



SUSTAINABILITY ASSESSMENT 2006 UNIVERSITY OF VIRGINIA



SUSTAINABILITY

FOREWORD

With an annual operating budget of \$1.88 billion, educating nearly 20,000 undergraduate and graduate students per year, employing approximately 8,000 and ranked among the best universities in the United States, the University of Virginia has a compelling impact on the economy, environment and society. Founded by Thomas Jefferson in 1819, the University prides itself on academic leadership, civic responsibility, self-governance and stewardship of the University Grounds and Academical Village.

Within this context of responsibility, UVA has the opportunity to address sustainability through reversing environmental degradation, repairing social inequity and building a strong economy. The UVA Sustainability Assessment was developed to appraise the state of the University's policies, culture and operations as related to principles and actions that support sustainability. The assessment process engaged more than 200 University members through introductory workshops, online surveys, interviews and research.

The recommended direction presented in the Strategy for Sustainability section is intended to assist the University community in visualizing how UVA can demonstrate leadership in advancing sustainability initiatives within our institution. The assessment itself describes four themes of UVA's Governance and Culture as derived from survey responses, providing a foundation in understanding the successes and challenges facing the University. The themes are followed by an analysis of baseline performance data in core management areas and an inventory of initiatives in academics and learning. The report recognizes accomplishments and is intended to stimulate an informed dialogue on the opportunities available to the University.

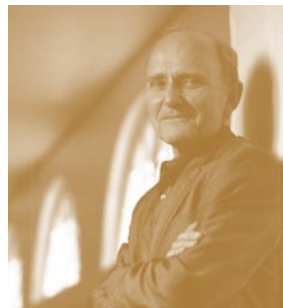
Prior to undertaking the assessment, it was clear that the University was accomplished in areas such as energy and water conservation, stormwater management and recycling. It was also clear that the University has an opportunity to minimize its ecological footprint. As described in the following pages, there is a strong and growing body of interest, support and activity among University members in regard to the importance of sustainability. The sense of personal and institutional

responsibility expressed by many respondents is demonstrated through diverse activities aimed at protecting the environment, as well as accomplishing financial savings. Respondents also expressed the desire for clear direction from University leadership.

While the scale of a comprehensive sustainability assessment encompasses all University areas and potential impacts, the boundaries defined for this study were limited to primary University functions, excluding the Health System, the UVA Foundation and other potentially important areas. For this reason, it is important to underscore that the findings are not fully representative of UVA's overall successes and/or shortfalls in meeting the sustainability challenge at hand, nor does it reflect a complete inventory of the programs, activities and leading faculty working on matters of sustainability.

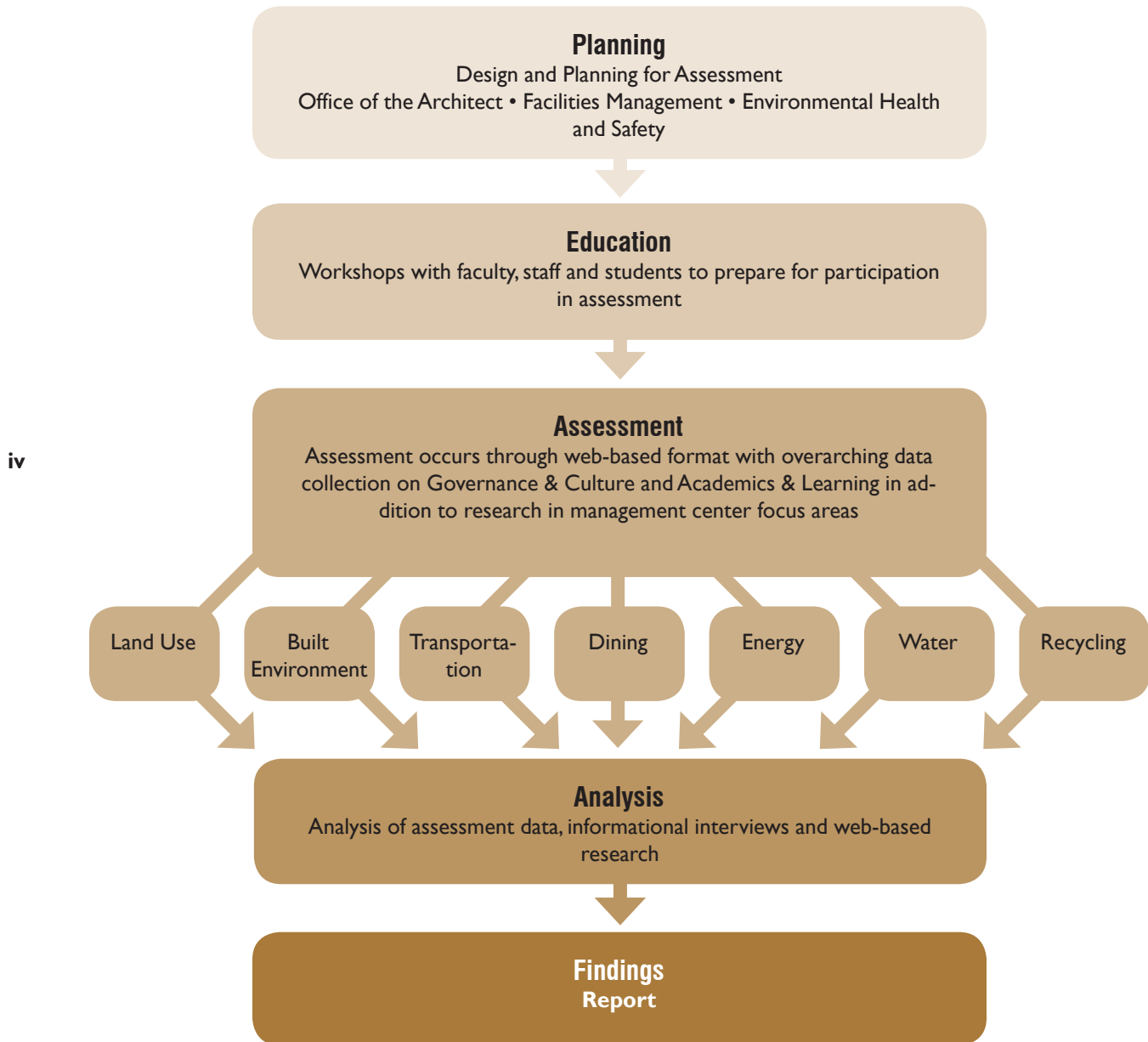
Evidenced by coverage in the general media and discussions around corporate boardroom tables, there is a growing awareness about the importance of sustainability and the need for investment in the future of the planet. As prospective and current students, parents, faculty and staff, alumni, neighbors and other stakeholders seek answers to how UVA is responding to the challenges at hand, institutional support is essential in providing vision, direction and support. It is our intention that this report will further stimulate interest, promote coordination, leverage existing sustainable activities and incite investment to position UVA for national leadership in this arena.

David J. Neuman
Architect for the University of Virginia
Charlottesville, December 2006



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Process and Organization of the Sustainability Assessment



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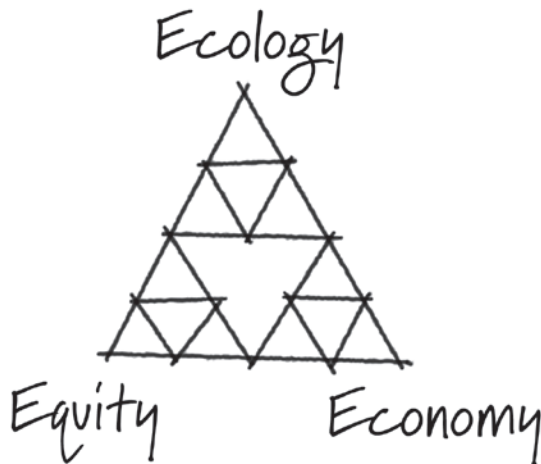
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SUSTAINABILITY

STRATEGY FOR SUSTAINABILITY



Sustainability can be described as individuals and communities doing our part to build the kind of world that we want to live in and that we want our children and grandchildren to inherit. It means becoming aware of all the interconnections—visible and invisible—by which our day-to-day choices affect the intricate balance of social, economic and ecological systems. In the business world, this “triple bottom line” for sustainability strategies encompasses outcomes that are **socially just, environmentally responsible and economically sound**.

Building and sustaining financial capital requires controlling expenses, managing risk and investing in valuable assets. Building and sustaining social and natural capital demands the same kind of vigilance and responsible action. Translating the idea of sustainability into action often requires a **transformative shift** in our behavior. If our institution is to acknowledge and accept the sustainability challenge, finding meaningful ways to chart a course of action toward sustainability, we must begin with significant discussion about who we are and what we stand for at the University of Virginia.

Intent and Approach

In the summer of 2006, a series of workshops, surveys and interviews were conducted to identify the University's baseline performance with regard to sustainability, in order to recognize accomplishments, stimulate dialogue

and develop recommendations. Participants in the University of Virginia Sustainability Assessment exchanged ideas and posed questions about achieving sustainability at the University. The Sustainability Assessment has revealed a broad group of committed people, all possessing a vibrant interest in sustainability and a desire to share their expertise and enthusiasm with the University community. Surveys from students, faculty and staff attest to a high level of awareness and concern, along with a growing desire to take individual and institutional responsibility for our environment. Increasingly, media analysis and discussion of “green” topics has focused attention on local, regional and global concerns that have a direct impact on the life of the University community. What might once have been perceived as a factional, or fringe movement has been replaced with a nationwide sustainability movement championed by citizens, corporations, politicians and institutions of all kinds.

Current Activities

Presently, the University has no official vision for sustainability. This does not indicate a lack of widely stated support; it simply does not identify sustainability as a University-wide priority. Without established policies or procedures prescribed by the institution, activities originate in an organic fashion from within the organization. Currently, each business unit or management center defines, tracks and communicates progress and improvements related to its core responsibilities to the University administration. The goals of major initiatives are outlined, best practices identified, strategic plans developed and a schedule for completion proposed. Reporting encourages each unit to identify and focus on its priorities and also ensures that those goals and priorities are aligned with those of the institution. This indicates a de-centralized structure with leadership of sustainability initiatives residing with interested individuals and action groups. Remaining mindful of challenges and opportunities, inherent in a de-centralized model, can ensure that sustainability initiatives achieve maximum impact by incremental improvements.

At the same time, as reflected in the Management Centers section of this report, many at the University have embraced the sustainability challenge through diverse

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initiatives. The University is demonstrating strong leadership in several areas, including energy management and resource conservation. However, given the encompassing nature of sustainability, there are other opportunities in areas as varied as renewable energy technologies, transit accessibility, local organic foods and community outreach and education.

Future Vision

Planners are trained to look into the future to assess the impact of current and future choices for their communities. In campus planning, scenarios or alternatives are used to describe the changes that could result from increasing levels of intervention on the part of the institution. In this case, we report on current conditions, addressing the present and future choices for integrating sustainable measures at UVA, and a recommended future direction, representing a future including both a 'shared responsibility' and a 'unified approach'.

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The recommended direction draws upon our current strengths as a foundation upon which to build. This direction can adapt to differing levels of intention and investment, and is flexible enough to evolve with the changing needs of the University. The measures can be effective individually or in combination to achieve maximum effect. Without a particular conclusion in mind, the recommended direction represents a genuine attempt to understand what is possible and desirable for our institution. The direction also considers our broader institutional aspirations in the context of our existing business practices and culture.

Following the recommended direction, the reader will be presented with the research from the assessment areas, to assist in understanding the measures which hold the most promise for expanding UVA's sustainable practices.

Talloires Declaration:

UVA is a signatory to the Talloires Declaration which is a ten-point action plan for incorporating sustainability and environmental literacy in teaching, research, operations and outreach at colleges and universities.

- 1. Raise public, government, industry, foundation and university awareness by publicly addressing the urgent need to move toward an environmentally sustainable future*
- 2. Engage in education, research, policy formation and information exchange on population, environment and development*
- 3. Establish programs to produce expertise in environmental management, sustainable economic development, population and related fields to ensure that graduates are environmentally literate*
- 4. Develop capability of university faculty to teach environmental literacy*
- 5. Set an example of environmental responsibility*
- 6. Engage government, foundations and industry in research, education, policy formation*
- 7. Convene deans and environmental practitioners to develop research, policy, information exchange & curricula*
- 8. Establish partnerships with primary & secondary schools to help develop the capability of their faculty*
- 9. Work with UN Conference on Environment and Development, the UN Environment Programme, other national and international organizations*
- 10. Establish a steering committee and a secretariat to continue this momentum and inform and support each other's efforts*

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STRATEGY FOR SUSTAINABILITY

Summary

Current departmental and interdepartmental sustainability initiatives are maintained, while efforts in our particular areas of strength in sustainability are enhanced. In addition, the annual reporting structure requires the responsible units to provide a review of their efforts in support of sustainable measures. Building on this foundation, we identify and focus on areas that we need to address for a comprehensive approach to sustainability. This effort is supported by establishing an advisory panel to aid a prescribed administrative unit in communicating and coordinating annual objectives.

Leadership/Administration

Goal-setting, implementation and measurement

A University-wide vision is articulated, with specific goals and objectives for sustainability initiatives. All units are required to include sustainability in their annual reporting. Metrics, performance measurements, costs and benefits are determined centrally by senior University administration. Departments are responsible for strategic planning, implementation and reporting. Communication and coordination are managed by a single administrative entity.

Resources

Personnel & funding

With a centralized approach, sustainability goals are set by the senior administration. Focused resources of funding and personnel are specified as part of the University budget.

Program

Implemented through metrics

A University-wide program is adopted to promote sustainability measures within and among all departments with the use of guidance and incentives.

Annual Reporting

Implemented through administrative goals

Sustainable measures are integrated into annual reporting structure and become standard within the broader University practices. Operational units are required to perform a self-assessment of current activities, determine best practices and peer benchmarks, and set measurable aspirational goals.

Student Commitment

Implemented through unified student organization

Student Government or equivalent body establishes a unified mechanism to facilitate communication and actions among student sustainability organizations. This body will also be tasked to identify synergistic opportunities, and to encourage collaboration on aligned initiatives.

Management Centers

Implemented through operational practices

University operational practices are reviewed for accountability in economic savings, social equity and environmental leadership. All units are required to demonstrate continuous improvement on a yearly basis.



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GOVERNANCE AND CULTURE



Section 1: Governance and Culture

Thomas Jefferson, the founder and architect of the University of Virginia, integrated concepts of sustainability into the design of the Grounds. Such social and environmental considerations are demonstrated by the mixed-use, intergenerational, innovative design of the Academical Village and the University's academic standard with adherence to a system of self-governance by the students. Given the University's commitment to honoring Jefferson's vision, sustainability is an important concern in determining current practices. One can readily argue that Jefferson's tenet of establishing a university to educate America's future citizens is in itself an act of sustainability.

The University's governance and culture has the unique ability to determine our direction, to leverage individual efforts and to stimulate positive change. The purpose of this Governance and Culture section is to portray in the broadest terms the current mindset of the University community. Participants in the Sustainability Assessment have provided insight on policies, goal setting, accountability, communication systems, collaborative efforts, barriers and opportunities. Respondents have also articulated their vision for sustainability at the Uni-

versity, provided suggestions on tapping the "Jeffersonian legacy," and specified desired resources.

This section is presented through four themes, offering for each a description of current conditions and a vision for the future, drawn from the substantial stakeholder process conducted for this report. The themes are:

- Theme 1: Awareness of the nature and value of sustainability
- Theme 2: The role of long-term, life-cycle costs in University decision-making
- Theme 3: Sustainability as an explicit University goal
- Theme 4: The University as a leader in sustainability initiatives

Theme 1: Awareness of the nature and value of sustainability

Current Conditions

The knowledge level of participants in the Sustainability Assessment ranges from a lack of familiarity with sustainability terms and concepts to full conversancy and active engagement in discussing sustainability with their colleagues. The most significant communication and activity appear to be within specific management centers and the academic community. The challenges revealed by the assessment include an incomplete understanding of sustainability and its payback, shortage of funds and time and uncertainty about how sustainability might be applied to an individual's responsibilities. In addition, a large portion of University members perceive sustainability primarily as resource efficiency (e.g. recycling and energy conservation), absent the implications of economic impacts, social equity and human health.

Improvised groups and listservs are providing effective coordination among staff, students and faculty. A network of faculty, staff and students communicates via a Sustainability Forum listserv. Multiple student organizations are focused on sustainability or environmental issues, including Environmental Sciences Organization (ESO), Green Grounds Group, Net Impact at Darden, Student Environmental Action (SEA), Students for Sustainable Communities (SSC) and Virginia Environmental Law Forum (ELF).

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A majority of respondents explicitly offer to serve as change agents and ambassadors within and between departments. Suggested opportunities for assistance include contributing ideas, giving lectures, supporting principles and policies and providing means of accountability.

Vision

Armed with information about the broad nature of sustainability and specific opportunities for implementing change, University members have the ability to serve as change agents within their departments and beyond. In cultivating sustainability leaders, these issues could be integrated into conversations and programs supporting the development of managers and executives.¹ An example might be the establishment of a task force to provide staff desired direction, support and accountability on the integration of existing Office of the Architect Sustainability Guidelines with the Facilities Design Guidelines; with the intent that capital costs for sustainable features of buildings might be better paired with operational returns.

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Faculty members identify interdisciplinary collaboration and hands-on application as ways to encourage cutting edge research, facilitate faculty engagement and infuse sustainability into the curriculum. Student roles as sustainability advocates can be enhanced by guidance and the provision of outlets for meaningful engagement.

Theme 2. The role of long-term, life-cycle costs in University decision-making

Current Conditions

The University manages facilities and other assets in accordance with prudent general business practices. Best management practices are in place in many of the management centers identified in this assessment. Participants also indicate that there are opportunities to look beyond conventional performance and to consider life-cycle costs, including costs borne by the University over time and the additional costs of “business as usual” borne more broadly by society. As a public institution, the University has the opportunity for proactive man-

agement of resources to protect human health and the environment. This longer-term thinking is not currently standard practice at the University, although it is practiced in specific areas.

An emphasis on first costs, rather than full consideration of life-cycle costs, was repeatedly noted in the survey as a challenge to sustainability practices. Financial accounting appears as a limiting factor, preventing individual departments from considering unintended additional costs or impacts for other departments and/or the University at-large.

Vision

Life-cycle and long-term costs can be considered as central to our educational mission of developing civically minded graduates and extending concern to future generations. In addition to reaping direct financial savings through reduced heating, cooling and stormwater management costs, innovative measures can demonstrate the University’s commitment to sustainability and promote the development of alumni positioned to make responsible choices as voters, consumers and members of their local communities. The teaching and application of sustainability practices, if infused in the University’s culture, can pay tribute to our principles of self-governance,



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GOVERNANCE AND CULTURE

honor, service, academic rigor and diversity. Because the University is a part of the built environment, sustainable buildings and site design - in new and renovated buildings - should also be at the forefront of life-cycle analysis.

Theme 3: Sustainability as an explicit University goal

Current Conditions

University procedures are guiding progress in specific sustainability areas. Several departments have developed guidelines indicating their commitment to sustainability initiatives, such as the Office of the Architect's Guidelines for Sustainable Buildings and Environmental Design; for others, such as Environmental Health & Safety, sustainability is inherent in their mission; others, such as Parking & Transportation, are simply guided by individual leadership and dedication, as in its development of a "strategic planning score card" to measure and evaluate compliance with U.S. Environmental Protection Agency and University Environmental Management System goals. However, identifying sustainability as a central University goal would provide broader vision, encouragement and accountability.

Three policies provide an explicit direction on environmental and sustainability issues at the University. In addition to regulation-based policies guiding the use and disposal of hazardous, toxic or sensitive material, the University has enacted the following policies:

- Recycling
- Environmental Management
- Energy Management and Sustainability

On an institutional level, the University is also a 1992 signatory to the Talloires Declaration, a ten-point action plan signed by over 300 university presidents and chancellors for incorporating sustainability and environmental literacy in teaching, research, operations and outreach at colleges and universities. Broader planning processes, including the University's Virginia 2020 plan, an institutional strategic plan and annual retreats of senior level Vice Presidents and Deans, offer important opportunities to elevate discussion and determine priorities in establishing University-wide goals and objectives.

Vision

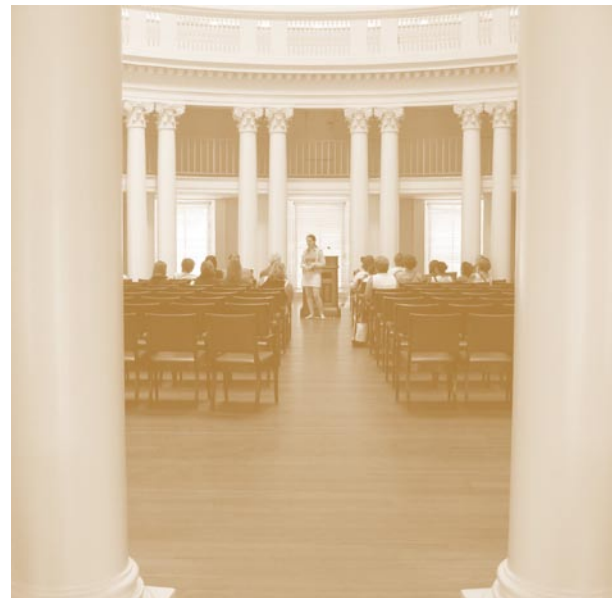
University-wide sustainability principles can be explicitly and publicly articulated with the aim of supporting a united approach, infusing sustainability into all departments, providing tools, information and accountability, recognizing value and rewarding accomplishments.

A significant majority of respondents articulated the desire and need for University-wide commitment to sustainability principles, primarily driven by the Board of Visitors and upper-level administrators. Such a commitment would require clearly communicated goals and objectives that are genuinely embraced by administrators and managers, along with the necessary education, tools and financial resources. Through performance measures, recognition and rewards, University community members and contractors could be held accountable.

Theme 4: The University as a leader in sustainability initiatives

Current Conditions

A significant number of respondents have indicated an inherent alignment of sustainability with the University's mission, the Jeffersonian Legacy and institutional leadership responsibilities. While sustainability is not refer-



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enced in the mission statement or in the University's strategic planning documents, it is notable that the University committed to the Talloires Declaration in 1992. President John T. Casteen III signed the declaration in a joint action with all other public university heads in Virginia under the auspices of the statewide University Presidents' Council.

Student interest was clearly ranked as the primary driver in advancing sustainability initiatives, while faculty and staff interest, consistency with University culture and values and good public relations followed in order. Cost savings were also indicated as a key driver by a majority of respondents. While alumni and funder interest were not frequently cited drivers, increasing awareness about the importance of and opportunity to address sustainability at the University may alter this perception. A minority of respondents indicated a lack of official commitment of resources, perhaps attributable to the inherent tension between long-standing institutional ways and more progressive perspectives brought by students, faculty and staff. Also to be noted is the observation by some that the term sustainability implies maintaining the status quo, as opposed to making radical improvements and thus may not go far enough in articulating the importance of the University taking a leadership position in addressing core global and local challenges.

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Vision

Minimizing our ecological footprint and demonstrating our leadership responsibilities are seen as interconnected and notably important. From carbon-neutrality and zero-waste to simply turning off lights and increasing recycling rates, a significant number of respondents identified minimizing our ecological footprint as of utmost concern. Similarly, many respondents identified the importance of looking beyond immediate and surrounding impacts of our decision-making to include broader social and environmental implications. By implementing a set of commonplace, responsible and innovative sustainability measures and values, the University of Virginia has the opportunity to become a leader with peer higher education institutions and in the surrounding community.

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MANAGEMENT CENTERS



Section 2: Management Centers

The Governance and Culture section, representing the broad outlook for the University as a whole, has been derived from a comprehensive review of the assessment data. The Management Centers section provides information derived from the University's operational units. These centers supervise the majority of operational activities at the University, supporting the primary academic functions. Focusing on these centers, which represent the material impacts of the institution, allows us to understand the implications of the notion of sustainability for individual aspects of the physical campus.

Management Centers include:

- Land Use
- Built Environment
- Transportation
- Dining Services
- Energy
- Water
- Waste and Recycling

This section offers a presentation of the issues, activities and opportunities in each Management Center. The information was provided by representatives of each

center through the assessment process. While some are stronger in their sustainable practices than others, there is a considerable amount of progress and action in all.

This section is not intended as a comprehensive assessment of each area's performance, but sets the stage for conducting a more thorough analysis. Further analysis should include other important sustainability activities not assessed in this study, such as purchasing policies and practices, materials reuse and University investments. Social indicators, including housing affordability, commute time and transportation modes should also be taken into consideration.

Limited by our existing systems of accounting and budgeting, we are challenged in accounting for life-cycle costs and long-term returns in our decision-making processes. Where available, the financial costs and benefits of particular actions are included below. However, a more thorough analysis would yield concrete data on the financial implications of improved sustainability performance.

Global Context

The context for our work extends beyond the ivory tower. Increasingly, leadership and innovation in our society are being directed toward global challenges of sustainability. Global warming, energy, water scarcity, persistent pollutants, security, ecosystem degradation and loss -- these and similar issues have emerged on local, regional and global stages.

Each of the Management Centers presents a piece of this global challenge. For example, some of our waste and material use issues stem from global supply chains, involving distant mining and remote disposal. Our greenhouse gas emissions generate impacts on global climate and temperature across the globe. Yet we do not know exactly how to map the global impact of our local activities; we know only that such links exist. In seeking to understand these complex relationships and to determine appropriate leadership roles in confronting the challenges, this inventory of actions is a necessary first step.

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University Context

Just as the University's culture can have a transformational impact, encouraging the reconsideration of "business as usual," the Management Centers considered here have the opportunity to promote a rethinking of the role of the Grounds as a teaching space. Even simple steps, such as signage and regular University communications, can gradually place important but otherwise invisible issues in the minds and on the agenda of the University community.

Regular communication of innovation and success reinforces progress, both by building understanding of new and unusual practices and by redefining institutional leadership. Instead of seeing high-efficiency lighting, stormwater management and alternative fuel buses as unrelated or incidental, University members can begin to understand that these and other individual actions demonstrate the University's deliberate commitment to progress on sustainability initiatives.

Working towards this type of engagement of the University community, the Office of the Architect for the University consulted with Facilities Management and Environmental Health and Safety in 2006 to aid in the design and development of this sustainability assessment. With the support of a graduate student intern in Planning, the assessment has been developed to gain an initial understanding of sustainability-oriented activities at UVA and to form a baseline for potential future actions at the University.

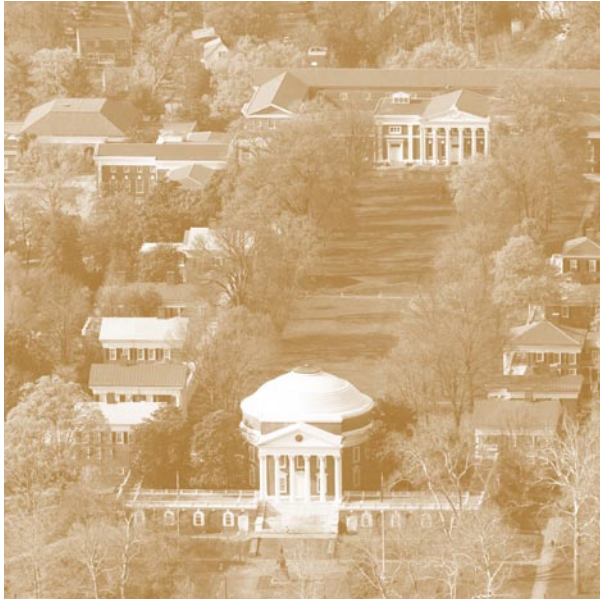
Also of note is the University's Environmental Management System (EMS), currently under development in the Office of Environmental Health and Safety (EHS). Going "beyond compliance," the EMS serves as a tool to analyze, evaluate, manage and track environmental impacts and improved performance. Analyses are conducted department by department, involving staff at all levels. As noted in the following sections, Transportation has completed its EMS, while those for Dining and Housing are underway. The data generated from the EMS is generally quantitative and technical in nature, offering a strategy complementary to but different from a sustainability assessment. After the EMS is implemented for a

department, EHS applies for State certification through the Virginia Environmental Excellence Program (VEEP).

In the following Management Center topic areas, each contains a section titled "Opportunities for Improvement." Absent a single source of information on best management practices for higher education sustainability, this section is based upon research of activities being implemented by peer institutions as exemplified by current trends and case studies. Data was compiled from information supplied by leading higher education institutions and national non-profit organizations tracking higher education sustainability performance activities, including: Association for the Advancement of Sustainability in Higher Education (AASHE), National Wildlife Federation's (NWF) Campus Ecology Program, Second Nature, University Leaders for a Sustainable Future (ULSF) and the U.S. Environmental Protection Agency (EPA).

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LAND USE



Sustainable environmental design would address the broad physical environs of the Grounds, including the management of University land use and landscape. The increasing population and economic growth of the University and its community context heighten the urgency of thoughtful and cohesive planning, with a concern for impacts related to suburban-type development, potential segregation of uses and community divisions along socioeconomic lines. Unsustainable development has the potential to result in impaired community ties, fragmented habitat and degraded air and water quality.

Representing a microcosm of society, a university's land uses and landscape often mimic those of a small town or city, including housing, dining, offices, classrooms, health care facilities and more. The physical sense of place defined by the University's Grounds has several immediate effects, including providing an accessible network of buildings and activities, offering a positive impression to visitors and prospective students and cultivating the University's relationship with the surrounding community.

Current Activities

Alone among U.S. college and university campuses, the University of Virginia Academical Village has been des-

ignated one of 830 international properties listed as a World Heritage Site by the United Nations Educational, Scientific and Cultural Organization (UNESCO).² The Academical Village, as designed by Thomas Jefferson, is an early example of a densely developed, mixed-use campus, incorporating housing, dining and teaching with social spaces. Jefferson's buildings enclose a commons area known as The Lawn. To this day, the rooms, pavilions and adjacent gardens continue to serve residential, educational and recreational purposes for students and faculty at the University. The Academical Village is a model for mixed-use development and sustainable living.

The University has grown from 197 acres in 1817, to 1,135 core campus acres today. Because land resources are limited, the University chooses to increase the density around the central core rather than to annex additional land. Infilling between existing facilities helps to create a more compact, walkable campus while preserving our forests and wetlands.

The Office of the Architect (OAU) is currently developing the Grounds Plan, an updated master plan for the University. This comprehensive planning effort, addressing the need to support academic growth for the next 20 years, offers multiple opportunities for sustainable development. In pursuit of this goal, the plan calls for an analysis of the Grounds' natural systems; a transportation demand management study to optimize options for multi-modal traffic on and around Grounds; and collaboration with the City of Charlottesville and Albemarle County in seeking opportunities to improve the quality of life in our community. The Plan will support increased density of developed areas of the Grounds while allowing for conservation zones. For example, the preservation of Observatory Hill, a University icon and headwaters of the Meadow Creek, honors cultural significance and provides a natural resource benefit.

With the support of graduate student interns in Planning and Architecture, OAU developed its Guidelines for Sustainable Buildings and Environmental Design in 2005. Provided to all design consultants and facilities managers, the sustainability guidelines offer objectives and recommendations for energy, water, construction materials, indoor air quality, site planning and design, historic

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preservation, building reuse and transportation.

OAU developed the Landscape Master Plan in 1997 and the Water Resources Strategic Plan in 1999. Both documents address stormwater management, seeking to optimize the processing of stormwater through the use of permeable surfaces, bioswales and bioremediation. Recommendations in the Landscape Plan underscore the importance of linking woodlands and waterways, enhancing bicycle and pedestrian circulation systems and preserving and improving open space, including places for ceremony, gathering, retreat, play and passage.³ Active programs in the realm of Grounds landscape include reforestation through a tree replacement program combined with efforts to retain large existing canopy trees throughout the Grounds; slope and stream stabilization projects; the development of a low maintenance plant palette for the Grounds, promoting durability, longevity and stabilization; and an integrated pest management program that minimizes pesticide and herbicide usage and employs organic controls to protect the health of the University community.

The Water Resources Strategic Plan provides for daylighting previously buried streams, addressing marginalized wetlands and mitigating the impact of stormwater runoff in support of repairing Meadow Creek.⁴ Aiming to exceed federal and state regulations in reducing runoff, maximizing filtration and restoring the natural drainage system, the University has completed stream and habitat restoration projects adjacent to the Health Sciences building, the Dell, the Emmet Street Parking Garage and the newly completed multi-use Arena. This Plan has also provided a Watershed User's Guide and Best Management Practices for continued management of our watershed health.

The Archeology Master Plan of October 2003 provides

protection throughout the Grounds by identifying culturally rich areas, sensitive to disturbance, to be monitored in response to any type of development. In response to this plan, for example, all utility projects within the Academical Village are subject to Level I survey and archeological monitoring during construction. In addition, the OAU recently completed the Historic Preservation Framework Plan, which has evaluated 24 geographic sections of the University Grounds, assigning preservation priorities to individual areas based on historical significance and integrity.

Comparing Our Performance

The following section notes best management practices being implemented at peer institutions as noted by current trends and case studies.

The Cornell Sustainable Campus program is guided by a belief in balancing people, planet and prosperity. Cornell has many established programs to make the campus more sustainable and has made significant progress. The award-winning Transportation Demand Management Program on campus has reduced the number of parking permits by 25% and enabled Cornell employees to commute 10 million fewer miles each year. Fewer cars on campus means more use of ride-sharing, bicycles, free public transportation and alternative fuel vehicles.

In 2004, the Governor of California signed Executive Order S-20-04, committing the state to aggressive action to reduce electricity use and reduce grid based energy purchases for all state owned buildings, including state institutions of higher education, by 20% by 2015. To achieve these objectives, the following measures were set forth: designing, constructing and operating all new and renovated state-owned facilities paid for with state funds as "LEED Silver or higher certified buildings; identifying the most appropriate financing and project

RECENT ACCOMPLISHMENT!

In April 2006, the University of Virginia was recognized by the US Environmental Protection Agency Region III and the Virginia Department of Conservation and Recreation for innovation and excellence in low-impact development stormwater management strategies.⁵

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LAND USE

delivery mechanisms to achieve these goals; seeking out office space leases in buildings with a U.S. EPA Energy Star rating; and purchasing or operating Energy Star electrical equipment whenever cost-effective. Furthermore, the Sustainable Building Task Force was established to develop an action plan aimed at achieving the sustainable building goals previously established by former Governor Davis through Executive Order D-16-00. The Task Force is comprised of more than 40 government agencies responsible for financial, building and environmental policy expertise⁶.

In September 2006, New York City Mayor Bloomberg announced the establishment of the Office of Long Term Planning and Sustainability. The office is charged with developing a long term plan for growth and development with an emphasis on sustainability and is responsible for assisting the City in operating as a “green” organization. Through this office, the City will undertake a greenhouse gas assessment of City operations and facilities, as well as an assessment of the entire City’s emissions. To support these ambitious efforts, the City has established a partnership with the Earth Institute of Columbia University to provide scientific research and advice on environmental health and climate change⁷. Acknowledging the University’s wealth of knowledge and expertise in the fields of science, health, planning and more, the City will leverage the University’s support in developing a well-grounded sustainability agenda⁸.

Recommended Actions

The following actions are organized from a low to high level of intervention.

- Increase awareness about University’s activities in sustainable building and design, stormwater management and environmentally friendly landscape treatments
- Continue improvements implemented through Fer-

tilization Management Program

- Establish formal commitment to habitat restoration and low maintenance landscape
- Commit to U.S. Green Building Council’s Leadership in Energy and Environmental Design (LEED) certification or equivalency for all new or renovated buildings
- Collaborate with University of Virginia Foundation (UVAF) to advance sustainable building and environmental design and environmentally friendly landscape measures
- Work with the Commonwealth and its agencies to advance sustainable building and environmental design measures
- Support the Commonwealth in developing a sustainability agenda, leveraging the University’s expertise in the sciences, humanity, business, planning and design



DID YOU KNOW?

Carr’s Hill Field is covered in Tarkett FieldTurf, composed of roughly 500 tons of recycled rubber from the outsoles of sneakers and supported by 10 inches of gravel below the surface to slow the rate of infiltration. Cost avoidance in mowing labor, field lining, watering, application of fertilizers and other chemicals, equipment maintenance and aeration results in nearly \$30,000 annual operational savings, while the new covering allows more frequent and sustained use as well as serving as a stormwater retention device.



ASSESSMENT

BUILT ENVIRONMENT



Sustainable environmental design should offer optimum working/living conditions, alongside reduced environmental impact, both now and in the future. The location of a building, its design, construction materials and practices, subsequent operation and maintenance, as well as future changes of use, are all factors to be considered as part of the complete building and site life cycle. Many problems of natural resource depletion and degradation, waste generation and accumulation and negative impacts to the ecosystem can be reduced or eliminated by more thoughtful design and working practices in planning facilities and infrastructure projects. The University's built environment includes academic facilities, libraries, dining halls, dormitories, athletic centers, health care and research facilities and the associated supporting infrastructure.

The siting and envelope of a building are not the only concerns. Americans spend nearly 90% of their time indoors⁹, raising the importance of indoor air quality (IAQ) and day-lighting, which impacts not only energy consumption, but teacher and student performance too.¹⁰ Accounting for nearly 50% of total energy consumption in the United States, almost double that of the transportation sector, material manufacturing and building operation contribute to the degradation of air and water quality as well as to global warming. By reducing

material delivery distances, selecting environmentally friendly materials, mitigating site construction impacts and improving operational performance, green building design can minimize environmental impacts while offering economic benefits.

Current Activities

Thomas Jefferson's design for the University of Virginia is the seminal achievement in American campus planning and defines the image of the University. Every subsequent building and landscape has attempted to respond to Jefferson's creation. The University's special character and sense of place derive not just from Jefferson's buildings, but from the ensemble of buildings and settings that form the entirety of the current Grounds.

Historic preservation protects both our historic and our natural resources. The University is committed to preserving its heritage and has surveyed and evaluated its buildings and landscapes to assess their condition and historic significance in the Historic Preservation Framework Plan (*See Recent Accomplishment!*). A preservation planner and a conservator in the OAU and two Facilities Planning & Construction (FP&C) project managers use this plan to inform decisions about renovation, restoration and adaptive reuse of historic buildings and landscapes.

FP&C maintains state-of-the-art energy conservation and design criteria with its Facilities Design Guidelines. These guidelines include direction on lighting, controls, mechanical and electrical systems, recycling and other sustainable practices, providing a reference for architects and builders working at the University. Compliance is enforced by an in-house review team. Together with the OAU's Guidelines for Sustainable Buildings and Environmental Design, the Facilities Design Guidelines present consultants and contractors with a sense of the University's commitment to sustainability.

While the University does not have an explicit green building policy at this time, all current design projects are evaluated using the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) checklist. LEED registration or certification on upcoming

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ing projects would entail registration fees. Fees and higher first costs concern some University stakeholders; however, many first costs are declining as the design and construction industries respond to increasing demand for green products and services.

Green roofs provide numerous environmental, economic and aesthetic benefits. They create natural habitat, minimize stormwater runoff, mitigate the heat-island effect and provide increased insulation. Green roofs are currently planned for the McIntire School of Commerce Rouss Hall addition, the School of Nursing and the South Lawn Project. The Green Grounds Group, a student organization, is working with the University administration to install a green roof on Clemons library and a roof garden on the Clemons 4th floor terrace. The University of Virginia Foundation (UVAF) is also exploring a green roof for the West Main Street Clinical Office project.

to conduct and coordinate in-house design reviews, provide consistency and incorporate lessons learned on prior projects. Commissioning, the process of ensuring that a building performs as designed and in a manner that satisfies the owner's needs, is a new quality control measure at UNC. A full-time commissioning coordinator, who tracks new capital projects and manages retro-commissioning efforts in existing buildings, was hired in July 2005.

Three of Harvard's buildings have received rankings from the LEED program: the Harvard School of Public Health's Landmark Center headquarters, Radcliffe's Schlesinger Library and the One Western Avenue graduate student housing center in Cambridge. Ten more Harvard projects are under consideration for similar rankings. Harvard also fills its campus diesel vehicles, such as the shuttle buses that run between Harvard Business School and Cambridge, with a blend of 80 percent diesel and 20

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Value management represents a critical step in determining the final building design, where building program and design features are evaluated in terms of project cost. The Value Management Study considers not only first costs, but building life-cycle costs as well.

Comparing our Performance

The following section notes best management practices implemented at peer institutions as exemplified by current trends and case studies.

The University of North Carolina, Chapel Hill, applies USGBC LEED guidelines to each project on campus. The guidelines clarify University expectations for everything from loading docks to fume hoods and stormwater management. A customized LEED checklist, included in the guidelines, is requested from designers at each phase of project submittals. The goal is to achieve a LEED Silver performance level on all projects. Three engineers, hired



RECENT ACCOMPLISHMENT!

The recently completed Historic Preservation Framework Plan documents the evolution of the University and recommends preservation strategies based on the historic significance of a building or landscape. The University's special character and sense of place derive not just from Jefferson's buildings, but from the ensemble of buildings and settings that form the current Grounds. The Framework Plan will provoke a critical dialogue as building renovations are planned, enhancing the University's strong, sustainable stewardship of its built environment.

ASSESSMENT

BUILT ENVIRONMENT

percent biodiesel at the university's own biodiesel fueling station in Allston. Harvard spent \$60,000 to install the pumps, a sum it expects to recover in fuel cost savings within five years.

The University of California, Berkeley, has established a Green Building Research Center. The Center offers design assistance to staff who manage building procurement and operation. They are currently in the process of developing the "LEED equivalent" system for rating sustainability on the Berkeley Campus. Other initiatives include sustainable design competition sponsorship, building performance verification, alternative energy demonstrations and eco-charrettes for early project planning.

Recommended Actions

The following actions are organized from a low to high level of intervention.

- Coordinate criteria from Sustainable Building Guidelines with Facilities Design Guidelines. Develop sustainability checklist for University code, constructability and life-safety reviewers to ensure implementation of sustainable building guidelines and criteria
- Expand educational and public relations outreach to students, donors, alumni and community members regarding importance of green design and the University leadership
- Increase the number of accredited architects and engineers at the University through an incentive program
- Establish minimum LEED certification or equivalency for all new and renovated buildings on the University Grounds, Health System and Foundation properties
- Assess life-cycle costs and savings of sustainable buildings in value management process.
- Track operational savings of sustainable building projects, cost avoidance and payback



DID YOU KNOW?

By conducting a basic cost assessment of roll vs. modular carpet replacement, Darden saved \$63,538 in minimized waste and installation expenditures. Covering 160,000 square feet, roll carpet would result in 13% waste and modular carpet would result in 1.5% waste. As a result, Interface carpet is now showcased on the ground floor of the Student Service Building, Abbot Lounge in Saunders Hall and classroom building corridors.¹¹



ASSESSMENT

TRANSPORTATION



In response to reduced land availability, increasing costs for land and construction, negative environmental and social impacts and growing community pressure, colleges and universities are increasingly taking a proactive approach to transportation demand management (TDM). TDM seeks to meet university transportation needs associated with future growth by reducing the demand for vehicular use and encouraging options for travel, including walking, bicycling and use of transit. By transitioning university members from single occupancy vehicles (SOV) to transit, higher educational institutions can improve the quality of life on campuses and minimize greenhouse gas emissions. For example, reducing single occupancy drivers by 15% among 15,000 drive-alone commuters would reduce vehicle miles traveled by 16.2 million, saving almost 800,000 gallons of gasoline and 7,000 metric tons of greenhouse gases.¹²

Current Activities

According to the 2002 Census Transportation Planning Package (CTPP) data, 6 percent of all University employees commute to work by trolley or bus.¹³ Consequently, a significant number of employees are traveling to work in personal vehicles.

To meet this demand, the University maintains 15,500

parking spaces, 3,000 of which are used by the University Hospital. Of the total spaces, 40% are located in structured parking garages and 60% are in surface parking lots. Looking strictly at the University's enrollment figures of 20,000 students, the University's parking ratio of students to parking spaces is 1.3:1.

Monthly parking fees range from \$14/month to \$43/month or \$168/year to \$516/year.¹⁴ The University also offers the Occasional Parker Pass at the Ivy/Emmet garage; at a cost of \$36, University members can park up to 20 times.¹⁵ As of fall 2003, first year students were prohibited from parking on Grounds.¹⁶

Over 95% of undergraduate students are served by the University Transit System (UTS), a fare-free system for University members with a valid identification card.¹⁷ Reaching beyond the Grounds and in collaboration with the City of Charlottesville, Charlottesville Transit Service (CTS) hosted a fare-free pilot program on all CTS buses in October 2005, April 2006 and October 2006. During the scheduled months, UVA ID holders could ride CTS for free. The University and City are working towards a permanent and formalized fare-free system. In the meantime, UTS riders can obtain a CTS transfer pass and all community members are able to ride the CTS Free Trolley between the University and Downtown.

Under the direction of Environmental Health and Safety (EH&S), Parking & Transportation (P&T) was the first department to undertake an

Transportation facilities and services directly affect the economic bottom line.

Consider the average cost of a structured parking garage at \$25,000 per space. At 1,000 spaces, capital costs will reach \$25 million. Recovering capital costs through user fees would increase rates beyond what is politically acceptable.

Comparatively, the average cost of transit pass per year is about \$260 per employee. At a total cost of \$260,000 for 1,000 employees, plus operations and maintenance expenditures, the total cost of a transit pass program is still far less than constructing new parking facilities.¹⁶

SUSTAINABILITY

Environmental Management System (EMS) approach to improving performance beyond compliance. (See *Recent Accomplishment!*)

Vehicle fleets throughout the University are owned and operated by independent auxiliary units, including Housing, Environmental Health and Safety and Parking and Transportation. Some departments have purchased hybrid Sport Utility Vehicles (SUVs), while others have started using diesel powered Gators, which could be converted to use biodiesel fuel. Estimates of the total fleet size range from 100-400 vehicles. Lacking a central source of information, it is difficult to determine the fleet size, environmental impact and unrealized economies of scale.

Non-motorized forms of transportation at the University play a critical role in accessibility to the University's Grounds. Findings from a survey on bicycling conducted by the OAU and the Green Grounds Group¹⁸ indicate that among respondents who have bicycles, 50% ride on sidewalks and brick paths and 51% believe that the University provides enough information about biking.¹⁹ However, only 45% indicated owning and wearing a helmet. A significant majority of 79% identified "more dedicated bicycle routes and lanes" as encouragement for riding more frequently. Building upon bicycle facilities mapping and case study research conducted in 2005-2006, the OAU and the Green Grounds Group are updating the 1993 University bike plan and developing a Bike Smart Map.

Since approval in 1998 by the University's Board of Visitors, the University is working to establish a "Groundswalk," enhancing pedestrian and bicycle connectivity throughout Grounds via a network of paths. The recently constructed Emmet Street Pedestrian Bridge represents an initial step in this project. Additional goals include

concentrating parking at the exterior of Grounds, improving pedestrian environment and restricting vehicle access on Grounds.²⁰

As an academic project, Professor Noreen McDonald and students in the Urban and Environmental Planning program researched and analyzed transportation demand management at the University, with support from Parking and Transportation. Initially focused on an assessment of a fare-free system between UTS and CTS, the project evolved into a comprehensive set of recommendations aimed at shifting modes of transportation and minimizing parking demand.

Comparing Our Performance

Transportation Demand Management (TDM) seeks to reduce the number of vehicles, or vehicle trips and vehicle miles driven. Employing many approaches and



RECENT ACCOMPLISHMENT!

The Virginia Department of Environmental Quality certified the University of Virginia's Department of Parking and Transportation (P&T) as an "environmental enterprise" (e2) upon approving its Environmental Management System (EMS). "Going beyond compliance," P&T was recognized for its use of biodiesel fuel in the bus fleet, minimizing water usage and stormwater runoff, and installing island canopies and berms to contain pollutant spills.²¹

ASSESSMENT

TRANSPORTATION

strategies, colleges and universities have implemented such programs as car sharing, free transit passes, guaranteed ride home, free bicycle accessories, parking cash out, bicycle checkout programs, incidental use parking, parking maximums, preferential parking and unbundled parking leases. The University is implementing a variety of these methods, including incidental use parking (via Occasional Parker Program) and parking fees. The following institutions, however, serve as models in applying a wider range of TDM strategies.

The University of Colorado at Boulder has created a culture around alternative transportation modes. In coordination with the City of Boulder, the University offers ample bicycle lanes and facilities, supports a pedestrian network, and provides fare-free ridership on all regularly scheduled transit routes within the Regional Transportation District (RTD) and the Community Transit Network.

The University of North Carolina (UNC) at Chapel Hill hired a Transportation Demand Management coordinator in 2001 to identify and implement opportunities to decrease single occupancy vehicle drivers. UNC also maintains a Commuter Alternatives Program. In exchange for their parking permits, members receive emergency rides home or to park and ride lots, free parking one day per month and 10-15% discounts from many local merchants. UNC employees riding in Triangle Transit Authority vanpools receive a \$10 per month subsidy and free, reserved parking on campus, while community members can purchase transit passes at an 80% discount from the Triangle Transit Authority.

Emory University offers a set of alternative work arrangements, including flextime, compressed work weeks, job sharing and telecommuting. With more than 1,600 employees and students participating in the program,

Emory saved more than \$16 million in avoiding the construction of a parking garage. Serving as a direct financial incentive to employees who do not use a parking space, Dartmouth College's parking cash-out program pays employees \$180-\$360 per year, paying more to those who live farther away from campus.

Given that affordable housing is most often found on the outskirts of a community, employees living farther away are subject to increased transportation expenses - a trade-off that proves difficult for employees on restricted budgets, while also increasing total vehicle miles traveled. The Yale University Homebuyer Program provides financial benefits to employees who are faculty members with an appointment of at least one year at 50% or more of full-time as well as to permanent part- or full-time staff employees. Through this program, more than 500 employees have purchased homes in communities adjacent to the University.



DID YOU KNOW?

The entire University Transit System (UTS) runs on B20: 20% biofuel mixed with 80% diesel fuel. In addition to moving the U.S. toward energy independence, a biofuel-based economy has the potential to stimulate regional economic development, decrease local air pollution and reduce greenhouse gas emissions. Faced with a possible struggle between providing crops for food or for fuel, biofuel research is increasingly focused on inedible materials.²²

SUSTAINABILITY

Recommended Actions

The following actions are organized from a low to high level of intervention.

- Increase safety awareness among automobile drivers in regard to bicyclists
- Host annual bicycle awareness day including tune-ups and bicycle route and safety information
- Improve bicycle safety on specific roads and determine new routes
- Establish central locations for bicycle corrals throughout Grounds
- Implement creative advertising to increase use of alternative modes of transportation
- Offer discounted and/or priority parking for car-pools and vanpools
- Ensure equitable parking rate structure and transportation options
- Work with Human Resources Department to support flex time programs, parking cash out, carpooling programs and other transportation demand management strategies
- Expand and promote Occasional Parker Program
- Establish a fare-free bus pass system on City bus system for University ID holders
- Establish car-sharing program for University members (e.g. Zipcar or Flexcar)
- Conduct biannual assessment of work-residence commuting patterns to reassess needs
- Conduct assessment of alternative fuel vehicle procurement
- Establish procurement process to realize economies of scale for alternative vehicles
- Establish University and Health System parking ratios to guide decision-making

ASSESSMENT

DINING SERVICES



Increasingly, consumers are physically and psychologically disconnected from the food production that sustains us. The negative consequences on ecosystems and human health resulting from the application of pesticides, hormones, and antibiotics in meat and produce production can easily escape awareness.²³ The economic and social impacts of embodied energy (“true” energy cost), wage equity and fair working conditions can also be difficult to recognize.

Studies indicate that fruits and vegetables are transported 1,500 to 2,500 miles, representing a 20% increase since the early 1980s.²⁴ Long distance food exerts additional demands upon natural resources used in packaging and transport, resulting in increased waste and elevated greenhouse gas emissions, respectively. Energy, water and land resources are also consumed during food preparation, cleaning and disposal. As consumers, University decision-makers and students have the ability to drive the demand for sustainability-sourced food and managed waste.

Current Activities

Aramark is contracted to provide food service at the University. Operating under the name of UVA Dining, Aramark maintains 23 dining outlets around Grounds,

excluding Darden and medical facilities. Facilities range in size and include Observatory Hill, Newcomb Hall, Fine Arts Lounge and Residential Colleges, such as the Language Houses.²⁵ Aramark serves approximately 7,000 meals per day in the residential dining halls and manages nearly 13,000 retail transactions per day in the cafes and other retail outlets. As contracted by Aramark, the University’s primary grocery supplier, SYSCO Food Services in Harrisonburg, Virginia, provides 82% of UVA Dining’s food. Dozens of other suppliers, including Java City, Greenberry’s and Cavalier Produce, provide the remaining 18%.

Although not always labeled as such, local fruits, vegetables, meat and cheese are purchased by UVA Dining, which also offers natural and organic dishes in the frozen and shelf table sections at The Crossroads. UVA Dining purchases recycled content paper napkins and recyclable food containers. While composting has been of interest throughout the years, progress has been slowed by questions of location and permits.

In response to student demand and championed by Students Promoting Fair Trade (SPTF), a student organization, UVA Dining began offering fair-trade coffee in all residential dining facilities in 2005.²⁶ Coffee served at the University that carry a fair-trade label or fall under the fair-trade umbrella according to the parent company include: Java City coffee, served at six branded locations throughout Grounds; Greenberry’s, served at two branded locations plus catering and concessions; Pura Vida, served in three residential dining locations; and Starbucks, served in one location.

University of Virginia Dining represents the second department in the University to implement an Environmental Management System (EMS) through Environmental Health and Safety (EH&S). By assessing the impact of all processes (such as energy and water consumption) and materials (such as cooking oil and packaging), UVA Dining can develop a list of priorities to minimize the department’s impact while improving its performance.

During spring 2006, Urban and Environmental Planning students undertook a preliminary assessment of the Charlottesville regional food system. The report exam-

SUSTAINABILITY

ines the geography of the foodshed, food production, distribution, waste, access to local food, and barriers and opportunities of the Charlottesville Region.²⁷ EAT Local (Everyone at the Table), a coalition formed as an outgrowth of the class report, hosts monthly potlucks during which work groups discuss progress on improving specific aspects of the local food security system.²⁸

Comparing Our Performance

Dozens of higher education institutions have initiated and advanced sustainable dining practices. The approaches implemented by colleges and universities are a function of the varied targets, including: supporting fair trade, locally grown and organic foods; ensuring equitable pay and treatment for growers; using ceramic dishware and silverware; minimizing energy and water consumption; purchasing recycled content or biodegradable products; decreasing waste production; and instituting composting programs.

In order to develop an informed and phased approach, a Sustainable Dining Assessment was conducted at the University of Minnesota. This initiative involved students in establishing the evaluation criteria. Similarly, Duke University conducted an inventory of the environmental impacts associated with campus dining services. The purpose of the analysis was to launch a comprehensive green dining program and to set a benchmark against which Duke Dining could measure its future progress.³¹

Yale University's Sustainable Food Program, managed by Aramark, stands out as a model institution. Established in 2003, the Yale farm is only 15 minutes from campus. Produce from the farm is sold at local farmers markets and restaurants, donated to volunteers, events and food banks, and featured in the dining halls on special occasions. Additionally, organic milk, coffee, yogurt, tea, bananas, granola, and local honey are served every day at

every meal, and at least one entrée and one accompaniment of sustainable food are featured during lunch and dinner. The farm also supports food-related courses and educational tours.³²

The University of California at Berkeley is home to the first Organic Certified Kitchen at a college or university in the U.S. Certified organic by the California Certified Organic Farmers (CCOF), the organic produce costs 20% more than conventionally grown produce. However, through a variety of cost savings in other areas, student meal plan costs have remained stable. Other innovative measures at UC Berkeley include: 100% Made in USA uniforms; environmentally friendly cleaning products and biodegradable take-out containers; and donation of over 70 tons of food waste for composting.³³

Supporting the second largest campus market in the country, the University of North Carolina provides competitively-priced fresh produce, bakery, coffee and deli selections on campus. The market is geared toward dorm residents with kitchens, thereby promoting healthy eating habits and minimizing off-site driving.³⁴

Similarly, in partnership with Aramark and the university's Executive Chef, a student organization at the University of Pennsylvania created a retail food stand, selling soups, sandwiches and prepared foods made from locally grown products.³⁵ FarmEcology, the student organization, in partnership with Aramark, also hosts an annual Harvest Dinner, featuring locally grown food and events throughout the year promoting the nutritional and environmental benefits of local foods.³⁶

Harvard University Dining Services commissioned a feasibility study on using vegetable oil to power the dining service's vehicle fleet. As a result, some of the vehicles are being converted to straight vegetable oil (SVO).³⁷

RECENT ACCOMPLISHMENT!

As of fall 2006 the University of Virginia is one of 15 higher education institutions participating in a pilot program, hosted by Aramark through SYSCO, to purchase locally grown produce when seasonally available. Slated to expand to dairy and other items during 2007, the program is modeled upon an initiative at the University of Minnesota.

ASSESSMENT

DINING SERVICES

Also reusing a waste product, Tufts University's Medford campus composts approximately 2.5 tons of food waste each day. As a result, Tufts' Dining Services has reduced its land-filled solid food waste and non-food waste by 62%.³⁸

Recommended Actions

The following actions are organized from a low to high level of intervention.

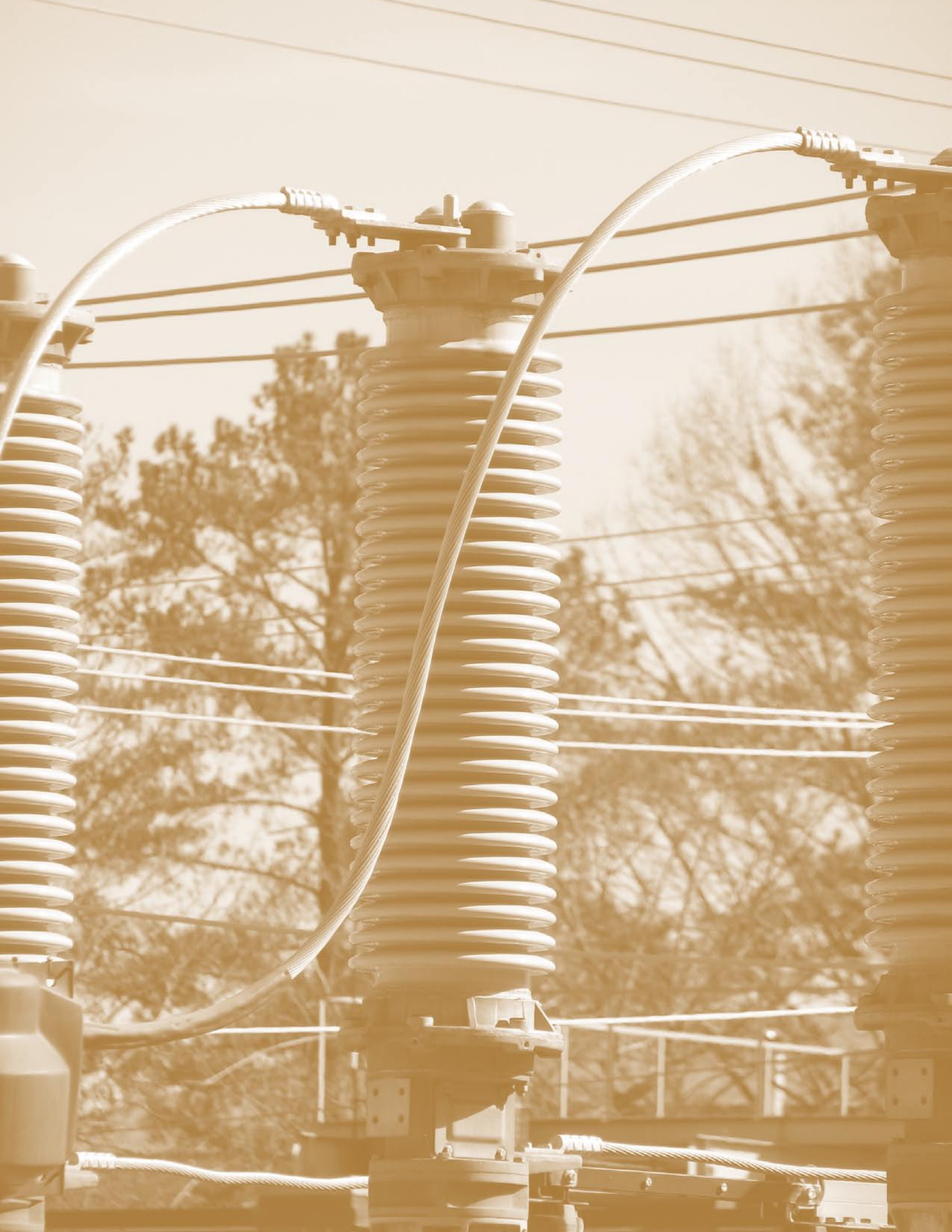
- Establish University priorities to assist UVA Dining in expanding sustainability initiatives
- Support the University's participation in Aramark's pilot program of purchasing local foods
- Incorporate educational and marketing signage provided by Aramark
- Track and promote sustainable dining procurement and initiatives
- Host special events and establish specific dining outlets to promote local organic foods
- Expand procurement of local and organic foods in all dining facilities
- Expand coffee purchasing to include shade grown and organic blends
- Expand procurement of environmentally friendly paper and cleaning products, take-out containers and energy-efficient machines
- Work with UVA Recycling to implement (on- or off-site) composting program
- Examine feasibility of recycling fryer oil to power vehicles on grounds
- Explore opportunities for establishing a University demonstration garden/farm



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DID YOU KNOW?

All of UVA Dining's used oil²⁹ is picked up by Valley Proteins, a rendering company that recycles the oil by turning it into other products such as agricultural feed, coating oil and soaps.³⁰



ASSESSMENT

ENERGY



Rising energy prices, pressures on existing fuel sources, the onset of deregulation and evidence of a host of negative environmental and social implications are heightening the importance of energy efficiency through building design, operations and “green” renewable sources. Due in large part to the Clean Air Act, air quality throughout the U.S. has improved over the last 30 years.³⁹ However, human-induced climate change, as documented by the Intergovernmental Panel on Climate Change,⁴⁰ is increasingly of concern, elevating the importance of clean energy sources and energy conservation measures.

As suggested by many citizens, politicians, organizations and businesses, it is time to rethink established approaches that sacrifice the health of the environment for the health of the economy and that overlook the importance of good jobs and technological innovation. According to several studies, conducted by the Apollo Alliance, a coalition of labor unions, environmental organizations and businesses, by implementing Apollo’s multi-faceted ten-point plan, the Commonwealth of Virginia will gain an additional \$5.2 billion of economic activity, create 82,306 jobs and generate \$3.4 billion in increased income⁴¹.

Current Activities

Direct use of fossil fuels (natural gas and coal) accounts for approximately half of UVA’s energy use, while electricity accounts for the other half. We burn natural gas, fuel oil and coal to produce steam for heating at the main boiler plant located next to the University Hospital. UVA purchases its electricity from Dominion Virginia Power, which is generated from 46% natural gas, 36% nuclear and 21% coal^{42 43}.

Over the past decade electricity consumption has remained nearly flat, averaging about 23.2 kWh/GSF⁴⁴ despite a significant increase in electrical devices such as computers, printers and lab equipment. If the University’s electricity consumption had increased at the rate of the 1980’s, the energy bill last year would have been \$5.0 million higher⁴⁵. Nonetheless, the University still spends over \$19 million annually on energy. As a result, energy still represents enormous opportunity for cost savings. In 2005, the Energy Management Program⁴⁶ spent \$21,784 to achieve an estimated annual energy cost reduction of \$339,000 in operations and maintenance (O&M) costs alone.

Since 1995, the University has upgraded more than 4,278,190 net square feet in its facilities with energy-efficient lighting systems, which has reduced the University’s annual energy consumption by more than 9,450,827 kWh. Because the production of electricity usually involves the burning of fossil fuels, this translates into an air pollution reduction of more than 7,500 tons of carbon dioxide per year.⁴⁷

Other highlights include comprehensive energy audits of certain buildings, upgrades of HVAC systems and electric motors and more than \$300,000 in annual savings through the Continuous Commissioning Program.⁴⁸ Accordingly, since 1996, the University’s Energy Program has received 13 awards from national organizations and regional chapters.⁴⁹

Since the mid-1990’s the University has had an energy plan. The University’s Energy Plan⁵⁰ and Energy Management and Sustainability Policy⁵¹, updated in December 2005 and enacted January 2006 respectively, outline en-

SUSTAINABILITY

energy conservation, efficiency and educational objectives and strategies. The University also recently updated its Energy & Utilities Master Plan, emphasizing measures to reduce energy usage. In addition to compliance with federal and state energy conservation rules, the University has established an Energy Steering Committee and has set design standards in the Facilities Design Guidelines and the Guidelines for Sustainable Building and Environmental Design.

In addition to working with the Conservation Advocates in first-year Residential Halls, the University's Energy Program works directly with the Green Grounds Group, a student organization. During fall 2005, 30 students surveyed 4,700,000 square feet of nonresidential University buildings, identifying 26% lit and unoccupied buildings wasting 7.8 million kWh of electricity.^{52,53} Student Environmental Action (SEA) campaigned for a green energy referendum in 2004 and 2006.⁵⁴ Given the referendum's non-binding nature and other technical and legal questions, future actions are uncertain.

Opportunities for Improvement

The following summary notes best management practices being implemented at peer institutions as exemplified by current trends and case studies.

Creating a culture of conservation has paid off in spades for many universities. State University of New York at Buffalo (SUNY Buffalo) stands as a leader in energy conservation measures. In addition to a range of energy policies and system improvements, SUNY Buffalo heavily promotes green computing and green lighting among university members.⁵⁶

More than one hundred colleges and universities across the U.S. are purchasing or producing renewable energy sources on or off site, including schools such as Uni-

versity of Colorado at Boulder, Penn State University, University of Pennsylvania, University of North Carolina - Chapel Hill and Duke University.⁵⁷

Additionally, many campuses are upgrading their electricity and heating generation systems through the use of combined heat and power (CHP or cogeneration). The University of Maryland in College Park selected cogeneration for its cost efficiency and environmental benefits. At full capacity, the turbines meet 90% or more of the campus's winter electric demand; when electric generation is maximum, the plant produces close to 100% of the campus steam requirement.⁵⁸

In order to track and assess performance improvements, many institutions are conducting greenhouse gas (GHG) emissions inventories, while others have stated commitments to address the institutions' contributions to global warming. For example, the Massachusetts Institute of Technology (MIT), Harvard University, Duke University and Tulane University have all conducted GHG inventories.⁵⁹ At the same time, the following universities have made commitments to reduce GHG emissions: Cornell University, 2001, 7% below 1990 levels by 2008; University of California System, 2006, 2000 levels by 2010, 1990 levels by 2020 and 80% below 1990 levels by 2050; University of North Carolina at Chapel Hill, 2006, 10% below 2005 levels by 2015, 20% by 2030, 30% by 2040, 45% by 2045 and 60% by 2050.⁶⁰

Recommended Actions

The following actions are organized from low to high intervention.

- Advance strategies identified in Built Environment and Transportation sections
- Implement campaign to turn off unnecessary lights and eliminate use of incandescent lights
- Increase user awareness of energy through real-time

RECENT ACCOMPLISHMENT!

As of 2005, 6,000 motion sensors or timers have been installed at the University to control artificial lighting, yielding an overall estimated savings of almost \$83,000.⁵⁵

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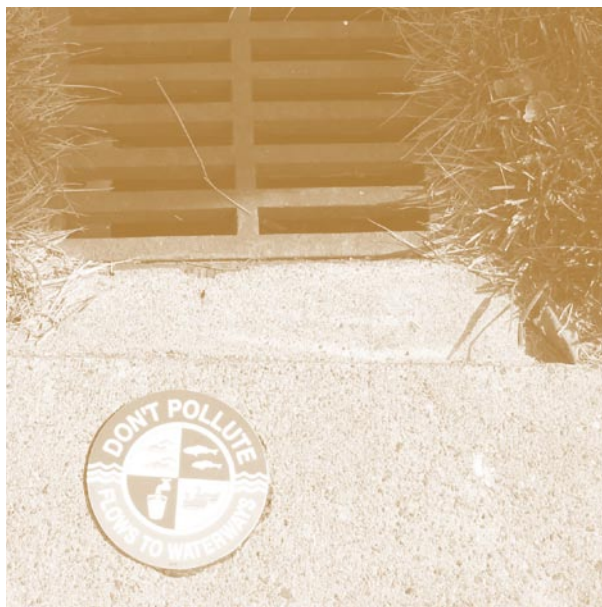
ENERGY

- energy monitoring in buildings
- Expand energy conservation measures and educational outreach
- Enforce existing energy conservation policies and plan
- Add "night setback" settings to all heating and cooling systems
- Eliminate simultaneous heating and cooling in building heating and cooling systems
- Adjust Variable Air Volume Boxes⁶¹ to 20% or lower, instead of typical 50% of maximum flow
- Establish sub-metering for better management and increased awareness
- Support students in advancing sustainability and conservation measures
- Purchase a portion of electricity from renewable sources
- Install lighting controls and variable flow controls on fans and pumps
- Add carbon dioxide (CO₂) sensors to control the amount of outside air needed in buildings
- Install insulating jackets on all steam valves and fittings
- Conduct steam trap testing and repair annually
- Recommission building heating and cooling systems
- Conduct assessment of greenhouse gas (GHG) emissions
- Establish specific measurable and time-bound GHG reduction goals
- Evaluate the benefits of a combined heat and power (CHP) cogeneration plant and implement if economically feasible



ASSESSMENT

WATER



While a seemingly ubiquitous resource, fresh water, accessible in lakes, rivers and reservoirs, accounts for less than a quarter of 1% of the total water supply. Globally, water shortages present a significant challenge, as demonstrated by the United Nation's warning that by 2025 more than 2.7 billion people are expected to experience severe water shortages⁶².

At colleges and universities, water is a valuable and broadly used resource, consumed by countless functions. Affected by seasonal drought conditions, facilities infrastructure and University members' practices, the efficient use of water through conservation measures and innovative best management practices is of increasing attention.

Current Activities

The University of Virginia is situated in the Rivanna Watershed, at the southernmost part of the Chesapeake Bay Watershed. The Commonwealth of Virginia and in particular the Charlottesville area, has experienced several years of intermittent drought conditions. Most notably, drought conditions in 2002 prompted the University and City of Charlottesville to impose strict water use restrictions and recommendations. More recently, the County of Albemarle was designated as a contiguous

disaster area by the U.S. Secretary of Agriculture due to reduced rainfall and increased temperatures.⁶³

Despite the University's growth, as of 2005 water consumption has declined over the last six years. Overall, water use dropped from 636 million gallons in 1997 to 427 million gallons in 2005, while per capita annual water use dropped from approximately 22,000 gallons in 1997 to 13,000 gallons in 2005.⁶⁴ Between 2004 and 2005, overall water use declined by 146,000 gallons.

Approximately one quarter of the University's water is used in heating and chiller plants. Reduced consumption rates are attributable to mild winters and summers, minimizing demand on heating and cooling systems, as well as to water conservation measures.⁶⁵ During 2005-2006, at least \$3.84 million was saved (through cost avoidance) by using central chiller plants instead of stand-alone building systems to produce chilled water.⁶⁶

To increase efficiency of water use, the University is implementing a system to recover water (condensation) from air handlers in the Chemistry building addition. Approximately 2 million gallons of water per year, generated by dehumidifying air, will be recovered and circulated to University cooling towers. Additionally, a steam condensate and quench water recovery system is being implemented at Special Collections, which will save at least 2 million gallons annually as well as reduce energy usage.

According to the 2005-2006 Facilities Management Annual Report, the University has a stated goal of "reducing or achieving a zero growth rate in the total annual water use." While water usage increased by 11.8 million gallons this year over the last year, overall water usage has declined by approximately 20% during the last 7 years. Consumption increases are due to the construction of new facilities, a 2% population increase and, most notably, higher heating and cooling degree days during winter and summer, respectively.⁶⁷

Supplementing state, federal and industry standards, the University's Facilities Design Guidelines outline a variety of water saving measures, including: mandating the use of low flow toilets, urinals and shower heads;

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mandating the installation of separate metering systems in irrigation, boiler, chiller and cooling tower units; and prohibiting the use of domestic water in single-pass air conditioning units.⁶⁸

The University also has a drought management plan which includes water conservation initiatives during times of drought. During the 2002 drought, the University instituted a broad range of water conservation measures, including: halting all irrigation at playing and practice fields; installing 216 water-conserving washing machines; deferring landscaping projects indefinitely; eliminating use of trays in dining halls (50,000 trays were washed per week); and closing Memorial Gym pool.⁶⁹

The 2002 drought also brought on a series of educational outreach efforts aimed at students, including signage encouraging shorter showers. More recently, the University's Housing Division has encouraged students to conserve water.⁷⁰ University students have been actively engaged in improving the University's use of water. Conservation Advocates in first year dorms are charged with developing and implementing programs to reduce water consumption. Fourth year engineering students are also conducting energy audits of select buildings identified as "energy hogs." Water quality is a focus for students from Environmental Sciences 102, who have been monitoring water quality and velocity at the Dell every semester since fall 2004, measuring nitrates, phosphates, pH and performing other chemical analysis.

Opportunities for Improvement

The following summary notes best management practices being implemented at peer institutions as exemplified by current trends and case studies.

During summer 2006, Harvard University installed new toilets outfitted with water-conserving flushing handles,

or "flushometers," in 508 Residential Houses at an increased cost of \$15 per unit. The dual-flush toilets handles, differentiated by color, allow users to release only 1.1 gallons of water per liquid waste flush and 1.6 gallons of water per solid waste flush. Given the low rate of maintenance requests for clogged toilets thus far, in the future Harvard will retro-fit the existing low-flow toilets with the dual handle for \$25 per toilet and consider making all toilets dual-flush.⁷¹

Water savings projects can yield cost savings as well. A study conducted by students at Brown University found that, in four buildings alone, the installation of low-flow shower heads and faucets, the use of water-saving dams in toilets and the repair of plumbing leaks would save the university an estimated \$12,180 annually. The report also recommended that the university install low-flow shower heads campus-wide in order to reap \$15,000 annual savings through the reduced consumption of heating and water.⁷²

Other progressive water conserving projects include: harvesting condensation from air handlers, thereby diverting water from the drain and collecting it for use in cooling towers, irrigation or grey water systems; eliminating once-through cooling water by connecting equipment to chilled water systems, cooling towers or air cooling units, which all conserve water; and redesigning controls to eliminate air humidification when not needed.

Recommended Actions

The following actions are organized from a low to high level of intervention.

- Expand educational outreach on water conservation issues and opportunities
- Conduct comprehensive assessment of potable water use in research facilities

DID YOU KNOW?

In addition to conserving water, The University is improving the quality of stormwater in our two watersheds. The stormwater management system designed for the Meadow Creek watershed includes daylighting and improvements started at the Dell, joined with the Emmet-Ivy parking garage site, and completed in 2006 with the installation of the riparian environment and bioswales at the John Paul Jones Arena.

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WATER

- Establish prioritized action steps to reduce improper use of water resources
- Conduct assessment of system leaks (faucets, pipes, etc.) and implement remediation measures, following up on 2002-2003 system analysis
- Install and monitor dual-flush toilets pilot program; determine large-scale application
- Identify opportunities to install large-scale water saving devices
- Identify opportunities to install grey water recycling system(s)



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WASTE AND RECYCLING



U.S. residents, businesses and institutions generated more than 236 million tons of municipal solid waste in 2003, including 12% food scraps, 11% plastics and 35% paper.⁷³ Representing the largest recycling sector, recycled paper and paperboard mills facilities employ 140,000 people and generate \$49 billion in annual receipts.⁷⁴ By minimizing waste disposal and diverting recoverable material to reuse or recycling facilities, institutions of higher education have the capacity to shift behavior, improve the environment and stimulate job growth.

Often cited as the last resort before disposing of materials, the old adage “refuse, reduce, reuse, recycle” continues to increase in importance. According to the Environmental Protection Agency, the number of landfills has dropped from 8,000 in 1988 to 1,767 in 2002.⁷⁵ The recent closure of the University’s local landfill in Ivy, shifting its role to that of a transfer station, serves as an indicator of the need to further reduce the generation of waste.

Current Activities

The breadth of recyclable materials acceptable through University Recycling facilities placed throughout Grounds includes white and mixed paper, cardboard, aluminum, metals, all plastics with recycling symbol, transparencies,

small electronics, disks and CDs, glass and power plant ash. The department also coordinates the Reusable Office Supply Exchange Program (ROSE), Medical Equipment Recovery of Clean Inventory (MERC I), “Chuck it for Charity” during Move-Out week and recycling at football games. Additionally, the University’s Surplus Property System collects, auctions and disposes of everything from sporting goods to office furniture.⁷⁶

In 2005, it cost the University about \$66 to dispose of a ton of trash (including service and landfill tipping fees) and only \$45 to dispose of a ton of recycling (including operating expenses). Thus, recycling creates a cost avoidance of \$21 per ton (up from \$14 per ton a few years ago). At this rate, 5,445 tons of materials recycled instead of land filled equates to more than \$114,000 in cost savings.⁷⁷

Surpassing the Commonwealth of Virginia’s recycling mandate of 25%, in 2005 the University diverted 41% of its total waste from landfills. As documented in the online Recycling Totals⁷⁸, recycling rates since 2000 have remained fairly stable, between 36% and 41%. Reportedly, these rates represent a significant increase, up from 5.4% in 1991.

According to the January 2006 Recycling Policy, the University will reduce solid waste generation and increase recycling and reuse. Perhaps most importantly, the policy stresses the importance of Source Reduction, such as working with manufacturers and suppliers to minimize packaging, ordering in bulk and aligning newspaper and phonebook production and circulation.⁷⁹

Annually, more than 20 students serve as Conservation Advocates. Under this program, established in 2000, students serve as ambassadors of and liaisons with University Recycling in each of the first-year residence hall. Around Earth Day, University Recycling hosts a Dumpster Dive to identify the percentage of recyclable materials found in trash cans. University Recycling also offers magnets, coffee mugs, water bottles and t-shirts to promote recycling initiatives. Online resources include a recycling tour, guide and web links.

Since 1994 University Recycling has earned 14 awards of

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excellence from the following organizations: US Environmental Protection Agency Waste Wise, Virginia Recycling Association, Solid Waste Association of North America, US Conference of Mayors, McKinley Group and Virginia Department of Environmental Quality.

Opportunities for Improvement

The following summary notes best management practices being implemented at peer institutions as exemplified by current trends and case studies.

The University's Recycling Program already stands out as a leader in environmental responsibility. Nonetheless, there are additional measures that can further reduce waste generation and increase waste diversion rates at the University. Similar to the University's Chuck it for Charity program, Dump and Run programs are hosted by many colleges and universities. In partnership with Habitat for Humanity, Harvard University decreased waste by 54% between 2002 and 2004, while generating more than \$70,000 in revenue for Habitat from the sale of donated items during the "Stuff Sale." In addition to collecting furniture, computer supplies, textbooks and more, Harvard collected 13 tons of used clothing during one year. The clothes were sold to a textile dealer; proceeds were donated to local homeless organizations.⁸⁰

Aiming to minimize waste production and increase recycling rates, Auburn University has implemented a football Game Day Recycling Program. In its first year, the program collected a total of 7 tons of plastic and aluminum drink containers. Through Auburn's "Get Caught Recycling" program, two autographed football helmets signed by the team's coach are given to fans that are caught recycling. Winning fans have their names announced during the game. An informative and humorous promotional video, involving the school mascot and University students, is shown two times during the game.⁸¹

Going beyond the University "source reduction" language in the Recycling Policy, institutions such as the University of Florida and Villanova University have adopted Sustainable Purchasing Policies. In addition to targeting products that are biodegradable, energy-efficient, durable and recyclable, both universities call for minimal packaging⁸². Finally, while bound by limitations different from those at the University of Virginia, the University of Florida has committed to a zero-waste disposal goal by 2015.⁸³

Recommended Actions

The following actions are organized from a low to high level of intervention.

- Identify opportunities to expand Chuck It For Charity (move-out program)
- Define game day reduction goals and incorporate recycling information and activities, such as "Get Caught Recycling"
- Assess and identify opportunities to minimize waste and increase recycling at special events, including sporting, fund-raising and educational symposiums
- Advance implementation of Source Reduction policy, including minimizing packaging, ordering in bulk and aligning newspaper and phonebook production and circulation
- Define environmentally and economically preferable beverage container types in all contract renewals and track results
- Define sustainable packaging guidelines or requirements in all contract renewals and track results
- Commit to purchasing recycled content products, thereby closing the loop
- Establish specific, measurable and time specific waste-reduction goals to meet Facilities Management waste reduction goals and Recycling Policy
- Work with UVA Dining to implement (on- or off-

DID YOU KNOW?

Revenues generated by the sale of recyclables vary from month to month, based on industry market values, and are used for program improvements. In July 2006 UVA collected \$135 per ton on white paper and \$65 per ton on mixed office paper. The University's biggest revenue generator is aluminum cans at \$2000 per ton (2000 lbs. = 1 ton); the lowest is commingled plastic at \$.01 per pound (or \$20/ton). Aluminum cans generate revenue two orders of magnitude greater than plastic! Unfortunately, in the past 4 years collected and processed plastics have doubled in weight from 4,500 to 10,000 pounds.

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WASTE AND RECYCLING

- site) composting program
- Create incentive program to further encourage contractors to recycle construction and demolition (C&D) waste and establish tracking mechanism
- Establish process, policies or incentives for expanding the reuse of materials.
- Demonstrate institutional support for University recycling through advertisements and public service announcements (PSA's) from the President's Office, Administration and Athletics





ASSESSMENT

ACADEMICS AND LEARNING



Section 3: Academics and Learning

While the focus of this assessment is on the physical campus, a university's quest to address sustainability must ultimately incorporate its missions of research, teaching and service. If sustainability can have an effect on operations, then the academic functions of the institution could provide even greater leverage for change. Opportunities for incorporation include environmental, social and cultural curriculum; professional training, as in architecture, engineering, business or law; and the use of the campus as teaching space.

The process of infusing sustainability into academics presents challenges and governance may be required to bridge the academic and support functions of the university. There are sensitive issues in attempting to tilt an academic institution toward the challenges of the day, given the potential reinterpretation of the mission and the need to maintain true academic freedom. One goal of this inventory of activities is to provide motivation and inspiration to teachers and researchers throughout the University, through tracking the activities in academics that are already in motion. The following summary provides a framework for academic initiatives by University departments, related institutes, research centers and

student leadership.

Teaching and Research College of Arts and Sciences

Arts and Sciences is the largest College at the University of Virginia, enrolling approximately 10,000 students. The College offers students the opportunity to address environmental and social issues through programs such as Bioethics, Biology, Chemistry, Environmental Science, and Environmental Thought and Practice.⁸⁴

In partnership with Environmental Sciences, undergraduate and graduate Biology students may specialize in Environmental and Biological Conservation, while Chemistry students may specialize in Biochemistry or Environmental Science, among other areas. Complementary to these programs, undergraduate Bioethics students examine moral questions at the intersection of biology, medicine, law, public health, policy and ethics.

The University's Environmental Science program, founded in 1969, was the first Environmental Science program founded in the United States. Within Environmental Science, undergraduate and graduate students learn about and discover the connections among the Earth's atmosphere, ecology, hydrosphere, biosphere and geosphere. In addition to engaging in independent research projects and internships, students may take courses such as Stream Monitoring, which offers hands-on learning and community service in analyzing the health of Meadow Creek, a tributary of the Rivanna River. Numerous courses, including the Fundamentals of Ecology, also utilize the University Grounds and Observatory Hill as field labs and learning environs. Environmental Science students may also pursue a joint degree with Biology in Conservation Biology.⁸⁵

In addition, Environmental Science faculty members participate in interdisciplinary research teams, such as the Global Environmental Change Program (GECF), the Shenandoah Watershed Study (SWAS), the Virginia Coast Reserve Long-Term Ecological Research Program (VCR LTER) and the Program of Interdisciplinary Research in Contaminant Hydrogeology (PIRCH). The Shenandoah Watershed Study, for example, is the longest running

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monitoring program at the University of Virginia, having been sustained for more than 25 years. This and other research areas have positioned Environmental Sciences faculty as leaders in academic achievement among its peers.⁸⁶

The Environmental Thought and Practice Program is aimed at building student comprehension and critical thinking about scientific information, economic analysis and the various ethical constructs that enter into environmental decisions, fostering an appreciation for how political and social context, historical events and cultural expectations shape the way we perceive and solve environmental problems. The program is supported by an interdisciplinary network of faculty members from Anthropology, Chemistry, Commerce, Environmental Science, Law, Religious Studies and Urban and Environmental Planning.⁸⁷

School of Architecture

The University's School of Architecture offers undergraduate and graduate programs in Architecture, Landscape Architecture, Urban and Environmental Planning and Architectural History. Each of the disciplines addresses the integration of environmental protection and restoration, social justice and sound economics. While

serving as the Dean of the School of Architecture, William McDonough, a world-renowned green architect and designer, lectured to hundreds of students on the importance of and opportunities for addressing sustainability.⁸⁸ Often initiated by leading faculty members, courses such as Green Codes, Sustainable Communities, ecoMod, Learning Barge, Green Watersheds and Regenerative Technologies offer students the opportunity to engage in dialogue and practical application. In addition to creating dual degree programs within the School, the School of Architecture also offers a dual degree with the School of Law, which allows for interdisciplinary education and collaboration.

School of Engineering and Applied Science

Including engineering disciplines such as Chemical, Civil, Materials Science, Systems and Science, Technology and the Environment, the University's School of Engineering and Applied Science (SEAS) is home to numerous faculty leaders and progressive courses addressing issues of sustainability. From research on alternative fuel sources, such as fuel cells and biodiesel, to environmentally and socially responsible products, processes and infrastructure, new and innovative solutions are explored and applied by undergraduate and graduate students.⁸⁹ Students engage in experiential learning by visiting local water and wastewater facilities and University and local construction sites including the Albemarle County building green roof. Additionally, through faculty research, a group in systems engineering is analyzing the resiliency of the critical infrastructure in the City of Charlottesville.⁹⁰

McIntire School of Commerce

Third year students entering the McIntire School of Commerce have the opportunity to enroll in several sustainability-infused courses while completing their core coursework. Thanks to faculty leaders, undergraduate student coursework may include Investing in a Sustainable Future, Financing a Sustainable Future, Business and the Environment, The Business of Saving Nature, Environmental Choices in the 21st Century and Business Ethics.⁹¹

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ACADEMICS AND LEARNING

Darden School of Business

Darden was ranked 13th in the world by the World Resources Institute and Aspen Institute for its leadership in social and environmental stewardship.⁹² While select students focus on sustainability in their studies, all graduate and Executive Education students in the University's Darden School of Business are exposed to social and environmental issues through required coursework, case discussions, special events and community life. Courses tailored to sustainability include Social Responsibility and Entrepreneurship, Conversations and Debates on Globalization, and Sustainable Innovation and Entrepreneurship.⁹³

School of Law

The Environmental Law and Land Use Program in the School of Law is directed by Jon Cannon, former general counsel and assistant administrator for resources management at the U.S. Environmental Protection Agency (EPA). Students in the program gain knowledge and skills in land use and environmental policies grounded in law, science, economics, ethics, psychology and politics. Coursework and seminars include Environmental Ethics, Environmental Law, Environmentalism and the Supreme Court, and Federal Land and Natural Resource Law.⁹⁴

Interdisciplinary

Advancing the opportunity for interdisciplinary collaboration, John Quale, School of Architecture, has teamed up with Paxton Marshall, School of Engineering and Applied Science, on several projects, including ecoMod and the Solar Decathlon. ecoMod is a research, design/build project, organized in 4 phases of housing development, aimed at producing an ecological, modular and affordable housing system that incorporates sustainable design strategies while providing comfort and marketability. One home is located in Charlottesville, another in New Orleans and a third is the focus of work this year.



In addition, a number of University Seminar courses over the years, open to the undergraduate student body, have focused on environmental and sustainability. Currently, in the course Designing a Sustainable Future, students are learning about the interconnectivity of sustainability from faculty members in Business, Engineering, Architecture, Planning, Law and Culture and Ethics. In years past, the University offered an Environmental Choices course, co-taught by faculty from the School of Commerce and the Environmental Thought and Practice program. Environmental Thought and Practice sponsors a lecture series on Race, Class and the Environment. The co-sponsors for the series are the Department of Environmental Sciences; the Vice President for Research and Graduate Studies; the Department of Politics; the Department of Science, Technology, and Society; the Institute for Practical Ethics and the Law School.

DID YOU KNOW?

Placing second overall and first in architecture in the Department of Energy's 2002 Solar Decathlon competition in Washington, D.C., students at the University of Virginia built a solar powered house using advanced renewable energy systems and building materials that maximize energy efficiency while minimizing the impact to the environment⁹⁶.

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The proposed Center for Sustainable Energy, Economy and Environment, developed by a diverse set of faculty across disciplines, offers a suggested model designed to facilitate and leverage interdisciplinary collaboration aimed at developing a secure and sustainable future decoupled from reliance on imported fossil fuels, while advancing the University as a leader.⁹⁵

Institute for Environmental Negotiation

Formed in 1980 to provide mediation and consensus-building services concerning conflicts and policy choices about land use and the natural and built environment, the Institute for Environmental Negotiation (IEN), is closely tied with the University's School of Architecture. Serving communities that are sustained ecologically, socially and economically, IEN's diverse and extensive scope of work includes a Rivanna Watershed Needs Assessment, Watershed Management Plans for Fairfax County, Virginia, Superfund Site Renewal Program, and Strategic Planning and Facilitation. Through internship positions, the University's Urban and Environmental Planning graduate students gain hands-on experience in issue scoping, public meetings and workshops, community dialogues and collaborative problem solving.⁹⁷

Batten Institute

Operating since 1996 under the Darden School of Business, the Batten Institute's Sustainable Business Initiative seeks to better understand how to create competitive advantage through innovative management of the triple bottom line – the economy, environment and stakeholders. The Institute advances these principles by hosting forums, conferences and seminars, and supporting leadership development, networking and research.⁹⁸ The Batten Fellows Program engages prominent thought and education leaders with the community and faculty. Fellows include Brian and Mary Nattrass, founders and managing partners of Sustainability Partners, Inc., an international consultancy focused on the strategy and implementation of values-driven innovation and sustainable business practices and Joel Makower, a journalist, best-selling author and leading strategist on business, the environment and the triple bottom line.⁹⁹

Center for Transportation Studies

The University's Center for Transportation Studies represents a partnership between the University's Civil Engineering Department and the Virginia Department of Transportation's (VDOT) Virginia Transportation Research Council (VTRC). Through education, research and public service, the Center seeks to build knowledge and advance application of innovative approaches. Research topics include: evaluating bicycle and walking accessibility; land use planning and university transportation systems; light rail transit impacts on traffic congestion; and carbon monoxide production due to reforestation and traffic.¹⁰⁰

Student Leadership

With over 500 active student-contracted organizations (CIO's) at the University of Virginia and a record 4th year ranking as first among medium-size colleges and universities in the number of alumni who currently serve as Peace Corps volunteers, there is no shortage of interested, intelligent and driven students addressing an array of activities and needs.¹⁰¹

Of the organizations focused on sustainability or environmental issues, the following groups play the most prominent roles: Environmental Sciences Organization (ESO), Green Grounds Group, Net Impact at Darden, Student Environmental Action (SEA), Students for Sustainable Communities (SSC) and Virginia Environmental Law Forum (ELF). Also active on issues of sustainability are organizations such as Students Promoting Fair Trade.

As noted throughout the Management Centers section, student leaders have been and continue to be involved in advancing a broad set of sustainable practices, including purchasing clean energy, minimizing energy consumption, improving bicycle facilities, advancing sustainable building and design, purchasing fair trade coffee and enhancing awareness about and opportunities to address local and national environmental problems such as mercury contamination.

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- Julia Monteith, Senior Land Use Planner, Office of the Architect
- David J. Neuman, Architect for the University
- Connie Warnock, Assistant University Architect, Office of the Architect

Josh Skov, Principal of Good Company¹⁰², a research and consulting firm that helps clients measure, manage and market their social and environmental performance served as a consultant on this project. We sincerely thank Josh for his invaluable perspective, support and humor provided throughout the sustainability assessment.

The online survey and resulting report was modeled upon the National Wildlife Federation's (NWF) Campus Ecology Program's State of the Campus Environment Report (2001), the University of North Carolina at Chapel Hill Campus Sustainability Report (2005) and the University of California at Berkeley Campus Sustainability Assessment (2005). Numerous other organizations and institutions were referenced during the development of the assessment, online survey and report writing, including those listed in the Referenced Websites section. The endnote citations should not go without notice, as a considerable amount of text and data was initially generated by these sources, serving as primary source content.

Over 200 University members across more than 50 departments, including students, staff, faculty and administrators were invited to and/or participated in the University's Sustainability Assessment process during summer 2006. Through four introductory workshops, nine online surveys and targeted interviews, University members contributed informative content, additional contact names and invaluable institutional knowledge and perspective. We are grateful for their support and

participation.

We apologize to those unable to participate in this process and to those inadvertently not incorporated. This list should not be construed as inclusive of all University members working on or interested in sustainability initiatives.

Governance and Culture

Note: Academics & Learning and Management Center contacts, listed below, were also invited to participate in the Governance and Culture survey. The contacts listed in this section, however, were not asked to complete Academics & Learning or Management Center surveys.

Alumni Association

- Molly Bass
- Wayne Cozart

Center for Public Service

- Dianne Martin

Commission on Diversity and Equity

- Brian Balogh
- Ellen Contini-Morava
- Angela Davis
- Charlene Green
- Valerie Gregory
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Environmental Sciences Organization (CIO)

- Temple Lee

Green Grounds Group (CIO)

- Kathy Cacciola
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- Beth Kahley
- Elaine Uang

Institutional Assessment

- George Stovall

Net Impact - Commerce (CIO)

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- Joseph Curry

Net Impact - Darden (CIO)

- Brent Pfister

Office of the Architect

- Luis Carrazana
- Andrew Greene
- Brian Hogg
- Mary Hughes
- Mark Kutney
- Tom LeBack
- Julia Monteith
- David Neuman*
- Connie Warnock
- Helen Wilson

Office of the Comptroller

- Steve Kimata

Office of the President

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- Cameron Howell
- Nancy Rivers

Office of University Development

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- Elizabeth Leverage
- Wes Myhre
- Bill Sublette

Office of University Relations

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- Megan Lowe
- Leonard Sandridge, EVP & COO

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- Darius Nabors
- Christina Polenta
- Brian Poulson
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- Khalial Withen

Students for Sustainable Communities (CIO)

- Alex Linthicum

Vice President for Student Affairs

- Pat Lampkin

Virginia Environmental Law Forum (CIO)

- Tyler Guy Welti
- Devin Huseby

University of Virginia Foundation

- Gary Lowe
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- Anna Towns
- Ed Ayers, Dean
- James Childress
- Megan Marlatt

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- Bob Pate
- David Breneman, Dean
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- Frank Dukes
- Karen Firehock

JAG

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McIntire School of Commerce

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- Carl Zeithaml, Dean

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- Elizabeth Fortune
- Judy Kinnard
- Noreen McDonald
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- Ron Herfurth
- Jessica Hurely Smith
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- John Rainey

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Printing and Copying Services

- Kelly Hogg

University Budget Office

- Melissa Clark
- Melody Bianchetto*

UVA Bookstore

- Jon Kates

UVA Dining

- Brent Beringer
- Mora Sims

UVA Recycling

- Sonny Beale
- Al Fioretti



ASSESSMENT

APPENDIX

Background and Methodology

Higher education sustainability assessments vary widely, from school to school, based upon the conditions and context unique to the respective institution. Social, environmental and economic indicators, measures of current practices and performance, provide important information in understanding baseline activities. Coupled with a strategic vision and plan, indicators enable a ongoing evaluation to determine if and to what extent the stated goals are being met¹⁰³.

The UVA Sustainability Assessment was designed to identify baseline performance, recognize accomplishments, stimulate dialogue and develop recommendations. In gaining a comprehensive understanding of UVA's sustainability initiatives, the University will be positioned to leverage activities, promote coordination, improve performance and demonstrate national leadership.

Hosted by the Office of the Architect, the UVA Sustainability Assessment is supported by the University's Administration. Developed with Facilities Management and the Office of Environmental Health & Safety, the assessment process was introduced to more than 55 staff, faculty and student representatives during a series of 4 two-hour introductory workshops hosted in late June 2006. Workshop participants self selected their workshop date thereby allowing an organic composition of each group and promoting a diversity of perspectives and experiences. After a presentation on the broader sustainability movement, highlights of UVA sustainability initiatives and the assessment process, participants shared ideas and posed questions regarding advancing sustainability at UVA.

In July through August 2006, 9 online surveys were distributed to more than 230 University members. The surveys were organized as follows:

Survey 1 - Governance & Culture

This survey included questions pertaining to the University's policies and procedures. Participants provided insight on cultural and institutional barriers and drivers to elevating sustainability at UVA. Participants articulated

their vision for the University and identified needs of support. This survey was distributed to all contacts.

Survey 2 – Academics & Learning

This survey was intended to identify academic programs and Institutes focused on or including sustainability and, more specifically, environmental issues. Participants provided insight on academic collaborations, classes using the Grounds as the learning forum and student organizations advancing related projects. This survey was distributed to academic faculty contacts only. Additional research and interviews were conducted.

Management Centers

Survey 3 – Waste and Recycling
Survey 4 – Landscape and Land Use
Survey 5 – Energy
Survey 6 – Water
Survey 7 – Built Environment
Survey 8 – Transportation
Survey 9 – Dining

Each management center survey was developed to gather qualitative and, to a limited extent, quantitative data on existing sustainability initiatives. Each survey was distributed to the specific University staff members engaged in the respective management center (ranging from of 3 to 20 contacts per survey). Additional research and interviews were conducted.

By the end of August 2006, an initial inventory of UVA sustainability activities was complete. The UVA Sustainability Assessment report was primarily written and prepared between September and October 2006. Research on peer institutions' sustainability performance was conducted during this time frame. The findings, recommendations and scenarios detailed in the UVA Sustainability Assessment report will be reported to workshop participants and the University community.

The UVA Sustainability Assessment process offers a different and potentially new, approach for colleges and universities seeking to undertake a similar process with limited time and staff support. Staff time on the assessment included one full time equivalent (FTE) from May

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to August, transitioned to part time from September to November. Three other staff each supported the project approximately 3 hours per week from May to August, transitioned to approximately 6 hours per week from September to November. The project consultant provided 31.5 hours of project support.

Copies of the UVA Sustainability Assessment survey (including the 9 sections noted above) are available for use. Contact the University's Office of the Architect for more information¹⁰⁴.

DEFINING SUSTAINABILITY

"Development is sustainable when it meets the needs of the present without compromising the ability of future generations to meet theirs."

-United Nations World Commission on Environment and Development, 1987

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APPENDIX

Case Statement

Why Sustainability?

Sustainability means meeting the needs of the present without compromising the ability of future generations to meet their own needs. Sustainability is an increasingly critical issue for Higher Education. According to the Association of Higher Education Facilities Officers (APPA), this component of more than 4,100 colleges and universities in the United States:

- Generates \$300 Billion in Revenues
- Employs more than 3 million employees (2% of U.S. workforce)
- Enrolls 15 million students
- Represents 3% of the U.S. Gross Domestic Product (GDP)
- Spends \$20 billion annually on operations
- Spends \$14 billion annually in construction

Sustainability Drivers

Institutions are beginning to find themselves under pressure to manage their environmental impacts based on:

- Leadership - emerging expectations among students, faculty, community, donors and alumni that universities serve as institutional models for environmental excellence and sustainability
- Economics – the need to reduce or contain rising costs for utilities and waste disposal and to construct buildings to reduce long term operation costs
- Recruitment - the value of a reputation for environmental stewardship in attracting and retaining talented faculty and students
- Smart Growth – address the challenges of growth and the need for more healthful and sustainable development through green building, low impact design, and natural resource protection and restoration
- Stewardship – growing interest of students to purchase “green” products

Leading Peer Institutions

Responding to these pressures requires a proactive and consistent approach. The following institutions are among those that have addressed this need by appointing an individual who is responsible for coordinating sustainability efforts with the goal of improving the envi-

ronmental performance of the institution²:

- Brown University
- Cornell University
- Duke University
- Harvard University
- Tufts University
- University of Connecticut
- University of North Carolina
- University of Vermont
- Yale University

Recognizing and Advancing UVA's Sustainability Initiatives

In order to ascertain what such a position could yield at UVA, we propose an assessment to determine current sustainability efforts underway at UVA. The evaluation would provide a means to strategically develop ‘next steps’ for the University. The assessment process has been developed as a cooperative effort between the Office of the Architect, Facilities Management, and Environmental Health and Safety. The methodology involves workshops and interviews with the following groups at UVA, proposed for June – August 2006, with a summary report prepared in Fall 2006.

- Business Operations
- Facilities Management
- Targeted Academic Departments and Research Groups
- Athletics and Recreation
- Targeted contact with Health System

¹ Brundtland Report, published by the World Commission of Environment and Development in 1987

² See additional listings, including up to 70 colleges and universities, at: http://www.ulsf.org/resources_sust_coordinators.htm and http://www.aashe.org/resources/sust_professionals.php



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Workshop Discussion Notes

Overview

The following synopsis represents the contributions offered by participants in the UVA Sustainability Assessment workshops, held during June 2006. Participants offered suggestions and comments in response to the following questions:

- What is your vision for sustainability at UVA and how can you contribute?
- How can UVA move towards leadership in sustainability?
- What can we learn from other institutions?

Several themes central to sustainability in higher education emerged from these contributions and we have grouped them in the following areas:

- Innovation
- Physical Environment
- Academics
- Students
- Policy
- Communication

For more information on the assessment goals and process, please visit <http://www.virginia.edu/architectoffice/susassessment.html>.

Innovation

The University has the opportunity to:

- Use its unique environment as a laboratory for exploration and learning about campus sustainability.
- Position itself as a community leader by being proactive about the challenges and opportunities of sustainability on campus.
- Realize large benefits and enhance quality of life through small, incremental changes.
- Engage, support and recognize all University members for their contributions to sustainability and serve as a role model for the community and other institutions of higher education.
- Foster creative funding strategies and reveal financial benefits by recognizing the relationship between first costs, life cycle costs and operating costs.
- Enhance University environs and embrace sustain-

able practices to attract high caliber students, faculty and staff.

Physical Environment

The University has the opportunity to:

- Model solutions to position higher education institutions as leaders in Smart Growth through its health system, sports facilities, housing, dining and transportation services.
- Improve the workplace environment by ensuring equitable parking fee structures, emphasizing exercise and improving lighting and safety in existing facilities/service.
- Make use of bike and pedestrian activities by creating connections with research facilities, such as Fontaine Research Park.
- Improve quality of life by elevating UVA as a leader in the Environmental Protection Agency's (EPA) list of Best Workplaces for Commuters.

Academics

The University has the opportunity to:

- Demonstrate leadership in teaching and research on sustainability to advance learning for all University members, regardless of their area of study.
- Serve as a leader in addressing the shifting needs and opportunities facing academia, through incentives in teaching and research.
- Use the environs as a learning tool, infuse sustainability across the curriculum and encourage cross-disciplinary pollination.

Students

The University has the opportunity to:

- Create a centralized forum for coordinating the efforts of student organizations (CIO's: Contracted Independent Organizations).
- Use this coordinating forum to tap students as educators within the University community.
- Publicize sustainability initiatives as a means to heighten awareness and engage all interested undergraduate, graduate and Ph.D. students.

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Policy

The University has the opportunity to:

- Use policies as an important tool in supporting sustainability initiatives at UVA.
- Create a common vision to encourage University-wide coordination that enhances operations, teaching and research, consistent with University sustainability policies.
- Learn from other model institutions in making decisions for the future planning, in addition to maximizing efforts through linkages with the City and County.

Communication

The University has the opportunity to:

- Market and promote sustainability initiatives to the University community, surrounding community and alumni by emphasizing innovative approaches, progressive policies, and student leadership.
- Advance sustainability initiatives through effective and coordinated communication and the celebration of achievements.
- Provide a University-wide sustainability event to serve as a forum in which to spur such activities.

Examples

- Composting
- Local Food and Resources
- Event Recycling
- Demonstration buildings
- Bio-fuel Research by the Transportation Council
- Reuse of Buildings as the first choice when improving facilities
- Expanding the Environmental Law program
- Educational outreach to the broader community
- Scholarships
- Addressing noise and light pollution by University Buildings
- Departmental bill-paying to educate in energy use
- Bike racks on all buses
- Student fee for sustainability
- Waterless Urinals

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