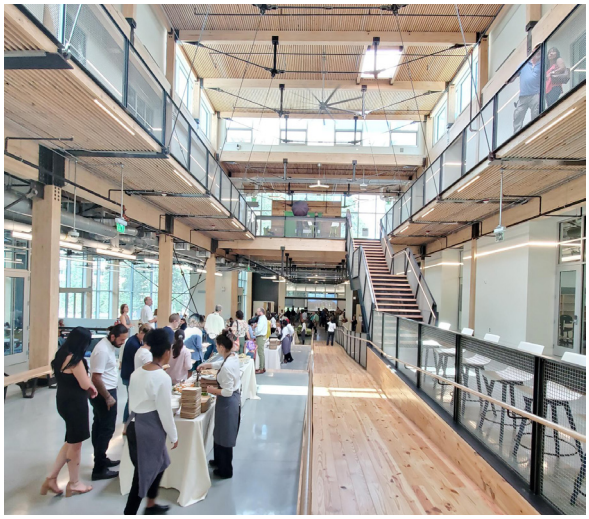
Case Study

The Kendeda Building for Innovative Sustainable Design: Built Environment Impacts in the Southeast

Georgia Institute of Technology Campus, Atlanta, Georgia (2018-Present)

Overview[1,2]



Funding: The Kendeda Fund

Project cost: $25 million; $397/square foot; $503/square foot for conditioned space

Building size: 47,000 square feet (37,000 of conditioned space and 10,000 of built exterior space)

Architects: Lord Aeck Sargent (LAS); The Miller Hull Partnership (MH)

Builder: Skanska USA

Contributing teams: Andropogon (landscape); PAE (mechanical, electrical and plumbing engineering); Newcomb & Boyd (mechanical, electrical and plumbing); Biohabitats (greywater systems); Long Engineering (civil engineering); Uzun & Case (structural engineering)

Description of project: Designed to dramatically advance sustainable design and construction in the Southeast, The Kendeda Building is expected to achieve one of the first Living Building Challenge 3.1 certifications in the Southeast.[3]

Built Environment Impact

- The Living Building Challenge (LBC), an initiative of the International Living Future Institute, is a green building certification program that envisions and celebrates the true meaning of regenerative design: design that goes beyond a net-zero impact and positively benefits its environment and community. The LBC has tiers of achievement, with full certification as the most rigorous. There are several buildings in the Southeast, including one in Georgia, which hold petal certification – certification of one or more of the seven aspects of the LBC. The Kendeda Building for Innovative Sustainable Design will join the Chesapeake Bay Brock Environmental Center in Virginia as the only two fully LBC-certified buildings in the Southeast. Importantly, the LBC only awards certification to buildings which have proven their net-positive impact through at least one year of operation; The Kendeda Building aims to achieve its certification in 2021.
- The Kendeda Building was projected to have an energy use intensity (EUI, a standard building performance measurement) of 30 kBTU/SF/year[3], which is 72% more efficient than an average building of similar characteristics. With a solar array on the roof (which also provides shade and an innovative rainwater collection system) that has an EUI of 42 kBTU/SF/year[4], the building will exceed its own energy needs over a 12-month period, ultimately providing energy capacity for others throughout the year!
- The building will also have a net-positive water impact. Harvest and filtration of at least 74,500 gallons of rainwater will offset the water usage required by the building's radiant heating and cooling system and the HVAC system annually. In total, the building is expected to harvest 460,000 gallons of water a year. This collected rainwater is treated to potable standards on-site and will be used in the building. Pending permit approval, the building will be able to use this water alone for potable purposes and not rely on the municipal water supply.[5] Greywater from showers, sink drains and water fountains is treated in constructed wetlands on-site and then released to recharge the adjacent natural water table. Even plumbing waste from toilets and urinals will be composted on-site and used off-site for beneficial reuse.

[1] https://livingbuilding.gatech.edu/kendeda-building-innovative-sustainable-design

[2] https://www.usa.skanska.com/who-we-are/media/constructive-thinking/a-living-building-qa-in-atlanta-pushing-the-boundaries-of-sustainable-construction/

[3] Interview with Shan Arora. Conducted by Catherine Butler Gunter and Megan O'Neil on December 3, 2020.

[4] https://livingbuilding.gatech.edu/kendeda-building-innovative-sustainable-design

[5] https://livingbuilding.kendedafund.org/2020/04/20/kendeda-building-nears-landmark-water-permit/

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Connection to the Natural Environment

- The LBC requires design teams to investigate and implement ways to reduce the embodied carbon of participating projects. LAS and MH compared concrete, steel and mass timber to determine that mass timber, while the most expensive material, had the lowest levels of embodied carbon. Steel and concrete were still used in the building but only where their strengths and performance characteristics were required. Working with Skanska, the design team further reduced the total amount of embodied carbon by using reclaimed lumber, avoiding unnecessary use of structural adhesives, assembling mass timber components near the project site, and reducing the number of surfaces and materials as much as possible. While these efforts made substantial strides in reducing the calculated embodied carbon, the remaining balance was offset to achieve zero embodied carbon at building completion.[6]
- The Kendeda Building has demonstrated the use of cross-laminated timber (CLT)/mass timber. Mass timber is a material that has grown in popularity for large commercial buildings and may soon become more prevalent in Georgia. Mass timber reduces the total materials used, including those with larger carbon contributions like steel and concrete. Using aesthetically pleasing mass timber products can also significantly reduce the need for additional interior finishing materials – like sheetrock, paint or tile – which further reduces materials needed and waste flows as a result. Wood sequesters carbon as it grows, and the carbon remains sequestered when the wood becomes part of a building.

Connection to the Social Environment

- The Kendeda Building recognized the need for advancing social equity in the community and identified workforce opportunities as a priority. Skanska worked with Georgia Works!, which trains and employs previously unemployed and/or homeless individuals. Six trainees were employed by the Kendeda Building project to construct the nail-laminated timber (NLT) panels used for the ceilings on the first and second floors. One of these men was ultimately hired full-time by Skanska. The project spent above market rate for the social benefits received by this collaboration.[7,8]
- The grand staircase, open-air atrium, natural materials and amenities like a rooftop pollinator garden, apiary and outdoor gathering spaces surrounded by local, drought-tolerant and pollinator-friendly landscaping are all examples of biophilic design. Biophilic design recognizes that incorporating elements of the natural environment – natural sunlight, organic materials and natural colors; well-ventilated air and access to outdoor spaces; plant life and more – is immensely beneficial to the human experience in the built environment.
- The Kendeda Building prioritizes occupant health, safety and well-being. As the architecture, engineering and construction sectors address the profound impact buildings have on public health, elements of The Kendeda Building's design serve as examples of best practices for healthy indoor air quality. The building maximizes interior ventilation with large open spaces, fans to provide air circulation, operable windows throughout the building and a direct outdoor air system that provides fresh air even when windows and doors are closed. Movable furniture allows flexibility for times when social distancing is required; technology in every classroom and conference spaces allow for virtual engagement; and accessible outdoor spaces on the roof and main level enable safe outdoor activity. Learn more about how The Kendeda Building is responding to the COVID-19 pandemic in this video.

[6] Interview of Joshua Gassman conducted by Shane Totten on December 16, 2020.

[7] https://www.usa.skanska.com/who-we-are/media/constructive-thinking/a-living-building-qa-in-atlanta-pushing-the-boundaries-of-sustainable-construction/

[8] Interview with Shan Arora. Conducted by Catherine Butler Gunter and Megan O'Neil on December 3, 2020.