INSTITUTE FOR SUSTAINABILITY, ENERGY, AND ENVIRONMENT
UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

Review of Campus Sustainability Programs: Opportunities for Education and Research

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Spring 2017

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Executive Summary

Transforming university campuses into "living laboratories" is a timely, important issue for sustainability research and education in overcoming growing sustainability challenges. Moreover, campuses significantly impact the local community and environment via illustrative campus sustainability enhancement. The University of Illinois at Urbana-Champaign (UIUC) has committed to promoting campus sustainability via the Illinois Climate Action Plan (iCAP). To elevate the leadership of the University in the campus sustainability program, we have reviewed the initiatives and practices in peer institutions, highlighted what our campus may learn from other universities, and are recommending further strategies and measures to improve our efforts.

We examined the campus sustainability programs at six universities (Harvard, University of Washington, Ohio State, Minnesota, California Berkeley, and Cornell). These universities have successfully integrated research and education into their campus sustainability programs and initiatives. Various funds — including external money from public sources, nonprofit foundations, and private companies — have been established to support regular or seed projects specifically targeting research-oriented projects using the campus and surrounding community as a testbed. Existing and ongoing campus sustainability projects in these universities have also been used for curriculum development and educational demonstrations. In addition, some institutions such as Cornell and Minnesota collaborate with local communities for sustainable development.

We further reviewed university/college rankings made by *Sustainability Tracking, Assessment & Rating System (STARS), Princeton Review's Guide to 361 Green Colleges and Sierra Magazine Cool Schools*. Although UIUC is ranked highly in all these evaluations, the University may consider several key areas for improvement: 1) integrating sustainability in curriculum and encouraging more students to take sustainability-related courses; 2) waste and purchasing categories of campus operations; 3) use of energy from renewable sources; and 4) a consistent, publicly available sustainable investment policy.

Based on the review above, we offer the following recommendations to fully exploit opportunities with campus sustainability programs at our campus:

- **Promote using campus sustainability projects as testbed for research and education projects.** iSEE will map the relevance of more than 500 iCAP projects (https://icap.sustainability.illinois.edu/) to a number of national research programs.
- **Seek additional funding for campus sustainability projects** to support internal research and education projects — and **leverage seed money** to attract larger external funds that are relevant to iCAP objectives.
- **Strengthen the engagement of students, faculty, and staff beyond our current practices,** e.g., increasing the visibility of campus sustainability efforts (including a number of existing projects with internal or external funds at our campus), bringing more active involvement of faculty and graduate students in the studies required for realizing some iCAP objectives, enhancing the coordination among all efforts on campus sustainability to form a strong force, etc.
- **Strengthen the collaboration with communities**, including local communities and regional communities for the co-benefits of the campus and the communities.

1. Introduction

In the past two decades, institutions of higher education around the world have increasingly acknowledged the importance of integrating sustainability into campus projects, operations and management (Savanick et al., 2006). Universities play a crucial role in training students to battle sustainability challenges and in preparing them for employment in an increasingly greener economy. Given the huge amounts of "untapped human resources" in universities and the growing commitment of the universities to sustainability efforts, transforming campuses into "living laboratories" for sustainability research and education has become a timely, important issue (Evans et al., 2015). This is in fact crucial for universities to remain competitive and viable (Cortese and Dyer, 2010). Moreover, universities significantly impact the local community and environment via illustrative campus sustainability enhancement (Savanick et al., 2006).

University campuses are expected to be living laboratories that take the lead in overcoming growing and emerging sustainability challenges (Morrison, 2009). By definition, a "living lab is an open innovation environment centered on users to test concepts and ideas on real scenarios with multidisciplinary research teams" (smartcities.ieee.org). Hence, in the context of a university campus, a living lab could be defined as a place where students, faculty, and staff work together to address sustainability issues through education and applied research. One rationale behind "campus as a living lab" is to merge campus facilities management and academics to provide students with such opportunities (Cohen and Lovell, 2014).

Campus sustainability projects and initiatives can provide a unique opportunity to explicitly connect campus operations with academia (Savanick et al., 2006) and to engage university students in real-world sustainability challenges. In fact, forward-thinking institutions are using campus sustainability projects as an academic resource to provide hands-on learning experiences for students (Cohen and Lovell, 2014), for example through campus-based learning, i.e., using the campus as a teaching tool and developing course contents based on campus projects; or through service learning, i.e., an educational method where students participate in an organized community service activity as part of academic learning (Savanick et al., 2006). Furthermore, campus sustainability projects can provide excellent opportunities for research through using campus and the nearby community as the testbed for research-oriented projects. For instance, several universities have already established special funding to prompt research using campus as a testbed, such as the Campus Sustainability Innovation Fund at Harvard University, the Campus

as a Living Lab program at Ohio State University, and the Green Seed Fund at the University of Washington, as will be discussed later in this report.

However, despite the potential benefits to all parties involved, many universities are not fully taking advantage of the opportunity with campus sustainability, mainly because 1) faculty and students are not aware of academic opportunities involved in campus sustainability projects; 2) facility operation and management staffs are not aware the benefits of collaborating with faculty and students (Savanick et al., 2006); and 3) appropriate funding mechanisms and incentives are not in place to properly engage faculty and staff members.

In particular, in many cases, campus sustainability projects do not identify and follow research purposes. Projects are usually designed to make the construction and operation of facilities and services more efficient in terms of water and energy use and reduction of carbon emissions on campus. In fact, when campus projects are not research-oriented, it would be difficult to engage faculty and graduate students in campus sustainability efforts.

UIUC, as one of the world's renowned and leading institutions of higher education, is committed to promoting sustainability in research and education. In particular, the University has committed to practice sustainability by integrating it into campus facility operations and management (iCAP, 2015). The Institute for Sustainability, Energy, and Environment (iSEE), established in 2013, coordinates and elevates efforts across campus in three arenas: research; education and outreach; and campus sustainability. Through the campus sustainability program, iSEE aims to help UIUC become an excellent model of sustainability by meeting the targets set in the iCAP. While the collective effort of the University in moving the campus operations and practices toward sustainability have been outstanding, the campus sustainability program can take a stronger leadership in academia and have a larger impact on education and research especially by learning from peer institutions. In this report, we review the campus sustainability programs and initiatives in some other universities, highlight successful practices, and discuss ideas and strategies to further elevate and improve sustainability efforts on our campus.

2. Review of Campus Sustainability Programs

In this section, we review some of the frontier campus sustainability programs that have developed successful mechanisms and strategies to integrate academic objectives into campus

sustainability initiatives and link academics to campus sustainability projects. Particularly, we pay attention in identifying how research is tied to campus sustainability projects.

2.1 Campus as a living lab

"Campus as a living lab" implies that students, faculty, and staff should be brought together to use campus and the surrounding community as a "testbed" to "pilot promising new solutions to real-world challenges threatening the health of people and the planet" (https://green.harvard.edu/series/living-lab). In the following, we review some of the campus sustainability programs and projects that particularly focus on and encourage research.

2.1.1 Harvard University

The Harvard Office for Sustainability coordinates all efforts on sustainability at the campus. The "Living Lab" — with the slogan "Our campus is part of the solution" — is one of the main commitments of the office. Within the "living lab" framework, Harvard is being used as a "testbed to generate solutions that enhance the health of people and planet." The living lab initiatives are focused in three main arenas:

- Campus Sustainability Innovation Fund
  - Projects should tackle real-world challenges faced directly on campus or in the community
  - The Fund is available to undergraduate and graduate students, as well as postdoctoral fellows at Harvard, and it can provide support for both research assistantships and original projects
  - Applicants must identify a faculty advisor *and* a staff partner
  - Proposals up to $10,000 will be considered
  - Mentoring and consultation from the Office for Sustainability is available to all potential applicants
- Climate Solutions Living Lab Course and Research Project
  - A three-year, highly interactive and multi-disciplinary course and research project focusing on studying and designing practical solutions for reducing greenhouse gas emissions at Harvard

- Student Grants
    - Founded by the Office for Sustainability, this program supports students who have new ideas and innovative projects that address global sustainability challenges with on-campus applications
    - Both undergraduate and graduate students can apply (individually or as a team)
    - The program funds at least one proposal ever year under its "Academic and Research" category

2.1.2 Ohio State University

The Campus as a Living Laboratory (CALL) program (also Campus as a Testbed) is one of the sustainability efforts at Ohio State. Coordinated by the Office of Energy and Environment and the Facilities Operations and Development, the CALL program brings together faculty and staff in the university to work collaboratively with students on developing and implementing projects that use the campus as a living laboratory, as well as addressing real-world sustainability challenges. It is an integration of applied teaching and research to university operations, which thus serve a dual purpose of fostering education and research, while reducing the university's ecological footprint. Moreover, it aims to provide students, faculty, and staff with a chance to make a difference on campus through research efforts that are university-focused in scope. Members of the campus community are invited to submit ideas, and a faculty or a staff member must be a sponsor of the project. A list of recent submissions for the Campus as a Living Lab can be found here. For a complete list of submissions (total of 59 as of March 2017), visit here.

2.1.3 Cornell University

The collective efforts of the organizations and entities responsible for campus sustainability initiatives at Cornell[1], including Cornell Sustainable Campus, seek to have global impact by using the campus and community areas as a "living laboratories". In particular, they aim to "create a living laboratory for low-impact behaviors, climate education, and research" through *Innovation* an essential guiding principles of the Cornell Climate Action Program. Some of the existing projects and ongoing efforts include:

[1] Student Organizations, Student Assembly Environmental Committee, Graduate and Professional Student Assembly, University Sustainability Committee, President's Sustainable Campus Committee Focus Teams, and Campus Sustainability Office, which is part of the Energy & Sustainability Department

- Renewable Energy Research Park: This proposed living lab for renewable energy research, education and demonstration aims to provide a platform for faculty and students conducting research in renewable energy.
- Cayuga Lake Modeling Project: An example of an emerging approach to water resources management known as ecosystem-based management (EBM), this project has the potential to be an exemplary case study, and to set a standard of excellence in watershed management.
- Stormwater management wetland demonstration project: This project is an example of living lab for water quality purposes. Some of the benefits of the project from research and education viewpoints include enhancement, study, and maintenance of the natural wetland environment, and the use of the site as an educational resource by the Department of Natural Resources. In particular, a facility called Fuller Wetlands serves as a living research lab for the creation and preservation of wetland habitats.
- Green Infrastructure: Existing green infrastructure projects across campus can be expanded to serve as a research and teaching tool, as a showcase for sustainable landscape practices, and as an effective means of adapting to the weather-related impacts of climate change. These projects can be used for research as a source of data and potential innovative solutions. They can also serve as interpretive sites, to enhance student and community understanding of green infrastructure and its value to the campus.

2.1.4 University of Minnesota

Through the Office of Sustainability, Minnesota is committed to incorporate sustainability into its teaching, research and outreach. In particular, the "university should promote innovative, high visibility research projects focused on sustainability and energy efficiency to inform campus operations as a whole as well as the broader community and promote collaborative projects that include faculty research undertaken in partnerships with operations staff, students, public entities, community organizations, and industry."

"Living Lab" is one of the main areas within the "It all adds up" program that have transformed otherwise unprogrammed areas into spaces for innovation, testing, demonstration, and learning. The Twin Cities Sustainability Committee invites proposals twice a year from the

university community to create living laboratories. The website provides a platform to submit ideas, apply for funds, check previous proposals, and prepare applications.

The Sarita Wetland restoration project, which began in 2000 as part of the Sustainable Campus Initiative, aimed to improve water quality and wildlife habitat, and develop education and research opportunities. In 2006, the wetland was used by 868 students in 17 courses. Moreover, the area has been used as case study for Ph.D. dissertations, M.S. theses and independent studies (Savanick et al., 2006).

2.1.5 University of Washington

Washington campuses serve as living laboratories for projects that address sustainability-related challenges, through which students, faculty and staff work together on research project, pilot, or campuswide initiatives. While both the Campus Sustainability Fund and the Green Seed Fund provide grant opportunities for living lab projects, the latter particularly emphasizes research opportunities that advance sustainable research while contributing to campus sustainability goals. To be eligible for Green Seed Fund, research teams are required to include at least one student, faculty, *and* staff member. In 2016, $190,000 in total was awarded to three projects addressing stormwater management, irrigation systems sustainability, and rainwater irrigation. For a list of funded projects since 2014, refer to the Green Seed Fund fact sheet.

2.1.6 Summary

The five universities that are reviewed in this section have successfully integrated research and education into their campus sustainability programs and initiatives. In particular, establishing and allocating funds specifically targeting research-oriented projects — using campus and the surrounding community as a testbed — has attracted active faculty involvement in campus sustainability programs. Examples include the Green Seed Fund at Washington, "Mini Grants" from the Institute on the Environment at Minnesota to support Living Lab proposals, research funding in energy, environment, and sustainability from the Office of Energy and Environment at Ohio State, the Campus Sustainability Innovation Fund a Harvard, etc. Existing and future campus sustainability projects can be taken as valuable resources for research purposes (e.g., Sarita Wetland restoration project at Minnesota; Cayuga Lake Modeling Project and Renewable Energy Research Park at Cornell). Existing and ongoing campus sustainability projects have also been used for curriculum development and educational demonstrations (e.g., Climate Solution

Living Lab Course at Harvard, Sarita Wetland project at Minnesota, stormwater management demonstration project at Cornell).

2.2 Grants and Financial Support

Fund support for campus sustainability initiatives is crucial, especially if the initiatives are expected to pursue research purposes. The funding sources and mechanisms to support campus sustainability projects are typically provided through the following channels (Campus InPower, 2009; Morrison, 2009):

- Student Fees
  - Referred to as Campus Sustainability Green Funds
  - The major source of funding for campus sustainability programs at most campuses
  - More details here in the AASHE Campus Sustainability Green Funds database
- Revolving Loan Funds
  - Distributed to projects that improve campus energy efficiency and reduce use of resources, thereby leading to monetary savings, this fund grows over time as monetary savings from projects are returned to the initial funds
  - Very popular in academia, they are referred to as Green Revolving Funds
  - More details here in the AASHE Revolving Loan Funds database
- Administrative Funds
- Alumni Funds
- Endowments and Internal Campus Banks
- Energy Service Companies (ESCOs) and university partnerships
  - Companies and businesses that design, develop and implement energy-saving projects for their clients
- External Grants
  - These might leverage additional university funding since they bring in new funding to the university budget

Table 1, next three pages, shows the major funding mechanisms in some of the universities reviewed for the purpose of this report.

Table 1. Major funding mechanisms for campus sustainability initiatives in some universities

	Funding Source	Details	Use
Colorado College	EcoFund	Established by the Campus Sustainability Council and maintained through the Office of Sustainability Up to $1,000 per project	Colorado College students can apply for this fund
Cornell University	Green Revolving Fund (Link 1, Link 2)	Established in 2013 to provide small-scale financing for energy efficiency, renewable energy, and other sustainability projects that generate cost savings for the University The fund has an academic component in the form of a class offered each Fall and Spring to help students gain hands-on experience identifying, developing, proposing, evaluating, implementing, and managing energy efficiency investment projects around campus	"We fund projects that make environmental and economic impact at Cornell University" Proposals with the goal of energy savings on campus can be submitted via GRF website
Harvard University	Harvard Green Loan Fund (Link)	Fund that provides capital for high-performance campus design, operations, maintenance, and occupant behavior projects	GRF projects are classified as either greenhouse gas emissions or utility reduction and/or innovation Applicant departments agree to repay the fund via savings achieved by the project
	Campus Sustainability Innovation Fund	Supports projects that use Harvard's campus or the neighboring community as a testbed for envisioning and piloting innovative solutions to sustainability challenges, including, but not limited to, climate and health, and is available to undergrads, grads, and postdocs	Fund is available to undergraduate and graduate students, as well as post-doctoral fellows Fund will provide support for both research assistantships and original projects that are working directly under the guidance of a Harvard faculty member or researcher Up to $10,000 per project
	Student Sustainability Grants	Founded by the Office for Sustainability in 2010 to provide students with seed funding to support new ideas and innovative projects that address global sustainability challenges with on-campus applications $500-$5,000 per project	Harvard graduate and undergraduate students (individual or team) are eligible Faculty or staff adviser should be identified

Table 1 (Continued). Major funding mechanisms for campus sustainability initiatives in some universities

	Funding Source	Details	Use
Ohio State University	OEE Research Funding in Energy, Environment and Sustainability (Link)	Fund supports student research in energy, environment or sustainability with priority given to proposals that directly impact university operations, campus, or surrounding areas $500-$15,000 per project	The award is open to all degree-seeking full-time students from any Ohio State University college, department, unit Must include a faculty advisor or mentor
	Ohio State Sustainability Fund (Link)	Managed by Office of Energy and Environment (OEE) with review and advice from the President and Provost's Council on Sustainability Projects are restricted to Ohio State campuses Should be used to see, catalyze or gap-fill funding on projects	Projects must be led by a staff or a faculty member
University of California Berkeley	Campus Green Initiative Fund (TGIF)	Supported by student fees Provides funding, via grants, for projects that improve and support UC Berkeley's campus sustainability efforts. Overall 250,000-300,000 per year	All students, staff, or faculty at UC Berkeley are eligible to apply
	CACS[2] Sustainability Innovation Grants	Enables members of the UC Berkeley campus community to undertake projects that will create a greener, more environmentally sustainable campus. Maximum of $3,000 per project	Proposals should be submitted by a UC Berkeley student, staff or faculty Preference is given to projects with strong student involvement; 20% of funds will be set aside for projects with direct student involvement
UIUC	Student Sustainability Committee Fund	The fund comes from student fees (Sustainable Campus Environment Fee; Cleaner Energy Technologies Fee). Managed by Student Sustainability Committee (SSC) Funding only can go to University-affiliated projects. Strong preference will be given to proposals receiving matching funding from departments and/or plans for maintaining continuity of the position after the end of the initial grant.	Students, faculty and staff can submit request for funding, and there is also student-led option (which require a faculty or staff sponsor)

[2] Chancellor's Advisory Committee on Sustainability

Table 1 (Continued). Major funding mechanisms for campus sustainability initiatives in some universities

	Funding Source	Details	Use
University of Kentucky	Student Sustainability Council Fund	Environmental Stewardship Fee managed by Student Sustainability Council To responsibly advance the theory, practice and reality of Sustainability at the University of Kentucky. Overall, more than $160,000 for this year	Any member of the University of Kentucky community can submit a proposal for funding support
	Sustainability Challenge Grant	Support provided by Executive Vice President for Finance and Administration, the Provost, the Vice President for Research and the Student Sustainability Council. In the first three years of the program 20 projects have been awarded a total of $500,000 to pursue transformational, sustainability-driven projects on our campus and beyond	Multidisciplinary teams from the University community in the creation and implementation of ideas that will promote sustainability by simultaneously advancing economic vitality, ecological integrity and social equity
University of Washington	Campus Sustainability Fund	The allocation of the Fund is administered by the CSF Committee The CSF usually has between $250,000 and $310,000 available for student-led sustainability projects every year (Varying from $250 to $90,000)	Student-led projects CSF is not able to fund research projects All projects must contain an actionable component
	Green Seed Fund Grants	Seeks to engage faculty, students, and staff in opportunities that advance sustainable research while contributing to campus sustainability goals Approximately $250,000 available for 2015-2016. The average award: $25,000-75,000 Very nice fact checking about Green Seed Fund Grants is available here. Nice comparison between the grants provided by UW for sustainability is here.	Research teams are required to include at minimum one student, one faculty and one staff Successful proposals will use the campus as a living, learning laboratory and help the UW find solutions to the most pressing environmental issues.

External funding becomes another financing mechanism to support campus sustainability projects at many campuses. External grants are mainly available from public sources, nonprofit foundations, and private companies. Such grants are growing because on one hand institutions are increasingly funding sustainability grants and on the other hand it is possible to leverage additional internal funding once the grant is awarded (Campus InPower, 2009). Table 2 shows some examples of external grants supporting campus sustainability programs and initiatives in some universities and colleges, which have developed funding mechanisms to support both regular and seed projects with research purposes specifically.

Table 2. Some examples of external funding support for campus sustainability projects

	Funding Sources
Colorado College	• National Wildlife Fund grant for composting in 2003 • UN Foundation for Conservation Tools in 2009
Cornell University	• New York State Green Innovation Grant Program • New York State Energy Research and Development Authority
Frostburg State University	• Federal funding provided by Congressman Roscoe Bartlett to build a Sustainable Energy Research Facility on campus
Harvard University	• Harvard Business School was granted $129,960 from Massachusetts Technology Collaborative to install a 192-panel photovoltaic array. • Campus Sustainability Innovation Fund is made possible due to the support of W.B. Mason Corporation
State University of New York	• New York governor granted $10.2 million to Environmental Science and Forestry School to develop commercial cellulosic ethanol facility
University of Rhode Island	• The Graduate School of Oceanography was given $100,000 in grant money from the Rhode Island Office of Energy Resources
University of Maine	• Efficiency Maine granted the University of Maine $50,000 in seed money to begin a massive efficiency program at the university
University of Richmond	• Awarded $100,000 from Dominion Foundation to design and install on-line energy monitoring hardware and software for the 14 dorms on campus
University of Illinois	• University of Illinois was the first recipient of an American Recovery and Reinvestment Act (ARRA) Large Customer grant (receiving over $848,000) to spend on campus-wide energy conservation projects. The project will save the University more than $1 million each year in energy costs (Link). • Carbon Credits (e.g., Chevrolet Bonneville Foundation carbon credits) • Donor Contributions, e.g., the Alvin H. Baum Family Fund supported the Center for a Sustainable Environment; the Institute for Sustainability, Energy, and Environment (iSEE) is funding and shepherding a number of seed research projects (http://sustainability.illinois.edu/research/)

3. Ratings, Evaluation, and Comparison

Sustainability ratings and evaluations generally demonstrate the overall commitment of an institution to the environment. Recent surveys have shown that information about institutions' efforts and practices toward sustainability would even influence college applicants' decisions to apply or attend the school (Franek et al., 2016). Moreover, such information can be helpful for current students, administrators, and alumni to compare the efforts and commitments of colleges and universities to sustainability (http://www.sierraclub.org/sierra/coolschools/faq). Although the sustainability ratings and evaluations cover broad sustainability aspects, campus sustainability is one of the major targets.

There are three main organizations that evaluate, rate and rank universities and colleges from sustainability perspectives:

- The Sustainability Tracking, Assessment & Rating System (STARS) conducted by the Association for the Advancement of Sustainability in Higher Education (AASHE)
- Princeton Review's Guide to 361 Green Colleges
- Sierra Magazine Cool Schools

In the following, these three rating systems are briefly explained. Refer to Table A1 to see a complete list of rankings for the schools considered in this study.

3.1 STARS Reporting Tool

STARS is a well-recognized, transparent, and self-reporting framework for universities to measure their sustainability performance. A university's performance is evaluated based on four categories (Academics, Engagement, Operations, Planning & Administration), and the rating is assigned based on the overall points achieved and the breakdown shown in Table 3. As of March, 2017, 811 institutions have registered to use STARS reporting tool; 273 of them have an active rating, and the rating for 136 institutions have expired[3]. Only one institution is rated *Platinum* (Colorado State University with an overall score of 85.29), and 92 are rated *Gold*, including UIUC with an overall score of 68.06 (submitted in March 2015).

In the Campus Sustainable Index report published by STARS, UIUC was ranked highly in several categories: Campus Engagement (100%), Buildings (62.3%, ranked 1st), Water (88.9%, ranked 2nd), and Coordination & Planning (100%).

[3] Note that the rating will expire after three years from submission of the report

Table 3. Minimum required scores for STARS' ratings

STARS Rating	Min. Score Required
Bronze	25
Silver	45
Gold	65
Platinum	85

Table 4 and Figure 1 compare UIUC and Colorado State University (CSU) in the four main categories. Major differences between the two institutions exist with the Academics, Operations, Planning & Administration (refer to **Error! Reference source not found.** for detailed scores). It s important to highlight that in the "campus as a living lab" area, which is a sub-category under Academic, UIUC has scored 3.20 out of 4.00 (compared to CSU's 4.00 out of 4.00), and UIUC did not report any "project/research/effort on our campus which uses campus as a living lab for Air & Climate." With regard to campus operations, while UIUC is ranked first and second in Buildings and Water, respectively, two categories require improvements: Purchasing (electronic purchasing, inclusive and local purchasing, life cycle cost analysis) and Waste (waste minimization, and waste diversion).

Table 4. The scores achieved out of total possible credits in each category for UIUC and CSU

Category	UIUC	CSU
Academics	39.21/58	54.92/58
Engagement	36.58/41	40.55/41
Operations	32.79/70	39.09/70
Planning & Administration	20.18/32	28.83/32

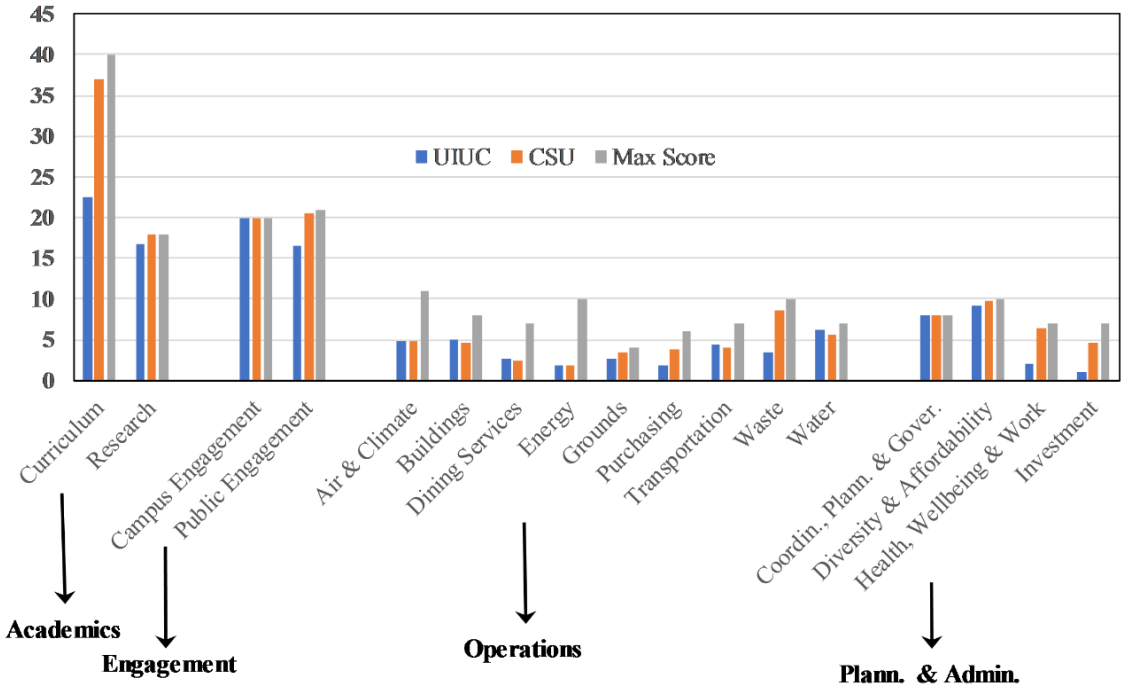


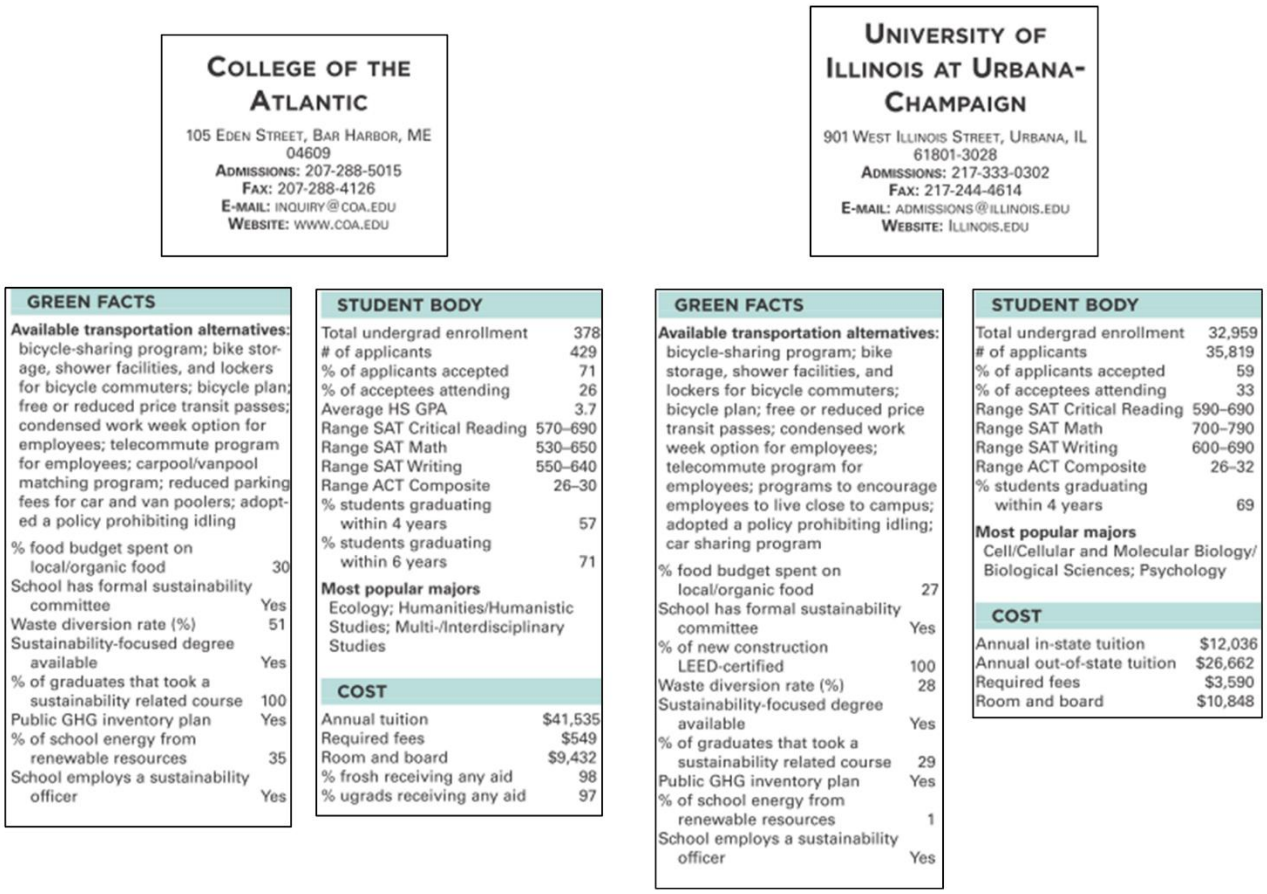
Figure 1. Comparison between UIUC and CSU STARS' scores in different sub-categories

3.2 Princeton Review – Green Guide

Based on a review of more than 2,000 colleges, the Princeton Review has selected, evaluated and profiled 361 colleges with an overall commitment to sustainability, and identified the top 50. The profiles for all those selected institutions are provided in the "The Princeton Review's Guide to 361 Green Colleges" (Franek et al., 2016). The evaluation and the ranking were based on a combination of school-reported data in response to 10 survey questions (refer to page 27 of Franek et al. (2016), or Green Colleges Methodology) as well as student survey responses collected in 2014-15. The surveys covered three key factors:

- Healthy and sustainable quality of life for students on campus
- Students' preparation for employment in an increasingly green economy
- Policies of the college being environmentally responsible

In the 2016 rating of Princeton Review's Top 50 Green Colleges, UIUC is ranked 44th. The top rank is the College of Atlantic. Figure 2 compares the school profiles for the two institutions.



COLLEGE OF THE ATLANTIC

105 EDEN STREET, BAR HARBOR, ME 04609
ADMISSIONS: 207-288-5015
FAX: 207-288-4126
E-MAIL: INQUIRY@COA.EDU
WEBSITE: WWW.COA.EDU

GREEN FACTS

Available transportation alternatives: bicycle-sharing program; bike storage, shower facilities, and lockers for bicycle commuters; bicycle plan; free or reduced price transit passes; condensed work week option for employees; telecommute program for employees; carpool/vanpool matching program; reduced parking fees for car and van poolers; adopted a policy prohibiting idling

% food budget spent on local/organic food	30
School has formal sustainability committee	Yes
Waste diversion rate (%)	51
Sustainability-focused degree available	Yes
% of graduates that took a sustainability related course	100
Public GHG inventory plan	Yes
% of school energy from renewable resources	35
School employs a sustainability officer	Yes

STUDENT BODY

Total undergrad enrollment	378
# of applicants	429
% of applicants accepted	71
% of acceptees attending	26
Average HS GPA	3.7
Range SAT Critical Reading	570–690
Range SAT Math	530–650
Range SAT Writing	550–640
Range ACT Composite	26–30
% students graduating within 4 years	57
% students graduating within 6 years	71

Most popular majors
Ecology; Humanities/Humanistic Studies; Multi-/Interdisciplinary Studies

COST

Annual tuition	$41,535
Required fees	$549
Room and board	$9,432
% frosh receiving any aid	98
% ugrads receiving any aid	97

UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

901 WEST ILLINOIS STREET, URBANA, IL 61801-3028
ADMISSIONS: 217-333-0302
FAX: 217-244-4614
E-MAIL: ADMISSIONS@ILLINOIS.EDU
WEBSITE: ILLINOIS.EDU

GREEN FACTS

Available transportation alternatives: bicycle-sharing program; bike storage, shower facilities, and lockers for bicycle commuters; bicycle plan; free or reduced price transit passes; condensed work week option for employees; telecommute program for employees; programs to encourage employees to live close to campus; adopted a policy prohibiting idling; car sharing program

% food budget spent on local/organic food	27
School has formal sustainability committee	Yes
% of new construction LEED-certified	100
Waste diversion rate (%)	28
Sustainability-focused degree available	Yes
% of graduates that took a sustainability related course	29
Public GHG inventory plan	Yes
% of school energy from renewable resources	1
School employs a sustainability officer	Yes

STUDENT BODY

Total undergrad enrollment	32,959
# of applicants	35,819
% of applicants accepted	59
% of acceptees attending	33
Range SAT Critical Reading	590–690
Range SAT Math	700–790
Range SAT Writing	600–690
Range ACT Composite	26–32
% students graduating within 4 years	69

Most popular majors
Cell/Cellular and Molecular Biology/Biological Sciences; Psychology

COST

Annual in-state tuition	$12,036
Annual out-of-state tuition	$26,662
Required fees	$3,590
Room and board	$10,848

Figure 2. UIUC and COA profiles in the 2016 Princeton Reviews' ranking (Franek et al., 2016)

3.3 Sierra Magazine – Cool Schools

Sierra Magazine's Cool Schools ranking gives colleges and universities a method to track and assess their sustainability programs. The raw data, mainly pulled from STARS, will be processed across 64 questions that reflect the broader priorities of Sierra Club and given a numeric value on a 1,000-point scale. In 2016, 202 qualified institutions participated in the Cool Schools ranking system, in which the College of the Atlantic was ranked 1st (total score 783.41) and UIUC 33rd (total score 648.38) (

Table 5). The major differences between the two institutions are in the *Energy*, *Investments*, *Academics*, and *Purchasing* categories.

Table 5. Comparison between UIUC and COA scores in Sierra Magazine's Cool School ranking system

Rank	School	Total	Co-Curricular	Energy	Investments	Food	Innovation	Academics	Planning	Purchasing	Transport	Waste	Water
		1,000.00	93	264	95	51	40	71	60	39	122	95	70
1	College of the Atlantic	783.41	86	162.2	95	37	40	65.9	60	29.1	88.4	60	60
33	University of Illinois, Urbana-Champaign	648.38	86	135.1	45	29	40	47.9	60	13.7	81.2	55	55

3.4 Comparisons on Campus Sustainability

The rating frameworks reviewed in the previous section evaluate universities and colleges based on their overall commitment to the environment and sustainability, and therefore they evaluate how sustainability is addressed and integrated into campus operations and management, university research, curriculum, students' activity and engagement, etc. In this section, we pay particular attention to campus sustainability initiatives, which encourage the use of campus as a testbed (living lab) to address real-world challenges related to sustainability through research and education. Three qualitative attributes are introduced and used to break down the comparison:

1) **Research**: We examine if the initiatives encourage and conduct research-oriented campus sustainability projects; we also evaluate if the initiatives consider the potential of existing and proposed projects to serve as case studies or testbeds for future research
2) **Teaching**: We examine if the universities promote sustainability in curriculum, and whether campus sustainability projects serve as educational purposes (either in curriculum or for public) — and for the teaching attribute, we also pull out information from the STARS and Cool Schools ratings.
3) **Funding**: We compare different sources of funding — and especially if some funds are specifically available to research projects using campus as a testbed

Using these three attributes, and based on our review, we have qualitatively compared the campus sustainability program at UIUC with the programs in some other schools. The comparison is shown in Table 6.

Table 6. Qualitative comparison of campus sustainability programs from the perspective of using campus projects for research and education

	Research	**Teaching**	**Funding**
Cornell University	• Some of the campus sustainability initiatives are specifically for research purposes • They specify the future research opportunities for some projects, especially proposed projects • No information on website yet regarding research projects proposed and conducted by faculty/students	• 25.29 points in Curriculum[1] • 86 points in Co-curricular[2] • Incentives for developing courses about sustainability [3] • Some current and proposed projects serve as teaching and educational tools for students or public • Projects for education and behavior change	• Green Revolving Fund, Carbon Credits, External sources • Not specific allocation for research projects • External funding
Ohio State University	• CALL program specifically provides opportunity for research projects that focus on campus or community • Using campus sustainability projects for future not specified	• 26.30 points in Curriculum[1] • 90.50 points in Co-curricular[2] • Incentives for developing courses about sustainability • Projects for education and behavior change	• CALL program, Ohio State Sustainability Fund, OEE Research Funding • OEE Research Funding gives priority to research that directly impacts campus and community
Harvard University	• Learning Lab (specified under Academics and Research theme) encourages research aiming to solve real world challenges but using Harvard as testbed • Research projects are supported, fund is available to undergrad, grad and postdocs with one faculty and one staff, mentoring is provided	• 86 points in Co-curricular • Incentives for developing courses about sustainability • A course is designed to specifically address reducing GHG at Harvard • Projects for education and behavior change	• Harvard Green Loan Fund, Campus Sustainability Innovation Fund, Student Sustainability Grants • Campus Sustainability Innovation Fund supports projects focusing on Harvard campus or neighboring community
University of California Berkeley	• Most of the projects are not research oriented and cannot serve as case studies for future research • CACS Grants support research projects but there is no information on the website	• 79.00 points in Co-curricular • Incentives for developing courses about sustainability • Projects for education and behavior change	• Campus Green Innovation Fund, CACS Sustainability Innovation Grants • CACS Sustainability Innovation Grants supports innovative projects or research, either on campus or to the benefit of the broader campus community
University of Illinois at Urbana-Champaign	• A few of the SSC-supported projects have research purposes and can be used for future research purposes • There is no specific call or funding for projects with research purposes	• 25.43 points in Curriculum[1] • 86 points in Co-curricular[2] • Incentives for developing courses about sustainability • CEE 598 used Green St. as case study for green infrastructure • Projects for education and behavior change	• Fund provided through Student Sustainability Committee (SSC), Carbon Credits, external sources • Not specific allocation for research projects
University of Washington	• Since 2014, three fully research projects focusing on campus/community sustainability issues are awarded each year through Green Seed Fund • The projects also serve for future research	• 30.81 points in Curriculum[1] • Incentives for developing courses about sustainability • Projects for education and behavior change	• Campus Sustainability Fund, Green Seed Fund Grants • Green Seed Fund is specifically for research while contributing to campus sustainability

Notes:

[1] The Curriculum category in STARS rating. Scoring is out of 40

[2] Co-curricular category in Sierra Magazine's Cool School's ranking. Scoring is out 93.00

[3.] Based on the assessment in STARS rating or information on website

3.5 Summary

The three rating organizations presented above evaluate the overall commitments of universities and colleges to sustainability. They adopt different methods and take multiple criteria into account in their evaluations, including to what extent sustainability is represented and reflected in university's operation (i.e., campus sustainability), research, teaching, among the others. Following these assessments, although UIUC is ranked high by all methods, there are several key areas that the University may consider for improvement:

1) Integrating sustainability in curriculum and encouraging more students (especially graduate students) to take sustainability-related courses
2) Waste and purchasing categories of campus operations
3) Use of energy from renewable sources
4) Sustainable investment: According to the STARS assessment, UIUC does not have a consistent, publicly available sustainable investment policy (see STARS review for detailed information)

In terms of campus sustainability specifically, Table 6 compares UIUC with the other five universities (Cornell, Ohio State, Harvard, California Berkeley, and Washington) with respect to teaching, research and funding. It should be noted that out of the six universities, four (Harvard, Ohio State, California Berkeley, and Washington) have established specific programs and grants to support research projects that use the campus or the neighborhood community as a testbed. At UIUC, while there is no program or grant designed specifically for research proposals, some projects (i.e. iCAP projects) are indeed research-oriented or can be used for future research and education. All six universities have supported programs, initiatives, and projects to educate campus members regarding sustainability and to change their behavior (for example, energy consumption, water consumption, and waste minimization). Moreover, Cornell features a strong appeal to use campus sustainability projects as teaching and educational tools. At Harvard, an advanced interactive and multidisciplinary course has been designed focusing on studying and designing practical solutions for reducing GHG emissions on the campus and neighborhood communities.

4. Summary and Recommendations

This report provides a brief review of campus sustainability initiatives and programs. While many of the campus sustainability programs aim to integrate sustainability into campus facilities, operations and management, and involve students, faculty, and the community in sustainability efforts, more opportunities can be exploited with campus sustainability initiatives and projects, especially with regard to research and education.

The connection between campus sustainability projects and academics needs to be enhanced. In particular, one of the main challenges in campus sustainability initiatives, especially at "research universities," is how faculty can be actively engaged in the programs, and how campus sustainability projects and faculty-led research projects can be beneficial to each other. This was the main topic of a panel discussion in *Northeast Campus Sustainability Consortium 3rd Annual* Conference *and International Symposium* in 2006. The panelists argued that the sustainability efforts and actions are usually dominated by a small core group, and in order to engage more people, different platforms should be designed and more voices should be heard. Savanick et al. (2006) provides the following recommendation to explicitly link campus sustainability with academic projects:

- Develop institutional accountability to provide incentives for staff and faculty to demonstrate progress toward improved sustainability performance — particularly to maintain the effort when there is a change in high-level administration
- Develop institutional communications to a) open the lines of communication between faculty and staff; and b) inform faculty and students about campus sustainability projects and opportunities
- Build an institutional funding mechanism to encourage and facilitate collaboration among different academic units and to assign projects as part of staff, faculty, and student jobs
- Connect with potential community partners and engage off-campus stakeholders to improve the relationship between the university and the communities

In addition, in a document published by Center of Sustainability & Economic Development (SEED) on "Campus as a Living Lab: Using the Built Environment to Revitalize College Education", eight important elements for successful adoption and implementation of campus as a living laboratory are identified:

- Engage the right campus participants
- Identify key collegiate programs
- Build credibility through engagement and data
- Integrate sustainability into the curriculum
- Expand beyond individual programs of study
- Build partnerships with industry
- Engage support beyond the campus

Based on the review above, we offer the following recommendations to fully exploit opportunities with campus sustainability programs at our campus:

1. **Use campus sustainability projects as testbed for research:** As reviewed above, some other universities (e.g., Harvard, Ohio State, Minnesota, Washington, etc.) specifically support and encourage research projects that address pressing sustainability challenges by using campus or the neighboring communities as a testbed. With more research-oriented campus sustainability projects, more opportunities will be provided for faculty and graduate students to actively participate in campus sustainability projects and, simultaneously, increase the impact of their research. However at UIUC, the various funding sources for sustainability including the Student Sustainability Committee have a limited role in supporting research-oriented projects. Furthermore, a number of iCAP projects (including those supported by SSC) that have potential to support research and education development are not well recognized and not utilized by researchers at campus.
2. **Seek additional funding for campus sustainability projects with research and education purposes:** In some of the universities mentioned above, one or more funding sources are specifically available to support students and faculty to conduct research projects with the focus of sustainability on campus and/or in the community (for example, the Campus Sustainability Innovation Fund at Harvard and the Green Seed Fund at Washington). These programs regularly call for proposals, provide mentoring and consultation resources to applicants, and encourage involving more academics in campus sustainability projects. For example, in some universities (e.g., Harvard), research funds from campus sustainability program are used to support research assistantships. Special emphasis should be placed on leveraging seed money for some projects to attract larger external funds to expand the collaborative partnerships and projects. For example, a

specific call for proposals from a national agency on large research (and extension) projects, may be a source for quick seed money (i.e., research assistant support for summer months) for some promising groups who intend to engage sustainability issues on campus or in the communities.

3. **Strengthen the engagement of students, faculty and staff:** Our campus has established several mechanisms to have students, faculty, and staff involved in campus sustainability activities, including a) the Student Sustainability Committee, which is responsible for selecting and funding projects using Student Sustainability Fund; and b) Sustainability Working Advisory Teams (SWAT), a unique form to assist the planning and realization of the objectives set with Illinois Climate Action Plan (iCAP). However, here are some other opportunities to strengthen the engagement of broader campus communities:
    - **a.** Increasing the visibility of campus sustainability efforts, for example, to organize town hall meeting to introduce the progresses and discuss pressing issues giving that many people at campus especially faculty members have not paid much attention on and do not know much about the iCAP efforts
    - **b.** Encouraging and supporting faculty to use campus sustainability projects and facilities for proposal development for external funding sources (Actually, there are already a number of such projects with internal or external funds or ongoing proposal efforts at our campus; we suggest to organize a special workshop or panel where the PIs of those projects are invited to share their experiences with other researchers. In addition, iSEE is developing a website where linkages between iCAP projects/facilities and a major national research program will be made. Through the linkages, when a RFP is announced from a program, researchers at our campus who are interested in preparing a proposal for the call can immediately find out which iCAP projects/facilities might be useful.)
    - **c.** Bringing more active involvement of faculty and graduate students in the studies required for realizing some iCAP objectives (Currently SWAT teams of faculty, staff, and students address iCAP objectives and make recommendations, which have helped in moving forward many of those objectives. However, the efforts of SWAT teams, which are mainly based on bi-weekly meetings, are limited on making effective recommendations to achieve some of those iCAP objective. To resolve this deficit,

some specific study problems have identified for thesis research of graduate students; Morgan Johnston has coordinated several cases. We suggest to have a more comprehensive assessment of the iCAP objectives — especially those led by iSEE — and identify a list of problems that require further study with considerable amount of time — beyond the effort of SWATeams. Some of those problems can be thesis topics for graduate student and faculty volunteers; some may need professional consultant and significant research support, and funding might be needed to address those problems.)

d. Supporting instructors to integrate campus sustainability — beyond general sustainability issues — in the curriculum for discussion examples, student term projects, etc. (Many of the campus sustainability projects, if introduced to faculty and public, can serve as education materials in curriculum and extension activities. For example, one student term project in CEE 598 "Sustainable Urban Systems" led by Arthur Schmidt in Spring 2015 studied green infrastructure on campus using Green Street as a case study.)

e. Inviting faculty and staff to be advisors for a student-led project — for instance, at least one faculty and one staff member are invited to sponsor a student-led project

f. Enhancing the coordination among all efforts on campus sustainability to form a strong force (At present there are several groups or organizations conducting parallel work, including several students' associations or committees, university administration, Facilities and Service (F&S), iSEE, and college- and department-level units. More active communication and coordination among these units can move our actions to approach the objectives — especially iCAP objectives — faster. iSEE is remediating some iCAP working procedures, including enhancing the interaction and feedback between different units and strengthening SWATeams).

4. **Strengthen the collaboration with communities**, both local (City of Urbana and City of Champaign) and regional (City of Bloomington, City of Chicago).

    a. The campus sustainability development can set a model for the sustainability development of those communities (e.g., currently the City of Bloomington is approaching iSEE to understand more on iCAP projects)

b. The communities can provide support for campus, e.g., hiring faculty, staff and students to working on some projects (for example, the Twin Cities Sustainability Committee of Minneapolis invites proposals twice a year from the University of Minnesota on campus and regional sustainable development. Cornell is working with neighborhood communities on ecosystem restoration.)

Acknowledgement: The preparation of this report has been benefited from numerous discussions with Ms. Morgan Johnston, Associate Director of Facilities and Services at UIUC. Meetings with iSEE management team and Associate Provost Mathew Tomaszewski and Provost Sustainability Fellow Scott Willenbrock also contribute to the recommendations listed in this report. Anthony Mancuso provided editorial help.

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Attachments

A1: List of Universities with Sustainability Ratings and Contact Information

Table A1. Sustainability ratings and contact information for some universities

University	Ratings			Contact Information
	STARS (score, rating)	Princeton Review (rank)	Sierra Magazine (rank)	
Boston University	53.74, Silver	**	134	Sustainability @ BU Director: Dennis Carlberg Email: sustainability@bu.edu Institute for Sustainable Energy Director: Peter Fox-Penner Email: pfoxp@bu.edu Clean Energy & Environmental Sustainability Initiative Director: Michael Caramanis Email: mcaraman@bu.edu
Brown University	Registered*	**	160	Energy & Environmental Office Assistant Vice President: Christopher Powell Sustainability Manager: Jessica Berry Email: brownisgreen@brown.edu
Colorado College	66.79, Gold	**	46	Office of Sustainability Director: Ian Johnson Email: Ian.Johnson@ColoradoCollege.edu
Colorado State University	85.29, Platinum	4	11	Green Initiatives School of Global Environmental Sustainability Director: Diana Wall Email: diana.wall@colostate.edu
Columbia University	67.06, Gold	42	90	Environmental Stewardship Assistant Vice President: Jessica M. Prata Email: jp2907@columbia.edu
Cornell University	70.05, Gold	15	32	Campus Sustainability Office Director: Sarah Zemanick Email: sc142@cornell.edu Please see here for other contacts Please see here for Sustainability portal

Table A1 (Continued). Sustainability ratings and contact information for some universities

University	Ratings			Contact Information
	STARS (score, rating)	Princeton Review (rank)	Sierra Magazine (rank)	
Duke University	Reporter*	**	66	Sustainability Director: Tavey McDaniel Capps Email: tavey.mcdaniel@duke.edu
Johns Hopkins University	Registered*	**	-	Office of Sustainability Associate Director: Matt Beecy See other staff here Email: sustainability@jhu.edu
Harvard University	Registered*	**	19	The Office for Sustainability Director: Heather Henriksen Email: sustainability@harvard.edu
North Carolina State University	65.87, Gold	**	87	Sustainability Office Chief Sustainability Officer: Jack Colby Email: jack_colby@ncsu.edu Director: Tracy Dixon Email: tracy_dixon@ncsu.edu
Northwestern University	Registered*	-	-	Office of Sustainability Director: Kathia Benitez Email: sustainability@northwestern.edu
Ohio State University	71.57, Gold	**	120	Office of Energy and Environment Director: Kate Bartter Email: arnold.680@osu.edu
Pennsylvania State University	66.74, Gold	**	70	The Sustainability Institute Director: Denice Wardrop Email: dhw110@psu.edu
Princeton University	58.08, Silver	**	102	Office of Sustainability Director: Shana S. Weber Email: shanaw@princeton.edu
Stanford University	81.02, Gold	11	5	Department of Sustainability And Energy Management Executive Director: Joseph Stagner Email: jstagner@stanford.edu

Table A1 (Continued). Sustainability ratings and contact information for some universities

University	Ratings			Contact Information
	STARS (score, rating)	Princeton Review (rank)	Sierra Magazine (rank)	
Texas A&M University	67.06 (Gold)	**	122	Office of Sustainability Director: Kelly Wellman Email: sustainability@tamu.edu
University of Arizona	Expired*	**	-	Office of Sustainability Director: Ben Champion Email: bchampion@email.arizona.edu
University of California Berkeley	Registered*	Rank: 29	29	Office of Sustainability & Energy Director: Lisa McNeilly Email: lmcneilly@berkeley.edu Principal Planner: Kira Stoll Email: stoll@berkeley.edu General Inquiries: sustainability@berkeley.edu
University of California Los Angeles	Expired*	**	62	Sustainability Chief Sustainability Officer: Nurit Katz Email: sustainability@ucla.edu
University of Illinois at Urbana-Champaign	68.06, Gold	Rank: 44	33	Institute for Sustainability, Energy, and Environment Director: Evan DeLucia Email: delucia@uiuc.edu
University of Kentucky	45.25, Silver	-	-	Office of Sustainability Coordinator: Shane Tedder Email: shane.tedder@uky.edu
University of Michigan Ann Arbor	70.07, Gold	**	81	Graham Sustainability Institute Director: Andrew Horning Email: ahorning@umich.edu Office of Campus Sustainability Director: Andrew Berki Email: aberki@umich.edu

Table A1 (Continued). Sustainability ratings and contact information for some universities

University	Ratings			Contact Information
	STARS (score, rating)	Princeton Review (rank)	Sierra Magazine (rank)	
University of Minnesota Twin Cities	66.39, Gold	**	74	Sustainability and U It All Adds Up Director: Shane Stennes Email: stennes@umn.edu
University of Nebraska, Lincoln	48.89, Silver	**	128	Office of Sustainability Director: Prabhakar Shrestha Email: pshrestha3@unl.edu
University of Nottingham	-	-	-	Sustainability Director: Andy Nolan Email: andrew.nolan@nottingham.ac.uk
University of Wisconsin Madison	Registered*	-	-	Office of Sustainability Director of Research and Education: Cathy Middlecamp Email: chmiddle@wisc.edu Director of Operations: Rob Lamppa Email: robert.lamppa@wisc.edu
University of Washington	77.43, Gold	Rank: 10	-	UW Sustainability Director: Claudia Frere-Anderson Email: frerecuw.edu
Vanderbilt University	Registered*	**	119	Sustainability and Environmental Management Office Director: Andrea George Email: andrea.george@vanderbilt.edu

Notes:

* 811 institutions have **"Registered"** to use the STARS Reporting Tool. STARS ratings are valid for up to three years; if an institution does not provide an update, then the rating is **"Expired"**. If an institution does not want to pursue a rating or make its scores public, it can submit as a STARS **"Reporter"**

** Out of 2,000 colleges reviewed by Princeton Review, 361 colleges were profiled and recognized with overall commitment to sustainability and they all appeared in "The Princeton Review's Guide to 361 Green Colleges". Out of the 361 colleges, Princeton Review ranked top 50 colleges.

- not participating (STARS, Sierra Magazine) or not evaluated/profiled (Princeton Review)