FEATURE ARTICLE

The State of Campus Resilience in the Face of a Changing Climate

by Karin Holland

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CLIMATE-RELATED EVENTS POSE A MAJOR THREAT to college and university campuses across the country, and this is only expected to worsen as the climate continues to change. Along with an increase in the frequency of extreme temperatures, a changing climate is resulting in many severe weather-related events, such as major storms, floods, droughts, wildfires, more powerful winds, and record snowfalls. And this doesn't include the other gradual—yet destructive—long-term changes taking place, such as rising sea levels.

BUSINESS CASE FOR RESILIENCE PLANNING

These climate-related long- and short-term events may affect colleges and universities in several ways, including operational disturbances, prolonged loss of supplies from food to laboratory materials, interrupted power, disrupted telecommunications, and damage to critical infrastructure and equipment. More importantly, these events can jeopardize the safety of campus users. Given their responsibility to ensure the safety and welfare of their users, colleges and universities have a lot at stake when it comes to increasing their resilience to the potential effects of climate change. They need to maintain the continuity of services and operations during emergencies by ensuring the viability of their own infrastructure, as well as the surrounding infrastructure, to the degree they can control it.

CURRENT STATE OF RESILIENCE PLANNING

A recent study conducted by Haley & Aldrich, an environmental and engineering consulting firm, involved interviews with more than 30 organizations, including several colleges and universities, to better understand their preparedness in the face of a changing climate. Although standard questions were posed, the interviews were flexible and the conversation was free flowing in order to gather as much organization-specific information as possible.

The interviews focused on the following topics, among others:

- The greatest vulnerabilities organizations faced
- Existing resilience measures in place
- Barriers to implementing resilience measures
- Opportunities for improving resilience

Colleges and universities are experiencing the following vulnerabilities:

- Having to deal with some buildings that are extremely old, pushing 100 years or more, making them particularly vulnerable and creating concerns about whether they are resilient enough in the face of a changing climate;
- Having the capacity to respond to both on- and off-site emergencies such as damage to campus infrastructure

during a storm event or disruption of the campus water supply caused by a burst pipe off site;

» Ensuring adequate emergency supplies on campus for users, e.g., medical supplies, water, and food, if a natural hazard hits the campus;

» Having solid contingency plans to keep users safe if they need to shelter in place and/or if shelter needs to be provided to local communities; and

» Ensuring continuation of service—a college or university campus can't just shut down. Mechanisms need to be in place to maintain operations if a natural disaster strikes.

According to the study, although colleges and universities recognize key vulnerabilities, most have just recently started thinking about resilience issues and have only implemented minimal resilience measures, typically on a stand-alone basis at the campus, rather than community, level. Campuses often begin by addressing infrastructure issues, such as flood defense. They also typically focus on short-term events, such as weather-related emergencies, rather than on longer-term gradual changes, such as increasing temperature extremes.

BARRIERS TO RESILIENCE PLANNING

The study found that 94 percent of organizations face significant challenges that are delaying resilience planning and deterring progress. While the majority recognize the importance of addressing natural-hazard preparedness in the near term, none have a whole-system, organization-wide resilience program in place.

Many universities have budgetary constraints and need to prioritize their limited funds between various short-term emergencies and long-term initiatives. Budgets often operate on short-term cycles, yet impacts associated with a changing climate may be incremental and/or longer term. The cost of existing assets makes it extremely difficult to replace them in the short term, so decisions must be made at the building portfolio level, not at the building level. There is also a perception that resilience measures are extremely expensive with a low return on investment, even though that might not actually be the case.

Many colleges and universities are in the early stages of understanding resilience issues and their associated implications and have not yet formulated plans because they don't know where to start. They are further hampered by a lack of location- and/or university-specific guidance, consistent regulations and policies, or established best practices. Some organizations, including institutions of higher education, don't have the leadership support necessary to make whole-system resilience planning a top priority.

A lack of metrics for measuring progress makes it difficult to track the effect of a resilience program. In fact, only six percent of respondents identified indicators and metrics for measuring progress with resilience initiatives. By not having metrics in place to measure successes, it is more difficult to justify such programs and gain buy-in from leadership.

Finally, behavioral inertia plays a part in preventing progress. It is difficult to convince people to take action against future potential impacts that cannot be quantified accurately. A paradigm shift in campus operators' and users' understanding of and attention to climate-related vulnerabilities is necessary for campus communities to become more resilient.

OPPORTUNITIES

Despite these issues and barriers, the study found that colleges and universities were among the most proactive groups in addressing climate change. Some of the bright spots involved campuses that align sustainability with resilience planning to increase results. Approximately two-thirds of the organizations interviewed are actively combining sustainability measures with resilience. Example

measures include incorporating natural wetlands that absorb stormwater, adding grassy swales that facilitate ground water infiltration, and having a diverse, renewable energy portfolio on or off campus that provides backup power as needed while reducing greenhouse gas emissions. Some universities are looking at the feasibility of implementing geothermal systems that heat and cool individual buildings or that can be implemented throughout the entire campus to reduce fuel consumption. This technology may also provide a potential emergency water resource asset, thus increasing campus resilience.

Respondents identified several factors that could be leveraged to facilitate resilience planning. These include being proactive now to save money in the long term, educating key stakeholders on the risks of climate change and its effects on their institution, collaborating at the municipal and local levels to share resources and expertise, and leveraging the increasing campus stakeholder interest in social responsibility and environmental concerns.

RECOMMENDATIONS

Several recommendations emerged from the interviews that can help colleges and universities become more resilient:

» SET ASIDE TIME FOR PLANNING AND PREPARATION. Resilience planning and implementation may take time, and it is therefore important to begin the process now. It is recommended that colleges and universities conduct a campus-level vulnerability assessment to determine how the campus will withstand potential harm from both short- and long-term climate change impacts. Planning efforts should include safe evacuation routes and/or preparations for dwelling in place in the event of extreme weather.

» INTEGRATE SUSTAINABILITY AND RESILIENCE THINKING. The effectiveness of resilience measures can be increased by incorporating elements of sustainability, such as energy optimization, renewable energy, and stormwater control. Universities should make sure to prepare for the longer-term consequences of climate change, such as the incremental rise in sea levels, as well as the severe impact of short-term events such as storms. They should also consider campus-wide approaches, such as a holistic stormwater collection and storage system or a network of vegetative cover to reduce heat island effects during hot summer months.

» KEEP ABREAST OF CHANGING REGULATIONS AT THE MUNICIPAL, REGIONAL, AND FEDERAL LEVEL. Colleges and universities should stay ahead of new and impending building and construction codes to ensure they are in compliance.

» MAKE SURE INSURANCE POLICIES COVER POTENTIAL DAMAGE from climate-related impacts.

» FACILITATE COLLABORATION AMONG ALL CAMPUS STAKEHOLDERS, including external stakeholders, if applicable, and determine each stakeholder group's specific needs in order to get everyone's buy-in.

» RAISE AWARENESS. Internal audiences need to be educated on the importance and benefits of emergency preparedness and how implementing measures now can decrease future problems and associated costs.

Colleges and universities are at a pivotal point in time for addressing climate change issues. The combination of increasingly severe climate-related events and aging and/or otherwise vulnerable campus infrastructure is a key reason to make resilience a priority. The welfare of students, the continuity of service, and the long-term soundness of the infrastructure that houses some of the world's finest centers of higher education depend on it.

AUTHOR BIOGRAPHY

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