Edited by Woodrow W. Clark

Sustainable Cities and Communities Design Handbook

Green Engineering, Architecture, and Technology

Second Edition

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This reference provides a holistic approach for creating and maintaining sustainable communities on both an individual community and metropolitan level.

Written by an international team of engineers, architects, and environmental experts *Sustainable Cities and Communities Handbook, 2nd Edition* brings together all the major players responsible for sustainable development on both an individual community and metropolitan level. Designed to provide a holistic approach for creating and maintaining sustainable communities, this book provides examples to illustrate actual practices for designing, planning, and ultimately managing sustainable cities and communities. This guide to the sustainable cities and communities begins with a cross-disciplinary foundation for sustainability set against the backdrop of the current Green Industrial Revolution.

Each new case study in this book illustrates new methods and technologies from different sector of society, encompassing both public and private institutions. Case Studies include: Sustainable Towns aiming at 100% Renewable Energy; Life Cycle Analysis Versus Cost Benefit of Renewable Energy: Solar Systems Photovoltaics in Public and Private Partnerships; Political–Economic Governance of Renewable Energy Systems; Renewable: Scaling Deployment in the United States and in Developing Economies; Life Cycle Analysis of demand-side programs and projects in California; Urban Circular Economy for European Cities Sustainable Development; Legal and Financial Mechanisms for Sustainable Buildings; Urban Sustainability and Industrial Migration. In addition, critical issues involving legal contracts, economics and accounting are also discussed.

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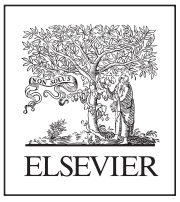

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Chapter 29

"Scrappy" Sustainability at Ohio Wesleyan University

Emily Howald, John Krygier
Ohio Wesleyan University, Delaware, OH, United States

Chapter Outline

A GRASSROOTS MODEL FOR SUSTAINABILITY IN HIGHER EDUCATION

There are colleges and universities with the expertise and financial resources to invest in large-scale, conspicuous sustainability efforts (such as large solar arrays, stylish LEED-certified buildings, and full-time sustainability staff) and there are those who do not. However, those without the funds for conspicuous sustainability are not necessarily excluded from substantive sustainability efforts. Indeed, we suggest that grassroots, "scrappy" sustainability efforts on college campuses and at other institutions may have certain benefits over top-down, high-investment sustainability.

THE CONTEXT OF SUSTAINABILITY AT OHIO WESLEYAN UNIVERSITY

Ohio Wesleyan University (OWU) is a small, private, liberal arts college in central Ohio that serves as a modest showcase for a relatively low-cost, grassroots, and distributed approach to sustainability (Fig. 29.1). The university neither has a sustainability coordinator position nor any other employee with distinct expertise in sustainability. None of the faculty have specializations in the field, and there are no classes taught on the subject. As of yet, there

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FIGURE 29.1 Ohio Wesleyan Campus, Delaware Ohio. *Photo Credit: OWU, Office of Communications.*

is no official sustainability plan and there are neither funds nor donations set aside specifically for sustainability projects. OWU has, over the last decade, expanded its endowment, raised significant funds for student travel and research, and embarked on a substantial upgrade to campus student housing. These are all fundamentally important and easily justifiable priorities. Given this situation, it is easy for students, faculty, and staff to feel like not enough is being done to foster sustainability on campus. Instead of complaining about the lack of top-down, large-investment sustainability, a group of students, faculty, and staff have embarked on a grassroots effort to make sustainability work at OWU despite limited resources. Ultimately, we argue, sustainability efforts can succeed if those who believe in the value of sustainability actually do something, then persist in furthering the efforts until something takes hold, and then persist in keeping the efforts going. Successes with these smaller, "scrappy" efforts will, hopefully, lead to larger efforts, backed by a spreading culture of sustainability.

OWU has a rocky history with sustainability efforts. Many higher education institutions believe that they must be leaders in finding solutions to the environmental crisis by developing and promoting the knowledge, tools, and technologies needed to transition to a sustainable society. As the environmental movement emerged and developed in the 1960s and the 1970s, OWU established an Environmental Studies major, the first such program in an academic institution in Ohio. In its nearly 40-year existence, the program has produced hundreds of majors that have gone on to successful careers related to the environment. In 2009, a Sustainability Task Force was created to evaluate the President's Climate Commitment (PCC), which 80% of students voted to support. Despite the lack of any direct negative consequences for not meeting the PCC goals, the Task Force was concerned about the capital investments

and employee time needed to implement and monitor the necessary energy efficiency upgrades to campus facilities, and recommended that a sustainability coordinator be hired (rather than signing the PCC). In 2011, an American Recovery and Reinvestment Act grant funded a 2-year sustainability coordinator position. The university hired Sean Kinghorn for the position, and his efforts generated significant rebate funds for the university, as well as energy-saving efforts and dozens of sustainability projects (many led by students). In 2013, Kinghorn's position ended, after the failure of several grants intended to acquire additional funds for the position. A student protest later that year demonstrated student commitment to the sustainability coordinator position. With the decision not to sign the PCC and the lack of funds to continue the sustainability coordinator position, one might expect the prospects for sustainability on campus to fade. At that point, the campus Sustainability Task Force set out on an effort to encourage grassroots sustainability efforts and create a campus sustainability plan, despite the setbacks.

The Sustainability Task Force is not an official campus committee; it is voluntary and open to all students, staff, and faculty. It coordinates and promotes sustainability on campus through the efforts of students, faculty, and staff working on projects in courses, as student-independent studies, through student organizations (such as the Tree House campus residence and the Environment & Wildlife Club), and as campus services (such as Buildings & Grounds and food service). Sustainability at OWU is one large, distributed, and voluntary collaboration. There are no experts and no one really in charge, but participation in sustainability efforts continues to grow, as do successful sustainability projects on campus.

Of course, this grassroots approach has its difficulties. There is a tendency for projects initiated by an individual student or a small group of students to work in the short term, until those students graduate and the project atrophies and eventually fails. OWU has many of these sustainability failures in its past. OWU students first developed a campus garden to grow food in the 1960s. Over the years there have been at least a half dozen such gardens. They are developed (often with student funding), exist for a few seasons, and then devolve into a large weedy eyesore. Our latest campus garden is currently in that weedy, decrepit stage, abandoned along with the special raised garden frames and portable greenhouse purchased with student funds. Another student received thousands of dollars to develop a campus bike share program in 2009. In 2011, the student graduated, and soon after all the bikes were abandoned, broken, or stolen; now the program is completely defunct. Funds from the regional waste authority were acquired in 2011 for campus composting. The effort required student volunteers to sort through campus dining services food waste to remove trash or contaminated materials. Students were initially excited to participate, but excitement faded fast: saving the Earth through sorting mounds of rotting food quickly lost its allure.

Given these experiences, grassroots campus sustainability may seem like a doomed cycle of "develop then fail." Such abjectly uncoordinated sustainability is just not sustainable. Yet the problem of no sustainability coordinator, no one on campus with expertise in sustainability, and very limited funds remained.

COORDINATING SUSTAINABILITY WITHOUT A SUSTAINABILITY COORDINATOR

Despite these setbacks there have been successful efforts, not the least of which is the university's newly proposed sustainability plan. Indeed, the cycles of failure of sustainability efforts on campus were a primary motivation for efforts by the campus Sustainability Task Force to develop a sustainability plan: significant effort and moderate funds were being put into perpetually failing projects. The plan was built on the foundation of efforts of the former sustainability coordinator; however, the development of the plan grew from the voluntary work of a grassroots group of students, faculty, and staff. The sustainability plan was created by students in Geography 499: Sustainability Practicum as overseen by the STF and the course instructor, Dr. John Krygier (the chair of the Environmental Studies program since 2010). Neither Krygier nor any of the students in the course had any clue about how to construct a sustainability plan when the course started. While initially rather disconcerting and even stressful, the students came to embrace their role: no one else was going to create a sustainability plan, so it was up to them.

Much thought was put into the reasons for the lack of successful sustainability efforts on campus. One key lesson learned from the failure to sign the PCC was that external, generic sustainability goals were simply not appropriate for our particular campus. Those creating the plan worked to make sure that all goals were appropriate for the institution, internally initiated rather than externally imposed. The students gathered information about hundreds of sustainability efforts on campus and began to shape what became a 40-page document. It became clear that this huge document was not really a plan, so the Sustainability Practicum was offered again and the effort focused on creating a much more succinct plan with short-, medium-, and long-term goals (see Proposed Sustainability Plan, above). Importantly, the goals were developed in consultation with students, faculty, staff, and administration. Student Emily Howald, as part of a course project and independent study, met with several academic committees, dozens of faculty, Buildings & Grounds, campus food service, student groups, and others for feedback on the plan. Concerns were considered and changes made. The plan was fine-tuned to the institution. Also important was the inclusion of a subset of campus sustainability projects that we could focus upon, semester after semester, in an attempt to stop the cyclic development and failure of sustainability projects on campus. This lent a level of coordination with a series of sustainability

projects: course projects, student group projects, and efforts by the campus food service and Buildings & Grounds are focused on making this subset of projects work. As the Sustainability Task Force awaits official adoption of the Sustainability Plan (Fig. 29.2), positive outcomes are emerging from the slightly coordinated yet distributed and grassroots approach to sustainability at OWU.

"SCRAPPY SUSTAINABILITY" OUTCOMES

In 2012, OWU Environmental Studies student Sarah D'Alexander organized (as part of a class project) the first "May Move Out" at OWU. The goal was simple: to collect, rather than discard, usable materials left behind by students as they moved off campus at the end of the spring semester. The effort was successful in collecting tons of clothing, furniture, appliances, bikes, etc

Ohio Wesleyan University *March 29 2017*

Sustainability Plan

As a liberal arts higher education institution, Ohio Wesleyan University must strive to promote sustainability through educational, technical, and social means. The Ohio Wesleyan Sustainability Plan is intended to invigorate and expand a culture of sustainability on campus with an eye on the future of humans and the earth's environment.

1 Commit to a Sustainable Future on Campus and in the Community
- Strengthen Environmental Studies Program
- Fund sustainability coordinator with support & facilities by 2020
- 5% yearly growth in student sustainability involvement

2 Reduce Our Impact on Global Climate Change
- Commit to energy-efficient building investments
- Utilize 5% solar or renewable energy on campus by 2020
- Install solar panels on campus for learning purposes
- Annual student run energy reduction challenge initiated in 2017

3 Increase Our Health and Well-being
- Commit to a farm and food collaboration with Stratford Ecological Center and the Methodist Theological School's Seminary Hill Farm by 2017
- Purchase 15% of campus food from local and regional sources by 2020
- Develop a long-term plan for composting by 2018
- Maintain and grow student-run Food Recovery Network and related programs

4 Live Better on Campus and on Earth
- Develop Sustainable Living model residence option by 2019
- OWU activity courses on sustainable practices by 2017
- Maintain and expand May Move Out
- New campus bird, animal, insect and plant habitat enhancement each year
- Expand reusable container program for campus food by 20% each year

FIGURE 29.2 The Ohio Wesleyan University Proposed Sustainability Plan, page 1 (of 4). Pages 2 and 3 detail the four areas of focus outlined on page 1.

FIGURE 29.3 May Move Out storage container for student donations to Goodwill. *Photo Credit: John Krygier.*

(Fig. 29.3). The logistics were complicated: students had to move usable materials to several rooms on campus, and staff drove trucks full of materials to local social service providers. A significant amount of collected materials were also stored on campus, in an unused building, with a desire to open a free store the following fall. Ultimately, this model failed. It involved too much labor and organization. In addition, the planned free store never opened, and much of the stored material had to be discarded when a need arose for the building that housed the materials.

Instead of letting the May Move Out effort end, we encouraged students along with staff in Buildings & Grounds and Residential Life to rethink the May Move Out. A student, again part of a course project, came up with a simpler process: renting storage pods, which were located near dumpsters during the May Move Out period and used for donated items. The pods would then be emptied by our local Goodwill. This approach required minimal labor, but did incur costs for the pod rental, which was funded by a small grant from our local solid waste authority. The May Move Out in collaboration with Goodwill was a success in its first year: diverting over 10 tons of materials.

Alas, without the grant there were concerns about the cost of the storage pod rental. Buildings & Grounds foreman Jay Scheffel came up with a plan to reduce the number and size of trash dumpsters (thus reducing costs), given that tons of materials were being diverted. With Scheffel's plan in place, the reduced dumpster costs covered the cost of the pods. We are now able to divert over 10 tons of materials each May as donations to Goodwill without incurring additional costs. In addition, only a handful of volunteers are required. The moral of the story here is that persistence, experimentation, and collaboration between students, staff, and faculty over a number of years resulted in implementation of a low-cost successful sustainability effort on campus.

In the fall of 2014, another Environmental Studies student, Allie France, noticed the large amount of waste thrown away in our campus dining halls, especially the throw-away takeout containers, used by many students on campus, which could be seen filling many of the campus garbage receptacles after lunch and dinner. Why doesn't OWU use reusable carryout containers? This is the kind of question one often hears from environmentally-conscious students. The course instructor suggested Allie do something about the situation as a course project. Allie embarked on what she thought would be an easy task: convince our campus food service to offer reusable containers. However, such sustainability efforts are never easy.

Initially Allie was encouraged by the response from campus food service: they would love to offer students reusable carryout containers. Alas, soon afterward it became evident that our old campus industrial dishwasher could not handle the increased demand for washing reusable containers. Indeed, the shift to throw-away containers and utensils was in part the result of the inadequate dishwasher. All of a sudden Allie was faced with learning much more about industrial dishwashers than she ever imagined. What she suspected was that our old dishwasher was very inefficient, and a new dishwasher would quickly recoup costs due to energy savings alone while allowing the OWU food service to offer reusable food containers. At this point the semester was over, as was Allie's course project. In the spring, Allie continued to work on the project. She worked with Buildings & Grounds to develop a return on investment (ROI) analysis for a new dishwasher. She then had to go to the campus Finance Officer. There were many infrastructure projects on campus ahead of the dishwasher, and, indeed, it was not even on the radar. However, the short ROI (around 2 years) and the fact that Allie had drawn attention to the issue moved the effort forward, a new dishwasher was purchased and installed in the spring of 2015 and reusable food containers were offered in the fall of 2015.

The reusable food container initiative faced some significant hurdles, again illustrating how complicated initiating sustainability projects can be (Fig. 29.4). Unfortunately, despite each container having a bar code, our campus information system (used by food service, the library, for student records, and IDs, etc.) was old enough that there was no easy way to modify the code to allow students to "check out" reusable containers. Replacing the campuswide information system was also not feasible. Thus students paid $5 when they took a reusable container and were given $5 when they personally handed the containers back at certain food service locations on campus. A student project in the fall of 2016 surveyed students about the reusable containers. The additional effort involved in returning the containers proved too much for many students. In addition, some students indicated that carrying around the reusable container suggested the image of an "eco freak." These students were all for the reusable containers, but they did not seem themselves as part of the "ecological clique" on campus and felt uncomfortable using the

FIGURE 29.4 Forlorn reusable food container, discarded near a trash can on campus. *Photo Credit: John Krygier.*

containers because of the image they projected. Addressing these issues took some effort, and several more students, Izzy Sommerdorf and Sarah Hanes, took on the project in the spring of 2017, have increased the number of drop-off locations, and come up with a simple suggestion to encourage the use of reusable containers: provide *larger* reusable containers and *smaller* throw-away containers. The idea is to make up for the added hassle of returning the container by allowing students to pile more food into the reusable containers. While this tweak to the process has led to increased use of the reusable containers, it also may lead to more food waste: sustainability efforts are always complicated. Once again, the moral of the story is persistence, experimentation, and collaboration between students, staff, and faculty over a number of years to put in place a low-cost successful sustainability effort on campus.

These are not the only success stories from years of grassroots efforts. In addition to the creation of an institutional sustainability plan, many other accomplishments in sustainability have taken hold. New and renovated buildings on campus are now routinely upgraded for energy efficiency such as the new geothermal-regulated pool in Meek Aquatic Center (these building improvements are, indeed, one instance of a significant investment in sustainability by the university). The university has hosted several successful years of the Sagan National Colloquium with environmental topics such as Food, Waste, Water, and Climate Change, bringing experts from around the

world to Delaware, Ohio, to share their insights. Campus dining halls now feature vegan options, many more local food options, and a general movement toward serving less meat. The recycling program has been successful for many years and has transitioned from a grassroots effort (begun in the 1980s) by students emptying recycling bins to having this task incorporated into housekeeping duties. Each year the students host Green Week, a collection of events and activities related to Earth Day and the environment. All campus printers are set to print double-sided pages as part of Information Services Print Green Initiative. Each of these efforts experienced similar troubles as those mentioned earlier, yet persistence and creativity led to success.

The university is expanding the number of filtered water hydration stations on campus, as an alternative to bottled water, rather than "banning the bottle." Student research determined that athletes were among the largest purchasers of bottled water, as there were no hydration stations in most of the campus athletic facilities. Hydration stations are being installed in six locations, almost all in athletic facilities, this fall, and a student was awarded $800 to buy OWU water bottles to promote the new hydration station to athletes.

There is also work on two related sustainable food issues. The first effort is to revive the campus garden and develop a means for sustaining it over time. To these ends, Environmental Studies student and Sustainability Development intern, Emily Howald, has developed a plan to offer campus "activity courses" (partial credit courses offered by the physical education program on campus, typically activities like yoga, running, and conditioning) that involve gardening. These courses will be offered in the second half of the spring semester (planting/harvesting early crops) and first half of the fall semester (planting/harvesting late crops) to take into account Ohio's growing season. In addition, students Maddie Coalmer and Larynn Cutshaw undertook a project to document a dozen out-of-the-way locations on campus to plant perennial crops (asparagus, mint, raspberries), which require minimal maintenance.

Second, due to increasing student interest in local foods, student Ellen Sizer undertook a project to get more local foods on campus. She developed a proposal for a "Hyper Local Salad Bar," which will be supplied by the nearby Seminary Hill organic farm, part of the Methodist Theological School of Ohio, managed by Tad Peterson and Noel Deehr. Tad and Noel have the capacity to provide many salad bar ingredients year round by using a greenhouse as well as a local food network (of organic farms) that they have developed.

Finally, OWU is expanding its sustainability and environmental vision beyond campus. During the fall of 2015 (and again during fall, 2017) we have offered a travel learning course focused on assessing environmental change, with a strong sustainability component, led by OWU Geography faculty member Nathan Amador Rowley. Students and faculty in the course work with Geoporter, a nongovernmental organization located in Bahia Ballena, Uvita, Costa Rica. Amy Work, a 2004 OWU Geography major, manages Geoporter. As residents of a coastal area in transition from a fishing economy to one based

FIGURE 29.5 OWU Faculty member Nathan Amador (left) and Amy Wok (OWU 2004, right) and various assistants hone in on a drone during an OWU Travel Learning trip to Costa Rica. *Photo Credit: John Krygier.*

on ecotourism, community members in Bahia Ballena, Uvita, are interested in understanding their natural environment and the potential impacts of global environmental change. Amy has been working with her community members to collect and map environmental information (including garbage, water quality, and whales) for several years, providing a solid basis in practice. OWU students learn the practice of data collection and mapping, but also, importantly, develop an understanding of the theories and concepts required to analyze and understand collected data (Fig. 29.5). Theories and concepts are put into practice in Costa Rica, the collaboration designed so that students and community members in Bahia Ballena, Uvita, will come to understand both the theory and practice of environmental change at a range of scales.

A NEW MODEL FOR SUSTAINABILITY?

The aforementioned examples illustrate the idea of grassroots, distributed (but not too grassroots and too distributed) kind of sustainability: students, staff, and faculty figure out how to make sustainability happen on campus with no full time staff and limited, devoted funds. Sustainability is not going to happen otherwise, at least in the short term. Upon reflection, there are some benefits to this approach to sustainability.

Most, if not all of these projects have required substantive collaboration between students, staff, and faculty. Creative and viable solutions arise from the cooperation of a diverse set of minds, all of whom can contribute some specific kind of expertise to the effort. In a way, this approach lends itself to more integration of sustainability across campus, and more active engagement, without depending on (or deferring to) one individual (a sustainability coordinator) for guidance and leadership. The engagement of an increasing number

of students provides many excellent theory-into-practice experiences, a significant part of a student's education at OWU. Success after facing many challenges, but moving forward anyway, may be more meaningful given the persistence it requires. This persistence and creative engagement reveals dedication and commitment to environmental causes. Finally, this approach has put in place a strong foundation of sustainability upon which a sustainability coordinator, if one is hired in the future, can build.

The OWU Sustainability Task Force did not set out to develop a model for low-resource, high-engagement sustainability, but we have developed one, by experimentation, collaboration, and persistence. We are still learning and plotting new ways to get sustainability to work on campus, but we are making progress. We hope this model may help other colleges, businesses, and organizations in similar situations make sustainability move forward, as it inevitably must, despite the numerous obstacles to doing what is necessary and right.