

# Campus buildings & student engagement in institutional sustainability efforts

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**ABSTRACT:** Colleges and universities are presently engaged in efforts to address the environmental impact of their operations, facilities, and activities. In an effort to provide a way for diverse institutions to compare their efforts in a consistent format, a number of publicly accessible self-reporting systems have emerged since 2006. This paper reviews self-reported sustainability data related to green building and student engagement activities submitted by a sample of 55 institutions that participate in three reporting systems: STARS, ACUPCC, and The College Sustainability Report Card. The objective is to determine the range of approaches across campuses, the usefulness of the data in revealing campus efforts, and unique approaches. Findings suggest that campuses vary widely in enrollments, size of building area, and energy usage, but employ many of the same green building standards and student engagement strategies. Nevertheless, the limitations inherent with the use of self-reported data are addressed.

**KEYWORDS:** campus, sustainability, green buildings, student engagement

## INTRODUCTION

Sustainability is nothing new for colleges and universities, many of which date back more than one hundred years. Some of the earliest environmental activities and efforts began on academic campuses in the 1960s and 1970s. However, over the past decade many institutions of higher education have begun to respond to and take responsibility for the dramatic environmental impacts of their campus operations, facilities and activities through comprehensive efforts focused on a wide range of sustainability issues, which include climate impacts, energy use, greenhouse gas emissions, building performance curricula, student engagement, travel, transportation, waste mitigation, purchasing, habitats, landscaping, environmental stewardship, and more. Many colleges and universities have found addressing sustainability at an institutional scale to be a complex and challenging task.

Nevertheless, since a significant portion of the greenhouse gas emissions that campuses are struggling to mitigate result from the burning of fossil fuels for heating, cooling, and powering campus facilities, it makes sense that many institutions have focused efforts on improving energy efficiency in buildings. The Leadership in Energy and Environmental Design (LEED) rating system has been used by many colleges and universities as a framework and a benchmark for achieving higher levels of building performance. In fact, many institutions have established policies that reference green building standards to guide the design and construction of campus facilities.<sup>1</sup>

But, energy conservation is not simply a matter of building design and system efficiency; occupant choices impact overall resource consumption considerably.<sup>2</sup> This is particularly true for colleges and universities, where student turnover at regular intervals is high. As a result, many campuses have initiated a series of programs for students aimed at raising awareness of environmental issues and changing behavior to conserve resources. Some common approaches include: competitions<sup>3</sup>, real-time feedback of energy usage<sup>4</sup>, orientations, student groups, and living and learning options.

There are vast differences in the myriad approaches that institutions take with respect to sustainability, with little of the consistency necessary for valuable comparison between peer institutions. In response, several organizations were established to enable institutions to report efforts using consistent frameworks and to track their progress over time. This development has dramatically increased the visibility of sustainability efforts beyond the campus boundaries and has assisted institutions in setting goals and targets and receiving ratings for these efforts. Through this wealth of publically accessible information, there are untapped opportunities to mine the self-reported data in detail with respect to how campuses are using facilities to engage students in activities aimed at resource conservation and environmental stewardship in green buildings.

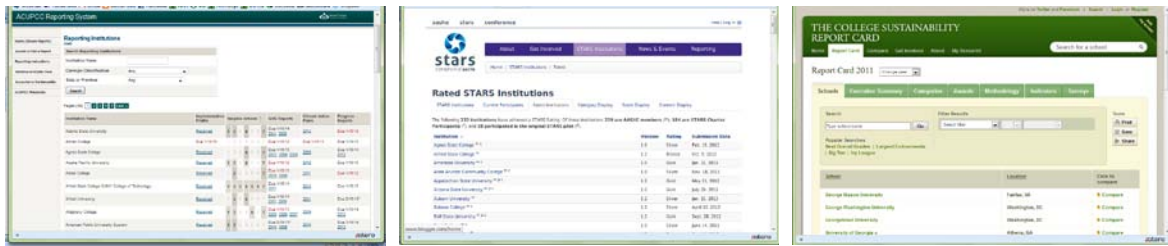
This study asks three critical questions. First, what are individual campuses reporting or saying about their student engagement and green building efforts? Second, how useful is the self-reported data available at

gauging the range of approaches to student engagement and green building activity across a large number of different institutions. Third, what approaches do campuses appear to share and what strategies appear unique among schools?

## 1.0 SUSTAINABILITY REPORTING

### 1.1. Transparency and information exchange

In just the past six or seven years, a number of organizations focused on sustainability in higher education have emerged and established transparent reporting systems that allow individual institutions to submit information related to campus sustainability efforts, share data and experiences with other schools and the public, and, in some cases, have their reported efforts evaluated. The most prominent and widely used systems are The College Sustainability Report Card, the STARS system, and the Presidents' Climate Commitment. All three systems employ publically accessible websites where data from self-reports, surveys, and other documents can be easily reviewed and tracked over time. See Figure 1.



The College Sustainability Report Card website  
Source: (ACUPCC)

STARS website  
Source: (STARS)

UCUPCC website  
Source: (The College Sustainability Report Card)

**Figure 1:** Sustainability data reporting websites

Among the many benefits of such reporting systems are the ability for institutions to reach beyond the boundaries of their own campuses to publicize sustainability efforts, learn from other school's successes, share best practices, and, perhaps, to see how they measure-up. Never before has there been a way to easily compare the sustainability activities of one school with those of another using information self-reported according consistent questions and categories. There is some redundancy in the data reported between the various systems, which can result in conflicting information reported by the same institution at different times. Nevertheless, each reporting system also has its own unique focus and user interface.

### 1.2. The College Sustainability Report Card

In 2007, the Sustainable Endowments Institute (SEI) pioneered the evaluation of campus and endowment sustainability efforts by introducing the The College Sustainability Report Card program. The program was intended to help identify colleges and universities in the United States and Canada that demonstrate leadership in sustainability as well as to provide information and experiences that schools could share with others working to improve their sustainability efforts on campus. Unlike other reporting and evaluation systems that seek increasing numbers of participants, SEI chose to focus on the 300 institutions with the largest endowments plus 22 others who requested to be included. Enrollments at these 322 institutions total more than 4.2 million students.

Institutions are asked to respond to one or more surveys related to sustainability in campus operations, endowments, dining services, and student activities. The primary data is self-reported from the institutions through the survey responses, but SEI obtains some information about the schools through publically accessible sources as well. A school's overall grade is calculated from grades received in nine subcategories, which encompass a total of 48 sustainability indicators. Subcategory grades correspond to a percentage of points earned: 0% for "F", 10% for "D", 30% for "C", 50% for "B", and 70% for "A".<sup>5</sup>

### 1.3. Sustainability, Tracking, Assessment & Rating System (STARS)

STARS is a framework and rating system that allows colleges and universities in the United States and Canada to measure and self-report their sustainability performance. The program is intended to support sustainability efforts across the higher education sector by providing a transparent repository of sustainability data that is easily accessible. The program was developed by the American Association for the Advancement of Sustainability in Higher Education (AASHE) with the participation of the higher education community. Initiated in 2007 with a series of pilot projects, STARS 1.0 was officially launched in 2009.

Currently, 367 schools participate and/or have been rated. Institutions submit their scores or points accumulated related to: education and research; operations and planning; administration, engagement, and innovation. Rating levels correspond to a minimum number of points reported: 25 for Bronze, 45 for Silver, 65 for Gold, or 85 for Platinum. In addition, schools may choose to participate as a “Reporter” without having their scores shared. Rankings are based solely upon data self-reported by the participating institutions and neither AASHE nor the STARS program independently verifies the validity of the self-reported data submitted.<sup>6</sup>

#### **1.4. American College & University Presidents’ Climate Commitment (ACUPCC)**

The President’s Climate Commitment was established in 2007 and is intended to be a “highly visible effort” to address global climate change through college and university commitments to emissions reductions and climate neutrality. To date, 665 presidents have signed the commitment, which requires institutions to set a target date for climate neutrality, complete an emissions inventory, take at least two immediate short-term “tangible actions,” integrate sustainability into curricula, and to develop a climate action plan.

The ACUPCC provides a framework to assist institutions in determining and documenting the status of an institution’s carbon emissions profile as well as charting a course toward dramatic emissions reductions in the future beginning with immediate action in one of seven categories: instituting a LEED Silver standard requirement for new construction; creating a purchasing policy for Energy Star rated products; establishing a carbon offset program for air travel emissions; encouraging the campus community to use public transit; purchasing or producing 15% of electricity through renewable sources; encouraging endowment investments to provide sustainable investment options; and adopting a waste minimization plan.<sup>7</sup>

## **2.0 SELECTION CRITERIA**

In the United States alone there are more than 4,300 colleges and universities.<sup>8</sup> Reviewing sustainability efforts at such a large number of unique institutions one-by-one would certainly be daunting and a laborious task for any researcher. Fortunately, voluntary third-party sustainability reporting systems help to facilitate the comparison of sustainability-related efforts across campuses for a much smaller subset of schools. As described above, the aim of this study was to examine three sets of publicly available self-reported data. However, the three reporting sites have different numbers of participants. For example, ACUPCC includes 665 reporting signatories, the College Sustainability Report Card includes the 322 institutions with the largest endowments, and the STARS system includes 232 institutions that have received a ranking. The data set for The College Sustainability Report Card alone consists of more than 10,000 pages of reported information. Therefore, the methodology followed for this data analysis was to narrow the review to institutions that participate in all three reporting systems, which resulted in a sample of 55 colleges and universities in the United States.

## **3.0 INSTITUTIONAL DEMOGRAPHICS**

The 55 schools reviewed include a diverse assortment of colleges and universities. 27 states and the District of Columbia are represented in the sample. Dividing the sample among United States Census regions, we find twelve schools in the Northeast, fourteen in the South, five in the Midwest, and fourteen in the West. The sample included 26 private and 39 public institutions. The average age of the institutions reviewed was 146 years with the oldest dating to mid 18<sup>th</sup> century and the youngest to the early 1960s. The campus enrolments ranged from just under 800 to nearly 67,000 full-time students. Building space ranged from just over one million to nearly 23 million gross square feet. Building energy consumption ranged from just over 68,000 MMBtus to more than 5,000,000 MMBtus of heating energy per year.

Two of the three reporting systems used provide evaluations of reported data. The STARS system assigns one of five ratings to efforts reported: Platinum, Gold, Silver, Bronze, and Reporter levels. Among the 55 schools reviewed, the average rating was a bit higher than Silver with 20 at the Gold level, 25 at the Silver level, seven at the Bronze level, and four at the Reporter level. Reporter institutions choose to be included in the data set, but are not required to report scores. No institutions yet rated have achieved a Platinum level. The College Sustainability Report Card system assigns grades “A” through “F” for efforts reported. Among the 55 schools reviewed, the average grade is between a “B” and a “B+” with 16 in the “A” range, 37 in the “B” range, and two in the “C” range. No school reviewed received an “F” grade.

## **4.0 STUDENT ENGAGEMENT AND INVOLVEMENT**

Competitions are a common student engagement strategy across the campuses reviewed. By far, the most popular competition is the annual Recyclemania Tournament, where schools compete with each other to minimize waste in a variety of categories. Of the institutions reviewed, data suggests that 67% participate in the annual Recyclemania Tournament competition in addition to their other waste mitigation activities. However, energy competitions, particularly those run in and between residence halls, are also common.

Most schools reviewed have student groups focused on sustainability issues, but there is little consistency among the campuses with some having many and others only a few. This review finds that 73% of institutions employ student sustainability representatives (eco-reps) to assist with student engagement and behaviour change efforts. Some colleges and universities have multiple types of eco-reps, although these positions are most common in residence halls. Themed housing or residence halls with a sustainability focus are equally popular. However, these housing types vary considerably among campuses. Some themed housing is simply a hallway in a larger building, while some are small, freestanding (often purpose-built) eco-houses. 87% of the campuses reviewed include sustainability in their freshmen orientations, by far the most common engagement strategy. Only about 31% of the institutions have a model dorm room for students to experience firsthand. Refer to Figure 2.

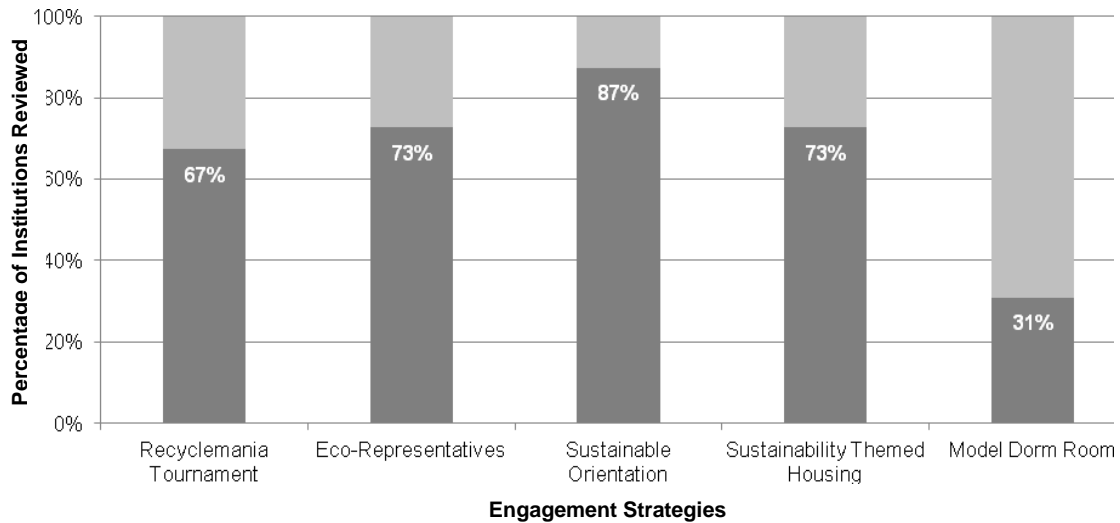


Figure 2: Most common student engagement strategies

### 5.0 GREEN BUILDING EFFORTS

The data revealed that 82% of campuses reviewed have, or are in the process of implementing, a green building policy that requires new buildings to meet minimum a LEED Silver standard equivalent and 77% have, or are in the process of implementing, a policy to purchase efficient Energy Star certified equipment and appliances where possible in campus facilities. See Figure 3.

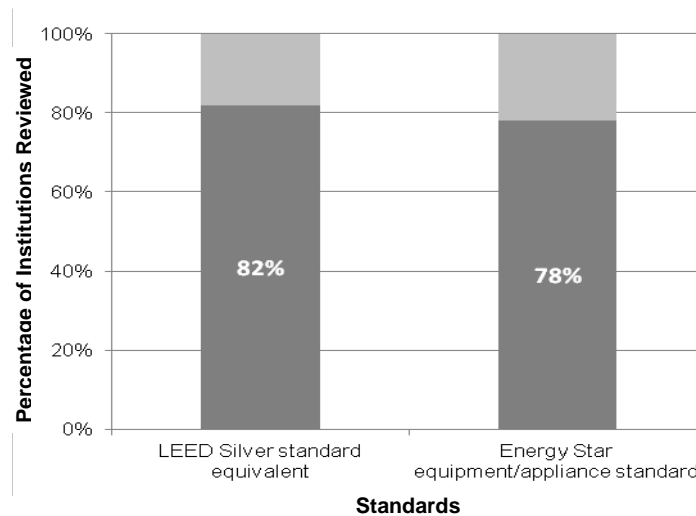
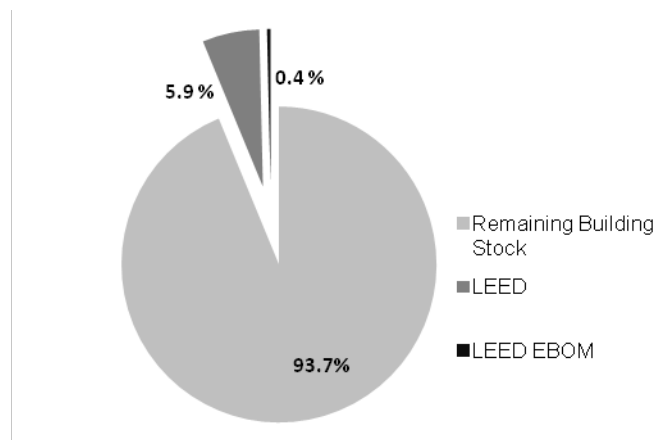


Figure 3: Green building and energy efficient equipment policies

Information reported on green buildings completed varied widely by institution. However, it appears that, all together, there are about 21.5 million gross square feet of building space designed to LEED standards, are in the certification process, or have received a certification, which represents about 6% of the overall gross square footage of building space at the institutions reviewed. Also, it is clear from the data that the amount

of building space on campuses is growing in almost all cases, but the overall increase appears marginal at about 5% above 2005 figures. Heating energy consumption has also increased, but only by about 3% with many campuses showing dramatic energy and emissions reductions since 2005. See Figure 4.



**Figure 4:** Percentage of overall building square footage designed to LEED standards, certified, or pursuing certification

## 6.0 THE USE OF BUILDINGS IN ENGAGEMENT EFFORTS

The data reviewed suggest that sustainability-themed housing and competitions, both those open to the larger campus community and those restricted to students, are among the most common ways that institutions are using campus buildings to engage people in institutional sustainability efforts.

The data also reveals several popular waste minimization efforts taking place in campus buildings including: trayless dining to reduce food waste and hot water consumption for cleaning; signage to explain recycling protocols; water bottle refilling stations to limit plastic water bottle usage; and optimizing the locations of recycling receptacles. However, the extent to which these activities are related to green building efforts remains unclear.

Some of the more interesting examples of strategies found in the data include kinetic energy capture on elliptical machines in a recreation center, E-cycler units to expand recycling options (batteries, ink cartridges, etc.), involving students in green building committees, solar carts to illustrate renewable energy strategies, and participation in Solar Decathlon projects. In addition, although only a handful of the institutions reviewed report using real-time energy feedback systems, anecdotal evidence suggests that they are more prevalent than the data suggests and certainly growing in popularity in recent years.

## 7.0 LIMITATIONS OF THE DATA

Although there is a staggering amount of information available through the three reporting systems used in this review, there are a number of limitations inherent in the presentation of the data that should be acknowledged.

The PCC data that is comparable across institutions is limited. Institutions submit climate action plans and progress reports in their own formats and content and length vary widely. The only information that is truly directly comparable is the "Implementation Profile" information that documents which "Tangible Actions" schools commit to take within two years of signing-on. However, the relationship between engagement and buildings is not easily discernible from the majority of the data presented. Categories are quite discrete and the information provided is brief. The STARS reporting system asks for information to be submitted in easily comparable categories, but the information submitted is lengthy and it can be difficult to navigate between the categories. Detailed information is included, but it is difficult to sort through when comparing institutions. The College Sustainability Report Card survey responses appear to strike a nice balance between easily comparable categories and descriptions of efforts. However, many schools left questions blank or incomplete. In addition, SEI has suspended the report card program to focus efforts on the Billion Dollar Challenge, which means that the data available dates from 2010 and will not be updated.

One significant limitation is that all the data reported is a snapshot in time and, thus, it is impossible to know what changes have resulted since the information was originally reported. This is particularly true of LEED and other building rating certifications, which may be in process. Finally, the greatest limitation is that the data is self-reported by the institutions themselves. Those reviewing the data have no easy way to independently verify that the data is accurate and the reporting systems do not perform this function. As with all self-reported information, the reader must trust that it reflects the truth.

## CONCLUSION

Since 2006, a number of organizations have established systems that allow higher education institutions to report sustainability information, to share this data with the public and other institutions, and, in some cases, to receive evaluations of their efforts. This paper examines three such reporting systems (STARS, The College Sustainability Report Card, and the Presidents' Climate Commitment) to see what the data available reveal about the range of approaches different campuses are taking with regard to student engagement and green buildings. Findings suggest that the data available is extensive among the three systems. However, the data are reported in ways that tend to compartmentalize the sustainability issues being addressed and fail to highlight the relationships between discrete activities. In particular, the data reveal that there is a great deal of green building activity and student engagement activity happening across many campuses, but the degree to which these two areas interact remains unclear. Future research is necessary to assess the degree to which green buildings being constructed at colleges and universities support student engagement and behavior change efforts.

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## ENDNOTES

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