filtered with high efficiency filters with a Minimum Efficiency Reporting Value (MERV) rating of 13. The floor mats at all primary entrances prevent dust and other contaminants on shoes from entering the building. All rooms with chemical use such as the copy

rooms are directly exhausted to the outside to prevent occupants from being exposed to any chemical smells.

Several of the furniture pieces in Lindner are GREENGUARD certified meaning they have been tested by a third party and verified to contain low amounts of chemicals and particle emissions and have met acceptable indoor air quality guidelines and standards. GREENGUARD certification is a voluntary program used primarily by commercial/institutional furniture manufacturers.

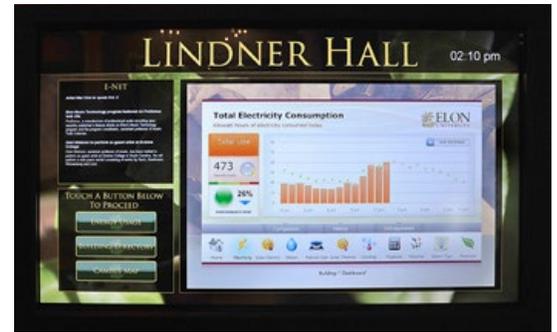
A comprehensive green cleaning program is being utilized in Lindner benefitting the building occupants and maintenance personnel. Green cleaning improves air quality, occupant health and

well-being and is better for the environment. The program includes (but is not limited to) the use of Green Seal certified or equivalent cleaning products that have low chemical content, bulk dispensing systems to reduce packaging waste, microfiber cloths to reduce use of disposables, vacuum cleaners with high-filtration systems to contain particulate matter and other aspects.



Sustainable Education Efforts

Lindner Hall serves as an active, educational tool every day. The touchscreen display in the lobby displays real-time energy usage for all the major uses in the building including the energy generation of the solar systems. Water consumption is also displayed. The display allows building occupants and visitors to see how much energy and water is being used in the building at any given time and is [accessible online](#) anytime for viewing, monitoring and use in class projects. The information gathered from the energy and water monitoring will be used to monitor the building's performance over time. The system also displays information on several of the green features in the building such as the low-flow plumbing fixtures and renewable energy.



Lindner Hall also serves as a laboratory for students to learn about sustainable features and assess their effectiveness. Projects utilizing the real-time metering system, comparing Lindner's features to those in other buildings, and others will be incorporated into existing classes and provide unique experiential learning.

This case study is another component of Lindner Hall's education program created to educate the campus and greater community about sustainable design and construction practices. [A video about Lindner Hall's sustainable features was also created.](#) Tours of Lindner focusing on its sustainable features are available. [Please contact the Office of Sustainability for tour information.](#)

LEED for New Construction Rating (out of 69 possible points)

Total Score	40
Sustainable Sites	7
Water Efficiency	3
Energy and Atmosphere	9
Materials and Resources	6
Indoor Environmental Quality	10
Innovation and Design Process	5
Certification Level	Gold
Energy Efficiency	27%
Carbon Emissions Avoided	48 tons/yr
Water Efficiency	49%
Landfill Diversion	95%
Green Space Provided	1.19 acres
Owner	Elon University
Architect	Spillman Farmer Architects
Engineers	Edmondson Engineers
Contractor	J.H. Allen, Inc.
Landscape Architect	McBride Hess Design Group
Commissioning Agent	Commissioning WorCx