Duke Sustainability
Smart Home

Building Information
Tenant: Pratt / Student

Architect: Smith Group

Construction: Bovis

Purpose: Research/Dormitory

Footprint: 6,069 sq ft

The first LEED™ Platinum certified residence hall in the country began as the vision of a Duke electrical and computer engineering student. Design began in 2003 with a class of 20 students. The goal of The Home Depot Smart Home is to serve as a living laboratory focused on sustainable living and technology integration. Ten students occupying the space each semester and carrying out projects with the support of the Pratt School of Engineering.

View the Duke Smart Home LEED™ Scorecard

Sustainable Site Features
The Smart Home was positioned to face due south and uses deciduous vine-laden wire screens and deep porches to shade the building in the hot summer months (when the sun is higher in the sky and leaves on vines provide additional shade), but permit the sun's heat to warm the central areas of the home in the winter months (when the sun's path is lower on the south horizon and the leaves have dropped away).

The Smart Home's greenroof consists of drought resistant plants called sedums that prevent heat gain by insulating the building and allowing evaporation to carry away excess heat. The plants roots and media also helps to filter and slow the flow of rainwater off the roof, reducing stormwater pollution.

Water Efficiency
Two 1,200 gallon cisterns capture the rainwater from the building's roof and feed the property's irrigation system. Low-flow showerheads and fixtures within the residence help to further minimize the residents' dependence on potable city water for purposes other than drinking.

Energy Efficiency
The Smart Home has a 3 kW photovoltaic (solar) array that generally accounts for about 30% of the residents' energy consumption. During the day, when residents are away at class and the panels are generating electricity, the surplus can be pumped into the electricity grid. Conversely, in the evening

hours when residents are using electronic devices and lighting, the home draws required electricity from the grid.

Use of daylighting in shared, communal areas reduces the need for power, while two exhaust fans located at concentrated high points along the ceiling expel hot air with minimal energy, creating a cool (highly efficient) breeze inside the house.

Indoor Air Quality
The building's climate control system does not rely on coolants that emit ozone depleting CFC's. A Siemen's energy performance monitoring system also helps ensure mechanical systems are operating optimally at all times.

Daylighting reduces the need for additional lighting in more than 90% of the building, while low-VOC materials reduce indoor air pollution.

Resource Management
Locations of recycling bins were included in the Smart Home's design. Collecting all construction waste helped divert more than 50% of materials from the landfill. The home also makes some use of locally manufactured and recycled content products.

Innovation in Design
The building uses recycled water to flush and carry sewage off-site, rather than contaminating clean drinking water. As part of their residency, students provide educational tours, highlighting best practice and sharing applicable knowledge gained from the program with visitors.

Read more about the Smart Home.