New Construction or Renovation:

WHICH IS GREENER?

BY DAVID VINSON, PHD

As the climate crisis accelerates, students are expressing their desires for a campus experience that embraces a culture of sustainability. Research shows that a college or university's sustainability strategy can make a major difference in recruitment. *The Princeton Review*, for example, found that 74% of its 2022 survey respondents said that a college's commitment to the environment would contribute to their decision about whether to apply to or attend the school. Higher education institutions are responding in kind.

For instance, initiatives that support campus communities via environmental justice and equity, sustainability-based hiring, and research are becoming more commonplace. Moreover, we are now seeing a boost in mental health and well-being programs that focus on eco-anxiety and climate grief.

Developing a culture of campus-based sustainability also translates to adopting sustainable practices in campus construction and renovation. Perhaps to the surprise of many, the benefits of reusing and renovating buildings can outweigh the benefits of building new energy-efficient structures. A study by the National Trust for Historic Renovation reveals the potential for large carbon impact reduction by comparing relative environmental impacts of building reuse and renovation versus new construction over an assumed 75-year lifetime. According to the study, a new building that is 30% more efficient than one already in use takes ten to eighty years to overcome the negative climate change impacts resulting from new construction. Reusing buildings and renovating them for higher efficiency, especially with renovations requiring few material inputs, have the potential to realize the greatest short-term carbon savings.

Renovation with Green Rooftops

Private colleges and universities are embracing sustainable design trends that are aesthetically pleasing, functional, and—of course—eco-friendly. One such trend is the installation of green rooftops. A green rooftop has ecological, societal, and social benefits. Not only can it provide a rainwater buffer, but

it purifies the air, reduces ambient temperature, regulates indoor temperature, saves energy, and encourages biodiversity. As a green roof absorbs rainwater, for instance, it delays the discharge of that water to the sewage system; the same water undergoes a purifying process, and then it evaporates through the plants. This cycle helps to stabilize the groundwater level, reduce the peak load on the sewage system, and reduce any risk of flooding. Because a green roof can accommodate greenery like plants and trees, it benefits wildlife and also looks far better than concrete or asphalt. Moreover, the plants in a green roof filter particulate matter from the air and convert CO2 into oxygen, helping to purify the air.

A remarkable domino effect occurs with the installation of a green roof. Plants absorb 50% sunlight while reflecting 30%. Both processes help to create a cooler climate indoors; in turn, air conditioning doesn't have to work so hard, equating to energy savings. Further, increased energy savings positively impact not only the immediate proximity of the building but the broader community, as well, reducing surrounding areas by as much as 3°C in temperature. A green roof also protects the roofing material from external influences like sun, rain, wind, and temperature fluctuations, thereby doubling or even tripling the lifespan of the roof. Sustainable roofs decrease the amount of sound that may travel through a building. Also, what is known as "cool roofs" are becoming popular in higher climates. These use materials that reflect natural light instead of absorbing heat energy like asphalt. Installation involves shingling or painting reflective materials on the building to decrease energy consumption and carbon emissions.

Renovation with Natural Sunlight and Ventilation

Extra windows allow more natural light to enter buildings on campus. Renovation that prioritizes more efficient use of natural light can cut back on energy consumption and can be managed in a number of ways: lining hallways with windows;

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orienting windows in consideration of the sun's positioning; and choosing options with good insulation to manage heat effectively. Another positive effect of embracing natural light for sustainable purposes is the impact it has on students. Studies have shown a link between improved lighting design and a 27% reduction in the incidence of headaches. Also, students with the most daylighting in their classrooms progressed 20% faster on math exams and 26% faster on language-based exams in one year than those with less daylighting.

The pandemic brought to our foremost attention the unseen value in clean air. Poor ventilation systems can spread sickness faster while limiting access to adequate organic air flow. Natural ventilation, as a result, is being utilized across the country to provide students and faculty with cleaner and more efficient airflow on campus. Windows are being installed and opened to create natural ventilation for buildings.

Other Strategies for Greener Renovation

Solar panels and geothermal energy are another means of powering buildings and outdoor activities while reducing energy. Although they cannot necessarily power an entire campus grid, they can supply enough energy to significantly reduce fossil fuel reliance. Geothermal systems can offer even more efficiency for campuses and could be instrumental in replacing conventional heating and cooling systems. The U.S. EPA reports that new geothermal energy systems have the capacity to reduce greenhouse gas (GHG) emissions 40% and lower energy bills up to 70% due to their efficiency. Low-E, or low emissivity windows, are a great way to reduce heating from the sun. Low-E windows have a coating that allows them to reduce both ultraviolet and infrared light that penetrate the glass, in turn reducing heating from the sun. Steel doors are another simple renovation project, and the

benefits are two-fold: they provide better insulation and are energy-efficient.

It is worth noting, too, that energy audits can help to identify sustainable renovation projects.

The installation of CO2 sensors, fresh air dampers, and new thermostats help to regulate the amount of outside air brought into the building based on CO2 levels. Other simple renovation fixes include the installation of new flooring and energy-efficient LED lighting.

Greener Campuses and Creating a Forward-Seeing Culture

The primary objectives of green renovation are to be more environmentally friendly and to forge a forward-seeing culture of sustainability. The ongoing investment in sustainability on college campuses is not only inspiring but serves as a model for how to develop a culture of intellectual and ethical engagement that positively impacts the planet. Moreover, because students care as they do for the health of the planet, greener campuses continue to be powerful recruitment tools. There is little to suggest that such a trend will change in the future As we embark on future green renovations, we must pursue projects that address university initiatives and follow suit in contributing to cultivating a more sustainable future.

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.

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