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# Evaluating Sustainability Initiatives on University Campuses: A Case Study from the University of Michigan's Sustainability Cultural Indicators Program

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## Abstract

The Sustainability Cultural Indicators Program (SCIP) is a multi-year program intended to inform University officials and others responsible for day-to-day operations including assessments of new sustainability initiatives. Following a brief review of ways in which SCIP data have been used by operations personnel at the University, a detailed discussion of one sustainability initiative and the use of SCIP data to assess its effectiveness is presented. The sustainability initiative deals with an expansion of composting in University residence halls beyond their dining facilities. A trial outreach program is introduced in one of the University's 17 undergraduate residence halls is described together with a plan for evaluating its outcomes using SCIP data. The results of the evaluation will help determine if and in what ways a composting program should be extended other residence halls. Outcomes from such sustainability trials can be helpful to university officials in determining the extent to which new sustainability initiatives are successful, whether or how they should be modified, and whether they should be implemented throughout other parts of the university, or discontinued.

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## Keywords

Campus sustainability · Evaluation research · Composting · Sustainability indicators

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## 1 Introduction

Universities throughout the world are actively trying to become more sustainable, in part to reduce their operating costs but also to instill in their students, staff and faculty an understanding of the meaning of sustainability, its importance in a local and global context, and the need for individuals to adapt a more pro-environmental way of life. As part of this effort, universities are initiating programs aimed at conserving energy and reducing their carbon emissions, reducing the amount of material and food wastes, educating faculty and staff as well as students, and both implicitly and explicitly, changing the culture of sustainability on their campuses.

But few universities are undertaking systematic approaches to evaluating the effectiveness of these various initiatives other than tracking operating costs or compiling other hard data such as measures of waste tonnage, energy use, bus ridership and so forth.

Many universities around the world have formal sustainability policies and goals that address aspects of sustainability. Within the framework of a 2011 presidential initiative, the University of Michigan (U-M) established a set goals and broad themes around climate action, waste prevention, healthy environments, and community awareness. As part of the community awareness theme, the University states that it will “*pursue stakeholder engagement, education and evaluation strategies toward a campus-wide ethic or culture of sustainability and will invest in multiple actions to educate our community, track behavior, and report progress over time*”.<sup>1</sup>

The articulation of the fourth theme of community awareness and its goal of moving toward a campus-wide culture of sustainability reflect U-M’s belief that institutions of higher education can play a critical role in bringing about a societal shift toward a more sustainable future. A culture of sustainability has been defined as “a culture in which individuals are aware of major environmental (and social/economic) challenges, are behaving in sustainable ways, and are committed to a sustainable lifestyle for both the present and future” (Marans et al. 2010, 2014).

Mechanisms for bringing about a cultural shift within universities and colleges are varied and complex (see Leal 2015). Under the heading of “Planet Blue,” efforts at U-M involve programs to expand recycling and reduce energy use in buildings, encourage alternative modes of travel to/from campus, promote the use of foods from sustainable sources, and introducing the concept of sustainability in coursework throughout the University. Many are voluntary programs such as Planet Blue Ambassadors and Planet Blue Student Leaders and are coordinated through the University’s Office of Sustainability and the Graham Sustainability Institute (see Marans et al. 2012).

Whereas these initiatives are seen as essential to creating a more sustainable campus culture, the Cultural Indicators Sustainability Program (SCIP) represents a critical and complementary component of the Community Awareness theme. That

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<sup>1</sup>See Callewaert and Marans (2017) for information about the University of Michigan and a detailed discussion of a campus-wide integrative assessment process leading to the establishment of the 2011 goals.

is, SCIP is the mechanism for measuring and tracking progress in moving toward a sustainable campus culture at the University of Michigan. It is a multi-year program involving annual web surveys of large samples of students, staff, and faculty. The sample design during the first year (2012) targeted 4400 students (1000 from each undergraduate class and 400 graduate students), 1000 faculty and 1000 staff. In subsequent years, the design called for 2400 students, 750 faculty, and 750 staff.<sup>2</sup> During the first year, over 4000 students responded with a 40.6 % response rate. Student response rates in subsequent years averaged about 22 %. Targeted numbers of faculty and staff were reached or exceeded with response rates averaging around 40 % for faculty and 45 % for staff. The surveys ask questions about awareness, commitment, engagement and actions or behaviors dealing with the University's goals of Climate Action, Waste Prevention and Healthy Environments. Responses to individual questions are combined to create a range of 15 diverse indicators that deal with awareness, behaviors, degrees of commitment, and levels of sustainability engagement.<sup>3</sup>

SCIP was designed to inform U-M administrators responsible for the day-to day operations of the University including its academic programs. At the same time, it was intended to serve as a model demonstrating how behavioral research could be used to address critical environmental issues while assessing and reporting progress toward creating a culture of sustainability in universities generally and within other organizational settings such as cities and corporations.

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## 2 Recent Uses of SCIP

Since its inception in 2012, SCIP has informed University operations in numerous ways. For instance, special reports have been prepared for facility managers in buildings located in selected parts of campus showing behavioral patterns and levels of awareness among building occupants (e.g. Medical Center, North Campus). SCIP data have also informed the University's Plant Operations Energy Management Team outreach activities which were not having much impact on staff and faculty in terms of understanding their buildings' energy use and awareness of University's efforts to improve the energy efficiency in those buildings. Furthermore, the SCIP data have been reported in newsletters and email blasts to the Planet Blue Ambassadors and Planet Blue Student Leaders suggesting where progress has been made and where greater efforts were needed. Selected operational units have also seen that the level of understanding of certain aspects of sustainability has not

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<sup>2</sup>In order to ensure that the responses each year represent the correct proportions of undergraduate and graduate students and faculty-staff ratios, sample weights were developed and used in the analysis of the data.

<sup>3</sup>Callewaert and Marans (2017) present a more comprehensive overview of the Sustainability Cultural Indicators Program (SCIP).

changed among students, faculty, and staff since the surveys were initiated. Finally, the SCIP data have been made available to faculty at U-M and elsewhere for classroom use.

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### 3 Using SCIP to Test New Initiatives

Because of the longitudinal nature of SCIP, it has become increasingly evident that data from the program could be used in other ways including the evaluation of impacts of new sustainability initiatives throughout the University. That is, SCIP data collected before and after an intervention could reveal if and by how much change has occurred in selected behaviors or levels of awareness of the University's sustainability efforts such as those dealing with energy conservation, waste reduction, or environmental protection.<sup>4</sup>

For more than a decade, U-M has initiated numerous sustainability programs designed to conserve energy, reduce waste, and change behaviors of students, faculty, and staff. In some cases, the programs have proved successful and continue to flourish. In other instances, they have been discontinued.<sup>5</sup>

A recent energy conservation initiative by the University's Plant Operations was intended to inform building occupants about building energy use and conservation measures in one cluster of buildings prior to the collection of the 2015 survey. Unfortunately, the initiative lacked cooperation of all facility managers and was aborted. The initiative included placing lobby boards at the buildings' entrances comparing each buildings energy use with that of all campus buildings, floor posters, presentations at staff meetings of units occupying those buildings, and a "neighborhood" lunchtime open house where all employees from the clustered buildings would be invited to view displays, answer questions, and partake in a free meal. At the present time, a team of students is working with Plant Operations to re-design their informational program, plan an experimental intervention including its components, and determine how future SCIP data can be used to evaluate it.

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<sup>4</sup>For an experimental design, a control group of people and or places is required whereby no intervention would take place. Comparing outcomes between the control and experimental groups would determine if the intervention targeting the experimental group is having an impact. For a discussion of control groups and the planning of experiments, see Campbell and Stanley (1963).

<sup>5</sup>One initiative that proved ineffective and was eliminated was an energy-saving signage campaign throughout the University. The signs were designed to encourage students, faculty and staff to save energy by having them "Use Your Power Wisely". A pilot study in five University buildings revealed that few occupants recognized the signs when presented to them in a questionnaire and for those who did recognize the signs, a limited number had read them (Marans and Edelstein 2010). Had the signs been first tested in the pilot buildings rather than printing and posting them through the University's 450 buildings, there could have been a savings of several thousand dollars.

Similarly, a graduate level course is being planned whereby students, working with operations personnel throughout the University, would develop ideas for other sustainability initiatives that might be tested with SCIP future years.

In 2015, several new initiatives were recommended as part of a series of sustainability reports to the University's new President.<sup>6</sup> While some of the recommended initiatives are relatively inexpensive and easy to implement, others require substantial planning, start-up time, and financial resources to implement them. For cases where initiatives would be relatively easy and inexpensive to implement, annual SCIP data could be used to demonstrate to decision makers whether the initiative accomplished what it was intended to do. If it had not done so, the initiative could be discontinued with relatively little cost to the University. However, in the case where recommended new initiatives require substantial resources in terms of time and money, it would seem prudent to set up trials or experiments in one part of campus or in one or two buildings, evaluate their impacts, and based on the evaluation, determine whether the trial should be extended to other parts of the campus, modified, or discontinued. SCIP data could be instrumental in making that assessment. One such initiative deals with composting.

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## 4 Composting in Residence Halls

In recent years, food composting has become an increasingly important vehicle for waste reduction at U-M. For undergraduate students, it has been actively promoted in the newly remodeled dining facilities within the residence halls. SCIP questions about composting were first asked in the 2014 surveys.<sup>7</sup> At that time, only a third of the undergraduate student body was aware of the University's efforts to promote composting. Few staff and even fewer faculty members knew about what the University was doing re: composting.<sup>8</sup> In the 2015 SCIP report, the percent of undergraduate students who know about composting increased to 39 % with more than half of the freshmen saying they were "very aware" or "somewhat aware" of the University's efforts to promote composting. Most of these freshmen were living in the residence halls.

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<sup>6</sup>Three committee reports were prepared for U-M's new president in 2015. The University of Michigan (2015a) reports covered landfill waste reduction, greenhouse gas reduction, and sustainability culture. The latter with its recommendations can be found at: <http://sustainability.umich.edu/media/files/Sustainability-Culture-Committee-Report-2015.pdf>.

<sup>7</sup>Composting was not viewed as an important component of the University's waste reduction program by the advisory team guiding the design of the initial SCIP questionnaires. Subsequent discussions with University personnel dealing with waste and food services resulted in the addition of four questions on composting.

<sup>8</sup>See Appendix Table C15 of the third year SCIP report covering 2014 findings (Marans and Callewaert 2015).

According to the report to the President covering waste reduction, “composting, the managed decomposition of organic material into a nutrient-rich soil amendment, is an integral component to reaching the University of Michigan’s waste reduction goal”.<sup>9</sup> Currently, only a small amount of the University’s compostable waste is diverted from landfills. Much of that waste is food scraps coming from dining facilities in residence halls. In efforts to expand composting beyond the dining halls into other parts of the students’ living-learning environment, it was decided to launch a pilot or trial program in one of the University’s residence halls. The pilot project was conceived by the University’s vice president for Student Life (SL) in collaboration with the Graham Sustainability Institute and would take place in Bursley Hall, one of the largest co-ed residence halls. Bursley Hall was built in 1967 and houses approximately 1270 students, most of whom are first-year students.

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## 5 The Composting Experiment

The pilot program was planned and is being implemented by a team of Planet Blue Student Leaders under the guidance of key staff from SL and the Graham Institute. The program, launched at the beginning of the winter semester (January, 2016) involves enlisting participants who were Bursley residents during the 2015–16 academic year. The participants regularly collect their individual food scraps or other compostable material and deposit them in a composting container located in a waste closet nearest their room.<sup>10</sup> The residence hall custodians would collect the compost material daily and take it to building’s Waste Center (along with recyclables and other trash) where it is weighed weekly prior to its being picked up by a private industrial composting company. In order to encourage participation, a competition was established between volunteers living in the east wing of Bursley and those living in the west wing. At the end of the first month of the experiment, nearly 100 students had volunteered to participate (more from Bursley East) and approximately 150 lb of composting material was collected.

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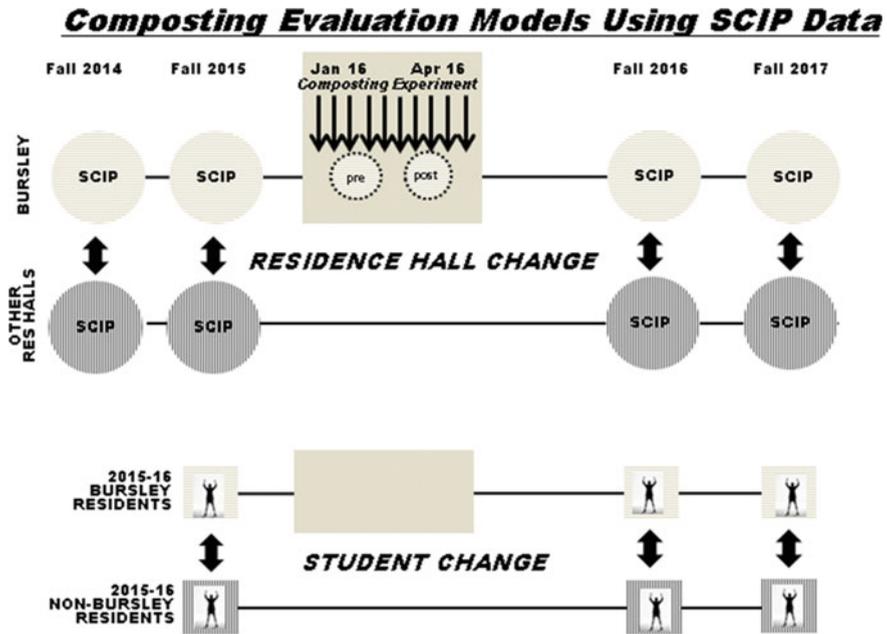
## 6 The Evaluation Plan

As shown in Fig. 1, there are two models for evaluating the impact of the Bursley composting experiment. The first model labeled **Residence Hall Change** considers the impact of the experiment on residence halls whereas the second model examines

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<sup>9</sup>The University of Michigan (2015a) report covering waste reduction can be found at: <http://sustainability.umich.edu/media/files/Landfill-Waste-Reduction-Committee-Report-2015.pdf>.

<sup>10</sup>Student volunteers were given small buckets with removable disposable liners to collect their composting material and guidelines as to what was compostable and what was not. In addition to food scraps, paper products such as napkins, paper toweling, plates, and cups are also compostable.



**Fig. 1** Composting evaluation models using SCIP data

the impact of the experiment on individual students over time (**Individual Student Change**).

In the Residence Hall Change model, the plan shows that prior to the experiment, SCIP data covering survey participants in Bursley Hall are compared to survey participants in other University residence halls. Specific data to be compared cover students’ general understanding of composting, their composting behavior, and their aware of U-M’s efforts to promote composting. It is hypothesized that for there would be no significant differences between students in Bursley and those living in all other undergraduate residence halls in both the 2014 and 2015 surveys.

During the 3-month intervention period (January–April), short surveys are administered to all Bursley residents at two points in time. The first (pre) survey, administered a few weeks after the pilot composting program was launched, would determine whether or not students had volunteered to compost and for those who had, the difficulties they were having in doing so. Students who had not participated in the composting experiment were asked why they had not done so. Both participants and non-participants were asked the SCIP questions covering-their overall understanding of composting, their composting behavior, and their awareness of U-M’s composting efforts. A similar short (post) survey would be administered to Bursley students prior to their leaving the residence hall at the end of the semester in late April.

The Residence Hall Change model shows that SCIP data collected in the fall 2016 and fall 2017 would compare Bursley Hall residents with residents living in other undergraduate residence halls. The expectation is that as a result of the experiment, Bursley residents would be most likely to (a) know more about composting, (b) engage in composting, and (c) be more aware of what U-M was doing to promote composting on campus.<sup>11</sup>

In the Individual Student Change model shown in the lower half of Fig. 1, the emphasis is in tracking 2015–16 Bursley residents over the next two years. Some of these students are expected to be participants in the composting experiment while many others will not have participated. There is also the possibility that some will remain in Bursley as sophomores in the 2016–17 year.

In the 2016 and 2017 SCIP surveys, students would be asked where they had previously lived while at U-M. It is hypothesized that because of the experiment, those who lived in Bursley during the 2015–16 academic year would be more aware of composting at U-M and more likely to engage in composting than students who had not been exposed to the Bursley composting program and experience.<sup>12</sup>

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## 7 Current Status

Since the Bursley experiment is currently in progress, we have no way of knowing its impact until survey data are collected at the end of the academic year and in future years. However, we are able to look at earlier SCIP data covering composting at Bursley and at the other U-M residence halls. Figure 2 shows that in 2014, our expectation was correct in that there were no significant differences between Bursley residents and students in other residence halls in their understanding of composting, their awareness of U-M's efforts to promote composting, and the frequency of their composting food scraps.

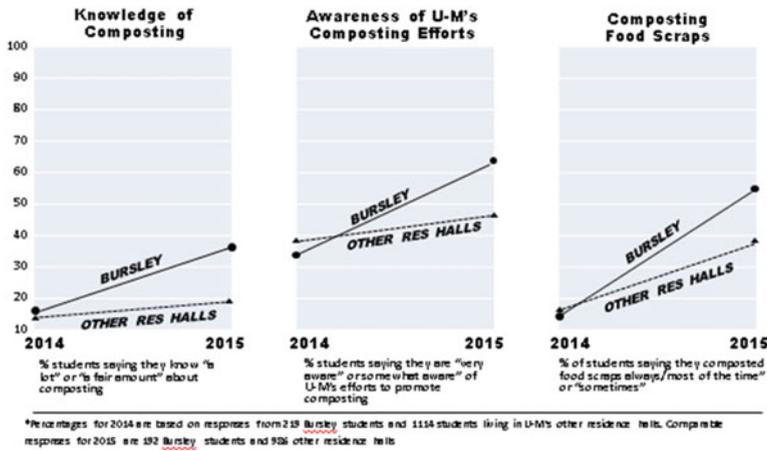
However, the SCIP data collected in 2015 indicate that students in Bursley were much more knowledgeable about composting, were significantly more aware of the University's effort to promote it, and were more likely to compost food scraps than students in the other residence halls. It is not clear whether these changes are attributable to discussions of the experiment early in the school year when the SCIP

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<sup>11</sup>Although it is difficult to know how many of the current Bursley Hall students will return to live there during the next academic year (2016–17), none will be living there during the 2017–2018 academic year since Bursley is designated as primarily a freshmen residence hall with some students choosing to remain there during their sophomore year. Nonetheless, it is expected that the effects of the well-publicized Bursley composting program will carry over in time showing a greater understanding of composting, more composting, and more awareness of composting at U-M than what would be found in other U-M residence halls.

<sup>12</sup>The 2015 SCIP data indicate that, most University freshmen (96 %) live in a residence hall and 17 % of them reside in Bursley Hall. Assuming future SCIP surveys target the same number of sophomores and juniors as in the past, (350 each), there will be approximately 60 future respondents who were Bursley Hall residents at the time of the experiment.

## ***2014-2015 Residence Hall Changes in Composting Knowledge, Awareness, and Behavior\****



**Fig. 2** 2014–2015 residence hall changes in composting knowledge, awareness, and behavior

survey was administered, the zeal of the Bursley housing, custodial, and dining staff, or a prevalence of a new cohort of sustainability-minded Bursley students. However, it does suggest that first, Bursley students were much more aware of and engaged in composting than students in other residence halls and second, there was generally a greater understanding of and engagement in composting among all residence hall students between 2014 and 2015. Therefore, the initial hypothesis should be modified to suggest that as a result of the experiment, there will be a greater positive change in understanding, awareness, and composting behavior in Bursley in future years than improvements in other U-M residence halls.

## **8 Future Scenarios**

At this time, it is unclear what direction U-M’s Student Life (SL) officials will take with composting in resident halls beyond the current academic year. One scenario is that no decisions will be made regarding an expansion of the composting program. In this instance, the Bursley composting intervention may or may not continue during the next academic year. If it were to continue, short surveys similar those administered in February and April 2016 could be administered, the results of which would be used in determining the next steps.

Another scenario is that based on findings from the short surveys conducted at the beginning and end of the current experiment, the composting program could be modified and introduced in other residence halls. Responses to the SCIP questions asked in the short surveys would be compared to earlier SCIP surveys which

presumably would show a greater understanding of composting and a higher level of engagement in composting practices.

A third scenario is to expand the experiment beyond Bursley into one or two additional residence halls during the 2016–17 academic year. The experimental composting program would be modified based on findings from the 2016 short surveys. The longer term evaluation would be based SCIP data collected in 2017. The evaluation would then compare data from Bursley and the added experimental residence halls with the non-experimental (control) residence halls where composting is limited to their dining facilities.

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## 9 Summary

The composting experiment at Bursley represents the first sustainability initiative on the U-M campus that can be evaluated systematically using SCIP data. The benefits of doing so can result in not only incremental learning but in significant financial savings to the University. Should the experimental composting program prove successful in terms of a greater understanding of composting, more students engaged in composting, and a significant amount of composting material being collected and diverted from landfills, an expanded composting program could move forward throughout more University residence halls. If, however, the Bursley experiment proves unsuccessful, the University's Office of Sustainability and Student Life need to re-think the role of composting as part of the University's waste prevention efforts, how it might be modified, and whether it should be continued throughout University Housing and elsewhere.

As previously mentioned, SCIP has large representative samples of faculty, staff and students each year enabling the clustering of respondents in buildings and groupings of buildings. Such clustering presents opportunities to conduct experiments or trial programs similar to the composting experiment described in this chapter.

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## References

- Callewaert, J., & Marans, R. W. (2017). Measuring progress over time: The sustainability cultural indicators program at the University of Michigan. In W. Leal Filho (Ed.), *Handbook of theory and practice of sustainable development in higher education* (Vol. 2). Berlin: Springer.
- Campbell, D., & Stanley, J. (1963). *Experimental and quasi-experimental designs for research*. Boston: Houghton Mifflin Co.

- Leal, W. L. (Ed.). (2015). *Transformative approaches to sustainable development at universities*. Switzerland: Spring International Publishing.
- Marans, R. W., & Callewaert, J. (2015). Monitoring the culture of sustainability at the University of Michigan; Fall 2015 <http://graham.umich.edu/media/files/SCIP-Year-3-Report.pdf>
- Marans, R. W., Callewaert, J., & Shriberg, M. (2012). Creating and assessing a campus culture of sustainability: The University of Michigan experience. In W. Leal (Ed.), *Sustainable development at universities: New horizons*. Frankfurt: Peter Lang Scientific Publishers.
- Marans, R. W., & Edelstein, J. (2010). Human dimensions of energy conservation and sustainability: A case study of the University of Michigan's energy conservation program. *International Journal of Sustainability in Higher Education*, 11(1), 6–18.
- Marans, R.W., B. Levy, B. Bridges, K. Keeler, T. Avrahami, J. Bennett, & et al. (2010). Campus sustainability integrated assessment: Culture team phase I report. Retrieved from:<http://www.graham.umich.edu/pdf/culture-phase1.pdf>
- University of Michigan. (2015a). Report for President Schlissel from the Committee on the Culture of Sustainability at the University of Michigan. <http://sustainability.umich.edu/media/files/Sustainability-Culture-Committee-Report-2015.pdf>
- University of Michigan. (2015b). President's Committee on Landfill Waste Reduction. Recommendations Report. <http://sustainability.umich.edu/media/files/Landfill-Waste-Reduction-Committee-Report-2015.pdf>

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