



Campus Task Force on Sustainability Recommendations

December 14, 2007

**Campus Task Force on Sustainability
Recommendations
December 14, 2007**

I.	EXECUTIVE SUMMARY	1
II.	BACKGROUND	4
	A. CAMPUS TASK FORCE ON SUSTAINABILITY	5
III.	RECOMMENDATIONS	7
	A. GENERAL RECOMMENDATIONS	7
	1. Coordination of Sustainability Efforts	7
	2. Leadership	8
	3. Funding Sustainability on Campus	9
	4. Research	11
	B. SPECIFIC RECOMMENDATIONS.....	11
	1. Energy and Transportation.....	11
	a. Energy Management.....	11
	b. Transportation, Parking and Fleet	14
	2. Materials Flow	15
	a. Purchasing.....	15
	b. Design and Construction.....	16
	c. Recycling and Waste Management.....	18
	d. Grounds and Landscaping	21
	3. Pedagogy.....	22
	4. Outreach.....	24
	a. Web Site.....	24
	b. Marketing.....	24
	c. Empowerment of UIC Communities.....	24
	d. Language and Public Relations	26
IV.	CONCLUSIONS	26
V.	APPENDICES	28
	APPENDIX 1 – MEETING DATES AND SUBCOMMITTEES.....	28
	APPENDIX 2 – TALLORIES DECLARATION	28
	APPENDIX 3 – AMERICAN COLLEGE AND UNUNERSITY PRESIDENT’S CLIMATE COMMITMENT	28
	APPENDIX 4 – CHICAGO CLIMATE EXCHANGE (CCX)	28
	APPENDIX 5 –MATERIALS FLOW SUBCOMMITTEE DOCUMENTS.....	28
	APPENDIX 6 – UIC’S GREENHOUSE GAS PROFILE (FY2005-2006)	28

I. EXECUTIVE SUMMARY

In April 2007, the Chancellor selected and charged the Campus Task Force on Sustainability, a committee comprised of faculty, students and staff, to provide a candid evaluation of UIC's current sustainability programs and initiatives, compare UIC's environmental performance to recognized benchmarks and recommend a pathway to environmental stewardship for UIC.

The Task Force divided into subcommittees to ensure that all aspects of sustainability at UIC were examined, including energy, transportation, materials flows, pedagogy and outreach. Below is a summary of the committee's recommendations for the campus. Some recommendations may be implemented immediately whereas others may need further consideration and commitment from the campus. However, the creation of this committee highlights the importance of sustainability and its increasing pervasiveness in higher education.

Prior to the Task Force's final report, the committee had recommended that the Chancellor sign the American College and University President's Climate Commitment (ACUPCC), which challenges colleges and universities to be climate neutral. On September 14, 2007, the Chancellor signed the ACUPCC, making UIC one of the inaugural signatories of this document. The committee hopes that this level of administrative support continues, as this commitment is crucial for environmental stewardship at UIC.

General Recommendations

- Create and adopt a Campus Sustainability Statement (vision and commitment).
- Establish a campus sustainability office, to be staffed by a sustainability professional with appropriate staff support, to coordinate all campus sustainability efforts.
- Investigate joining the Chicago Climate Exchange as a means of promoting reduced carbon footprint.
- Sign the Talloires Declaration and Illinois Sustainable University Compact.
- Establish a permanent Chancellor's Committee on the Status of the Environment or Campus Sustainability Committee.
- Investigate the possibility of a student fee (with opt out provision) dedicated to student-generated sustainability initiatives, with a possible extension to faculty and staff on volunteer basis.
- Investigate possibility of the establishment of endowments to fund sustainability initiatives, and student research competitions.
- Establish a seed grant program to stimulate new research collaborations.
- Future new construction, remodeling, and renovation projects of \$5 million or greater shall be LEED® (Leadership in Energy and Environmental Design) Silver Certified. New construction, remodeling, and renovations totally less than \$5 million shall comply with the LEED® Silver requirements to the greatest extent practicable. The relevant sections of LEED® should be used to guide decision making and maximize sustainable practices with regard to materials flow.
- Incorporate the concepts of sustainable planning and development into the Campus Master Plan.
- Join the American Association for Sustainability in Higher Education (AASHE) in order to utilize its resources and for benchmarking.
- Using UIC assets, perform an inventory of Greenhouse gas emissions to establish a baseline by which UIC can measure its progress in reducing its carbon "footprint." (An inventory for FY2005 and FY2006 was completed and is provided in Appendix 6)
- Implement campus administrative procedures that emphasize the electronic transfer and approval of information (e.g. forms, agreements, and vouchers) rather than the exchange of hard copy documents or traveling across campus for departmental approvals and signatures.

Energy-Related Recommendations

- Survey, evaluate and repair/replace as practical, electric, steam, high temperature hot water, and chilled water meters to facilitate measuring energy usage in our facilities. Acquire information on costs at as fine a level of detail as possible.
- Establish appropriate metrics to determine energy reduction goals. Establish a general goal of 20% total energy reduction for the campus in the medium term and a 40% total energy reduction in the long term. Convert all fuels (gasoline, natural gas, etc.) into a common metric (e.g. MMBtu) to determine baseline and savings.
- Conserve water and reduce sewage (combined bill is \$1.25 million annually). Assess status of water meters on campus and determine consumption in gallons. Eliminate single pass cooling systems. Survey laboratory water usage.
- Establish a “shadow” billing program where possible. Using existing metering data, make colleges aware of energy usage within their buildings with the intent of reducing consumption.
- Investigate using Energy Savings Performance Contracts either through third party or University loan.
- Invest in Direct Digital Controls for heating, cooling and ventilation equipment as energy savings measures.
- Develop incentives for energy reduction.
- Publish listings of Energy Awareness measures to campus.

Transportation-Related Recommendations

- Study whether purchasing energy efficient vehicles such as hybrids or electrics is feasible. Determine if electric vehicles could be used by the campus and recharged overnight, taking advantage of lower prices for externally produced power in evening hours. Consider adding a surcharge to departmental vehicle charges to allow purchase of more expensive hybrids. (N.B.: UIC now has 5 hybrid vehicles).
- Investigate biodiesel trucks as alternatives for service vehicles.
- Study possible alternatives for the parking program. Consider parking incentives for car pooling.
- Perform a cost-benefit analysis, that includes energy, for the shuttle bus system to determine if reduced operating hours, change of routing, and/or smaller vehicles will provide greater efficiency without significant loss of service.
- Commission the Urban Transportation Center to gather data on numbers of UIC faculty, staff, and students using public transportation, driving to work, and cycling to work. Include on-campus transportation data, including the number of individuals who routinely travel between the east, west and south campuses.
- Initiate a project for tracking official air travel.
- Encourage use of the Chicago to Urbana Amtrak train instead of using cars whenever practicable.
- Continue to increase on-campus housing to cut down on commuting.
- Track total fuel consumption by campus owned buses, cars, trucks.

Materials Flow Recommendations

- Develop and implement a Green Procurement Policy that includes a minimum recycled content of materials, utilization of non-toxic (and less toxic) chemicals (cleaning, research, maintenance, pest control), using life-cycle analysis as a means of comparison.
- Reinvalidate campus recycling program to meet increased recycling goal through promotion, education, installation of bins, and bin maintenance.
- Implement food composting program using the new food service vendor, Sodexo, that has developed programs in other institutions. Give preference to on-site composting and reuse of composted materials on campus.

- Work with Sodexo to establish sustainable food purchases and use of biodegradable packaging in food operations, based on successful programs they have already established.
- Implement Integrated Pest Management (IPM) program in place of chemical fertilizer and herbicide programs.
- Use only recycled water for irrigation; reduce amount of run-off through smart (sustainable) landscaping practices including planting native plants, cisterns, and low-impact development (e.g. permeable pavement).
- Establish collection and on-site conversion program for collecting used vegetable oil from campus food services for conversion to biodiesel for campus vehicles and machinery.
- Support implementation and promote usage of user-friendly property management website (under development) that will facilitate intercampus exchange of used furniture and equipment.
- Establish a hazardous waste minimization program, which should be part of overall sustainability policies and practices.
- Coordinate efforts with Sustainability Office to inform faculty, staff, and students of recycling, composting, and green purchasing practices.

Pedagogy and Curriculum Recommendations:

- Promote sustainability scholarship at UIC, coordinated by a recognized administrative office.
- Create “The Sustainable City” as part of UIC Identity; no urban university is better positioned than UIC to bring sustainability to cities where most of the human populations now lives.
- Make the obvious connection between sustainability and “Healthy Cities.”
- Make instructional operations truly paperless.
- Ask for impact on sustainability when new courses are proposed, or existing courses evaluated. The number of relevant courses already offered by UIC in CUPAA, COE, LAS, A&A, AHS and other colleges is easily in excess of 50.
- Establish a series of summer institutes for the purpose of assisting faculty in incorporating sustainability principles into their courses.
- Consider project-based courses and other partnership initiatives with local businesses and community organizations.
- Create a cross-college committee to examine new certificate and degree programs in sustainability; e.g. interdisciplinary minor(s) in sustainability. Investigate the feasibility of establishing a School of Sustainable Development.
- Build partnerships with the City of Chicago, the Field Museum, the Morton Arboretum etc., so that the impact of our efforts will be regional. Many consider fresh water the emerging key natural resource locally and globally; Mayor Richard M. Daley put his signature on “Chicago’s Water Agenda 2003,” a landmark strategy to ensure the city maintains a safe, clean, and plentiful supply of drinkable water.
- Make a “green map” of the UIC campus (don’t forget the importance of water!).
- Add environmental impact signage to buildings (public relations and teaching value).
- When evaluating Deans and Vice Chancellors, include contributions to sustainability on campus and off.

Outreach Recommendations:

- Create a campus-wide web site dedicated to sustainability; highly visible to students, faculty and staff, located directly from UIC web site through the QuickLinks function and links from the “Living,” “Research,” and “Working” subsections.
- Launch a marketing campaign to faculty, administrators, students, staff and alumni aimed at encouraging sustainable efforts and practices on-campus and at home.

- Publicize sustainability initiative and campus accomplishments not only on campus but also to the community; use these opportunities of recruitment for faculty, staff and students; highlight for development purposes.
- Revive the greenaic@uic.edu listserv.

II. BACKGROUND

To begin, we should define sustainability in the general sense. According to the US EPA, *Sustainable development* joins two important themes: that environmental protection does not negate economic growth and that economic growth must not be detrimental to the planet now or in the future. The term "sustainability" came into common use after the 1987 publication of the World Commission on Environment and Development report, *Our Common Future*. Otherwise known as the Brundtland Report, it defined sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." Sustainability encompasses the three intersecting circles of ideas, aspirations and values that continue to motivate organizations to become better stewards of the environment, promote positive economic growth and set social objectives.ⁱ

Colleges and universities began implementing sustainability practices as early as the 1970s when Earth Day first was celebrated, even if they weren't called that. Energy costs were a big concern in the 1970s and conservation campaigns were implemented. A significant milestone in campus sustainability was the composition of the Talloires Declaration in 1990 at an international conference in Talloires, France. This was the first official statement made by university administrators of a commitment to environmental sustainability in higher education (Appendix 2). The Declaration is a ten-point action plan for incorporating sustainability and environmental literacy in teaching, research, operations and outreach at colleges and universities. Over 300 university presidents and chancellors in over 40 countries have signed it.ⁱⁱ

In recent years, due to the growth in the number of higher education institutions implementing sustainability, numerous organizations have been established to share and coordinate programs. The Association for the Advancement of Sustainability in Higher Education (AASHE) is an association of colleges and universities working to advance sustainability in higher education in the United States and Canada. The US Environmental Protection Agency (EPA) has also taken strides in looking at sustainability in colleges and universities. On May 1, 2003, the Colleges and Universities sector was selected to become a new sector in the Sector Strategies Program with the purpose to help colleges and universities work to achieve environmental gains through innovative action, including sustainability.ⁱⁱⁱ Other organizations and programs related to sustainability in higher education, cross-institutional campus greening initiatives, institutional-specific campus greening program and initiatives, and key periodicals related to sustainability in higher education may be found at http://csap.envs.wmich.edu/pages/rel_links.html.

In institutions of higher education sustainability is an overarching concept that takes in environmental programs, facilities, planning, social action and academics. In Sarah Hammond Creighton's book *Greening the Ivory Tower* she asserts that successful university environmental action involves five important components.^{iv} These components can be adapted to include sustainability and summarized as:

1. Understanding how the institution works and the roles of the board of trustees, the administration, faculty, staff, and students.
2. University commitment and demonstrated support for environmental action, such as an environmental or sustainability policy endorsed by the president and/or chancellor.
3. University-wide environmental planning or sustainability committee (or smaller committees that deal with different parts of the program).

4. Individual leaders that come from all segments of the university population (faculty, staff or student) and take on initiatives outside their job responsibilities. A paid professional sustainability coordinator may also be hired. To be most effective they should report to an upper administrator such as at the Vice Chancellor level.^v
5. An understanding of the basic principles of environmental protection and sustainability including energy efficiency, waste reduction, life-cycle cost accounting, and smart growth.

Most campuses have environmental compliance programs but sustainability efforts go far beyond environmental compliance. All higher-educational institutions by their nature generate hazardous waste and therefore need programs to comply with the regulations. Many also have programs to comply with the clean air and clean water acts, as well as numerous other areas mandated by regulatory agencies. Sustainability can be incorporated into many functions of the university including energy use and sources, construction, land use, transportation, water use, dining/food services, purchasing, solid waste management and academics. Sustainability programs at academic institutions are growing on a daily basis.

A. CAMPUS TASK FORCE ON SUSTAINABILITY

In April 2007, the Chancellor established the Campus Task Force on Sustainability with representation from UIC's students, faculty, staff and administration. The Chancellor cited three major reasons for forming a UIC sustainability initiative:

1. UIC's educational mission, as expressed through the 2010 Strategic Plan, asks that UIC's students be prepared as leaders of society. Students learn in many ways: in classrooms and laboratories, but also through the educational priorities set by the administration. Sustainability is one of the most important and pervasive issues at the present time, and UIC should be a leader in teaching this issue both in the curriculum and through its actions.
2. There are genuine opportunities to realize significant cost savings through energy and material procurement and usage policies. Such policies, once enacted, can result in lower energy costs and greenhouse gas emissions, improved material efficiencies, and better services.
3. UIC is in a unique position to partner in this endeavor with the city and many institutions in the region that have already launched sustainability initiatives. Such partnering is consistent with UIC's Great Cities Commitment and presents opportunities for further enhancing UIC's strength across the campus.

At UIC, interest and expertise in this area exist in several units, including the Energy Resources Center, the Institute for Environmental Science and Policy, the Buildings and Grounds Subcommittee of the Faculty Senate, the Office of the Vice Chancellor for Administrative Services, and Central Management Services. Drawing upon these resources, the Chancellor charged the Campus Task Force on Sustainability with the following purposes:

1. To work with individuals and groups on campus to coordinate thinking on improving campus sustainability at UIC.
2. To gather information on sustainability initiatives on other campuses and in other organizations and to compare UIC's environmental performance against recognized benchmarks.
3. To evaluate candidly UIC's strengths and weaknesses with respect to implementing sustainability options on our campus, identifying both opportunities and obstacles for future actions and recommending a pathway to environmental stewardship for UIC.

Initially 27 faculty, staff and students were asked to serve on this Campus Task Force. However, when the campus learned about the formation of this committee, additional faculty, students and staff

volunteered their time and service. The final committee, chaired by Joseph Muscarella, Vice Chancellor for Administrative Services, and Thomas Theis, Director, Institute for Environmental Science and Policy, was comprised of 35 faculty, staff and students. The task force members are listed below.

Boyd Black, Director, Project Management Services, Capital Programs
John Bruch, Area Coordinator for South Campus Operations, Campus Housing
Ken Buric, Director, Utility Operations, University Office for Facilities Planning & Programs
Christopher Comer, Professor, Biological Sciences
Michael Crumbock, Visiting Assistant to the Associate Vice Chancellor for Civic & Corporate Relations,
Vice Chancellor for External Affairs
Nick DiCanni
Matt Dickinson, Student, LAS
Mark Donovan, Executive Director Facilities Management & Capital Programs, Physical Plant
Administration
Jim Foerster, Associate Vice Chancellor, Facility and Space Planning
Stephen Graff, Student
Heather Haberaecker, Executive Assistant Vice President for Business and Finance, OBFS
Charles Hoch, Professor, Urban Planning and Policy
Michael Iversen, Adjunct Faculty, Urban Planning and Policy Program
Kristy Kambanis, Assistant to the Vice Provost for Faculty Affairs
Susan Kaplan, Outreach Activities Coordinator, Institute for Environmental Science and Policy
Michelle Kerr, Graduate Student, Earth and Environmental Science
Cynthia Klein-Banai, Assistant Director for Chemical Safety, Health and Safety Section, Environmental
Health and Safety Office
Karen Koy, Student, Graduate College, Earth and Environmental Science
Stefanie Lenway, Dean, College of Business
Joshua Linn, Assistant Professor, Economics, College of Business Administration
David Loffing, Associate Hospital Director, Hospital Administration
Chris Miller, Assistant Professor, Policy Studies
Kevin Monahan, Research and Policy Analyst, Graduate College Administration
Joseph Muscarella, Vice Chancellor for Administrative Services
Maria de Lourdes Coss, Director of Purchasing, Office of Business Financial Services
Monica Rausa Williams, Director, Administrative Services, Office of the Vice Chancellor for Research
Carlo Reyna, Student
Kent Roberts, Assistant Director, Materials Management, Hospital
Robert Rouzer, Director of UIC Student Centers, Campus Unions Administration
Albert Schorsch III, Associate Dean, College of Urban Planning and Public Affairs; Faculty Senate
Lisa Sharp, Assistant Professor, Psychology in Medicine, Health Promotion and Research
John Shuler, Documents Librarian, University Library
Rosemary Sokas, Director, Environmental and Occupational Health Sciences
Piyushimita Thakuriah, Interim Director, Urban Transportation Center
Thomas Theis, Director, Institute for Environmental Science and Policy
Jennifer Woodard, Associate Vice Chancellor for Civic and Corporate Relations
William Worek, Department Head, Mechanical & Industrial Engineering; Director, Energy Resources
Center
William Worn, Clinical Associate Professor, Architecture

At the initial meeting, the Task Force decided to form subcommittees to examine four different areas related to campus sustainability: (1) Energy and Transportation; (2) Materials Flow; (3) Pedagogy; and (4)

Outreach. A complete list of subcommittee members, chairs, and meeting dates for both the full committee and subcommittees are listed in Appendix 1.

The recommendations of the Campus Task Force are grouped under two categories: General and Specific. The General section includes recommendations regarding the coordination of sustainability efforts, organizational structure, leadership, and funding sustainability. The Specific section includes recommendations by each of the subcommittees in the areas of energy and transportation, materials flow, pedagogy and outreach. All of these recommendations have been approved by the Campus Task Force on Sustainability.

III. RECOMMENDATIONS

A. GENERAL RECOMMENDATIONS

1. Coordination of Sustainability Efforts

A central office or center should be established to coordinate sustainability and campus environment efforts. Collaboration is important between student centers, facilities management, environmental health and safety, utilities, campus housing, purchasing, academics and research for sustainability efforts on campus. This type of structure is needed to foster and develop an environment to support partnerships and teams between on-campus units.

This sustainability office should have a sustainability professional with appropriate staff support to coordinate all campus sustainability efforts among the various offices. This may include a graduate assistant and other student help. This position should be at the campus level, such as an assistant to the Chancellor for sustainability, and be placed under a vice chancellor's direction with ability to report across campus lines. Successful programs follow this model, and the sustainability office may have joint appointments or affiliations of staff in other crucial departments on campus (e.g. facilities management, student centers, campus housing). A number of university environmental organizations have produced a good resource for hiring a sustainability professional.^{iv} UIC should anticipate growth in the office as programs increase with opportunities and funding sources.

This sustainability professional position is key to the coordination the outreach efforts for students, faculty and staff. In particular, students need to be involved in the sustainability efforts. Involvement of student groups are important as many of the current student organizations have an environmental focus but other groups, such as honor societies and faith-based organizations, should be included as well. In the short-term, Campus Programs may coordinate this effort and invite representatives from these student groups to meet once a semester to discuss environmental issues on campus.

The campus sustainability office would also coordinate partnerships with community associations and organizations. Currently, faculty and staff in different departments have working relationships and contacts with different agencies, e.g. City of Chicago Department of Environment, Resource Center, or Center for Neighborhood Technology. Having a central office that would cultivate and coordinate partnerships with these agencies with an environmental focus can only help facilitate communication between faculty and staff on campus, and provide opportunities for networking and funding for sustainability efforts at UIC. This office should work with Public Affairs and the Development Offices to get matches from donors for grants.

Measurement systems are needed to track UIC's progress made in implementing the task force recommendations and continuing the process. The sustainability office will need to develop datasets that monitor baseline performance and response to the various initiatives. Examples might include campus-wide surveys of attitudes and activities as well as direct measures of reductions in use of energy or paper or increases in website hits. The office would work with the existing committees to create objectives that

are specific, measurable, and achievable and have realistic timeframes. A key feature should be that measures also serve the purpose of continued outreach and engagement.

Specifically, the task force recommends that the sustainability position have the following functions:

- Coordinate sustainability efforts among various offices
- Implement the task force recommendations and staff committee (see section 2 below)
- Oversee recycling (coordination, promotion, grant writing & reporting, vendor recommendations/bids)
- Coordinate outreach efforts for students, faculty and staff (web site, events coordination, student organizations, internships)
- Cultivate and develop community partnerships (City of Chicago, Center for Neighborhood Technology, etc)
- Measure, monitor and report performance annually (baseline and response to initiatives)
 - Surveys
 - Recycling data
 - Greenhouse gas inventories
 - Energy usage
 - University-wide savings due to sustainability efforts
- Develop campus-wide policies and facilitate incorporating sustainability concepts into individual departmental policies
- Research and implement funding mechanisms for sustainability projects

The campus should make greater use of academic resources at UIC that have a sustainability interest. Many of the specific recommendations propose studies to examine the practices and issues more closely. Campus studies provide research projects for thesis dissertations, and opportunities for undergraduate independent study, class projects, or research projects. One campus-specific resource that future sustainability efforts could utilize is the report prepared by the Urban Planning Course 594: Creating a Sustainable UIC Campus.^{vi} This seminar course was the result of efforts of the Provost, Urban Planning and Policy, and the Institute of Environmental Science and Policy. Not only is the report a result of an academic endeavor, it provides specific recommendations for sustainable practices at UIC.

2. Leadership

While UIC has not adopted a mission statement or established central sustainability committee, there have been some commitments by the administration in regards to sustainable initiatives. The Chancellor signed the American College and University President's Climate Commitment (ACUPCC) on September 14, 2007, making UIC one of the inaugural signatories of this document (Appendix 3). The ACUPCC challenges college and universities to become climate neutral (see Appendix 6 for an assessment of UIC's carbon footprint), recognizing that by reducing carbon emissions and by integrating sustainability into their curriculum, colleges and universities will better serve students, address climate change, stabilize and reduce long-term energy costs, and attract excellent students and faculty and new sources of funding, and increase support of alumni and local communities. As a result of becoming a signatory on the ACUPCC, UIC has become eligible to be part of a pilot program initiated by the Clinton Foundation to help colleges finance energy-efficiency projects.

UIC should create and adopt a Campus Sustainability Statement to be endorsed by Faculty Senate, adopted by Chancellor, and approved by Board of Trustees. This is consistent with the 2010 Strategic Thinking Document.

“UIC can and should be a part of the architectural imperative that is Chicago. This leadership should be evidenced in a renewed commitment to aesthetics that encourages ongoing comprehensive and progressive attention to the campus and its surroundings. As the campus adopts an innovative and sustainable model of contemporary urban design, it will become a source of pride and support for our students, faculty and staff, as well as a potential destination for the residents of Chicago.

[...]

Our aim should be to create a distinctive physical environment that reflects our ambitions and achievements. The campus must support all our activities while being architecturally innovative and environmentally sustainable.”

From 2010 Strategic Thinking. Part 3, “Environment,” pp. 31-32.

The principles of sustainable development should be incorporated in the Campus Master Plan, including location of buildings, stormwater management, landscaping, proximity to public transportation, parking, as well as building design and construction.

The Task Force recommends the Chancellor sign the Talloires Declaration. This is a ten-point action plan for incorporating sustainability and environmental literacy in teaching, research, operations and outreach at colleges and universities and has less restrictive requirements than ACUPCC. By signing this document, UIC clearly its commitment to sustainability.

The Lieutenant Governor has established the Illinois Sustainable University Compact, which UIC could sign because we are already complying with a number of its basic requirements. The Compact sets out 12 sustainability objectives for Illinois campuses, including using renewable energy, incorporating green building practices in campus construction, developing sustainable transportation options, and improving water conservation.

There should be further review of the membership requirements for the Chicago Climate Exchange (Appendix 4). The Chicago Climate Exchange (CCX) is North America’s only active voluntary, legally binding greenhouse gas emission cap and trade program. CCX Members sign legally binding commitments to reduce emissions, quantify and verify emissions using standardized procedures and have proven annual compliance with specified emission reduction targets. This may be achieved either by reducing emissions or purchasing surplus emissions reductions or project-based emissions reductions.

A permanent Chancellor’s Committee on the Status of the Environment or Campus Sustainability Committee should be established to set priorities and monitor and track UIC’s progress towards goals and actions. This committee may also be an internal advisory board to the campus sustainability office, to suggest new initiatives and provide on-going input from different campus units. This committee may assist with the preparation of reports for Climate Commitments and help with the accountability of sustainability initiatives on campus in terms of measuring and benchmarking efforts.

3. Funding Sustainability on Campus

Many campuses have a sustainability fee voted for and paid by the students. At Cornell University and at UIUC, 79% of the voting students supported the establishment of a \$5/semester renewable energy fee. At Cornell, the revenue from the fee increase will go toward purchasing and developing renewable energy for the university, and is managed by the Kyoto Task Team, a university committee composed of students, staff, and faculty. The revenue from the fee increase at UIUC will go to help establish a sustainable campus environment by financing initiatives such as green buildings, engagement of the university community, recycling, energy efficiency, and environmentally responsible purchasing.

A \$3 per semester Campus Green Fee supported by 75% of voting students at Northeastern Illinois University this Spring was approved by the University's Board of Trustees. The fee is expected to raise about \$90,000 annually to fund sustainable energy projects on campus.

UIC should investigate the possibility of a student fee (with opt-out provision) dedicated to sustainability initiatives. There would be a student council established to determine expenditures. This fee should be extended to faculty, staff and alumni on a voluntary basis.

Many sustainability programs and green initiatives are funded by endowments at other colleges and universities. The Campus Sustainability Office may work with the Development Office for endowments to fund sustainability initiatives, research seed funding and student research competitions. The Campus Sustainability Office may work with state legislators to fund sustainability efforts as well.

At Macallister College, students established a revolving fund for sustainability initiatives that was funded by the environmental studies department, student union and the president. It is used for programs that save the university money and the savings are put back into the fund. Harvard University has had great success using endowment funds for this purpose and found that they have a substantial return-on-investment.

External grants for energy conservation and recycling can provide campuses with a source of funding. Illinois universities have received grants for energy efficient lighting upgrades for the third consecutive year from the Illinois Clean Energy Community Foundation grant for lighting upgrades. Western Illinois University received \$249,870 to allow Physical Plant staff to retrofit existing fluorescent lighting fixtures in several buildings with high efficiency electronic ballasts and lamps that use 35% less energy than the original equipment. The project also includes replacing all incandescent light fixtures with energy efficient fluorescent fixtures. The new high efficiency lighting will reduce air conditioning loads in summer, as well as electrical demand during high cost periods of peak electrical usage. The completed project is expected to result in nearly \$131,400 in costs savings per year.

UIC has received \$741,000 over the past 3 years from ICECF for lighting upgrades which have resulted in 1.315MW in electrical demand reduction. UIC has invested over a million more dollars in these projects as its cost share with ICECF.

Illinois State University received a \$250,000 to upgrade nearly 6,400 lighting fixtures in 11 buildings across campus. The upgrades are expected to result in a 495 kW reduction in electricity use, which could save them approximately \$250,000 annually. Over the past two years, thousands of fluorescent light fixtures in classroom buildings have been upgraded with new electric ballasts and T-8 fluorescent lamps.

UIS received a \$27,550 grant to expand campus recycling efforts from the Illinois Department of Commerce and Economic Opportunity. UIS will use the grant to expand collection of recyclable materials – especially paper, aluminum, and plastic – by placing collection bins at locations that were previously not served and to hire a recycling coordinator for the campus. Plans also include creating several new student worker positions and stepping up efforts to encourage all members of the campus community to recycle. Illinois State University has received a similar grant of \$59,968 to purchase of additional recycling containers and a larger collection truck. It is projected that the added recycling containers and new collection truck will allow the University to increase its general recycling rate by 10% and the rate in campus housing areas by 25%. The grant will be matched through the retention and hiring of additional recycling staff and efforts related to environmental awareness to promote and advertise the expanded recycling project.

4. Research

UIC is pursuing sustainability in the academic realm. The Institute for Environmental Science and Policy (IESP) “advances cooperative research, scholarship, and service that support a sustainable environment.” IESP’s mission is to advance multidisciplinary research and scholarship among UIC’s faculty and students in the disciplines of the environmental and health sciences, engineering, economics, and the social sciences. These studies will prepare the next generation of environmental scientists and decision-makers and transmit viable solutions for environmental problems to the public sector.^{vii}

There should be a small seed grant program to stimulate new research collaborations in sustainability (low cost, three per year for two years). Collaboration is important not only for the success of the campus sustainability office and sustainability efforts, but collaboration among faculty fostering interdisciplinary research should be encouraged as well.

Currently, the Office of Research Services, Office of the Vice Chancellor for Research, has a checkbox on the Proposal Approval Form for all proposals that principal investigators may check if the grant or contract is in the field of environmental research (science, engineering or policy). IESP captures this data each year to see how many awards have been made in the area of environmental research. Federal agencies are paying increased attention to the area and it is one where UIC researchers may be able to increase success in obtaining federal support.

For example, the National Science Foundation is currently discussing the possibility of instituting a new grant program in the area of “sustainability science.” A new Integrative Graduate Education and Research Traineeship (IGERT grant) was recently awarded for the LEAP (Landscape, Ecological & Anthropogenic Processes) program, which seeks to integrate a variety of scientific fields with relevant economic and social science disciplines to prepare students for careers in environmental science, policy and conservation practice. The program also includes collaborative research and a team-based capstone project; internships with Chicago-area partner organizations; and seminars and workshops. LEAP fellowships provide a stipend and tuition for two years, and research and travel funds for four years. Seven UIC students are currently enrolled in LEAP.

UIC researchers have had some success in obtaining grants in environmental science. However, UIC needs to be positioned to make contributions to theoretical and practical aspects of sustainability in the years to come.

B. SPECIFIC RECOMMENDATIONS

1. Energy and Transportation

a. Energy Management

The largest environmental impact made by universities are the atmospheric releases from burning fuel for heating and cooling buildings, heating hot water, and providing electricity to the campus. When considering energy management, universities look at both their energy source and their energy usage. Brown University exemplifies efforts in both of these areas. Brown’s Facilities Management has made energy efficiency investments in existing buildings and new construction in the last 12 years that accumulated over \$5 million in reduced or avoided energy costs. Energy efficiency investments have included retrofits of lighting, motors, and mechanical systems to reduce energy consumption. Major capital projects in the last 10 years have typically used 30% less energy than similar buildings constructed to minimum energy code standards.^{viii} Brown also plans to increase its utilization of clean energy sources.^{ix} Their efforts demonstrate what universities can do:

- Being part of state commitments to renewable energy standards.

- Utilizing cogeneration systems for power where the steam generated in the power plant is used for heating of hot water and boiler system.
- Contracting-for-differences financial hedge that would support a new renewable energy plant, such as wind or power.
- Installation of clean generation technology on campus such as photovoltaic cells for heat, electricity, and hot water.
- Purchase of Renewable Energy Certificates (RECs) to offset emissions. Most schools that make the switch to clean energy do so by purchasing RECs. Because there is a market for certificates, when universities purchase RECs, they are creating an incentive for an increase in the supply of clean energy.
- Sometimes campuses use student-approved fees to purchase the clean energy.

A better understanding of campus energy usage comes from performing an energy audit. In their energy audit, the University of Wisconsin, Madison found that 72% of its energy use was from heating, cooling, and ventilation systems, while 7% was attributed to computers, 6% to power plants, 5% to lighting, 4% to water/sewer, 4% to lab equipment, and 2% to miscellaneous. So even if they were to unplug all the lights, lab equipment and computers they could not reduce energy use by more than 16%. However, they have implemented an energy conservation campaign as well as upgrading their HVAC systems.^x

A study at Oberlin College found that by using feedback, education and incentives there was a 32% reduction in energy use among dormitory residents. Further dormitories that had web-base feedback had higher conservation level (55%) than those with weekly reporting from manual metering systems (31%).^{xi}

Many colleges and universities have inefficient heating systems. An energy study performed at UIC in 2003 found that 24 out of 32 buildings investigated on the East Campus had poor energy efficiency when benchmarked against similar buildings.^{xii}

A case study at two Pennsylvania universities found that through a guaranteed energy savings program (GESP) utilizing an energy service company (ESCO), there was improved operational efficiency, a smaller ecological footprint, and operating cost savings for the university. An ESCO's services encompass developing, designing, and financing energy efficiency projects; installing and maintaining the equipment; measuring the energy savings; and assuming the risk that the project will save the amount of energy promised.

UW-Madison is part of the state's energy-saving Wisconsin Energy Initiative, which began in 1992. The university invested \$29 million in high efficiency fluorescent lights, occupancy sensors, premium efficiency motors, LED exit lights, direct digital controls on air handling, ultra low flow plumbing fixtures, and window inserts. They also implemented an energy conservation program consisting of:

- Turning off lights when feasible.
- Maximizing use of natural lighting.
- Not using halogen lights.
- Replacing desk and lamp light bulbs with compact fluorescents.
- Reporting excessive illumination and suggesting ways to reduce lighting levels.
- Dressing to the season and setting room thermostats sensibly.
- Obtaining Physical Plant approval for use of electric space heaters or foot warmers.
- Turning off computer and other office equipment when away on evenings & weekends and eliminating use of screen savers.
- Eliminating nonessential office equipment.

- Consolidating and sharing underused office equipment.
- Buying equipment with “Energy Star” label. ^{xiii}

In an effort to control rising utility bills and encourage energy conservation, UIS will begin charging students who living in campus apartments with above-average energy consumption. Students who live in campus apartments will be charged for their actual utility usage if they use more than 10% above the average usage in their apartment building. For the past few years, students have been charged an average rate for all utilities.

The ability of power plants to purchase fuel at a reduced cost created a unique arrangement for power generation at the University of Illinois. Utility Operations, an independent organization operating within the University, runs its own cogeneration plants on the UIC campus. Cogeneration is the simultaneous production of heat and power in a single thermodynamic process. Instead of discarding the heat produced by the power production process, it is captured and used to provide space heating and hot water heating, thus eliminating the added expense of burning fuels for the sole purpose of space heating. When operated under certain conditions, cogeneration can be beneficial and helps lower the emission of carbon and sulfur dioxide pollutants into the air.

On the other hand, there is a lack of incentive for conserving electricity by faculty, staff, and students. Each individual building or department does not pay for the amount of electricity that it uses; the cost for electricity is paid for as a whole by the university. In Spring 2007, the administration invited staff from the Office of Capital Programs (OCP), Facilities Management, Utilities and Environmental Health and Safety to a web-cast on starting a campus energy conservation program. The intention is to stimulate the development of an energy conservation program at UIC. The campus is actively studying the opportunities for energy savings

Appendix 6 of this report contains the results of an assessment of UIC’s Greenhouse Gas (GHG) emissions profile that was conducted during Fall 2007. Results show for FY2005 the total emissions were 224,852 MTCDE (metric ton carbon dioxide equivalents) and for FY2006 they were 240,466 MTCDE. This shows an increase of 6%. The emissions include all direct sources of GHG emissions from sources that are owned or controlled by the institution, including production of electricity, heat, and steam, laboratory and cooking natural gas, transportation, purchased electricity, and emissions from landfilled waste. The largest contribution is from the cogeneration plants (74%), followed by transportation (18%) and purchased electricity (7%). Transportation includes campus fleet but is primarily the result of faculty, staff, and students commuting to campus. These numbers are comparable to other university’s GHG emissions, when normalized for community size or building square footage. This indicates that in order to achieve the greatest reduction in GHGs, energy consumption and community commuting habits should be targeted.

The following are specific recommendations from the Energy and Transportation subcommittee regarding energy-related sustainable efforts at UIC.

- Survey, evaluate and repair/replace as practical, electric, steam, high temperature hot water, and chilled water meters to facilitate measuring energy usage in our facilities. Acquire information on costs at as fine a level of detail as possible.
- Establish appropriate metrics to determine energy reduction goals. Establish a general goal of 20% total energy reduction for the campus in the medium term and a 40% total energy reduction in the long term. Convert all fuels (gasoline, natural gas, etc.) into a common metric (e.g. MMBtu) to determine baseline and savings.

- Conserve water and reduce sewage (combined bill is \$1.25M annually). Assess status of water meters on campus and determine consumption in gallons. Eliminate single pass cooling systems. Survey laboratory water usage.
- Establish a “shadow” billing program where possible. Using existing metering data, make colleges aware of energy usage within their buildings with the intent of reducing consumption.
- Investigate using Energy Savings Performance Contracts either through third party or University loan.
- Invest in Direct Digital Controls for heating, cooling and ventilation equipment as energy savings measures.
- Develop incentives for energy reduction.
- Publish listings of Energy Awareness measures to campus.

b. Transportation, Parking and Fleet

Universities lend themselves to sustainable transportation practices due to the use of quadrangles (green spaces around which buildings are constructed with roads going around the periphery). They are meant to be self-enclosed units that allow for pedestrian access between buildings. Larger campuses have integrated the use of bicycle paths and provide bike racks. They may also utilize a shuttle bus to get from more distant areas of campus. Another approach has been for the university to arrange for an agreement with the local public transportation system to provide both on and off-campus transportation to students. This opportunity can be extended to employees as well. Many campuses have limited parking which further encourages the use of public transportation.

A typical university also has its own motor vehicle fleet that includes cars, trucks, vans, plows and bulldozers. Through the universities’ selection of vehicles that use cleaner technologies this environmental impact can be reduced. Purchasing policies can be developed to support this effort. Also, some states, including Illinois, have clean fleet programs that promote this. The Illinois Green Fleets Program is “a voluntary program that recognizes a fleet manager's progressive efforts in using environmentally friendly vehicles and fuels to improve air quality while promoting domestic fuels for greater national energy security.”^{xiv} The University of Florida has taken this type of program a step further: a research assistant is taking discarded vegetable oil from restaurants on and around the campus, brewing it into biodiesel, and using it in the campus fleet.^{xv}

UIC has several green initiatives in the area of transportation. First of all, its proximity to public transportation enables many students, faculty and staff to access the campus without private vehicles. There are also incentives for the utilization of public transport. In 2001 the Board of Trustees approved the U-PASS Program for undergraduate students. Graduate students from the Graduate College, College of Pharmacy, and School of Public Health were integrated into the program beginning in fall 2002. Both of these actions were a result of student referendums. The U-PASS can be used on CTA and PACE. This also serves as an example of the effect of student involvement at UIC is the U-PASS program.

A second transportation initiative was a result of legislative change. Employees are able to take part in the *Pre-Tax Qualified Transportation Program*. This is a revision in the Internal Revenue Service Code that allows benefits eligible employees to realize income tax savings by paying for commuting expenses with pre-tax dollars. The UIC *Pre-Tax Qualified Transportation Program* offers vouchers which may be used for transportation expenditures on RTA, CTA, Pace, South Shore Railroad and Metra.^{xvi}

Historically, UIC has participated in the Green Fleet initiative utilizing natural-gas powered buses. As new technologies for energy-efficient transportation arise, the campus continues to evaluate other options such as biodiesel and E85.

The following are specific recommendations from the Energy and Transportation subcommittee regarding transportation-related sustainable efforts at UIC.

- Study whether purchasing energy efficient vehicles such as hybrids or electrics is feasible. Determine if electric vehicles could be used by the campus and recharged overnight, taking advantage of lower prices for externally produced power in evening hours. Consider adding a surcharge to departmental vehicle charges to allow purchase of more expensive hybrids.
- Investigate biodiesel trucks as alternatives for service vehicles.
- Study possible alternatives for the parking program. Consider parking incentives for car pooling.
- Commission the Urban Transportation Center to gather data on numbers of UIC faculty, staff, and students using public transportation, driving to work, and cycling to work. Include on-campus transportation concerns, including the number of individuals who routinely travel between the east, west and south campuses.
- Initiate a project for tracking official air travel.
- Encourage use of the Chicago to Urbana Amtrak train instead of using cars whenever practicable.
- Continue to increase on-campus housing to cut down on commuting.
- Track total fuel consumption by campus owned buses, cars, trucks.

2. Materials Flow

Materials flow includes the areas of purchasing, design and construction, recycling and waste management, and grounds and landscaping. More detailed recommendations and cost benefit discussions are located in Appendix 5.

a. Purchasing

Sustainable practices at colleges and universities can also be implemented through the purchasing process. Purchasing usually occurs in one of three ways. The first is that faculty, staff and students make the purchases through a decentralized system that utilizes purchase orders or corporate purchasing (credit) cards. The second way is through central purchasing where decisions are made about materials that are purchased in large quantities such as office supplies and chemicals. Central purchasing offices or cooperatives between several campuses can often get discounted prices for these types of commodities. The third way is through negotiation of contracts for certain services such as waste hauling, copy machines, and e-procurement systems.ⁱⁱ Where purchasing controls can be implemented, policies can be set to mandate the use of environmentally friendly products (e.g., less hazardous cleaning products), recycled products, printing services, and tracking chemical purchases.

Western Illinois University developed a green purchasing policy that was approved in August 2007. They recognize that the purchase and use of products and services as well as their ultimate disposal can profoundly impact the environment. The goal of this policy is to reduce the adverse environmental impact of their purchasing decisions. By including environmental considerations in their purchasing decisions, along with concerns about price, performance, and availability, they will remain fiscally responsible while attempting to promote practices that improve public health and safety, reduce pollution, and conserve natural resources.^{xvii}

UIC has a copier and printer rental program available on campus through Publications Services. Typically, a copier has a 4-5 year life on campus but then will be refurbished for use by another business.^{xviii} With a rental service, there will be no equipment disposal issues. All University stationary, business cards, envelopes are on 100% post-consumer stock. Specifications for University publications include 10% post consumer content for paper and soy-based inks.^{xix}

Food and dining services have been targets for sustainability initiatives. For instance, farm-to-cafeteria initiatives were initiated on many campuses during 2006. Aramark, the campus dining service provider at Furman University, is providing produce that is either local or organic to the extent possible.^{xx} UIC's new food service provider, Sodexo, has established programs at other institutions that support sustainable food practices at Portland State University (2006), Menlo College (2004), Herb'n Farm, and Sodexo's organic brand, premiers at Colorado College (2003). Sodexo has won numerous awards for various environmental initiatives.

Specific recommendations in the purchasing area are:

- Develop and implement a Green Procurement Policy that includes percent recycled content of materials, utilization of non-toxic (and less toxic) chemicals (cleaning, research, maintenance, pest control), using life-cycle analysis as a means of comparison.
 - Promote usage of rental/service agreements
 - Paper products should be > 50% post-consumer
 - Green computer policy
- Work with Sodexo to establish sustainable food purchases and use of biodegradable packaging in food operations, based on successful programs they have already established.

b. Design and Construction

Many campuses are now integrating the concepts of Green Buildings and/or LEED® certification into their design process. Both renovation of old buildings and construction of new buildings give the university prime opportunities to improve energy efficiency, indoor air quality, water conservation, while utilizing sustainable products and new fuels and technologies into building design.^{xxi} For instance, in March 2002 Stanford University released "The Guidelines for Sustainable Buildings" as a result of the coordinated work of students, faculty, and senior staff to incorporate sustainable design into when planning its central campus buildings.^{xxii} Green construction has already been implemented in campuses world-wide for science buildings, residence halls, fitness centers, and other buildings. Since universities are like small towns, sustainable concepts applicable to landscaping, storm water management, and water conservation are all relevant.

One of the notable "green buildings" on US campuses is the Adam Joseph Lewis Center at Oberlin College, built to house the environmental studies program. It utilizes green practices and technology in the areas of energy, heating, cooling and air quality, landscape, water and wastewater, and materials. It utilizes solar energy and energy conservation techniques to create zero energy balance. The building has its own wastewater treatment system and the water is reused for toilets and landscaping. The building was built as an educational tool to demonstrate how buildings can be different. The building's systems are monitored through a transparent system and are utilized for teaching and research tools.

More recently, the Swarthmore Science Center at Swarthmore College was constructed as an environmentally friendly building. Some of the science center's sustainability features are a storm water channel that doubles as bench seating in a sunken garden, where the grade was lowered so that full-size windows could be installed to bring daylight to the lower level, and wainscoting made of panels of compressed sunflower seeds. Windows open in offices without affecting safety since ventilation systems are designed to make sure that labs have negative pressure and are vented outside, rather than circulating possible contaminated air back into hallways. The labs' fume hoods, which pull large amounts of air out of the building, were designed with heat exchangers to recapture some heat or cold that the heating and air-conditioning system had previously added to it.^{xxiii}

Residence halls have also been targeted for green construction. Saint Xavier University constructed Rubloff Hall, a \$9 million, 88-bed residence hall. Sustainable building features include a roof garden over 10% of the surface to dissipate heat; an energy-efficient lighting system and double-pane windows; a building control system that reduces energy consumption and increases indoor air quality; a ventilation system that brings in outside air for free cooling; dual-flush toilets; an energy recovery system that captures heat from exhaust ventilation; and high-efficiency thermal insulation systems for the roof and walls.^{xxiv}

Most campuses have master plans for long term planning and many have begun to incorporate sustainable development into these plans. McGill University embarked on development of a master plan that involved the environmentally-minded campus community – staff, students and faculty alike. The McGill Master Plan’s Guiding Principles specifically include clauses towards sustainable development, including aspects from circulation and transportation to building design and construction.^{xxv} Lawrence Technological University updated a Campus Master Plan inclusive of sustainability and storm water mitigation in 2005.^{xxvi}

The Office of Capital Programs (OCP) at UIC functions as a resource and single point of contact for departments on all major construction and building infrastructure projects. Currently, all new projects designed and constructed since 2000 have been designed to achieve the equivalent of LEED® Certification. These include the College of Medicine Research Building, the Structural Biology Building, Student Center East, Student Center West, and the MRI addition to the Outpatient Clinic. New construction projects currently under way are being designed with the goal to achieve LEED® Silver Certification.

Throughout the University’s 140 year history, buildings have been adapted for reuse. The buildings on the west side are up to 80 years old and have been used long beyond useful life. Renovation projects have not been designed with an established specific, measurable goal; however, they are also examined to improve energy efficiency above the recommended industry standard and improve life-cycle costs. Although the budget allocations for new construction and remodeling are separate from the building maintenance budget, the budget crunch of the last few years has made all involved in the design process realize that having durable building materials and energy efficient systems reduce maintenance requirements. A recent remodeling project is the upgrade of Grant Hall. The narrow existing windows were replaced by thermal windows that will provide more light and a better thermal barrier. In addition, a geo-thermal heating system was installed. The Lincoln Hall renovation is currently being designed to achieve LEED® Silver certification.

General recommendations for design and constructions are:

- Projects should be designed to achieve LEED® Silver certification or equivalent. The relevant sections of LEED® should be used to guide decision making and maximize sustainable practices with regard to materials flow. Specific goals should include:
 - 75% diversion of construction waste for new construction
 - 20% of materials manufactured regionally
 - Use of low-emitting materials
- Goals should be reevaluated annually, considering market changes

In order for UIC to meet this goal, UIC should develop sustainability guidelines for the campus using the LEED® rating system as the basis. The Materials & Resources and Indoor Environmental Quality sections of the LEED® rating system should be used to help guide decision making and maximize sustainable design and construction practices with regard to materials flow. The campus sustainability

guidelines should reflect the urban nature of the Chicago campus and the diversity of campus projects, provide suggested and preferred strategies to achieve the desired certification level, and be a living document, updated on a regular basis to reflect changes in the market for sustainable materials and recycling options and the needs and goals of the campus.

The following are some selected suggestions for consideration when developing the guidelines related to Materials & Resources and Indoor Environmental Quality.

- **Building Reuse:** Credits available for building reuse will generally be driven by the project program though design options that maximize the retention of existing building components should be achieved where possible.
- **Construction Waste Management:** The two credits available for diversion of 75% of the construction waste stream from landfills is readily achievable in the Chicago area with minimum to no additional cost. In some cases recycling results in overall project savings. All UIC projects should include a specification requiring diversion of a minimum of 75% of the waste from landfills.
- **Resource Reuse:** Incorporation of salvaged materials at any significant level will generally have little practical application on projects at UIC. These credits will be difficult to achieve. The credit for reuse of 30% of furniture and furnishings could be a viable goal for some renovation projects.
- **Recycled Content:** The market has evolved to a point that the first credit for this category should be a serious goal for all projects and the second credit should often be achievable.
- **Regional Materials:** The first credit for this category (20% manufactured regionally) is readily achievable without additional cost to the project in most situations. The second credit (50% extracted regionally) is more challenging but should be a consideration when developing project specifications for materials.
- **Rapidly Renewable Materials:** Availability of products to achieve this credit is still limited. Maximization of the use of rapidly renewable materials should be a consideration when evaluation the performance and cost of selected materials.
- **Certified Wood:** Availability of certified wood is limited and as the market is still evolving, certified wood can be expensive. With the limited amount of wood incorporated into many UIC projects as more products begin to incorporate certified wood this credit may become more readily achievable.
- **Low-Emitting Materials:** The three credits for Adhesives & Sealants, Paints & Coatings and Carpet should be required on all projects. Economical products that comply with the Composite Wood credit are not readily available. The availability of Composite Wood products that help achieve this credit will vary with project needs so care should be taken when developing specifications to maximize use where economical.

c. Recycling and Waste Management

i. Waste and Composting

Recycling is the most common green program at colleges and universities. Student and legislative pressures as well as economic incentives have become drivers behind recycling programs. In 1994 the State of Illinois mandated (415 ILCS 20/3.1) that state-supported institutions of higher education in Illinois participate in a waste reduction planning process. From the recycling provisions of the waste reduction plan were to achieve, by January 1, 2000, at a least a 40% reduction (base year 1987) in the amount of solid waste that is designated for landfill disposal. An extension was made to 2005. Plans were to be submitted every five years. Grant monies for developing these programs were provided and UIC received over \$200,000 that was used toward the purchase of a dedicated recycling truck, recycling containers, and promotional material.

Paper products make up nearly half of a university's waste stream. Other common wastes are cardboard packaging (particularly in dining halls), glass, aluminum, and plastics. Facilities management departments generate a lot of scrap metal from used equipment. Often a contract will exist for the hauling of these materials. Construction and demolition debris generated from construction and renovation projects is often recyclable. Environmentally minded universities will develop an appropriate waste disposal agreement that promotes waste reduction and recycling. Many campuses may use their own trucks for waste hauling but can save tipping fees at landfills by recycling more materials.

Another way that campuses can control their waste stream is through composting. Material from grounds, as well as food, can be composted. This requires a site that is isolated from neighbors and has good drainage. Land-locked or urban universities may need to use an off-site contractor for this. Some campuses take this a step further. For example, methane gas is generated as the compost degrades and at the University of Maine, Orono the gas is captured and converted to electricity.

The University of Vermont has an exemplary program, as demonstrated by the receipt of the National Recycling Coalition's "Outstanding College or University" award for 2007. Each year, UVM diverts 960 tons of material from landfills, about 35% of the University's total waste stream. The University collects a ton of paper, cans and bottles each day, and additionally, each year, 175 tons of food waste is delivered off-site for composting, eight tons of waste cooking oil is given to a local biodiesel manufacturer, 56 tons of wood chips go off-site to be burned for electricity generation, 32 tons of computers and other "e-waste" are recycled and disassembled by a contractor, and 116 tons of scrap metal are recycled at a local scrap yard. The most notable improvements in the recycling effort over the past year include improved composting and recycling at special events on campus, the expansion of the student-led Eco-Reps program, and efforts to educate the campus community about the value of waste reduction. The award application also notes that UVM has devised a new tracking system for construction and demolition waste, developed a program for distributing surplus furniture, and launched a "One Less Cup" campaign to reduce disposable cup use.

Through a partnership with Central Texas Biofuels, Texas A&M Dining Services is fueling its campus delivery truck with biodiesel fuel made from used cooking oils generated by the University's dining facilities. The fuel may also be made available to other departments on campus.

UICycle, the UIC recycling program, has a goal "to minimize that waste by encouraging the conservation of resources – through using less in the first place, reusing what's already been used, and recycling (as a last option)." ^{xxvii} Initiated in 1996 to comply with the Illinois mandate for waste reduction at public colleges and universities, UICycle primarily recycles paper. A majority of campus buildings also have bins for aluminum, glass bottles, and plastic. In 2005, 2069.8 tons of material was recycled. This number includes paper, glass, plastic, aluminum, scrap, and compost. Compost materials are taken off-site. This gives an average recycling rate of 25.40%. Other materials recycled on campus but not included in this number include CDs, laser cartridges, carpets, and computers. In spite of severe program cutbacks recycling has increased on campus. This is due to the institution of medical privacy regulations. The campus negotiated a service contract for shredding and one of the requirements was that the paper be recycled. ^{xxviii} Battery recycling is being done through City of Chicago's recycling program and the Rechargeable Battery Recycling Coalition (RBRC). There is a new electronics collection program centralized through a Central Management System contract.

Waste reduction can also be used to reduce waste at the source. Currently, electric hand dryers are installed in restrooms to eliminate paper towels. In terms of substitution or reduction, UIC needs to adopt a paper reduction policy or program – copy and print on both sides of paper, reuse paper for scrap, electronic storage of information. There are many ways UIC may take steps to substitute or reduce waste.

UIC should investigate paper goods use for food services and evaluate for life cycle (biodegradable, recyclable disposable plates, cups, and cutlery). All contracts such as vending machines should be reviewed for use of more readily recyclable materials (e.g., aluminum cans). Recycled products should be offered in bookstores. Outreach efforts should encourage faculty, students and staff to use their own water bottles and not buy bottled water, bring their own coffee mug, and promote the use of rechargeable batteries instead of alkaline.

Many campuses have programs that facilitate the reuse of equipment, office supplies and furniture. End of year move-outs from residence halls provide outlets for furniture and supplies that students throw out – either for needy populations or to resell in fall to incoming students.

Currently, Facilities Management has a warehouse for excess furniture. Property management is working on website for giving away furniture and equipment.^{xxix} UIC should reinstate the Great Stuff Exchange for campus departments, faculty and staff. Departments donate extra office supplies and non-capitalized equipment, which is free to anyone who wants it.

There are numerous ways to increase recycling on campus through educational programs, expansion of accessibility, recycling more types of wastes, competitions (e.g. Recycle Mania – national wide campus recycling competition), waste audits, etc. There are state grants that can be used to upgrade recycling programs.

Numerous campuses have reduced waste by implementing a food compost program. These institutions include Yale, Cornell, University of Maryland, Rutgers and the University of Chicago. Harvard has installed a composting machine located in the kitchen. Ohio University has a solar-powered in-vessel composting unit. UIC's current food service provider, Sodexo, has established successful composting programs at Warren Wilson College in Swannanoa, North Carolina and the Shedd Aquarium here in Chicago.

The benefits of a food compost program include the implementation of flagship sustainability practice where waste is turned into a resource (public relations boon), the diversion of cafeteria, grounds yard waste, wood shop, and possibly animal bedding waste that may reduce disposal fees, and reducing costs for fertilizers and mulches. UIC needs to tap into Sodexo's experience as an industry leader, strengthen relationships with local green businesses, and set an example of responsible environmental stewardship to current and future generations of students. A combination of improvements to the campus recycling program and a composting program would allow for a 50% solid waste recycling goal in the medium term, as compared to current rate of 25%.

The following recommendations should be the focus of the waste reduction program:

- Reinvigorate campus recycling program to meet increased recycling goal through promotion, education, installation of bins, and bin maintenance.
- Implement food composting program using opportunity to work with new food service vendor (Sodexo) that has developed programs in other institutions. Give preference to on-site composting and reuse of composted materials on campus.
- Coordinate efforts with the sustainability office to inform faculty, staff and students of recycling, composting, and green purchasing practices.
- Support implementation and promote usage of user-friendly property management website (under development) that will facilitate intercampus exchange of used furniture and equipment.

ii. Hazardous waste

Hazardous waste management is one of the core environmental programs that large, research universities must have to maintain environmental compliance. Since 1980 when the US Environmental Protection Agency (EPA) enacted the Resource Conservation and Recovery Act (RCRA), various approaches to reducing the environmental impact of these materials have been taken. In summary, this concept of pollution prevention can be stated as a system that puts the highest priority on:

1. Elimination (don't create it in the first place)
2. Reduction (make as little waste as possible or recirculate in the system)
3. Recycling (use the waste as raw materials for a similar or different use)
4. Treatment (destroy the waste in an environmentally sound manner)

The Environmental Health and Safety Office (EHSO) at UIC manages the hazardous chemical waste program where 32.5 tons of waste were disposed of in 2005. In addition, 1.6 tons of batteries were recycled. Currently, researchers and laboratory workers are informed of specific waste minimization practices through the laboratory safety training program and various manuals and other resources provided on the EHSO website. The table in Appendix 5 provides more detailed information. Also, EHSO runs a campus-wide chemical redistribution program and facilitates department redistribution. In 2006, a mercury thermometer elimination program was conducted and approximately 2000 thermometers were collected. Disincentives are in place to discourage future use. EHSO is currently examining various solvent recycling programs.

Specifically, the recommendation of this task force is that a hazardous waste minimization program should be a part of the overall sustainability policies and practices. Additionally, UIC needs to:

- Increase training in UIC Medical Center in order to reduce biohazardous waste. Emphasize existing waste minimization training for all lab personnel.
- Implement xylene and/or acetone recycling as demonstration project.
- Provide feedback and examine incentives to hazardous waste generators as to quantity and costs of waste disposal.
- Implement a campus-wide chemical inventory program.

d. Grounds and Landscaping

Institutions can reduce usage of potable water for landscape irrigation by using high-efficiency irrigation technology, captured rain/recycled site water, or landscaping and other techniques. They may use only recycled water for irrigation and reduce the amount of run-off through smart (sustainable) landscaping practices including planting native plants, cisterns, and low-impact development (e.g. permeable pavement).

Other ways that institutions can reduce the usage of potable water include:

- Conservation and minimization through narrower residential streets, reductions in impervious sidewalk area, additions of porous pavement or replacement of existing pavement with pervious structures, and creation of concave medians and landscaped traffic-calming features.
- Conveyance through grassed channels and bioretention channels, and disconnection of impervious areas to redirect runoff to vegetated areas.
- Storage to reduce peak discharge via pedestrian sidewalks, rainwater capture and use (rain barrels), green roofs, and yard, curb, or subsurface storage.
- Infiltration through trenches and basins, and exfiltration devices.

- Landscaping measures such as bioretention cells, rain gardens, slope reduction, planter boxes, native ground cover, and green alleys.
- No watering mid-day.

Currently, UIC generally tries to plant hardy materials and recently planted some native grasses. The Student Recreational Facility has native species landscaping so no irrigation system was installed. A green space across the street from the hospital this past fall is utilizing native plantings that do not need irrigation. The planned Advanced Chemical Technology Building will have storm water management on-site that will prevent storm water run-off and will be surrounded by native plantings. Also, OCP has plans to update the campus master plan with sustainable design considerations.^{xxx}

Common sustainable practices for outdoor weed/pest control include:

- Establish and implement Integrated Pest Management Policy to control pests.
- Develop grounds design standards that include provisions for discouraging pests (foster habitat for natural predators of pests).
- If mosquitoes are a problem, work with staff to identify mosquito breeding sites.

UIC used biosolids on some athletic fields for the first time last year. However, the baseball field is now being renovated with synthetic turf. The fertilizer and herbicide programs are outsourced to companies like Chemlawn. However, due to budget limitations there has been very little spraying. Several UIC employees were recently certified as pesticide applicators, and they will probably start applying synthetic herbicides and pesticides on campus.

Other sustainable landscaping practices relate to the use of fossil fuels in the equipment. One practice is to switch from diesel to less-polluting fuel for vehicles and machinery with diesel engines and also to encourage reduction in idling for all vehicles and equipment when not in active use. UIC has a no-idling policy.

Specific task force recommendations on landscaping and water are:

- Implement Integrated Pest Management (IPM) program in place of chemical fertilizer and herbicide programs.
- Use only recycled water for irrigation; reduce amount of run-off through smart (sustainable) landscaping practices including planting native plants, cisterns, and low-impact development (e.g. permeable pavement).
- Establish collection and on-site conversion program for collecting used vegetable oil from campus food services for conversion to biodiesel for campus diesel vehicles and machinery.

3. Pedagogy

At the academic level, sustainability concepts are being studied through coursework and research. While it is not a formal science discipline, the American Association for the Advancement of Science will make sustainability science and technology the central theme of its annual meeting in 2007. In 2006, the National Academy of Sciences recognized the field as a separate discipline, worthy of its own section in the well-regarded journal *Proceedings of the National Academy of Sciences*. Centers and institutes that deal with sustainability are opening up at Arizona State University, Harvard University, Stanford University, the University of Wisconsin, and elsewhere.^{xxxii} Harvard University even offers a credit course titled “Sustainability: The Challenge of Changing our Institutions” that can be taken at Harvard or on-line. The course’s goal is to teach students how to enact environmental sustainability programs on their campuses or in other institutions.^{xxxii}

Illinois State University's Board of Trustees has approved a new bachelor's degree in renewable energy, which will include a technical sequence and an economics and public policy sequence. The degree is a multidisciplinary undergraduate major that provides a broad overview of renewable energy industries. The program will add one new faculty position and 40 majors are anticipated to enroll by the fourth year of the program. Support for the program will initially come from a U.S. Department of Energy grant, and department resources will be used for long-term program support.

Currently, courses on topics related to sustainability are offered through several departments on campus including Biological Sciences, Civil and Materials Engineering, Earth and Environmental Sciences, Economics, Business Administration, and Urban Planning and Policy. However, it is time to examine the course offerings more carefully and organize them for a more coordinated and effective pedagogy across the curriculum. It is important to get students and staff involved with faculty in thinking about how sustainability is taught as soon as possible. One possibility would be to hold a town hall style meeting to raise awareness, solicit input, and kick off the campus program.

Much learning occurs outside of the classroom, so it is important to provide a climate where students can actively participate in learning and teaching about environmental issues through extracurricular activities. In this regard it is important to create incentives for students to devote time and personal energy to sustainability by finding ways to provide modest support for student organizations that wish to be involved on the campus and in the Chicago area. A study at Texas A & M University found that graduate-level education in sustainable development can increase students' sustainable behavior as measured by their own ecological footprints.^{xxxiii}

These are the specific recommendations of the subcommittee on pedagogy and curriculum:

- There is a need for a coordinating administrative function for promoting sustainability scholarship at UIC.
- Create "The Sustainable City" as part of UIC Identity; no urban university is better positioned than UIC to bring sustainability to cities where most of the human populations now lives.
- Make the obvious connection between sustainability and "Healthy Cities."
- Make instructional operations truly paperless.
- When new courses are proposed, or existing courses evaluated, ask for impact on sustainability. The number of relevant courses already offered by UIC in CUPAA, COE, LAS, A&A, AHS and other colleges is easily in excess of 50.
- Establish a series of summer institutes for the purpose of assisting faculty in incorporating sustainability principles into their courses.
- Consider project-based courses and other partnership initiatives with local businesses and community organizations.
- Create a cross-college committee to examine new certificate and degree programs in sustainability; e.g. interdisciplinary minor(s) in sustainability. Investigate the feasibility of establishing a School of Sustainable Development.
- Build partnerships with the City of Chicago, the Field Museum, the Morton Arboretum etc., so that the impact of our efforts will be regional. Many consider fresh water the emerging key natural resource locally and globally; Mayor Richard M. Daley put his signature on "Chicago's Water Agenda 2003," a landmark strategy to ensure that the city maintains a safe, clean, and plentiful supply of drinkable water.
- Make a "green map" of the UIC campus (don't forget the importance of water!).
- Add environmental impact signage to buildings (public relations and teaching value).

- When evaluating Deans and Vice Chancellors, include contributions to sustainability on campus and off.

The opinion of the subcommittee on pedagogy and curriculum is best summed up by the thought: Let's not miss any "teachable moments" here at UIC.

4. Outreach

Outreach efforts pertaining to sustainability at UIC should utilize a combination of internal marketing strategies, external public relations efforts, and empowerment of the varied constituencies on and off campus, in an approach designed first to involve the entire campus community in UIC's efforts toward climate neutrality, and eventually to create a widespread participation in accomplishing the transformation of UIC into a "green campus."

a. Web Site

A major focus of the outreach effort of the sustainability program should be to communicate the existence of the sustainability effort and its constitution to the campus and community at large. An excellent way to communicate with both the campus and the public would be through a website dedicated to the sustainability effort. Ideally this website would be accessible directly from the UIC homepage, through the QuickLinks function. The fewer "clicks" it takes to find and open the sustainability website, the more traffic it will experience, and the more people will explore it. The website should be no more than two "clicks" away from the University homepage, perhaps with links being placed under the "'Living", "Research" and "Working" subsections.

The purpose of the website would be: to provide information about UIC's sustainability efforts; provide resources to students, faculty, staff, and the community interested in minimizing the environmental impact of their homes and workplaces; to increase awareness of environmental issues and programs available to the campus; and to track the University's progress as it moves towards sustainability, a smaller carbon footprint, and less environmental impact. The website will achieve this purpose through providing information about what goals the University has set, how those goals are being achieved, and the progress the University has made towards becoming a sustainable, green campus. In the interim, IESP has agreed to host a temporary website focusing on research efforts and projects at UIC.

b. Marketing

Internal marketing through varied means including a UIC sustainability website, e-newsletters, listserv mailings, posters, and signage at recycling centers, is key to involving students, faculty, administrators, and alumni in UIC's efforts in sustainable practices. An emphasis is given in the list above to electronic advertising to reduce paper waste, but any opportunity to draw additional participants into the effort should be considered, both in and out of the classroom.

Currently, there is a listserv, greenuic@uic.edu, which was active in the late 1990s to 2003. This listserv should be revived and administered by the campus sustainability office. This listserv may provide updates about green efforts, sustainability initiatives and events on- and off-campus. This may also be a forum for the campus community to make suggestions and improvements for sustainability at UIC.

c. Empowerment of UIC Communities

Faculty: Faculty should be strongly encouraged to utilize the Blackboard site for distribution of classroom materials, and should be provided with tip sheets to reinforce other good practices such as turning out the lights when classrooms are unattended. Faculty participation in student-led sustainability efforts, including participation in teach-in activities and other actions, should be expected as evidence of service for promotion and tenure consideration.

Administrators: Offices should be encouraged to send their newsletters via email and in such newsletters to share tips or report on their office's progress toward meeting sustainability goals. One possible means to setting these goals is to include sustainability criterion in the job descriptions of deans, department heads, vice provosts and vice chancellors, resulting in a reporting requirement, encouraging the setting of goals and establishing accountability. Certain events each year should be promoted to this segment as work-excused to encourage participation in sustainability activities. A Town Hall style meeting should kick off the campus program to raise awareness and solicit input.

Alumni: Alumni should be invited to attend, co-organize, and speak at events; they should be asked to lead or encourage research in fields impacting the environment or sustainable practices, and to sponsor events or donate funds to support these activities.

Students: With their unique wealth of energy, passion, and time to organize as well as their vast network of communications opportunities, students are ideal candidates to spearhead the sustainability efforts at UIC. The key to empowering students to engage in positive sustainable activities and lifestyle is to make it clear that these actions are supported and expected by their professors and upper level administration. This message can be conveyed through UIC's first contact with prospective students (brochures printed on labeled 100% post-consumer waste recycled paper) and with its incoming freshman class through the launch of a sustainable/green "UIC Campaign" introducing the campus sustainability movement to new students during orientation, with activities such as a cardboard box-a-thon (in which the dorm, or floor, recycling the most cardboard during the move-in wins a pizza party), cross-campus hike/tour (to promote walking paths as alternatives to driving or taking the shuttle), and campus clean-up (picking up litter while identifying any need for additional recycling stations), including the distribution of "Sustainable UIC" or "UIC Students for a Green Campus" T-shirts, which will serve as advertising when worn throughout the year.

Initiatives experienced early in the year lead to practices throughout the year including some or all of the following: competitions between residence halls (which are independently metered by Facilities Management for energy use tracking) to reduce electricity usage; Campus Sustainability Day events (October 24); Earth Month events in April (symposia, concerts, outings); opportunities for student organizations to volunteer to tend to small "rain garden" plots around campus, areas of native plantings to designed to improve the watershed (similar to the adopt-a-street program) offering widely varied student groups an advertising opportunity while partnering for sustainability; and recycle awareness days, when a sponsoring student group may target a particular building or buildings to sort recyclables mistakenly discarded in the trash, then publicize the results within the building and on their website to increase awareness.

The organization of these activities and many others are not expected to be borne by one or two existing student organizations with a focus on environmental issues. Rather, with encouragement and participation in campus-wide events, additional groups may be expected to emerge. With support, students are willing to organize and host events close to their hearts or studies, from faith-centered student groups hosting a speaker to discuss positive actions to take as stewards of the earth, to students passionate about business and entrepreneurship sponsoring events that encourage local or small business partnerships, e.g. hosting a farmers market on campus.

Students should be encouraged to take a lead role by placing initiatives on ballots of the Undergraduate Student Government. For example, students may vote to enact a student fee to support sustainability efforts, or they may vote to recommend that the Chancellor sign the Talloires Declaration to join with

campuses world-wide in support of environmental responsibility. In this way, students are empowered from above to take on leadership roles.

Partnership with campus housing for residential activities is important to the involvement of students. Sustainable living guides need to be developed and distributed to campus residents. Incentives should be created to support student involvement.

d. Language and Public Relations

Specific language choices are crucial in outreach efforts, as language choices can affect the strength of the mandate, and the overall inclusiveness of the project. Decisions should be made by those in the campus sustainability office regarding the message to be conveyed, whether (for instance) UIC has “set a goal of climate neutrality” (finite) or “strives to enact a vision of climate neutrality” (ongoing). Similarly in seeking to reach out to all of UIC’s communities, consideration should be given to factors such as the different audience that may be reached at an event that is advertised. Outreach efforts that engage the widest possible community at UIC are required to make significant progress toward true sustainability.

The sustainability office should sponsor (or co-sponsor with partnering academic departments) conferences on the environment to be held at UIC, and should actively promote sustainable features of the UIC campus, including its walking paths, bike friendly policies, and recycling opportunities. UIC needs at least two demonstration projects (e.g. Lincoln Hall).

In addition to serving as a hub for varied campus groups and academic departments, the campus sustainability office should also be charged with building on UIC’s increasingly positive recognition in the press by producing materials for press releases when sustainability goals or milestones are reached. An announcement and event should be coordinated by the sustainability office to commemorate the ceremonial signing of the President’s Climate Commitment, to celebrate with the City of Chicago when UIC completes construction of its first LEED® certified “Gold” building, and to broadcast widely when UIC declares climate neutrality. UIC should publish its sustainability successes through the AASHE listserv, as well.

In summary, the recommendations of the outreach subcommittee include:

- Create a campus-wide web site dedicated to sustainability; highly visible to students, faculty and staff, located directly from UIC web site through the QuickLinks function and links from the “Living,” “Research,” and “Working” subsections.
- Launch a marketing campaign to faculty, administrators, students, staff and alumni aimed at sustainable efforts and practices for on-campus and at home.
- Publicize the sustainability initiative and campus accomplishments not only on campus but to the community; use these opportunities for recruitment for faculty, staff and students; highlight for development purposes.
- Revive the greenuic@uic.edu listserv.

IV. CONCLUSIONS

Although UIC has not had an official sustainability framework, it has been supporting sustainable campus initiatives for many years as evidenced by the promising recycling program, the widespread use of mass transit, UIC’s commitment to strive for LEED® certification on construction projects, and its many academic environmental programs. However, in order to enable and emphasize sustainability practices throughout the campus, UIC needs to establish the institutional infrastructure. This can only be accomplished by making sustainability a well-recognized priority from the highest administrative levels of UIC and supporting that commitment by setting and achieving ambitious goals and milestones, as outlined by the ACUPCC, the Talloires Declaration and other pledges to sustainability efforts.

The members of the Task Force on Campus Sustainability believe that the students, faculty, and staff of UIC are extremely supportive of this effort. Sustainability is not only an academic issue but a human issue. Given its history and resources, UIC is well-positioned to rise to the level of the best campuses in the country in formalizing and communicating its sustainable policies and programs.

V. APPENDICES

APPENDIX 1 – MEETING DATES AND SUBCOMMITTEES

APPENDIX 2 – TALLORIES DECLARATION

APPENDIX 3 – AMERICAN COLLEGE AND UNIVERSITY PRESIDENT’S CLIMATE COMMITMENT

APPENDIX 4 – CHICAGO CLIMATE EXCHANGE (CCX)

APPENDIX 5 – MATERIALS FLOW SUBCOMMITTEE DOCUMENTS

APPENDIX 6 – UIC’S GREENHOUSE GAS PROFILE (FY2005-2006)

ⁱ What is sustainability? US EPA, < <http://www.epa.gov/sustainability/basicinfo.htm#what> > Accessed 12/13/07.

ⁱⁱ Association of University Leaders for a Sustainable Future. <http://www.ulsf.org/programs_talloires.html> Accessed 2/3/2007.

ⁱⁱⁱ US EPA College and University Sector. <<http://www.epa.gov/ispd/colleges/>> Accessed 2/5/07.

^{iv} Creighton, S.H. Greening the Ivory Tower. The MIT Press, Cambridge, MA, 1998.

^v “A Practical Guide to Hiring a Sustainability Professional for Universities and Colleges”. White Paper, January 26, 2006. <http://www.c2e2.org/sustainability_guide.pdf> Accessed 2/3/2007.

^{vi} UIC Sustainable Campus Green Planning Standards. Draft dated May 3, 2005. Prepared by UPP594: Creating a Sustainable UIC Campus.

^{vii} <http://www.uic.edu/depts/ovcr/iesp/about/about.htm> Accessed 2/10/07.

^{viii} http://www.brown.edu/Departments/Brown_Is_Green/energy/ Accessed 2/3/07.

^{ix} http://www.brown.edu/Departments/Brown_Is_Green/energy/renewables.html Accessed 2/3/07.

^x https://www.academicimpressions.com/on_demand/0107-energy-conservation.php

^{xi} Petersen, J.E., V. Shunturov, K. Janda, G. Platt, and K. Weinberger, “Dormitory residents reduce electricity consumption when exposed to real-time visual feedback and incentives”, International Journal of Sustainability in Higher Education, Vol. 8 No. 1, 2007, pp. 16-33.

^{xii} Carolina Larsson, Energy Study at UIC, Master’s thesis for Linköping University, Sweden. March 2003.

^{xiii} <http://www.news.wisc.edu/11940.html> Accessed 2/3/07.

^{xiv} Illinois Green Fleets Program. <<http://www.illinoisgreenfleets.org/index.html>> Accessed 2/4/07.

^{xv} Carlson, Scott, In Search of the Sustainable Campus. The Chronicle of Higher Education, October 20, 2006; Pg. 10.

^{xvi} <http://www.uic.edu/depts/avcad/parking/transbenefit.html> Accessed 2/8/07.

^{xvii} Western Illinois University Official University Policy Manual, <http://www.wiu.edu/policies/greenpurchases.php> Accessed 10/2/07.

^{xviii} John Cepek, UIC Publications Services.

^{xix} Gerard Catrambone, Associate Director, Publications Services.

^{xx} Lipka, Sara, Truth in Advertising: Furman University’s Local Produce, The Chronicle of Higher Education, October 20, 2006, p. 12.

^{xxi} Creighton, S.H. Greening the Ivory Tower. The MIT Press, Cambridge, MA, 1998.

^{xxii} Chang, Audrey B. “The Development of Stanford University’s Guidelines for Sustainable Buildings: A Student Perspective”, Sustainability on Campus, Ed. P.F. Barlett and G.W. Chase, The MIT Press, Cambridge, MA, 2004.

^{xxiii} Biemiller, Lawrence, At Swarthmore, a Green Building as a Billboard for Science, The Chronicle of Higher Education, April 28, 2006 Friday, CAMPUS ARCHITECTURE; Pg. 1.

^{xxiv} http://www.aashe.org/archives/2006/06_10_12.php Accessed 2/6/07

^{xxv} <http://www.aashe.org/resources/profiles/mcgill2006.php> Accessed 2/5/07

^{xxvi} <http://www.aashe.org/resources/profiles/lawrencetech2006.php> Accessed 2/5/07

^{xxvii} <http://fmweb.fm.uic.edu/UICycle/default.aspx> Accessed 2/10/07.

^{xxviii} Betsy Vandercook, Assistant Director, UICycle, Physical Plant Administration 2/10/07.

^{xxix} Paul Walters, Assistant Director, Property Accounting

^{xxx} Boyd Black, Director, Project Management Services, Capital Programs, 2/7/07.

^{xxxi} Monastersky, Richard, A New Science Breaks Down Boundaries, The Chronicle of Higher Education, October 20, 2006; Pg. 20,.

^{xxxii} <http://course.hgci2.net/> Accessed 2/8/2007.

^{xxxiii} Ryu, H. and S.D. Brody, “Examining the impacts of a graduate course on sustainable development using ecological footprint analysis”, International Journal of Sustainability in Higher Education, Vol. 7 no. 2, 2006.