



Setting the Standard

STRATEGIES FOR CONSTRUCTING ENERGY EFFICIENT CAMPUS BUILDINGS

BY DAVID VINSON, PhD

In size, population, and the many activities taking place on campus, private colleges and universities are in many respects like small, self-contained cities. The systems in place to keep these institutions operating smoothly are multi-faceted, not least of all given the evolving needs and wants of those who live and/or work on campus. Increasingly, this means administrations are working to find innovative ways for their campuses to operate smoothly with reduced impact on the environment.

Across the country, campus sustainability has been embraced as a core institutional value. Not only is sustainability an asset for campus recruitment, but it facilitates long-term economic, social, and environmental stability and growth. As we continue to accrue knowledge regarding the environmental impact of the activities and operations of universities, our strategies for developing sustainable practices have increased exponentially. Perhaps more than ever, our institutions are using the resources of teaching, outreach, and partnership to implement and promote sustainable lifestyles. Many universities have also signed declarations to indicate their commitment to sustainability, a practice that is trending upwards.

Transforming our campuses into sustainable environments has proven to be a considerable but worthwhile undertaking. This process begins with a shift in campus culture, and it extends to building a network of universities committed to sustainable practices. This

is not a localized endeavor but a global one. For instance, the International Sustainable Campus Network (ISCN) provides a platform for leading educational institutions around the world to exchange ideas and information for realizing a sustainable campus. To date, its signatories include the world's top-ranked universities such as Yale and Harvard in the United States, National University of Singapore, University of Gothenburg in Sweden, as well as many other renowned educational institutions. Projects like ISCN invite the participation and support of researchers, students, and all campus citizens. Their main goals include the testing of innovations developed by scientific research, promoting lifestyle transformation and more livable spaces, and serving as an example for off-campus communities to minimize environmental impact and optimize the integration of built and natural environments.

What follows is an overview of two standouts in the latest in energy-efficient campus buildings. Institutions such as Washington

University in St. Louis and Tufts University serve as exemplary models for innovations in sustainability, and both provide a roadmap for other like-minded institutions to follow.

Excellence in Sustainability at Washington University in St. Louis

Washington University in St. Louis ranks among the nation's leaders in sustainability (environmentamerica.org), and its commitment to creating a sustainable campus runs through all aspects of its community and operations. Faculty regularly conducts research to develop innovative strategies to combat climate change and environmental degradation; and its staff members are engaged in a multi-decade process to transform traditional campus operations into sustainable ones. Students at Washington University gain knowledge and leadership skills that prepare them to play essential roles in shaping future solutions. Moreover, university leaders and stakeholders are aligned with a university-wide strategic planning

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process consisting of multiple focus areas targeting sustainable operations. As of 2023, Washington University has completed a total of thirty-five LEED-certified projects, twenty-three of which have exceeded LEED Silver, including thirteen Gold and nine Platinum certifications. The LEED Silver standard adopted by Washington University has proven instrumental in achieving 3.25 million square feet of LEED-certified space, double that of the university's total in 2015. Thirty percent of university-owned space on the Danforth

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and School of Medicine campuses is LEED certified, and the main campus is home to one of the first two buildings in the world to achieve Living Building certification—one of the most stringent green building certifications in the world. The Tyson Living Learning Center (LLC) is a net-zero building, meaning that it operates at net-zero energy and net-zero water consumption. The LLC produces its energy on site from solar photovoltaic panels, and all water used in the building is filtered from rainwater captured on the roof. The 2,900-square-foot facility houses a computer lab, classrooms, and administrative offices for the Tyson ecological research station. Moreover, the building itself is largely made of local, repurposed materials—this includes siding provided by nearby eastern red cedars, which were removed due to a habitat restoration.

The refurbishment of McMillan Hall, one of the university's oldest and most revered buildings, required a delicate balancing act of preserving its historic character while incorporating new classrooms, offices, as well as research and teaching labs. An added challenge was to maintain the university's high standards of sustainability. The result is a high-performance 9,000-square-foot addition. Among its features is a green roof that doubles as a

classroom and garden space, where students can learn about plants and ethnobotany. The refurbishment also includes a 174-seat Arts & Sciences classroom and three anthropology teaching labs, all with state-of-the-art audio-visual equipment. The Danforth University Center (DUC) was the second LEED building on campus and the first to be assigned gold certification. Sustainable features of the DUC include low-flow water systems, substantial use of daylighting, low-energy usage lighting, local and regional material, and access to transit and bicycle shower facilities. Among the institution's many other green buildings is The Lofts of Washington University, an \$80 million residential and retail project which was awarded LEED Platinum certification. The student apartment and retail complex was designed to be forty-six percent more efficient than standard construction, which effectively minimizes environmental impact and creates healthy spaces for tenants and retail customers. Solar thermal panels heat twenty-five percent of the building's domestic hot water. Solar photovoltaic cells provide ten percent of the building's electrical needs. Rain gardens treat storm water, and the building's signature aluminum sunshades are striking in design an effective tool in keeping apartments comfortable.

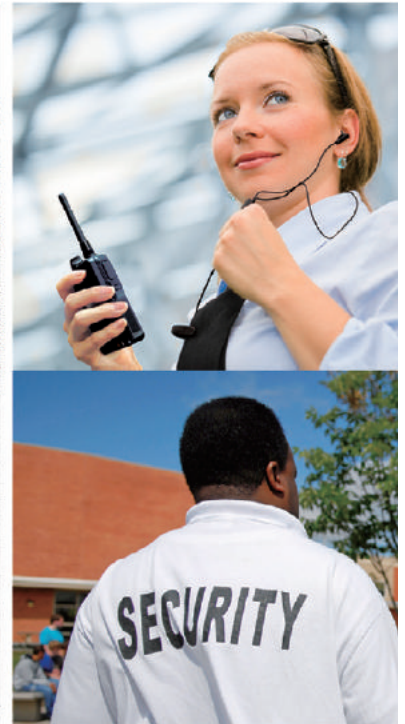
A Tradition of Sustainable Design at Tufts University

Located in the Greater Boston area, Tufts University has long been a leader in campus sustainability. As far back as 1990, Tufts developed the first university environmental policy and launched the international Talloires Declaration, now endorsed by well over 400 university leaders worldwide. The university has committed to reaching carbon neutrality by 2050, and it has prioritized sustainable infrastructure within the built environment and in all its campus planning projects. Of its many sustainable buildings, the Joyce Cummings Center stands out. It is a highly efficient, seven-story building designed with a low energy-use intensity target and one that incorporates a remarkable range of sustainability features, all in service of reducing energy consumption and greenhouse gas emissions. The Joyce Cummings Center utilizes two heat recovery wheels, a heat recovery chiller, a rooftop solar array,

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occupancy sensors, triple glazing on windows for temperature control, and high-performance insulation. It also features ample natural light and efficient lighting, in addition to a plaza that incorporates drought-resistant plants.

The Science and Engineering Complex (SEC) is another example of Tufts' achievements in

sustainability. Sustainability was considered in every decision of the SEC's design and construction, and the results are impressive. The SEC uses seventy percent less energy than a typical lab building and is certified LEED Gold. Rather than demolish existing buildings and starting from scratch, the project built

upon Tufts' Robinson Hall and Anderson Hall, joining them together and in turn reducing carbon emissions during the building process. This strategy also allowed for the reuse of large amounts of building material.

Now completed, the SEC contains many of the same features as the Joyce Cummings Center but also offers an ethical food sourcing café. Its heat recovery system captures up to seventy-two percent of the building's heat—heat that would otherwise be lost. The SEC received the Honor Award for the Boston Society for Architecture's 2021 Sustainable Design Awards. It was recognized as an "outstanding achievement" and was chosen by the American Institute of Architects (AIA) Committee on the Environment as a recipient of a 2022 COTE Top Ten Award, the industry's best-known award program for sustainable excellence. In line with other sustainable buildings at Tufts, the School of Dental Medicine has been undertaking since 2008 a multi-year, multi-phase master plan to promote sustainability and environmental quality. This plan began with a five-story vertical expansion that added 95,000 square feet to the existing building, subsequently earning LEED Silver Certification. Its second phase was completed in late 2011 and received LEED Gold Certification the following February. Looking forward, Tufts' next renovation project plans to achieve a forty percent water savings with the use of dual-flush toilets, low-flow urinals, and metered lavatory faucets. Occupancy sensors will be added to offices, and energy-efficient hand dryers will be installed in every bathroom. The dental school has committed to purchasing at minimum ninety-one percent Energy Star-rated equipment, including computers, monitors, copiers, printers, and refrigerators. Tufts has also purchased Green-e Energy Certified Renewable Energy Certificates, thereby offsetting 100 percent of the dental school's second-floor power consumption for the first two years following full renovation.

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ABOUT THE AUTHOR: Dr. David Vinson has a PhD in English with specializations in transatlantic literature and cultural studies.

He is a committed scholar, teacher, and dad. If you ever meet David, avoid the subject of soccer. His fandom borders on the truly obnoxious.