

# The Role of Sustainability in Campus Planning

A New England university builds on the land grant tradition

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The Morrill Act of 1862, signed by Abraham Lincoln, established the land grant university with a Solomon-like simplicity: the federal government would deed large tracts of land to establish public colleges in each state. These institutions would then train young citizens in agriculture, forestry, mining and the mechanical arts — fields tied directly to the prosperity of the nation at the time. Land grant universities today are emerging as leaders in the sustainability movement. They have deep historic ties to stewardship of land and water resources; their faculties — specializing in innumerable fields now thought of as environmental — make them living laboratories for the latest thinking in green design and planning.

Nowhere in New England is this trend more evident than at the University of Maine, which straddles the towns of Orono and Old Town. As both the state's land-grant and sea-grant university, the main campus is augmented by satellite campuses in the state's heavily wooded and sparsely inhabited north, as well as its more populated southern coastal area.

UMaine embodies — geographically, culturally and demographically — the state's growing reputation as a national leader in green thinking and innovation. Maine's splendid coast, known largely as a vacation haunt of Astors and Rockefellers in an earlier time, is now a destination for Americans and Canadians of all economic means. Increasingly, educational and political leaders in the state are seeking ways to leverage its proximity to Canada — Orono forms part of an equilateral triangle between Boston and Quebec City — and the state's industries stand to benefit as U.S. and Canadian trade increases. Not coincidentally, the location is also part of the university's plans to broaden its draw of U.S. and international applicants.

When most people think of green campus design, they envision buildings with solar panels or turbines harnessing hydroelectric power. But even more substantial sustainability advances can be made at the planning level.

While charting the University of Maine's growth over the next quarter century in a formal master plan, extraordinary sustainability opportunities and challenges were uncovered, due both to physical and institutional conditions:

- University President Robert A. Kennedy has signed the American College and University President's Climate Commitment, which is both an impetus and a challenge — how can the institution fulfill its pledge while also implementing a growth strategy and increasing its research presence?

- The university's own Climate Change Institute (CCI) is right in the thick of the worldwide discussion about global warming. The interdisciplinary research unit focuses on the variability of the Earth's climate, with a special attention to the Quaternary Period, a time of numerous glacial/interglacial cycles. In addition, more than two dozen UMaine academics, within and outside the CCI, are engaged in research related to alternative energy and the physical, biological, chemical, social, and economic effects of climate change.

- The College of Engineering is advancing composite research in technologies and alternative energy production.

- The presence of the extensive forested land, including Demerritt forest and the forest preserve, part of the land grant legacy, offers multiple opportunities to test how such property can be managed, expanded and preserved.

- A rich legacy of campus landscape design by Frederick Law Olmsted, Sr. and his firm is matched by a unique architectural patrimony, including

several buildings on the National Register of Historic Places. The challenge for planners was to celebrate this rich tradition while designing spaces that could accommodate 21st century growth.

A central idea of the master plan was that it had to respond to urgent environmental imperatives using a four-pronged approach: demand management to encourage efficiency and energy conservation; renewable energy supply strategies; resource management; and alternative transportation.

To these ends, key decisions were made early on at the planning level, including a campus growth boundary; extension of the Olmsted-designed university mall to the south, framed by new buildings oriented in response to the sun and arrayed along a landscaped promenade featuring wind breaks; and a new transportation network favoring human-powered movement within a pedestrian system that enhances connections between buildings and links the entire campus to surrounding forests and riverfronts.

This is an idea that has gained currency in the larger urban planning field — setting a perimeter beyond which major building will not occur. The boundary places a moratorium on new roads and development in the Demerritt forest, with the exception of research-related projects. The idea rests on the principle, supported by a large body of urban evidence, that density is a good thing. A compact land-use pattern has been shown to reinforce the pedestrian qualities of a district, maintain operational and infrastructure efficiencies, prevent encroachment into surrounding natural systems, and enhance human vitality and interaction by placing a variety of activities in close proximity to one another.

The Olmsted-designed university mall is an elegant building arrangement that echoes the formal Beaux-Arts

planning principles commonly applied in the early 20th century. The challenge was to celebrate and preserve this history by echoing this design vocabulary south of the library, cast in such a way as to consider building placement as a means of mitigating winds and maximizing solar exposure during the long Maine winters. Thus the new mall is a 21st century iteration of the original. Since wind breaks and solar orientation were not given primary consideration in the original Olmsted design, the orientation of major buildings was flipped 90 degrees; together these buildings shelter pedestrians from northern winds that sweep onto the site from October through April. Furthermore, this solar orientation means substantial heat gain in winter.

The proposed forest connections create an expanded trail network and increased recreational access to the forests — an amenity enjoyed by students, faculty and the Orono and Old Town communities. Like many inland Maine towns, the history of Orono and Old Town are closely tied to their riverfronts. As a means of recapturing this important link, the master plan

re-establishes Olmsted's riverfront parade ground and reintroduces vegetation along the riverfront in conjunction with a new trail commemorating the Wabanake tribe, the pre-Columbian settlers of this region of Maine.

The master plan specifies that many of the new buildings have entrances that are aligned for easy movement from building to building. Corridors are located along building perimeters so that pedestrians can "cross-through" multiple structures as they make their way across campus during winter.

Virtually every major decision in the master plan is informed by the imperative of preserving water resources and lowering energy costs and emissions. The majority of new buildings are located on sites currently used as surface parking. Concentrating development in the core campus also maintains fields and forests as buffers that offer natural control of storm water run off and quality. The university is improving the efficiency of its physical plant and miles of underground infrastructure, transitioning much of its power needs to cleaner fuels, and ultimately transitioning to renewable

energy sources. The institutional goal is to reduce CO2 emissions from a current peak of 70,000 metric tons annually to 14,000 metric tons annually by 2050.

New Englander Justin Smith Morrill, after whom the Morrill Land Grant Act is named, was a visionary about agriculture and higher education's duty to preserve and advance practical knowledge. After Morrill's time, the United States would go on to become the world leader in agriculture. The University of Maine seeks to set an example of how, by tapping into the land grant legacy and other educational traditions, the nation might assume a leadership position in the environment as well.

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## Green Tuition Breaks

In response to growing concern about environmental issues and to prepare graduates for an expanding "lean and green" economy, Keene State College will offer a bachelor's degree program in sustainable product design and innovation in fall 2009. The program will include hands-on, project-based learning that focuses on real-world applications, with an emphasis on innovation and business management.

Because the state colleges and universities in Connecticut, Maine, Massachusetts and Rhode Island do not offer a comparable program, residents of those states are eligible to enroll at reduced tuition through the New England Board of Higher Education's Tuition Break — the Regional Student Program. This longest running NEBHE program has been helping New England residents pursue and afford their chosen field of study at out-of-state New England public colleges and universities — when that major is not offered by their in-state public colleges.

Among other opportunities for tuition breaks in sustainability programs in New England:

**Lyndon State College** recently launched an interdisciplinary bachelor's degree program in sustainability studies, which will be available this fall under the Tuition Break to residents of Connecticut, Massachusetts, New Hampshire and Rhode Island.

**Vermont Technical College** offers a "+2" bachelor's degree program in sustainable design and technology, with tracks in green energy, green buildings or green sites. Residents of Maine, Massachusetts, New Hampshire and Rhode Island, who have earned an associate degree in a technical area, are eligible for the program under Tuition Break this fall.

The **University of Maine** has offered its sustainable agriculture bachelor's degree program since 1988, when it was the first such undergraduate program in the United States. The program continues to be relatively unique in New England. Residents in Connecticut, Massachusetts, New Hampshire and Rhode Island are eligible to take the program at UMaine under Tuition Break. The bachelor's degree program prepares students for employment in the expanding arena of organic and locally grown produce. Students gain field experience working for a local food guild, organic seed companies, and organic farms or as research field assistants.

Based on a regional agreement to share programs not offered by every New England state, the Tuition Break program currently affords students an average \$7,000 savings on their annual tuition bills.