When the idea of designing and building a Living Building Challenge (LBC) certified project was first introduced to the Georgia Tech campus, the obvious question was: "What is a living building?"
The Living Building Challenge is a program, advocacy tool, and philosophy that defines the most advanced measure of sustainability possible in the current built environment. Meeting the challenge requires close adherence to some of the most stringent building performance standards in the world. To be certified under the program, a building must meet all the program requirements over a full 12-month period of continued operations and full occupancy.

For the first time, High Performing Buildings Magazine is following the progress of a building during the design and construction phases. Georgia Tech is sharing lessons learned, both good and bad, so others can learn from this experience and pay it forward.

Proposed rendering showing the west façade of the Living Building at Georgia Tech. The approximate 42,000-square-foot building will consist of two-stories, a basement and a spacious porch area facing the west.

Image courtesy of The Miller Hull Partnership in collaboration with Lord Aeck Sargent.

Wile some of the initial responses revolved around being “green” or “highly sustainable,” achieving Living Building Challenge certification entails a whole lot more. Though sustainability is a cornerstone of the Living Building Challenge, this project demonstrates a commitment to build to the most stringent standards in the world in a way that not only does less harm to the environment but is actually restorative and gives back to the environment. It is about rethinking one’s approach to achieving this ambitious certification and then sharing the lessons learned, both good and bad, with others so that they, too, can learn from this experience and pay it forward. It is all about embracing an opportunity to transform—and sharing the knowledge gained throughout the process.
The Living Building at Georgia Tech, which hopes to achieve certification in 2020, advances the Institute’s Campus Master Plan. The project will integrate into the Eco-Commons, a series of campus green spaces designed to conserve natural resources, including energy and water, and provide the community with educational, research, and recreational amenities.

This endeavor not only supports Georgia Tech’s goal to use its resources as efficiently as possible but complements the Institute’s educational and research mission. The Living Building at Georgia Tech will essentially become a living-learning laboratory for hands-on educational and research opportunities that will be a model for the southeast region of the United States and other similar climatic zones around the world.

“The Living Building Challenge accelerates our vision for a more sustainable and resilient campus,” said Steve Swant, executive vice president for Administration and Finance at Georgia Tech. “This project will test us. It is like nothing we have done before and requires us to rethink how we approach the process of designing, building, maintaining, and occupying this facility.”

Since announcing the agreement in the fall of 2015, there has been a flurry of activity and, as expected, many lessons learned along the way. The real action began in December 2015, when three design team finalists were selected to participate in a leading philanthropic investor in civic and environmental programs. With a $30 million commitment from Kendeda to build and operate the facility, the Institute embarked upon a journey in 2015 to build the Living Building at Georgia Tech.

“The Kendeda Fund sees this as a transformational opportunity, and a proof of concept for ecological design in the southeast,” said Dennis Creech, a fund advisor to Kendeda. “This is an opportunity to showcase solutions to these very real problems around energy and water, which are challenges for Atlanta and for the planet. We want to show how the built environment can actually enhance global health. That’s way beyond sustainability; it’s about being restorative.”

**A Methodical Approach**

Since announcing the agreement in the fall of 2015, there has been a flurry of activity and, as expected, many lessons learned along the way. The real action began in December 2015, when three design team finalists were selected to participate in...
an ideas competition. The concept of an ideas competition was new for Georgia Tech but quite appropriate given the enormous task of planning a facility that not only performs to the highest of environmental standards but also addresses the needs of the occupants both in terms of health and their connection with each other and the natural surroundings.

The competition’s three-month discovery phase promoted engagement and collaboration among interdisciplinary teams and yielded a rich learning process that explored a variety of ideas and considerations for climate, site evaluations, materials, costs to build and operate, accessibility, and replicability.

While only one team—Lord Aeck Sargent and The Miller Hull Partnership—could ultimately be selected to design the project, the ideas competition has been greatly influential in shaping how all the competing teams approach their business.

“All three teams and the individuals involved have been positively impacted by this experience,” said Howard Wertheimer, assistant vice president for Capital Planning and Space Management at Georgia Tech. “They continue to share their knowledge and lessons learned with colleagues and clients from coast to coast.”

Fast forward to the summer of 2016, and several more milestones took place. Namely, Skanska USA, a company experienced in successfully delivering projects according to the stringent building requirements of the Living Building Challenge, was selected to construct the Living Building at Georgia Tech. In addition to finalizing the working teams, Georgia Tech also selected the final project site: the northwest corner of Ferst Drive and State Street.

Several variables were carefully considered during the site evaluations including Georgia Tech’s Campus Master Plan, and potential connections to existing transportation and campus life. In addition, more technical aspects were considered such as the site’s capacity to harvest rainwater and solar energy, as well as other Living Building Challenge requirements including the ability to work in harmony with nature in order to minimize human intervention.

The Living Building at Georgia Tech will essentially become a living-learning laboratory for hands-on educational and research opportunities that will be a model for the southeast region of the United States and other similar climatic zones around the world.

In addition to finalizing the site plan and building’s orientation, the team of architects, engineers, landscape architects, cost estimators, and other professionals, have been hard at work since last spring analyzing systems and carefully weighing the tradeoffs to strike the ideal balance between form, function, and cost for this unique building.

“Given the requirements of this project, we must look for solutions that can serve the needs of the building and its occupants with minimum resources, including dollars, required to operate it,” said Joshua Gassman, lead project manager for Lord Aeck Sargent. “For instance, the schematic design proposes automated exterior venetian blinds on the east-facing side of the building, which will reduce heat gain, while providing needed daylight, with minimal energy requirements from the building’s photovoltaic panels.”

Initial energy analysis indicates that more than half of the energy produced on site is allocated to heating and cooling the building, which makes these types of decisions early in the design phase vital to the long-term success of the building.

Other decisions presented during the schematic design phase that will move forward include:

• Incorporating glu-lam (glue laminated wood) for the majority of the building’s structure. Wood is a preferred material due to its aesthetics, low carbon footprint, and regional availability—all of which

The three teams who participated in the ideas competition were:

• Collins Cooper Carusi / Eskew + Dumez + Ripple / Hellmuth + Bicknese
• Perkins + Will
• Lord Aeck Sargent / The Miller Hull Partnership

Each of the three competing teams combined professionals from multiple disciplines including architecture and landscape architecture; mechanical, electrical, plumbing, civil and structural engineering; hydrology; sustainability; and other specialists and advisors.
are important variables to Living Building Challenge certification. While steel and concrete won’t be eliminated entirely, these materials will only be used strategically where needed for structural support.

• Employing radiant flooring that uses the building’s thermal mass to stay cool in the summer while staying warm in the winter. In addition to maintaining thermal comfort, this will also eliminate the need for traditional large fan systems — and the associated cost of energy — to circulate air throughout the building.

• Using foam-flush composting toilets. While Tech is still exploring the cost benefits of a blackwater treatment facility, composting toilets was deemed a far more practical solution based upon its low energy and water requirement, simplicity to use and maintain, and inexpensive life-cycle cost.

The schematic design received the greenlight in December 2016, and the team is now moving into the design development phase.

Sharing the Experience
The learning process and sharing of knowledge is as much a desired outcome as the actual certified building. While the building design is still taking shape, there have been several key findings already learned through this experience.

One of the lessons learned from the beginning is to invest in the people and time upfront to ensure this project is done right and with the right partners. This entails integrating the technical expertise at the very beginning of the programming and design
phases. The ideas competition, which consisted of onsite workshops and team interviews was essential to understanding the interaction and dynamics among the teams of designers, planners, engineers, and other specialists.

“The return on this investment of resources has yielded greater information sharing and transparency amongst all the teams,” stated Wertheimer. “By fully vetting our project partners in this manner, not only did we learn how these teams work together, but we also learned more about the unique challenges of the Living Building Challenge and how best to situate this 42,000-square-foot building on our campus. We essentially invested in predesign services, which gave us a tremendous head start on this project.”

According to Wertheimer, the Institute is currently employing principles from the ideas competition to help select the design teams for future projects on Georgia Tech’s campus.

Another takeaway is that form and function can coexist. According to Wertheimer, while we cannot have it all, especially with a defined project budget, the careful analysis performed so far has shown that it is possible to create a fully functional, high-performance building that is aesthetically pleasing and meets all of the programmatic requirements.

As learned in the schematic design phase, this harmonic approach works best when nature and simplicity help guide the design process. Choosing materials, mapping out the interior structure to facilitate interaction, and understanding how to best leverage natural resources like water and sunlight are great examples of incorporating basic design principles that are effective, inviting, and replicable — both in terms of accessibility and cost.

“Designing a Living Building requires us to consider how nature would design a building, with balanced and efficient natural systems,” said Brian Court, partner, The Miller Hull Partnership. “This thought process enables the building design to evolve through an iterative process instead of thinking the answer is evident from the outset.”

Lastly, changes in process and approach can lead to real transformation. While there is much work to do before the Living Building at Georgia Tech breaks ground later this year, the process has already begun to influence today’s and tomorrow’s thought leadership. For instance, the two teams that were not selected are mining their research on the Living Building Challenge’s Red List with the goal of building awareness of materials that go beyond being eco-friendly and embody responsible sourcing that positively contributes to the surrounding community.

In addition to the tools and techniques deployed in the field, Georgia Tech is incorporating the principles of the Living Building Challenge in and outside the classroom. Last year, the College of Design conducted the Portman Prize Studio, a graduate-level architecture studio project sponsored by Georgia Tech alumnus, John Portman of John Portman & Associates. Unlike traditional studio projects, this one afforded students not only the opportunity to work on a real-world project, but gave them the unprecedented opportunity to participate in the ideas competition by participating in the workshops and observing the final interviews.

As transparency and replicability are key goals of the project, Georgia Tech will continue to pay it forward with outreach opportunities to teach and promote the principles of the Living Building Challenge.

ABOUT THE AUTHOR
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To learn more about the Living Building at Georgia Tech, visit livingbuilding.gatech.edu and livingbuilding.kendedafund.org. Be part of the progress and follow Georgia Tech’s Living Building Challenge journey in the monthly HPB newsletter.
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